



Wealden Recycling, Recovery and Renewable Energy Facility: Environmental Statement Volume 1:Text

March 2018 On behalf for Britaniacrest Recycling Ltd

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Acronyms

AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
ACC	Air-cooled Condenser
ACM	Asbestos Containing Material
ADMS	Atmospheric Dispersion Modelling System
AONB	Area of Outstanding Natural Beauty
AQEG	Air Quality Expert Group
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ARUN	Automatic Rural and Urban Network
AWTS	Aggregate Treatment and Recycling Facility
BAP	Biodiversity Action Plan

BAT	Best Available Techniques
BGS	British Geological Survey
BoCC	Birds of Conservation Concern
CEMP	Construction Environmental Management Plan
CERC	Cambridge Environmental Research Consultants
CFMP	Catchment Flood Management Plan
CHP	Combined Heat and Power
CLO	Contaminated Land Officer
COMEAP	Committee on the Medical Effects of Air Pollutants
Crvi	Hexavalent Chromium
CTMP	Construction Traffic Management Plan
CWG	Common Working Group
DCMS	Department of Culture, Media and Sport
Defra	Department for Environment, Food, and Rural Affairs
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DTM	Digital Terrain Model
DTS	Desk Top Study
EA	Environment Agency
EAL	Environmental Assessment Level
EcIA	Ecological Impact Assessment
EHO	Environment Health Officer
EIA	Environmental Impact Assessment
EMF	Electro-Magnetic Field
EPA	Environmental Protection Act
EPAQS	Expert Panel on Air Quality Standards Guidelines
EPR	Environmental Permitting Regulations
EPUK	Environmental Protection UK
EQS	Environmental Quality Standard
ES	Environmental Statement
ESA	Environmental Statement Addendum

EU	European Union
FZ1	Flood Zone 1
GLVIA3	Guidelines for Landscape and Visual Impact Assessment 3rd Edition
GPA	Good Practice Advice
GW	Groundwater
HDC	Horsham District Council
HDPF	Horsham District Planning Framework
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HHRA	Human Health Risk Assessment
HLC	Historic Landscape Character
IAQM	Institute of Air Quality Management
IBA	Incinerator Bottom Ash
ICNIRP	International Committee on Non-Ionising Radiation Protection
IDB	Internal Drainage Board
IED	Industrial Emissions Directive
IEMA	Institute of Environmental Management and Assessment
IPPC	Integrated Pollution Prevention and Control
LA	Local Authority
LCLG	Langhurstwood Community Liaison Group
LDV	Light Duty Vehicle
LGV	Light Goods Vehicle
LHA	Local Highways Authority
Lidar	Light Detection and Ranging
LLCA	Local Landscape Character Area
LLFA	Lead Local Flood Authority
LNP	Local Nature Partnership
LNR	Local Nature Reserve
MBGL	Metres Below Ground Level
MBT	Mechanical Biological Treatment

MSW	Municipal Solid Waste
N/A	Not Applicable
NAEI	National Atmospheric Emissions Inventory
NCA	National Character Area
NERC	Natural Environment and Rural Communities
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
ODT	Odour Detection Thresholds
OS	Ordnance Survey
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PLQRA	Preliminary Land Quality Risk Assessment
PM	Particulate Matter
PPE	Personal Protection Equipment
PPG	Planning Practice Guidance
PRoW	Public Right of Way
PVC	Polyvinyl Chloride
RDF	Refuse Derived Fuel
RMSE	Root Mean Square Error
RPaG	Registered Park and Garden
SAC	Special Areas of Conservation
SFRA	Strategic Flood Risk Assessment
SGV	Soils Guidance Value
SM	Scheduled Monument
SMC	Scheduled Monument Consent
SNC	Sites of Nature Conservation Importance
SPA	Special Protection Areas
SPL	Sound Pressure Level
SPZ	Source Protection Zone
SSOW	Safe Systems of Works

SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWL	Sound Power Level
TEQ	Toxic Equivalent
TMP	Transport/Taffic Management Plan
TOMP	Toxic Organic Micro Pollutant
TP	Trial Pit
TPH	Total Petroleum Hydrocarbon
VOC	Volatile Organic Compound
V/V	Volume by Volume
WFD	Waste Framework Directive
WHO	World Health Organisation
WPA	Waste Planning Authority
WPC	Warnham Parish Council
WSCC	West Sussex County Council
WSWLP	West Sussex Waste Local Plan
WTS	Waste Transfer Station
ZTV	Zone of theoretical visibility
3D	Three Dimensional
3Rs	Recycling, Recovery and Renewable Energy

Glossary

Ambient sound level: BS 4142 defines the ambient noise level as: 'Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.' It is sometimes used to mean an environmental noise level defined specifically in terms of the LAeq noise index. The terms ambient and background may be colloquially synonymous when describing environmental noise levels.

Background sound level (L_{A90}): BS 4142 defines the background noise level as: 'The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 % of a given time interval, T, measured using time weighting, F, and quoted to the nearest whole number of decibels' (i.e. a noise level defined specifically in terms of the L_{A90} noise index). The terms ambient and background may be colloquially synonymous when describing environmental noise levels.

Broadband: a noise containing a wide range of frequencies (for example, a whooshing noise like a waterfall or out of tune analogue radio).

Conservation Area: A Conservation Area is an area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance.

Decibel (dB): units of sound measurement and noise exposure measurement.

Deposited Dust: Dust that has settled out onto a surface after having been suspended in air

Dust: Solid particles suspended in air or settled out onto a surface after having been suspended in air

Effect: The consequences of an impact, experienced by a receptor

Emission: 1. the act of emitting or sending forth; 2. (Physics / General Physics) energy, in the form of heat, light, radio waves, etc., emitted from a source; 3. a substance, fluid, etc., that is emitted; discharge. (Collins English Dictionary)

Equivalent continuous sound pressure level (L_{AeqT}): is defined in BS 7445 as the 'value of the Aweighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'. In more straightforward terms, it is a measure of the noise dose or exposure over a period. It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. It is also the unit best suited to assessing community response. Façade/Free-field: This applies to the positions for either measurement or prediction. A façade position is one that effectively represents noise levels at a building but is conventionally taken at a position 1 m from the building; this includes reflections from the building. A free-field position is one that is at least 3.5 m from a building where reflection effects are not significant. The difference between a noise level measured at a façade position and a free-field position, assuming that there is a specific noise source that causes reflections, is that levels are around 3 dB higher at the façade, due to the reflection effects.

Frequency (Hz): the pitch of the sound, measured in Hertz. The tonal quality of a sound is described and measured in terms of the frequency content and is commonly expressed as octave or third octave bands, the latter being the division of the octave bands into three for finer analysis, across the frequency spectrum. The smaller the octave band or third octave band centre frequency number defined in terms of Hz, the lower the sound. For example, 63 Hz is lower than 500 Hz and is perceived as a deeper sound. The attenuation due to air absorption and natural barriers increases with frequency i.e. low frequencies are always the most difficult to control.

Heritage Asset: A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).

Highway Link: Length of highway

Historic Environment: All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.

Historic Environment Record (HER): Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.

Immission: The act of immitting, or of sending or thrusting in; injection; - the correlative of emission. (Webster's Revised Unabridged Dictionary).

Impact: The change in atmospheric pollutant concentration and/or dust deposition. A scheme can **have an 'impact' on atmospheric pollutant concentration** but no effect, for instance if there are no receptors to experience the impact.

Impulsive noise: any type of single or repeated noise of short duration, e.g. the noise from an explosion or the noise of a power press.

Listed Building: A building that has been placed on the statutory List of Buildings of Special Architecture or Historic Interest.

Pedestrian Amenity: The convenience or comfort of movement of foot

Rating level, $L_{Ar,Tr:}$: BS 4142 defines the rating level as 'The specific noise level plus any adjustment for the characteristic features of the noise.'

Receptor: A person, their land or property and ecologically sensitive sites that may be affected

Registered Battlefield: A battlefield of historic value, registered on the English Heritage 'Register of Historic Battlefields'.

Registered Parks and Gardens: Designated parks and gardens which are recorded on the English Heritage 'Register of Historic Parks and Gardens of special historic interest in England'.

Setting of a heritage asset: The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

Severance: Real or perceived difficulties moving between one part of a community to another

Scheduled Monument (SM): Archaeological site that is recorded on a schedule of monuments by the Secretary of State under the Ancient Monuments and Archaeological Areas Act 1979. These monuments are recognised as being of national importance and are legally protected and conserved.

Sound Pressure Level (SPL): Sound pressure is the dynamic variation of the static pressure of air and is measured in force per unit area. Sound pressure is normally represented on a logarithmic amplitude scale, which gives a better relationship to the human perception of hearing. The sound pressure level is expressed in decibels (dB) and is equal to 20 times the logarithm to the base 10 of the ratio of the sound pressure at the measurement location to a reference sound pressure. The reference sound pressure in air is normally taken to be 20 µPa, which roughly corresponds to the threshold of human hearing.

Sound Power Level (SWL, Lw): A sound power level is a measure of the total power radiated as noise by a source in all directions. It is a property of the source and is essentially independent of the measuring environment. The sound power level of a source is expressed in decibels (dB) and is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to a reference sound power. The reference sound power in air is normally taken to be 10-12 watt.

SoundPLAN: A computer software package that uses a ray-tracing numerical modelling approach to predict acoustic propagation from industrial and/or transport noise sources. The prediction methodologies follow national and international standards.

Specific sound level L_s : BS 4142 defines the specific noise levels as 'The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.'

TEMPRO: Software designed to predict traffic growth based on the National Transport Model NTM

Trackout: The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicle using the network.

Tonal: Noise sources sometimes contain pure tone components that can be identified as hums, whistles etc. The presence of these tonal components is sometimes considered to add an extra, annoying quality to the noise.

World Heritage Site: Sites, places, monuments or buildings of 'Outstanding Universal Value', recognized as such under the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage.

1 Introduction

1.1 Introduction

- 1.1.1 This document is the Environmental Statement (ES), which has been prepared to accompany the planning application for the proposed Recycling, Recovery and Renewable Energy (3Rs) Facility at Langhurstwood Road, Horsham, West Sussex.
- 1.1.2 This ES has been produced by RPS, on behalf of Britaniacrest Recycling Ltd., and sets out the findings of the Environmental Impact Assessment (EIA) process.
- 1.1.3 The proposed development is located at Site Hb, The Wealdon Brickworks Site, Langhurstwood Road, Horsham, West Sussex, RH12 4QD. It is located at the former Wealden Brickworks site, situated within the wider Warnham and Wealden Brickworks site in the Parish of North Horsham, in Horsham District. The site lies approximately 11 miles south west of Gatwick and 10 miles west of Crawley in the county of West Sussex. The town of Horsham is situated approximately 900 metres to the south east of the site, whilst the village of Warnham lies approximately 1.3 kilometres (km) to the south west.
- 1.1.4 For identification purposes, the site is centred at OS Grid Reference 517122, 134331 and its general location is shown on Figure 1.1. Figure 1.2 shows the site boundary.
- 1.1.5 The proposed development would comprise a facility to sort, separate and process up to 230,000 tonnes per annum of residual commercial and industrial waste and/or residual municipal solid waste ("MSW").
- 1.1.6 The processing of waste would generate an estimated 21 megawatts (MW) of electricity per annum. Of this, approximately 18 MW would be available for export to the national grid, with the remainder used by the facility itself. The proposed development would also be capable of supplying heat to suitable external users, subject to a heating network becoming available.

1.2 Statutory Framework and Purpose of the Environmental Statement

Purpose of EIA

1.2.1 EIA is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a project. The findings of the EIA process are reported in an ES in order to inform the relevant planning authority and interested parties as part of the decision-making process.

The EIA Directive

1.2.2 The legislative framework for EIA is set by European Directive 2011/92/EU, as amended by Directive 2014/52/EU (collectively referred to as the EIA Directive). Directive 2014/52/EU entered into force on 15 May 2014.

The EIA Regulations

1.2.3 The requirements of the EIA Directive have been transposed into UK legislation through the Town and Country Planning (Environmental Impact Assessment) Regulations 2017. These regulations are referred to in this ES as 'the EIA Regulations'.

1.3 Need for EIA

- 1.3.1 Schedule 1 of the EIA Regulations identifies development types that always require EIA. Schedule 2 identifies development types that require EIA if they are likely to lead to significant effects on the environment by virtue of factors such as their nature, size or location.
- 1.3.2 The proposed 3Rs Facility would fall under Category 10 of Schedule 1 of the EIA Regulations. This identifies "Waste disposal installations for the incineration or chemical treatment (as defined in Annex I to Directive 2008/98/EC under heading D9) of non-hazardous waste with a capacity exceeding 100 tonnes per day" (i.e. more than 36,500 tonnes/year). The proposed development would exceed this threshold and is therefore considered to be EIA development.

1.4 Content of the ES

- 1.4.1 This ES has been prepared in accordance with the EIA Regulations. Although there is no statutory provision as to the form of an ES, it must contain the information specified in Regulation 18 and Schedule 4 of the EIA Regulations. For the avoidance of doubt, the specified information within Regulation 18 and Schedule 4 is provided in Appendix 1.1 of this ES.
- 1.4.2 This ES provides all information required under Regulation 18 and Schedule 4. The information supplied within this ES is considered to provide a clear understanding of the main and likely significant effects of the project upon the environment.

1.5 Structure of the ES

- 1.5.1 The ES has been structured in order to allow relevant environmental information to be easily accessible. This volume of the ES (Volume 1) includes the main text of the ES. A description of the site and the proposed development is provided in Chapter 2. An outline of the main alternatives considered during the evolution of the project and the reasons for the choices made is found within Chapter 3. Chapter 4 outlines the approach and methodology adopted for the EIA. The remainder of Volume 1 contains topic by topic environmental information as shown in Table 1.1.
- 1.5.2 Figures and appendices to accompany the text of the ES are provided separately in Volumes 2 and 3. Volume 3 includes specialist reports providing relevant background and technical information. A Non-Technical Summary (NTS) of the ES is available as a separate summary document.

Structure of ES	
Non-Technical Summary	Summary of the ES using non-technical terminology
Volume 1: Text	
	Glossary
Chapter 1	Introduction
Chapter 2	Site Description and Description of Development
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Landscape and Visual Resources
Chapter 6	Traffic and Transport

Table 1.1: Contents of this ES

Structure of ES		
Chapter 7	Air Quality and Odour	
Chapter 8	Noise and Vibration	
Chapter 9	Archaeology and Cultural Heritage	
Chapter 10	Hydrology and Flood Risk	
Chapter 11	Hydrogeology and Ground Conditions	
Chapter 12	Ecology and Nature Conservation	
Chapter 13	Population and Health	
Chapter 14	Summary of Mitigation and Monitoring	
Volume 2: Figures		
Including all figures and drawings to accompany the text.		
Volume 3: Appendices		
Including specialist reports forming technical appendices to the main text.		

1.6 The Applicant

- 1.6.1 Britaniacrest Recycling Ltd is a family business with over 40 years of experience in waste recovery, recycling and haulage providing professional skip hire and waste management services to local residents and businesses. The company currently operates a Waste Transfer Station (WTS) at the site. The facility has planning permission to handle up to 230,000 tonnes per annum of industrial and commercial waste.
- 1.7 The Assessment Team
- 1.7.1 The EIA has been managed by RPS, taking into account information provided by the Applicant and design team. RPS is a registrant of the Institute of Environmental Management and Assessment (IEMA) Quality Mark. All authors of this ES are senior members of RPS, with sufficient expertise to ensure the completeness and quality of the ES.
- 1.8 Further Information
- 1.8.1 This ES has been submitted as part of an application for the proposed 3Rs development. The application has been submitted to West Sussex Council. The application, ES and Non-Technical Summary can be viewed at:

County Hall West Street Chichester PO19 1EQ.

1.8.2 Copies of the ES and planning application documents can be viewed on the local planning authority website: https://www.westsussex.gov.uk/planning/find-a-planning-application/ 1.8.3 Further copies of the ES can be obtained from the following address:

RPS 20 Western Avenue Milton Park, Abingdon Oxfordshire OX14 4SH

- 1.8.4 A digital copy of the full ES can be obtained on CD for a cost of £10. Printed copies are available (price on request).
- 1.8.5 All comments on the ES (and planning application) should be issued to West Sussex Council (planning department) at the address stated in paragraph 1.8.1.

1.9 References

Legislation

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the Assessment of the Effects of Certain Public and Private Projects in the Environment (codification).

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects in the Environment.

Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (2017 SI No. 571)

Publications

Biffa (2017) The Reality Gap (2017) (<u>https://www.biffa.co.uk/wp-content/uploads/2015/11/048944_BIFFA_Reality-Gap_2017Single-150817-2.pdf</u>).

Defra (2017) Digest of Waste and Resource Statistics – 2017 Edition. March 2017.

Suez Environment (2017) Mind the Gap (www. <u>http://www.sita.co.uk/wp-content/uploads/2017/09/MindTheGap20172030-1709-web.pdf</u>).

2 Site Description and Proposed Development

2.1 Introduction

- 2.1.1 This chapter provides a description of the project and forms the basis for the environmental assessment provided in this Environmental Statement (ES). Further information can be found in the appendices to this chapter provided in Volume 3 of the ES.
- 2.1.2 The effects of the project have been assessed throughout the ES based on what is likely to occur. For example, construction information is presented as the 'likely case'. A number of measures which would reduce or avoid adverse environmental effects arising have been included as part of the project design. Details of these measures are provided in this chapter and set out in each subsequent topic chapter. This chapter, together with the topic chapters, provide the data required to identify and assess the main and likely significant effects of the project in accordance with Regulation 18 and Schedule 4 of the EIA Regulations.
- 2.1.3 This chapter provides a description of the site and the key components of the project, including an overview of the approach to construction.

2.2 The Site and Surrounding Area

Location

- 2.2.1 The site is located at the former Wealden Brickworks site off Langhurstwood Road, approximately 900 metres to the north west of Horsham and 1.3 km to the north east of the centre of Warnham. The site lies within the administrative areas of West Sussex County Council and Horsham District Council.
- 2.2.2 The site location is shown on Figure 1.1, with the site boundary shown on Figure 1.2.

Site Description

- 2.2.3 The site, as defined by the site boundary, comprises approximately 3.8 hectares (ha) of land within the former Warnham and Wealden Brickworks site, a 24.4 ha site. The planning application boundary includes the proposed access route up to the adopted highway. The site includes a large warehouse building currently in use as a Waste Transfer Station/Materials Recycling Facility, surrounded by hardstanding and several smaller buildings.
- 2.2.4 The site, based upon its former use as a brickworks, is classified as a brownfield site in the West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2014) and is one of five sites allocated for strategic waste management uses.

Topography

2.2.5 The site is relatively flat and falls from 51.30 metres Above Ordnance Datum (AOD) within the north east corner to 47.50 metres AOD within the south west corner. The surrounding topography is gently rolling, which, together with existing woodland and trees means that the site is well screened from the surrounding areas.

Surrounding Land Uses

- 2.2.6 The southern boundary of the site is defined by the internal access road, beyond which lies the Weinerberger brickworks factory (also known as Warnham Brickworks). The London-Horsham railway line lies immediately to the west of the site, beyond which there are mature tree belts and open countryside.
- 2.2.7 The eastern boundary of the site is defined by an internal access road, beyond which lies the Brookhurst Wood Mechanical and Biological Treatment (MBT) Facility, which is operated by Biffa in partnership with West Sussex County Council. The MBT Facility commenced receiving waste in 2014 and covers approximately 5.6 ha of land. To the north of the MBT Facility lies an ecological habitat area, which has been established in accordance with Condition 8 of the planning permission for the MBT Facility.
- 2.2.8 Two ponds are located within dense scrub to the immediate north of the site, surrounded by grey willow, hawthorn and blackthorn.
- 2.2.9 The land to the immediate north and beyond the ponds is currently vacant and comprises several derelict former brickworks buildings. A planning application (reference WSCC/080/13/NH) was submitted in 2013 for the construction of a new facility for the compaction and baling of Refuse Derived Fuel (RDF). At the time of writing this ES, the planning application for the proposed facility is undetermined.
- 2.2.10 Approximately 315 metres to the north of the site boundary is located an Aggregate Treatment and Recycling Facility (ATRF). Further north and east of the ATRF is the active Brookhurst Wood Landfill Site, which covers an area of approximately 34 ha. The landfill had planning permission to receive waste until the end of 2016. However, a further planning application to extend the end date for landfilling by 24 months to December 2018, as well as to extend the date for completion of restoration of the landfill from December 2017 until December 2023 has been approved. A leachate treatment plant and gas management compound, site office, store and car park is located between the ATRF and the landfill.
- 2.2.11 Further details on the allocation of the site in the Waste Local Plan and the relevant planning history of the site are provided in the Planning Statement, which accompanies the application.

Access and Rights of Way

- 2.2.12 Access to the site is via a private shared estate road, which connects to the public highway at Langhurstwood Road. Langhurstwood Road links directly to the A264 some 750 metres to the south. The A264 links to the A24 and the M23 after a short distance.
- 2.2.13 This internal access road also serves the Brookhurst Wood Landfill Site, the Weinerberger brickworks factory and the MBT Facility. It will also serve the proposed facility for the management of RDF, if approved. The internal access road has a 10 mile per hour (mph) speed limit.
- 2.2.14 There are no public rights of way located within the site.
- 2.2.15 Further details regarding the proposed site access and details of traffic movements on the public highway are provided in Chapter 6: Traffic and Transport.

Towns and Villages

- 2.2.16 The site lies approximately 900 metres to the north west of the edge of Horsham. According to the 2011 Census, Horsham town has a population of approximately 49,000 residents.
- 2.2.17 The land to the north of Horsham is allocated as a major strategic development site in the adopted Horsham District Planning Framework (Horsham District Council, 2015), which post-dates the West Sussex Waste Local Plan 2014.

- 2.2.18 This urban expansion extends from the land to the east of Langhurstwood Road, north of the A264 between Langhurstwood Road and Wimland Road. The development will include around 2,500 homes, a business park, two primary schools, a retail centre, commercial leisure facilities and a wide range of community facilities. The outline planning application for the land to the north of Horsham was subject to a resolution to grant planning consent (subject to a legal agreement) in 2017.
- 2.2.19 The site lies approximately 1.3 km to the north east of the centre of Warnham. According to the Warnham Parish Plan (Warnham Parish Plan Steering Group, 2007), Warnham has a population of approximately 1,100 residents.

Residential Properties

- 2.2.20 There are no residential receptors within the site. Residential properties in closest proximity to the site include:
 - Langhurst Moat Cottage and Wealden, Langhurstwood Road lie approximately 210 metres south east of the site and several residential properties on Langhurstwood Road, lie approximately 370 metres south east of the site.
 - Grayland's Lodge, on Langhurstwood Road, lies approximately 330 metres to the north east of the site;
 - Residential properties on Station Road lie approximately 330 metres south of the site;
 - Cox Farm lies approximate 420 metres north west of the site; and
 - A proposed residential development at North Horsham lies approximately 450 metres south east of the site.

2.3 Overview of the Proposed Development

- 2.3.1 The proposed development would comprise a Recycling, Recovery and Renewable Energy (3Rs) Facility to sort, separate and process up to 230,000 tonnes per annum of residual commercial and industrial ("C&I") waste and/or residual municipal solid waste ("MSW").
- 2.3.2 The processing of waste by the proposed development would generate an estimated 21 megawatts (MW) of electricity per annum. Of this, approximately 18 MW would be available for export to the national grid, with the remainder used by the facility itself. The proposed development would also be capable of supplying heat to suitable external users, subject to a heating network becoming available. The quantity of heat available would depend on the network configuration and the demand.

2.4 Facility Process and Operations

Overview

- 2.4.1 The 3Rs Facility is designed to accept residual waste streams, which, in the absence of the facility, are likely to be disposed of to landfill, or exported for treatment in similar facilities elsewhere. The facility would comprise a mechanical sorting facility in which inert materials and potentially recyclable materials are extracted, followed by energy recovery of the residual stream where the energy content of the remaining waste stream would be recovered.
- 2.4.2 The facility would be licensed to accept non-hazardous commercial and industrial wastes but also municipal solid waste should it become available.

2.4.3 A small amount of the electricity would be used to drive the plant itself and the balance would be exported from the facility to the local distribution network in the form of electricity. The turbine would be configured to be able to export heat as well, but until a distributed energy network is available, it would operate in electricity generation mode.

Waste Acceptance and Handling

- 2.4.4 Acceptable waste would arrive at the facility and be delivered to the reception hall and materials pretreatment area for sorting and recovery of the fractions that can be recovered and recycled. These would be inert materials, wood, selected plastics, ferrous metals and non-ferrous metals.
- 2.4.5 Acceptable waste would be delivered to the facility in covered vehicles or containers. A vehicle entering the site would be received at the weighbridge, where it would be checked to ensure that it holds a Waste Carriers Licence and that the (electronic) Transfer Note is in order. It would then be weighed to Trading Standards requirements, following which it would be allowed to proceed to the reception hall under the control of a traffic light system to maintain safety of the operation. The traffic light system would direct the vehicle into the enclosed hall where it would be directed to a designated unloading bay and its load discharged into the waste processing hall. Loads that are not carrying recyclable material may unload directly into the bunker.
- 2.4.6 Waste deliveries would only be accepted from authorised carriers and all heavy goods vehicles entering the site would report to the weighbridge gatehouse before being allowed to enter the site. Details of all waste entering the facility would be recorded in a tracking system. In addition, frequent inspections of waste would be undertaken in the reception hall and any non-compliant waste would be quarantined in a contained service area where it would remain until alternative disposal arrangements are in place.
- 2.4.7 Having been processed by the mechanical pre-treatment plant in the waste processing hall, the feedstock would be deposited in the bunker. Within the bunker, the feedstock would be mixed using a crane grab to create a homogenous waste profile. Mixing would be part of the bunker management to achieve, as far as possible, uniformity in the waste calorific value to aid the combustion process. The waste bunker would have sufficient capacity to store up to three days of feedstock in order to take into account potential interruptions in waste deliveries.
- 2.4.8 In order to limit environmental nuisances such as vermin, dust, litter and odour all deliveries, handling and storage would be undertaken in a fully closed environment. Access to and from the reception hall and bunker for waste delivery would be via an entrance fitted with a fast acting door which would remain closed during non-delivery periods.
- 2.4.9 Periodic washing would also be carried out to maintain a clean tipping area.
- 2.4.10 The reception area and handling equipment would also be designed to allow the facility to operate as a Waste Transfer Station in the event of extended maintenance periods or shutdowns. This would be achieved by enabling the bunker waste to be back-loaded into articulated vehicles.

Waste Processing and Feedstock Preparation

- 2.4.11 Acceptable waste would be loaded from the storage area in the waste processing hall into a receiving hopper in the waste processing hall by crane for subsequent processing by the mechanical pre-treatment equipment. The following typical process would then take place:
 - The waste would be fed from the receiving hopper into a coarse shredder;
 - The shredded material would be passed through a trommel or screen to remove fines;
 - The oversize material would pass under over-band magnets to recover ferrous metals and an eddy-current separator to remove non-ferrous metals;
 - An air separator would segregate heavy and light fractions;

- Near-infrared detection and sorting units would remove PVC and other plastics as required; and
- The material would then pass through a secondary shredder with capability to reduce the particle size down to a minimum of 75 mm.
- 2.4.12 The residual waste, known as feedstock, would then be moved to the bunker awaiting thermal treatment.

Thermal Treatment

- 2.4.13 The feedstock would be lifted by crane grab from the bunker into a feed hopper and fed onto a moving grate. The furnace in which the grate is located would be at a temperature in excess of 850 °C. Air would be fed through the grate from the underside to maintain the combustion process. The grate would be inclined and the grate-bars would move relative to one another. The movement of the grate would cause the feedstock to tumble slowly down the grate, exposing the feedstock to the air and ensuring almost complete burnout of the carbon in the feedstock. The process would be continuous.
- 2.4.14 Ash (known as Incinerator Bottom Ash or IBA) would fall through the grate and would contain less than 3% carbon. The ash would be recovered through a water bath (for cooling) and removed to a storage area. The ash would then be moved off-site for conversion into an aggregate substitute and recycled.
- 2.4.15 The hot gases (known as flue gas) from the combustion of the feedstock would pass through a water-tube boiler. The water in the boiler tubes would turn to steam and the steam would be superheated to approximately 430 °C at a pressure of between 60 72 bar (depending on the final design). The superheated steam would then be passed into a steam turbine that expands the steam, causing it to rotate and drive an electrical generator. Tappings would be included in the turbine casing to allow steam extraction in the event a distributed energy network is fitted. Initially, however, these tappings would be blanked off.

Electricity Generation and Parasitic Load

- 2.4.16 The superheated steam would pass through the turbine and pass under vacuum to an air-cooled condenser (ACC). The ACC would comprise fans blowing air across a radiator-like tube surface with the low pressure steam passing into the tubes. The cooling of the air would condense the steam back to water, following which it would flow to the feedwater tank and be pumped around the boiler circuit again. There would be no discharge of process water into local watercourses.
- 2.4.17 The turbine-generator would produce approximately 21 MW of electricity. A proportion of this electricity generated would be used by the facility itself to power the on-site consumers, such as electric motors, fans, lighting, HVAC etc. This is known as the parasitic load.
- 2.4.18 The efficiency of the facility determines the remaining energy available for export. It is not possible at this stage to state what the exact efficiency would be, but it would be more than sufficient to meet the energy efficiency requirement for a recovery facility of 0.65 set out in the Waste Framework Directive (2008/98/EC). In consequence the facility would qualify as "recovery" under Article 3 of the Directive.
- 2.4.19 The operator would be required by the Environment Agency under the permitting process to minimise the electricity required to operate the facility so as to optimise the amount of energy that is available for export outside of the operation of the plant itself.

Flue Gas Treatment

- 2.4.20 The flue gas produced by the combustion process would contain mostly carbon dioxide and water, but would produce some nitrogen oxide (NO_x) and trace quantities of pollutants, depending on the composition of the feedstock being combusted.
- 2.4.21 NO_x is a naturally occurring product of any combustion process. The means of treating it would have to be approved by the Environment Agency, but it is anticipated that selective non-catalytic reduction would be

used. This would be achieved by the injection of ammonia or urea into the raw gas stream. In the case of urea, it would convert to ammonia and in both cases the ammonia would react with the flue gas stream at a location where the temperature is around 850-900 °C.

- 2.4.22 Lime and powdered activated carbon would be injected into the gas stream in the flue gas treatment system, which would be deposited on the filters in the downstream bag filter system. The lime would neutralise any acid gases in the flue gas and the powdered activated carbon would attach to organic compounds (including dioxins) and be removed by the filters. The use of dry lime would enable greater energy efficiency to be achieved and reduces the incidence of plumes at the stack exit.
- 2.4.23 A baghouse filter would be included as the last process prior to the stack. The baghouse filter would consist of hundreds of individual filter bags and would capture particulate in the gas stream, including dust, lime powder and powdered activated carbon. The filters would be vibrated periodically by "rappers", causing the dust to fall off and be captured and placed in a silo. This material is known as air pollution control residue, and is categorised as hazardous due to its alkalinity, but represents only about 3% by weight of the original raw waste input. The air pollution control residue would be emptied from the storage silo by vacuum tanker and removed off-site for further processing. Processes are available that allows the air pollution control residue to be recycled.

Flue Stack

- 2.4.24 The facility would have a single flue stack with a proposed height of 95 metres located to the east of the main buildings. The height has been determined through computer dispersion modelling of emissions and evaluation of the resulting dispersion plumes so that ground level concentrations of key pollutants are kept well within acceptable levels under all operating conditions (See Appendix 7.2).
- 2.4.25 Dispersion of pollutants is dependent on a number of factors including local land topography, emission rates and pollutant concentrations and the height of the facility buildings. The air quality and plume dispersion modelling used to identify the stack height necessary for optimum dispersion is described in detail in Chapter 7: Air Quality and Odour.
- 2.4.26 The stack has been designed to meet all predicted climatic conditions. A separate windshield has been avoided, thereby minimising visual impact. Continuous emissions monitoring would be included in the stack with 100% redundancy so that in the event of a breakdown the standby equipment would continue to monitor the emissions. The sampling would be brought down to a low level, hence avoiding the necessity for galleries around the stack at height and enabling it to have a smooth profile. The outer surfaces of the stack would be grey-coloured and non-reflective, further minimising visual effects.
- 2.4.27 The applicant has undertaken consultation with the Aerodrome Safeguarding representatives for Gatwick Airport. This consultation has confirmed that, as the building and stack height proposed are under the Outer Horizontal Surface level, which lies at 204.35 metres AOD, there would be no infringement of this surface and no impact with regard to radar or navigational aids. It was, however recommended that medium intensity red steady obstacle lights be placed around 1.5 metres from the top of the stack to ensure that the stack is clearly visible to helicopters and other aviation traffic at all times. The recommended obstacle lighting is therefore included within the design.

Residues Management

Incinerator Bottom Ash (IBA)

2.4.28 The primary residual material from the combustion process is IBA, which consists of the non-combustible fractions of the feedstock. IBA is continually discharged from the combustion chamber. The volume of IBA generated would be dependent on the composition of the feedstock processed. However, it is estimated that the yearly quantity of IBA generated at the proposed facility would be approximately 40,000 tonnes.

- 2.4.29 IBA from the furnace would be quenched with water prior to transfer to the bottom ash area bunker. This process would involve the use of a drag conveyor to recover the IBA to a water bath before final transfer to the ash bunker. Storage for approximately four days of IBA has been provided. The Environmental Services Association (ESA) protocol for IBA agreed with the Environment Agency would be followed. This would lead to the IBA being categorised as non-hazardous and capable of being recycled into an aggregate substitute.
- 2.4.30 Due to the mechanical pre-treatment plant in the waste processing hall, the incidence of metals in the feedstock would be small. Any metals finding their way into the feedstock, however, may be recovered from the ash during its subsequent processing. It is also possible that a metal separator (over-band rotating magnet), located on the last conveyor before the bottom ash bunker, would remove ferrous metal and transfer it to a separate compartment of the ash bunker for storage pending off site transport.
- 2.4.31 Transfer of IBA from the bunker to collection trucks would be either by crane and hydraulic grab or by frontend loader. The transfer would take place in an enclosed loading bay in order to limit fugitive emissions. All trucks leaving the facility would be securely covered.

Boiler Ash

2.4.32 Boiler ash residues would be removed from the tube surfaces of the boiler by an enclosed conveyor system and transferred to a silo located within the facility. The silo would have the capacity to store approximately ten days of boiler ash residue, and would be transported off site but may be mixed with IBA prior to transport off site, depending on its composition.

Flue Gas Cleaning Residues

- 2.4.33 Flue gas cleaning residues would be removed from the baghouse filter by an enclosed conveyor system and transferred to two dedicated storage silo located within the facility. The storage silos have the capacity to store approximately seven days of flue gas cleaning residues. The residues would be transported off-site either for recycling or to landfill.
- 2.5 General Layout
- 2.5.1 The total site area is 3.8 ha as shown on Figure 1.2. This includes the external site road up to the point at which is connects with the public highway. The proposed development would be contained within the land under the applicant's ownership.
- 2.5.2 The overall layout of the proposed development is shown on Figure 2.1, with key dimensions shown on Figure 2.2 and in Table 2.1 below. Further details of the dimensions and elevations for the main buildings are provided in Appendix 2.1.

Building	Maximum	Width (m)	Lenath (m)	Area (GIA)
Dananig	Height (m)		Longth (m)	(m ²)
Waste Processing Hall	12.85	67.50	30.46	1,821
Tipping Hall	12.85	51.87	36.11	1,873
Workshop	13.20	20.51	16.98	348
Bunker	32.43	59.30	24.15	1,432
Offices	13.20	32.00	29.00	448 (per floor x
				3)
Control Room	18.69	12.80	8.50	272
Boiler Hall	35.92	29.58	59.43	1,757
Bottom Ash	17.00	11.70	14.85	174
Water Treatment Hall	9.45	17.92	16.52	296
Compressed Air and Electrical	9.45	17.92	13.36	239
Turbine Hall	25.90	24.64	37.17	916
Flue Gas Cleaning	23.00	30.96	10.99	258
Air Cooled Condenser	25.90	33.75	22.30	753
Transformer Enclosure	6.15	18.22	10.25	187
Storage/Recycling Area	8.60	18.74	43.85	822
Gatehouse	4.90	3.91	12.02	44
Flue Stack	95.00	2.5 dia	2.5 dia	n/a
Security Fencing	1.80	n/a	n/a	n/a
Total Gross Internal Area (GIA)			12,536	
Total Gross External Area (GEA)			13,160	

Table 2.1: Approximate Dimensions of Buildings and Structures

2.6 Water Usage, Drainage, Treatment and Disposal

Water Usage/Process Waters

- 2.6.1 The thermal treatment process is designed as a net consumer of water and, therefore, there is no requirement for regular disposal of any waste water from the combustion process. However, waste water would be created from the process in the following areas:
 - Water from the boiler drains;
 - Back-flushing water from the de-mineralisation plant;
 - Ash discharge occasional overflow; and
 - De-aerator occasional overflow.
- 2.6.2 It is also expected that a liquid runoff would result from the normal washdown operation of the tipping hall and bunker areas and from surface water on potentially contaminated areas (roads and hardstanding). This would be routed to a waste water pit designed to allow for the waste water to be recycled within the process. If there is excess process water, it would be tankered off-site.
- 2.6.3 During construction of the bunker, the integrity of the walls and floor would be verified to ensure watertightness. Further routine visual checks of the bunker would be undertaken following clearance of wastes to ensure the integrity is maintained.
- 2.6.4 The operation of the facility would not require discharge of process effluents to watercourses or the foul sewer. The bottom ash quench system would lead to a net use of water within the process.

Site Drainage

2.6.5 Details of the proposed drainage strategy are provided in Appendix 10.4 and Chapter 10: Hydrology and Flood Risk. The details are summarised below.

Surface Water

- 2.6.6 A drainage strategy has been prepared for the proposed development, which seeks to replicate the existing catchment areas as far as practically possible and also seeks to maintain surface discharge rates and volumes.
- 2.6.7 The proposed arrangements, which would use existing outfall pipes, are as follows:
 - Catchment A: This includes the west and south west external pavements, which would be discharged through a swale prior to discharge into Culvert A (located below the adjacent Network Rail northern line to the west of the site);
 - Catchment B: This includes the main building roof, runoff from which would be discharged into Pond B to the north of the site;
 - Catchment C: This includes the external pavement areas to the east, which would be drained through a swale prior to discharge into Pond A; and
 - Catchment D: This includes the shared access road to the public highway. As the proposed development does not directly pertain to Catchment D; no changes to the existing shared access road drainage are planned as part of this application.

Foul Water

- 2.6.8 The proposed foul water scheme would address domestic flows from the office and welfare facilities and also include connections from the storage/recycling area, gatehouse and transformer.
- 2.6.9 Wastewater would discharge to surface water; a Bio-disc package treatment plant has been specified to improve the quality of the effluent prior to discharge via the Catchment A outfall into a tributary of Boldings Brook in line with the current sewage effluent discharge consent.
- 2.6.10 Based on a population of up to 50 staff per day, the peak rate of foul discharge is estimated at 0.2l/s, with a daily discharge no higher than 2,500 litres per day.
- 2.7 Waste Types, Inputs, Sources and Facility Outputs

Waste Types

2.7.1 The facility would treat commercial, industrial, household and solid waste and selected combustible waste, complying with the European Waste Codes shown in Table 2.2 below.

Waste code	Description
02	Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food
	preparation and processing
02 01	wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing
02 01 03	plant-tissue waste
02 01 04	waste plastics (except packaging)

Table 2.2: Waste Types to be accepted

Waste code	Description
02 01 10	Waste metal
02 06	wastes from the baking and confectionery industry
02 06 01	materials unsuitable for consumption or processing
03	Wastes from wood processing and the production of panels and furniture, pulp, paper
	and cardboard
03 01	wastes from wood processing and the production of panels and furniture
03 01 01	waste bark and cork
03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those
02.02	mentioned in 03 01 04
	wastes from pulp, paper and cardboard production and processing
	mechanically separated rejects from pulping of waste paper and cardboard
03 03 08	Wastes from the leather fur and textile industries
04 02	Wastes from the textile industry
04 02	Wastes from network medicate (fer evennels groups were)
04 02 10	organic matter from natural products (for example grease, wax)
04 02 21	Wastes from processed textile fibres
15	Waste packaging absorbants wining clothe filter materials and protective clothing not
10	otherwise specified
15 01	packaging (including separately collected municipal packaging waste)
15 01 01	paper and cardboard packaging
15 01 03	wooden packaging
15 01 04	metallic packaging
15 01 05	composite packaging
15 01 06	mixed packaging
15 01 09	textile packaging
17	Construction and demolition wastes (including excavated soil from contaminated sites)
17 02	wood, glass and plastic
17 02 01	Wood
19	Wastes from waste management facilities, off-site waste water treatment plants and
	the preparation of water intended for human consumption and water for industrial use
19 02	wastes from physico/chemical treatments of waste (including dechromatation, decvanidation, neutralisation)
19 02 03	premixed wastes composed only of non-hazardous wastes
19.05	wastes from aerobic treatment of solid wastes
19.05.01	non-composted fraction of municipal and similar wastes
19 05 02	non-composted fraction of animal and vegetable waste
Waste code	Description
19 05 03	off-specification compost
19 06	wastes from anaerobic treatment of waste
19 06 04	digestate from anaerobic treatment of municipal waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing,
	compacting, pelletising) not otherwise specified
19 12 01	paper and cardboard
19 12 07	wood other than that mentioned in 19 12 06
19 12 08	Textiles
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes
20	Municipal wastes (household waste and similar commercial industrial and institutional
20	wastes) including separately collected fractions

Waste code	Description
20 01	separately collected fractions (except 15 01)
20 01 01	paper and cardboard
20 01 10	Clothes
20 01 11	Textiles
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	Plastics
20 02	garden and park wastes (including cemetery waste)
20 02 01	biodegradable waste
20 03	other municipal wastes
20 03 01	mixed municipal waste
20 03 02	waste from markets
15 01 09	textile packaging
17	Construction and demolition wastes (including excavated soil from contaminated sites)
17 02	wood, glass and plastic
17 02 01	Wood
19	Wastes from waste management facilities, off-site waste water treatment plants and
	the preparation of water intended for human consumption and water for industrial use
19 02	wastes from physico/chemical treatments of waste (including dechromatation,
	decyanidation, neutralisation)
19 02 03	premixed wastes composed only of non-hazardous wastes
19 05	wastes from aerobic treatment of solid wastes
19 05 01	non-composted fraction of municipal and similar wastes
19 05 02	non-composted fraction of animal and vegetable waste
19 05 03	off-specification compost
19 06	wastes from anaerobic treatment of waste
19 06 04	digestate from anaerobic treatment of municipal waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing,
	compacting, pelletising) not otherwise specified
19 12 01	paper and cardboard
19 12 07	wood other than that mentioned in 19 12 06
19 12 08	Textiles
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes
	other than those mentioned in 19 12 11
20	Municipal wastes (household waste and similar commercial, industrial and institutional
	wastes) including separately collected fractions
Waste code	Description
20 01	separately collected fractions (except 15 01)
20 01 01	paper and cardboard
20 01 10	Clothes
20 01 11	l extiles
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	Plastics
20.02	garden and park wastes (including cemetery waste)
20 02 01	biodegradable waste
20.03	other municipal wastes
20 03 01	mixed municipal waste
20 03 02	waste from markets

Fuel Oil for standby generator< 0.1% sulphur content</th>

Inputs/Capacity

- 2.7.2 Overall, the facility would have a capacity to receive 230,000 tonnes of waste per annum. This is the same as is currently approved for the Waste Transfer Station operations.
- 2.7.3 The thermal treatment plant would have a nominal capacity of 180,000 tonnes per annum.

Waste Sources

2.7.4 It is currently anticipated that all waste arriving at the facility would be primarily from locations within West Sussex, but some may also derive from East Sussex, Surrey and possibly Hampshire.

Other Inputs/Process Consumables

- 2.7.5 The following chemicals and process consumables would be imported for use by the plant:
 - Lime: approximately 4,000 tonnes per annum;
 - Activated Carbon: approximately 150 tonnes per annum;
 - Hydrochloric Acid: approximately 55,000 litres per annum;
 - Caustic Soda: approximately 70,000 litres per annum;
 - Fuel Oil: approximately 350,000 litres per annum;
 - Ammonia: approximately 400,000 litres per annum (diluted), which may be supplied in the form of urea; and
 - Residuals: Outputs.
- 2.7.6 The following outputs would result from the facility:
 - Electricity: 21 MW;
 - Glass and Inert Aggregates: Approx. 23,500 tonnes per annum;
 - Ferrous Metals: Approx. 14,000 tonnes per annum;
 - Non-Ferrous Metals: Approx. 5,400 tonnes per annum;
 - Air pollution Control Residues (APCr): Approx. 15,000 tonnes per annum; and
 - Rejects: Approx. 10,000 tonnes per annum.

Summary

2.7.7 A summary of the materials balance for the facility is provided in Diagram 2.1 below.



Diagram 2.1: Materials Flow Diagram

2.8 Utilities

Mains Water Supply

2.8.1 A potable mains water water supply would be connected to the site. The highest demand would be during the intial fill when the boiler and tanks would be filled. Following that, only make-up water would be required. Arrangements would be made with Southern Water for the supply.

Foul Sewer Connection

2.8.2 An application would be made to the sewerage undertaker for connection to foul sewer. Discharge to sewer would be confined to foul drainage from the on-site amenities (toilets, shower, kitchens etc).

Electrical Power Import/Export Connection

- 2.8.3 Electrical power would be imported and exported through a connection with the Distribution Network Organisation, UK Power Networks.
- 2.9 Monitoring
- 2.9.1 The proposed monitoring arrangements are summarised below. These would be agreed in detail through the Environmental Permitting process administered by the Environment Agency.

Bottom Ash Sampling

2.9.2 Ash samples would be analysed for carbon in ash, heavy metals, dioxins and other prescribed substances with the aim of ensuring that these are at acceptable levels and that the combustion process is operating correctly. Samples would be taken and tested by an independent National Accreditation of Measuring and Sampling (NAMAS) accredited laboratory. The IBA Testing Protocol agreed between the Environment Agency and the Environmental Services Association would be followed and it is expected that the IBA would be deemed non-hazardous.

Flue Gases

- 2.9.3 The monitoring of exit flue gases would be accomplished through the use of a continuous emissions monitoring system essentially comprising a sample handling system, analyser unit and logging/reporting equipment. These systems use various analytical technologies to determine the gas composition on a continuous basis.
- 2.9.4 The components measured would, as a minimum, be those stipulated within the Environmental Permit issued by the Environment Agency. The Environment Agency currently states that at least particulate, HCl, SO₂, NO, NO₂, VOC, NH₃, CO and O₂ shall be measured continuously. All the species to be identified and monitored would be specified in the permit and data would be made available to the Environment Agency. The CEMS would have an emergency electrical supply with sufficient capacity to maintain the system for at least 30 minutes in the event of a power failure. All monitoring instruments would be regularly calibrated.
- 2.9.5 A standby continuous emission monitoring system would also be provided that can be switched into operation on either line in the event of a problem with the duty system or whilst maintenance is taking place.
- 2.9.6 Dioxin/furan and heavy metal sampling would be undertaken in accordance with the Environmental Permit. The sampling would be carried out by an independent company/laboratory and is expected to be supplemented by tests carried out by the Environment Agency.

Process Control

- 2.9.7 The processes taking place throughout the plant would be monitored by an integrated computer control system, typically comprising Programmable Logic Controllers (PLC) for the furnace and grate, refuse crane operation, gas cleaning system, bag filter, water treatment plant and turbine generator system. These would be integrated into a distributed control system (DCS) operated from a central control room.
- 2.10 Access
- 2.10.1 Access to the facility would be taken from the existing entrance point to the site. All vehicles would proceed to the gatehouse and pass over the weighbridge before proceeding into the site. No vehicles would be permitted onto the operational site without passing over the weighbridge or receiving formal authorisation to bypass it. Vehicles would then circulate around the perimeter of the facility in a one way clockwise system. All waste vehicles would pass over the second weighbridge before exiting the site.

On-Site Circulation and Parking

- 2.10.2 Staff and visitors would enter the site and turn right before reaching the weighbridge to enter the car park.
- 2.10.3 All other vehicles would first proceed to the gatehouse where they would pass over the weighbridge before following the route appropriate to their purpose and then pass over a second weighbridge before exiting.
- 2.10.4 An impermeable surface would provide access for use by Heavy Goods Vehicles (HGVs) around the main building, with a parking area for six HGVs provided to the front of the site. Separate parking is also proposed to the front of the site for 31 cars for staff and visitors (plus two disabled spaces). A coach parking space and a covered bike shelter would also be provided for staff and visitors.

Traffic Management

2.10.5 The capacity of the proposed facility would match the capacity of waste already permitted to be managed at the site, i.e. 230,000 tpa. The facility would not therefore result in any increase in vehicles coming to the site

above those already permitted. There would, therefore, be no requirement for any additional waste related HGV movements to transport waste to the site over and above the sites extant consent.

2.10.6 Total HGV movements at the site would be managed so as to not exceed the numbers permitted by the extant permission. The applicant would be willing to accept a planning condition in this respect.

2.11 External Lighting

- 2.11.1 Details of the proposed site lighting are provided in Appendix 2.2. Illumination levels would accord with SLL Lighting Guide 1: The Industrial Environment (CIBSE, 2012).
- 2.11.2 The lighting design has been based on the use of appropriate lighting to provide safe working conditions in all areas of the site, whilst minimising light pollution and the visual effect on the local environment. This would be achieved by the use of luminaries that eliminate the upward escape of light.
- 2.11.3 Within the internal process areas, outside of normal working hours, operators would be in the control room and thus lighting would generally remain switched off, with the exception of emergency and escape route lighting. The lighting would be controlled with movement detection locally and from the control room and lighting groups would be switched on only as and when necessary.
- 2.11.4 Lighting would generally be installed along the walkways and stairways around the process equipment to provide illumination for safe access and operational tasks, and at night would only be switched on when operators need access to a specific level.
- 2.11.5 The waste processing hall and bunker area lighting would be switched on permanently as feeding of waste from the bunker to the hopper is essential for the 24-hour operation of the facility. Maintenance on the pretreatment plant would be carried out overnight and visual spectrum smoke detection would be used as part of the fire protection. These buildings would be covered with solid cladding, which would minimise fugitive light emissions from this area.
- 2.11.6 For the administration/visitors' building, lighting would generally be switched off out of normal working hours, unless nightshift operators need specific access to the offices or mess facilities.
- 2.11.7 A dimmable lighting scheme is proposed to facilitate lower levels of lighting in the evening to suit low level site activity.
- 2.11.8 Aviation warning lights fitted to the stack and the boiler building would be medium intensity red steady obstacle lights and would be positioned to be visible from the air.

2.12 Appearance and Materials

- 2.12.1 The facility would include a curved roof, referred to as 'curvilinear', incorporating a large sweeping curve across the facility. The curve would start at the bunker hall, cross the bunker and boiler halls and then cover the air cooled condensers and flue gas treatment area. The purpose of the curve is to visually bring all of the separate elements of the facility together as one structure and to visually reduce the building's height. The design builds on the reduction in height achieved from sinking the building into the ground.
- 2.12.2 The external colours would also aid the visual reduction in height by having the higher elements in lighter greys with a darker grey plinth at a lower level.
- 2.12.3 The design has taken into account the "Guidance on the selection and use of colour in development" (High Weald AONB, 2017). The Western High Weald Woodland and Heath Sub Palette has been selected as the

most appropriate for the proposed development. Muted greys, greens and browns are proposed, as described in the Design and Access Statement accompanying the planning application. This would enable the building to be more readily absorbed, in visual terms, into the landscape.

2.13 Landscape Strategy

- 2.13.1 The landscape proposals (Figure 5.38) are also designed to assist in screening low level clutter, such as vehicles in the car park, giving a simplicity to the front of the facility and providing as much screening of as much 'human-scale' activity as possible.
- 2.13.2 The planting at the front of the building would be a simple palette of predominantly evergreen trees in hedgerows or ground cover. At the internal roundabout, a line of trees within a curved hedgerow would help to screen direct views along the access road from Langhurstwood Road. Trees and hedgerows would provide a softening element to the building in views from the Biffa waste management facility and the Weinerberger Brickworks. To the north of the facility areas of native woodland containing both evergreen and deciduous species would complement the existing, retained woodland.
- 2.13.3 The use of a simple wildflower mix would provide an additional ecological habitat within the site.
- 2.13.4 The landscape proposals are shown on Figure 5.38 of this ES.

2.14 Hours of Operation

Waste Preparation, Processing and Energy Generation

2.14.1 The proposed development would operate 24 hours per day, 7 days a week except during shutdowns for maintenance activities.

Receipt of Waste

- 2.14.2 The hours for waste delivery would remain the same as those currently approved for the Waste Transfer Station operations i.e. 07:00 to 18:00 on Monday to Saturday
- 2.14.3 Deliveries/collections would be scheduled to avoid movements on Sundays, Bank Holidays or Public Holidays. With the prior approval of the local planning authority, occasional waste deliveries and/or collections may take place outside these hours to avoid peak hour traffic flows or to prevent waste being stored within vehicles overnight, at weekends or during holiday periods.

Plant Maintenance and Shutdown

- 2.14.4 Procedures for checking the efficiency and safety of the plant would be applied during commissioning of the plant, at which time it would be fully tested.
- 2.14.5 Regular maintenance would ensure high performance from the plant. A comprehensive programme of preventative maintenance would be implemented based on modern condition monitoring techniques. A computerised maintenance management system would be deployed with scheduled maintenance routines with appropriate priority on a daily basis. The plant would shut down for maintenance for around two week each year.

Staffing

- 2.14.6 It is estimated that the operation of the site would be undertaken by up to 50 people. Operational staff would include one site manager, six support staff (weighbridge, administration and security), five shift teams for the energy plant of four persons per team, together with a waste operational team of 14 persons. The five shifts would be needed to cover 24-hour operation, 7 days per week, using a rotating shift pattern and a spare shift to cover holidays and absences.
- 2.14.7 Maintenance would be covered by two shifts of 12 hours per day with a total complement of six persons.
- 2.14.8 During the course of any one day the number of people on site would be:
 - Site manager: 1;
 - Support staff: 6;
 - Plant shift operations: 8;
 - Maintenance: 6;
 - Materials recovery and preparation: 12;
 - Total: 32 staff members.

2.15 Resilience of the Design to Climate Change

- 2.15.1 Regulation 18(3) of the EIA Regulations requires consideration of the vulnerability of the project to climate change.
- 2.15.2 Resilience to future climate change has been considered during the design process. The design has taken into account, for example, future flood risk and resilience to extreme weather events. The project would be built and designed in accordance with relevant buildings regulations and would therefore be able to withstand climatic changes anticipated to occur within the project's lifetime. This philosophy would provide a significant betterment when considered against the existing drainage system in terms of flow rate and volume.
- 2.15.3 The proposed drainage strategy would incorporate appropriate measures to manage surface water runoff to greenfield runoff rates using sustainable drainage systems (SuDS) and would take into account the 1 in 100 year risk event, with an allowance for future climate change. Further details of the proposed drainage strategy are provided in Chapter 10 (Hydrology and Flood Risk) and Appendix 10.2 (Flood Risk Assessment).

2.16 Vulnerability to Accidents and Disasters

- 2.16.1 The EIA Regulations require consideration of the effects on the environment deriving from the vulnerability of the project to risks from major accidents and/or disasters, where these are relevant to the project concerned.
- 2.16.2 This section considers the potential accidents and disasters that could affect the proposed development or the environment. However, it is stressed that such events are not considered likely.

Substances Used on Site and Storage of Hazardous Materials

- 2.16.3 A range of chemical substances and some hazardous materials would be stored on site associated with the thermal treatment process, including lime, activated carbon, hydrochloric acid, caustic soda, boiler water treatment chemicals, fuel oil and ammonia or urea. These materials would be stored in accordance with Environment Agency and Health and Safety Executive guidance.
- 2.16.4 The selective non-catalytic reduction system would use either ammonia or urea as the reagent. The reagent and boiler water treatment chemicals would be stored in suitable containers or if diluted, stainless steel bunded storage tanks provided with a pressure relief valve and vent scrubber system, as appropriate. In the event of a spillage, the bunds would retain the liquid. The drainage from waste storage areas would be routed to the wastewater pit.
- 2.16.5 Lime and activated carbon would also be used within the flue gas treatment process. Storage would be in dedicated steel silos with equipment for filling from a tanker through a sealed pipe work system. Delivery to the site would be by bulk powder tanker.
- 2.16.6 Boiler water treatment chemicals would be used to de-mineralise the boiler water and control water hardness, pH and scaling and would be delivered in sealed containers and stored in the water treatment room.
- 2.16.7 Diesel fuel would be used on site for the auxiliary burners and mobile plant and equipment. The fuel would be stored in an underground storage tank. The auxiliary fuel would only be used to start-up the thermal treatment plant and bring it to temperature prior to injection of feedstock.
- 2.16.8 There would also be portable bottles of oxygen and acetylene gas stored on site for welding purposes. The gas bottles would be kept secure in a separate compound adjacent to the workshop and only used as necessary.

Hazard Prevention and Environmental Controls

Fire

2.16.9 A Fire Prevention Plan would be submitted to the Environment Agency along with the permit application and insurers would require close scrutiny of fire protection measures. Comprehensive fire protection and detection systems would be installed within the facility to prevent fires occurring. In addition to these systems, standard health and safety procedures would be put in place. These would include measures such as the prohibition of smoking. Flammable liquids and chemicals would be kept in sealed containers/tanks within bunded storage areas.

Accidental Discharges of Water from Circulation System

2.16.10 The facility has been designed as a zero water discharge facility and is set on an impermeable concrete mat. Therefore, no spillages or accidental discharges from the plant are anticipated. However, in the event of such an incident occurring, contaminated water would be diverted to a wastewater pit where it can be held and either reused in the process, treated and discharged to the sewer under a discharge consent or tankered off site for disposal if necessary.

Spillages of Additives

2.16.11 Liquid additives and chemicals would be stored in sealed tanks within bunded storage areas or equivalent with a capability of containing up to 110% of the capacity of the storage tank. Additives including lime and activated carbon would be fed into the process automatically and there should be no requirement for human intervention in this process. The delivery of all additives would follow standard health and safety and Control

of Substances Hazardous to Health (COSHH) procedures. In the event of a spillage, the bunds would retain all liquids, these will then be pumped into tankers and removed from the site.

Emissions to Air, Odour and Dust Suppression

- 2.16.12 The potential impacts of the facility's emissions to the atmosphere are discussed in detail in Chapter 7: Air Quality and Odour.
- 2.16.13 Odour, dust and other environmental effects from the facility would be controlled in accordance with the requirements of the Environment Agency guidance.
- 2.16.14 Air from the reception hall has the potential to be odorous because of the presence of raw waste. However, containment of dust and odour within this area would be achieved through the maintenance of negative pressure in the hall with odours drawn into the thermal treatment plant and destroyed.
- 2.16.15 To achieve this, combustion air fans would draw feed air for the combustion process from the waste reception hall into the furnace to feed the combustion process. As a result, any dust or odour from the tipping, mixing, shredding and furnace loading operations would be retained within the waste reception hall or drawn into the furnace where the odour-carrying gases would be destroyed by combustion, virtually eliminating the possibility of odour detection outside the facility.
- 2.16.16 Doors would be fitted with automatic door closures, where required.

Vermin Control

2.16.17 The main area where vermin could potentially be attracted is the tipping and bunker hall. Waste would not be allowed to accumulate within the tipping hall and the floors would be kept clean through the use of loaders which would collect any spilled waste and deposit it into the waste bunker. In addition to these measures, standard pest control methods would be implemented as part of the Environment Agency permitting procedures.

Plant Maintenance and Shutdown

2.16.18 Regular maintenance of the facility would be carried out on a daily basis by a permanent team of qualified maintenance engineers. Most maintenance work would be carried out during normal daytime working hours and would conform to a planned maintenance program. For approximately two weeks per year the thermal treatment plant would need to be shutdown and allowed to cool to allow personnel access for maintenance and repair, particularly to the furnace and boiler. Every ten years or so it may be necessary to carry out an extended outage to maintain the steam turbine. All maintenance would be carried out to written procedures and recorded in the CMMS. A stock of spares would be held in store within the facility for a rapid replacement of parts that wear out or fail.

Abnormal Operating Conditions

Start Up

2.16.19 This would take place during commissioning of the facility and after each maintenance shutdown period. Prior to start up all systems and equipment would be checked to ensure they are ready for use. Prior to combustion, auxiliary burners would be used to bring the furnace up to its minimum operating temperature where the combustion gases are at least 850 °C. It would also be necessary for the flue gas treatment system to be brought up to its operating temperature before it would be fully effective. Once the appropriate temperatures have been achieved, the feed hopper and grate would be activated and waste fed into the furnace. 2.16.20 Generation of electricity can only begin when sufficient steam at the correct pressure and temperature has been produced. There would be a period of delay between start up and the export of electricity to the local public electricity supply network. During this period the plant would import electrical power through the same cables that are used for export of generated power.

Fire Protection

- 2.16.21 The facility would be equipped with a comprehensive fire protection and detection system and would conform to the required health and safety regulations including procedures in the event of a fire.
- 2.16.22 In the bunker hall, remotely operated water cannons would be installed, which are capable of covering the entire bunker and feed hoppers. Both an electrical fire pump and a reciprocating engine-driven fire pump would ensure that fire systems are available at all times. The operation of the fire pump would set off an audible alarm in the control room. The firewater tank would be sufficient to provide enough water for at least 2 hour's capacity of the pump, giving time for the emergency services to respond.
- 2.16.23 Fire detection and protection systems would be installed in other areas of the plant, the type of which would be dependent on the nature of the process(es) taking place in any given location. Smoke extractors would also be fitted in the boiler house. Fire detection and protection systems would be installed in all electrical and instrument rooms, and would be tested to current standards.

Failure of a Bag Filter

2.16.24 Failure of a filter bag is an irregular event, which would be detected by monitoring equipment, which sends a warning to the operators in the control room. The failed bag filter would be located by a loss of pressure across the filter bag and the faulty bag isolated, and the bag replaced either on-line or during an outage. Individual bag failure would not result in an exceedance of the Environmental Permit limits.

Failure of FGT Equipment

2.16.25 There are various standby items, which can readily be installed to enable the plant to remain operational. If a lime injection system failure were to occur then unspent lime on the filer bags would ensure that the combustion conditions and emissions comply with the Environmental Permit during an emergency shutdown.

Failure of Other Equipment

2.16.26 The plant would be designed with stand-by systems and redundancy in equipment and this, together with a comprehensive planned maintenance programme to ensure the plant remains operational and in compliance with the Environmental Permit.

Electrical Failure

2.16.27 In the event of a failure of the power supply connection to the local public supply network, the facility would operate in island mode, during which the turbine generator would directly supply the required power to sustain operation of the facility until the supply connection is restored. In the event that operation in island mode is not possible, the facility would switch to an uninterruptible power supply and import power from the power supply network, allowing the facility to maintain all critical systems. Under these conditions, a controlled safe shut down of the facility would be initiated. During this period, all emissions would be monitored and kept within the permitted limits.

Emergency Shutdown

2.16.28 If any incident endangers or is likely to endanger personnel, or there is a risk of serious damage to the facility, an emergency shutdown would be necessary. Prior to the plant becoming operational, precise operating

procedures for the various possible scenarios according to the likelihood of incidents in the facility, taking into account the safety of personnel and the equipment would be in place.

2.16.29 In order to rapidly extinguish combustion in an emergency, an emergency shutdown would be initiated or the induced draft fan would be switched off. This would result in the immediate stopping of the combustion air fan, the grate feed and the burner. Staff would ensure that the above actions have been completed, and that the fan intake louvres and dampers are closed (to prevent any natural draught which could leave a fire smouldering on the grate), the air dampers under the grate are closed, and the burner fuel oil safety valves are closed.

2.17 Construction

Construction Programme

2.17.1 It is anticipated that construction of the proposed facility would commence within three years of being granted planning permission, depending upon financing and procurement lead times. The construction of the proposed development is estimated to take approximately 34 months, including commissioning and testing. A provisional schedule is outlined below:

Phase 1 – Site Preparation

2.17.2 The first phase would comprise site preparation and construction of the site roads to sub-base level, main drainage runs, temporary car parking and staff facilities. Site preparation works would include site clearance, fencing, bulk excavation, regrading, advance landscape berming and planting. It is estimated that Phase 1 would take approximately 2 to 3 months.

Phase 2 – Construction Works

2.17.3 The second phase would comprise the construction works and installation of major process plant. Construction works would include the construction of buildings, roads completion, drainage and infrastructural works completion. Subject to lead times for plant delivery, the duration of Phase 2 is estimated at approximately 23 months.

Phase 3 – M&E and Final Works

2.17.4 The third phase would comprise ongoing installation and testing of mechanical and electrical equipment and any final completion and finishing works. The duration of Phase 3 is estimated at approximately 8 months.

Commissioning and Testing

2.17.5 Commissioning and testing activities would comprise the certification of various components of the facility by a number of work groups. The commissioning of the facility should be scheduled to begin at least 12 weeks prior to start-up of operations.

Construction Working Hours

- 2.17.6 Normal hours of working during construction would be:
 - Monday to Friday 07.30 to 19.00 hours; and
 - Saturday 08.00 to 16.00 hours.
- 2.17.7 No construction works would take place on Sundays or Public Holidays. In the event that construction would be required outside of these hours consent would be agreed in advance with the local planning authority. Non-intrusive activities (such as electrical installations and commissioning operations etc) would be
undertaken outside of these hours in order to minimise overall construction time. HGV movements associated with such activities would be minimal.

Employment

- 2.17.8 The level of staff employed during the construction phase would vary throughout the construction period but it is estimated that there would be an average of 50 workers on site at any one time.
- 2.17.9 The level of work is anticipated to fluctuate over the course of the construction programme but the peak level of workers is likely to be in months 7 to 9 and would peak at around 182 people.

Plant

- 2.17.10 Plant to be used during the construction phase would typically include:
 - Tracked excavators (excavation and loading);
 - Articulated dump trucks;
 - Wheeled back hoe loaders;
 - Wagons;
 - Telescopic handlers;
 - Rollers;
 - Water pumps;
 - Concrete pump;
 - Generators;
 - Cement mixer truck;
 - Cranes; and
 - Vibratory sheet piling rig(s).

Construction Access

2.17.11 Access during the construction phase would be via the existing site access.

Environmental Management

- 2.17.12 A site specific Construction Environmental Management Plan (CEMP) will be prepared for the proposed development in consultation with the local planning authority. The CEMP will include all of the construction phase mitigation measures identified in this ES.
- 2.17.13 The purpose of the CEMP will be to:
 - Provide a mechanism to ensure that measures to prevent, reduce and where possible offset potentially adverse construction phase environmental effects identified in the ES are implemented.
 - Ensure that good construction practices are adopted and maintained throughout the construction of the proposed development.
 - Provide a framework for mitigating unexpected impacts during construction of the proposed development.
 - Provide the necessary assurances to third parties that their requirements with respect to environmental performance will be met.

- Provide a mechanism for ensuring compliance with environmental legislation and statutory consents.
- Provide a framework against which to monitor and audit environmental performance.
- 2.17.14 Depending upon the conditions attached to the planning permission for the proposed development it is proposed that either relevant parts of the CEMP or the whole of the CEMP will be submitted to the local planning authority prior to commencement of works for approval and to demonstrate compliance with any pre-commencement planning condition requirements.
- 2.17.15 The approved CEMP will be adhered to and implemented throughout the construction period strictly in accordance with the approved details, unless otherwise agreed in writing by the local planning authority.

2.18 Decommissioning

- 2.18.1 Planning permission is sought for permanent development on the site and therefore it is not considered necessary to consider the effects of the decommissioning phase within this ES.
- 2.18.2 However, in the event of decommissioning becoming necessary, the techniques followed would be controlled having regard to relevant legislation and good practice guidance at that time and would be subject to a decommissioning environmental management plan.

2.19 Residues and Emissions

2.19.1 The following section provides a summary of estimates, by type and quantity, of expected residues and emissions associated with the proposed development. The basis for these estimates, as well as an assessment of their effects, is discussed in more detail within the topic chapters of this ES. Chapters 6 (Traffic and Transport), 7 (Air Quality and Odour) and 8 (Noise and Vibration) are relevant in this regard.

Construction Phase

Emissions to Air

- 2.19.2 There is the potential for dust generation during the construction phase due to earthworks, and movements of mobile plant accessing and operating on the site.
- 2.19.3 Contractors would be required to use good engineering practices and follow good practice guidance to minimise dust emissions during the construction phase.

Traffic

2.19.4 Full details of construction traffic are provided in Chapter 6. Contractors would be required to use good engineering practices and follow good practice guidance to minimise dust emissions during the construction phase.

Noise

2.19.5 Noise emissions are likely to be highest at the early stages of works i.e. during site preparation and civil works, and decrease during the plant erection and fit-out stages. Noise emissions during the fit-out as buildings are completed would be very low as work is undertaken mostly with hand-tools within the completed structures.

- 2.19.6 For the majority of the construction period, plant on-site would comprise various diesel mechanised construction plant including excavators (with various tool attachments depending upon the task being undertaken), dump trucks, fork-lift trucks, concrete wagons and pumps, mobile cranes and delivery lorries.
- 2.19.7 It is anticipated that the most noise generating activity on site would be piling of foundations. As building foundation loadings are not high for the majority of the development, the need for driven piling is expected to be limited and alternative methods would be employed where possible.
- 2.19.8 Details of noise associated with construction traffic are provided in ES Chapter 8: Noise and Vibration.

Vibration

2.19.9 Depending upon the method used, piling has the potential to cause vibration that would be noticeable on-site. However, the propagation of ground-borne vibration is subject to significant losses due to the distances between the site and receptors and the varying densities of the subsurface geology.

Operational Phase

Emissions to Air

- 2.19.10 The plant would be designed and operated in accordance with the requirements of the Industrial Emissions Directive (2010/75/EU), known as the IED, which requires adherence to emission limits for a range of pollutants. The table below shows the current Industrial Emissions Standards.
- 2.19.11 More detailed information regarding emissions to air including short- and long-term Waste Incineration Directive (WID) Emission Limits is provided in Chapter 7: Air Quality and Odour and associated appendices.

Pollutant	Scenario 1 Short-Term Emission Limits (mg.Nm ⁻³)	Scenario 2 Daily-Mean Emission Limits (mg.Nm ⁻³)
Particles	30	10
TOC	20	10
HCI	60	10
HF	4	1
SO ₂	200	50
NOx	400	200
СО	-	50
Group 1 metals ^(a)	-	0.05 ^(d)
Group 2 metals ^(b)	-	0.05 ^(d)
Group 3 metals ^(c)	-	0.5 ^(d)
Dioxins and furans	-	0.0000001 (e)

Table 2.3: Relevant Industrial Emission Directive Limit Values

Notes: All concentrations referenced to temperature 273 K, pressure 101.3 kPa, 11% oxygen, dry gas.

- (a) Cadmium (Cd) and thallium (Tl).
- (b) Mercury (Hg).
- (c) Antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni), and vanadium (V).
- (d) All average values over a sample period of a minimum of 30 minutes and a maximum of 8 hours.
- (e) Average values over a sample period of a minimum of 6 hours and a maximum of 8 hours. The emission limit value refers to the total concentration of dioxins and furans calculated using the concept of toxic equivalence (TEQ).

2.20 Greenhouse Gases/Carbon Footprint

2.20.1 A greenhouse gas assessment of the proposed thermal treatment facility, based on an estimate of its operational carbon footprint has been undertaken and is included at Appendix 2.3. The assessment takes

into account process emissions (considering the scenarios of the facility operating in electricity-only mode and potential combined heat and power (CHP) mode), avoided emissions and vehicle emissions associated with the transportation of waste.

- 2.20.2 The assessment of the potential carbon footprint for the facility shows that it performs well, providing an estimated reduction in greenhouse gas (GHG) emissions of approximately 242,700 tonnes of CO₂ equivalent per annum operated in electricity-only generation mode, and 310,800 tonnes of CO₂ equivalent per annum if it is able to be extended to run in CHP mode. This saving with electricity generation alone is equivalent to the annual emissions from approximately 39,700 homes.
- 2.20.3 Emissions savings from avoided landfilling of waste amount to approximately 76,500 t CO₂ equivalent per annum, and further savings of 38,000 t CO₂ equivalent per annum are achieved through recovery and recycling of metals from combustion residue (bottom ash).
- 2.20.4 Whilst combustion of waste in the thermal treatment facility produces emissions of 51,000 tCO₂ equivalent per annum, these are balanced by emissions savings from displaced electricity generation from the grid mix of mainly conventional power stations of between 69,200 t CO₂ equivalent per annum.
- 2.20.5 Over the expected lifetime of the proposed facility (assumed to be 25 years) total GHG emissions savings from the thermal treatment facility amount to at least 6.06 million tonnes of CO₂ equivalent compared to the current landfilling of the waste, and over 7 million tonnes of CO₂ equivalent if CHP is developed early in its operational life.
- 2.20.6 In summary, the proposed facility is anticipated to have a significant positive effect in terms of greenhouse gas emissions within West Sussex compared to the existing commercial and industrial waste management arrangements.
- 2.21 References

Legislation

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions

The Construction (Design and Management) Regulations 2015 (2015 SI No 51)

The Environmental Permitting (England and Wales) Regulations 2016 (2016 SI No 1154)

Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (2017 SI No. 571)

Publications

CIBSE (2012) LG01 Lighting Guide 01: The Industrial Environment – LG1.

High Weald AONB (2017) High Weald AONB Guidance on the Selection and Use of Colour in Development.

Horsham District Council (2015) Horsham District Planning Framework (excluding South Downs National Park).

Warnham Parish Plan Steering group (2007) Warnham Parish Plan – A Parish Plan for a Planned Parish.

West Sussex County Council and South Downs National Park Authority (2014) West Sussex Waste Local Plan. April 2014.

3 Need and Alternatives Considered

3.1 Introduction

- 3.1.1 This chapter of the Environmental Statement (ES) provides a summary of the need for the project and the main alternatives considered by Britaniacrest during the environmental assessment process.
- 3.1.2 As set out in Chapter 1 of this ES, the 2017 Environmental Impact Assessment (EIA) Regulations are the relevant consideration for the proposed 3Rs Facility. The regulations require an ES to include:

'A description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.'

- 3.1.3 This chapter therefore sets out the key reasons for the selection of the project site, together with a description of the alternative design and layout options that have been considered. Further information is provided in the Planning Statement and Design and Access Statement that accompany the planning application.
- 3.2 Need for the Proposed Facility and Site Suitability

Need for Recycling and Recovery Facilities in the UK and West Sussex

- 3.2.1 It has been the objective of the UK and Europe for many years to reduce the quantity of waste being sent to landfill. This can only be achieved if there is infrastructure available to allow the waste to be recycled or recovered. Whilst the UK has made major strides in reducing the landfilling of waste, and the UK Government and local authorities have spent over £2 billion in recent years, investing in such infrastructure, this has been almost exclusively for municipal wastes. Yet the Waste Framework Directive (WFD) sets the same objectives for commercial and industrial wastes as it does for municipal waste. Whilst there is around twice the quantity of this waste compared to municipal waste, there are few facilities available that enable the waste from shops and businesses to be properly recycled and recovered. As a result, up to 9 million tonnes of commercial and industrial waste is landfilled in or exported from the UK, and the waste is travelling further afield as landfill sites are being closed.
- 3.2.2 Department for Environment Food and Rural Affairs (Defra) "Statistics on UK Waste", published 27 February 2018 states that the estimated annual commercial and industrial waste production in the UK in 2016 was circa 32.2 million tonnes (Defra, 2018). Statistics on commercial and industrial waste are not easily obtained and, therefore, to determine the destination of that waste would require the waste transfer documents to be collated and the locations to which the waste is taken to be mapped. What is known, however, is that in Kent, East Sussex and Hampshire there are now no landfill sites at all for active non-hazardous waste. In West Sussex, the landfill capacity available is primarily designated for use for municipal waste and the landfill will be full within the next year. Even household waste arising in West Sussex requiring to be landfilled may need to be transported to Redhill, Surrey.
- 3.2.3 In August 2017, Biffa published its report, "The Reality Gap" in which the company updated its 2015 study, and predicted a potential residual waste treatment capacity gap in the UK of 4.4 million tonnes per annum (mtpa) or up to 5.9 mtpa by 2025 if further disposal infrastructure is not developed. This was followed in September 2017 by Suez Environment, who published their report "Mind the Gap", reinforcing Biffa's conclusion, and evidencing the company's claim that the UK could face a 'disaster scenario' with regard to a shortage of waste treatment infrastructure over the next decade. These reports have since been followed by

the Environmental Services Association, report (ESA, 2017) that estimates that if no further infrastructure is built, there will be an EfW capacity gap of circa 17 million tonnes per annum by 2030.

3.2.4 There is therefore a clear need for facilities to treat commercial and industrial waste in the UK.

Proposed 3Rs Facility Site

- 3.2.5 Britaniacrest Recycling Ltd currently operates a Waste Transfer Station (WTS) at its site at the old Wealden Brickworks, Langhurstwood Road, Horsham, West Sussex. The facility has planning permission to handle up to 230,000 tonnes per annum of industrial and commercial waste.
- 3.2.6 Currently the operation at the old Wealden Brickworks is confined to receiving wastes, including deliveries from skip collections from local businesses, separating what is viable to separate and bulking up for processing and recovery elsewhere. With the exception of wood, any active waste has to be transferred to Hookwood, where it is shredded and converted into a refuse derived fuel (RDF) and exported to continental Europe. With the current facilities, it is not possible to extend the recycling activity significantly without investment in infrastructure, and other than wood and demolition waste, the amount of waste the site can receive is limited. Britaniacrest Recycling Ltd is proposing to develop the 3Rs Facility at its old Wealden Brickworks site to enhance the waste management operations at the site, which would anticipate achieving a diversion from landfill of around 95% of the waste coming in to the facility.
- 3.2.7 In September 2016, West Sussex County Council (WSCC) announced that it would issue tenders for the transport and treatment of the RDF produced by the Mechanical Biological Treatment (MBT) plant operated by Biffa at the site adjacent to the proposed 3Rs Facility. In September 2017, WSCC indicated its intent to award the contract to Britaniacrest Recycling for a nominal five year period. During the contract period the RDF will be transported by heavy goods vehicles (HGVs) to UK docks and exported to energy recovery facilities within the European Union. If constructed, and subject to public procurement regulations, the proposed 3Rs Facility would provide a potential treatment point for the RDF, significantly reducing the carbon footprint compared to the current export arrangements and maintaining the resource within the UK economy.
- 3.2.8 The new facility would replace the existing Waste Transfer Station and would take commercial and industrial waste or similar, and sort and segregate materials such as metals, plastics and rubble and recover their value using the latest sorting technology. The energy content of the residual material left over would be recovered using well established and proven thermal treatment technology.
- 3.2.9 Electricity would be exported to the local electrical distribution grid. These processes would provide a sustainable alternative to landfill disposal, avoid the use of fossil fuels and save primary materials.

Conclusion

- 3.2.10 There is a clear need for state-of-the-art facilities to allow commercial and industrial waste to be treated, recycled and energy to be recovered in the UK. This would avoid long distance waste travel and export of materials, such as RDF, to Europe for energy recovery.
- 3.2.11 In order to meet the challenges facing the UK in terms of lack of landfill capacity and the need for waste treatment, leading new facilities are required that can treat, recycle and recover energy from commercial and industrial waste.
- 3.2.12 The existing Britaniacrest site is confined to receiving wastes, including deliveries from skip collections from local businesses, separating what is viable to separate and bulking up for processing and recovery elsewhere. With the current facilities at the site, it is not possible to extend the recycling activity significantly without investment in infrastructure, and the amount of waste other than wood and demolition waste the site can receive is limited.

- 3.2.13 Development of the site to provide the proposed 3Rs Facility would provide a modern facility suitable for waste treatment, recycling and energy recovery. The site already operates as a waste handling facility and is large enough to accommodate the required functions within the existing site boundary.
- 3.2.14 The site provides an opportunity to create a facility positioned in an area where there is currently a lack of suitable landfill capacity for such wastes. The main reasons for the selection of the site for the proposed use include:
 - Existing use as a waste transfer station, with planning permission to handle up to 230,000 tonnes per annum of industrial and commercial waste;
 - Allocation of the site within the Waste Local Plan for waste transfer/recycling/recovery use;
 - Location within an area with limited landfill capacity, resulting in long distances travelled for waste treatment or energy recovery (including export of RDF overseas);
 - Ability to accommodate the new use within the existing site boundary;
 - Site ownership by family business with over 40 years' experience in energy recovery, recycling and haulage;
 - Location in an area of existing built development, on a former brickworks site, adjacent to the railway and Brookhurst Wood landfill site;
 - The site is not subject to any statutory environmental designations and is at low risk of flooding;
 - The site provides good public transport links, including access to the A24 and A264; and
 - Ability to accommodate proposed use without any increase in traffic flows during the operational phase.

3.3 Alternative Layout and Technology Options Considered

Introduction

- 3.3.1 The evolution of the project design and site layout has been an iterative process, which has been undertaken during the period 2015-2018 and has taken account of input from a range of sources, including:
 - Consultation, including in particular, feedback from statutory and non-statutory consultees and from the previous application at the site;
 - EIA topic specialists, resulting from the findings of site surveys or assessment work; and
 - A wide range of other specialist consultants forming part of the wider team, including specialists in planning, energy, drainage and utilities.
- 3.3.2 This section sets out the key stages of the design process and the main reasons for the selection of the current design.

Alternative Waste Management Technology Options

- 3.3.3 In considering alternative technology options and determining the ultimate technology option proposed at the site, the applicant sought advice from Vismundi Limited.
- 3.3.4 Vismundi Limited assessed the technology options available for the relevant waste streams and the resulting Alternative Technologies Assessment report is included at Appendix 3.1 to this chapter. The scope and conclusions of the report are summarised below.

- 3.3.5 The assessment considered the alternative processes for the treatment of the waste streams to be managed at the site.
- 3.3.6 The proposed 3Rs Facility would receive commercial, industrial and municipal wastes that have not been recycled and, in the absence of such a facility, would have been subjected to minimal sorting and materials recovery, and therefore would have largely been disposed of at landfill. A basic assumption of the assessment, taking into account the waste hierarchy, was that landfill was not an alternative option for these wastes. Furthermore, since the facility would be the receiver of the wastes and would not be engaged directly with the waste producer, nor with the method of collection of the wastes, alternative options for the collection methodologies and logistics were not considered.
- 3.3.7 The technology options considered included:
 - Mechanical sorting and treatment;
 - Biological processing in the form of:
 - o Composting;
 - Anaerobic digestion; and
 - Mechanical biological treatment.
 - Thermal treatment in the form of:
 - Combustion or incineration in the form of:
 - Moving grate combustion; and
 - Fluidised bed combustion; and
 - Gasification and pyrolysis.
- 3.3.8 The analysis concluded that mechanical pre-treatment followed by thermal treatment would be the best technology choice. Gasification was identified as a possible thermal treatment option, but was dismissed primarily due to its significantly smaller operational experience base. Pyrolysis does not currently demonstrate any environmental benefit and has a significantly weaker business case.
- 3.3.9 In view of the type of material to be treated at the site, alternative treatment technologies, such as composting, anaerobic digestant or mechanical biological treatment (with either of the latter processes), were not considered to be a viable option.
- 3.3.10 On balance, mechanical pre-treatment with energy recovery using modern, state of the art technology was identified as the preferred option. The main factors in this choice included:
 - Technical performance;
 - Reliability; and
 - Environmental performance, including emissions.
- 3.3.11 The selected technology is flexible and robust and would allow the facility to achieve "recovery" status in accordance with the Waste Framework Directive, providing an alternative to landfill in addition to much needed renewable energy.

Alternative Designs

3.3.12 National planning policy highlights the importance of good design as a key contributor to providing sustainable solutions to new development and working practice. The design of the facility has drawn upon a number of considerations, including the surrounding landscape context, topography, proposed facility requirements and layout and the views and aspirations of the local community.

- 3.3.13 The process has necessarily been iterative in nature, responding to technical and environmental considerations. The key design aims can be summarised as:
 - Retention and enhancement of existing landscape features;
 - Provision of new landscape treatment and minimising the height of the building;
 - Consideration of colour options for the main building, taking into account its landscape context;
 - Efficiency of building/plant layout;
 - Heavy goods vehicle (HGV) access and manoeuvrability;
 - Implementation of sustainable design;
 - Securing sustainable drainage and minimising impacts on adjacent watercourses;
 - Optimisation of the existing ground conditions, topography of the site and surroundings;
 - Minimising the environmental effects of the proposed development; and
 - Achievement of environmental improvements.
- 3.3.14 The design has been guided from the outset by the landscape context, the site configuration, topography and the operational needs of the facility.
- 3.3.15 In particular, the design has evolved through an understanding and appraisal of the site's context and the subsequent architectural design evolved through an iterative process guided by this, together with consultation with key stakeholders and outputs from the EIA process.
- 3.3.16 Input from the following key stakeholders has taken place at various stages throughout the evolution of the project and has influenced and shaped the design of the proposals:
 - Formal EIA scoping process: A formal Scoping Opinion was requested from the planning department of West Sussex County Council. The Council in turn consulted: The Environment Agency, Natural England, County Council (Highways, Environment, Heritage and Ecology), Warnham and Horsham District Councils, Gatwick Airport Aerodrome Safeguarding and Langhurstwood Road Residents Group.
 - EIA process: Key outputs and findings from the EIA process have been fed back to the architect team to enable the design to be responsive to the findings of the assessments and to incorporate recommended mitigation measures into the design of the facility, where appropriate.
 - Gatwick Airport Aerodrome Safeguarding: A separate specific consultation was held with Gatwick Airport Aerodrome Safeguarding in order to confirm any specific safeguarding measures that may influence the design.
 - Process engineers: The architect has worked closely with the process engineers to ensure that the emerging design would meet technical and operational requirements of the facility.
 - Community Liaison Group: A presentation by the applicant's agent of the early design concept was made to the Community Liaison Group for the project and their feedback, particularly in terms of scale, finish materials and cladding was fed into the design.
 - Committee report on the December 2016 application: The report of the planning committee in July 2017 has been reviewed to consider the key reasons for the recommendation for refusal of the December 2016 application on the same site. This has been taken fully into account in developing the updated design.
- 3.3.17 The design process has been heavily influenced by the aspirations of Britaniacrest Recycling Ltd for a functional and cost effective design that relates to the context of the site. Account has been taken of the potential effects of the buildings upon the surrounding landscape. This has been considered through the

visual assessment, using agreed viewpoints from the surrounding area with accurate site and building levels to consider the predicted view.

Design Process Prior to 2016 Application

- 3.3.18 This section sets out the evolution of the design prior to submission of the previous planning application in December 2016. In developing the design of the facility, the applicant considered a number of alternative layouts and designs for the site. The options considered during the design evolution process are summarised in Figure 3.1a-h.
- 3.3.19 Initial design options looked at separation of different elements of the design; the offices, workshop and waste transfer facility. These options also looked at the entrance route and the impact of the topography of the site.
- 3.3.20 Option 2 (Figure 3.1b) sought to include sustainable characteristics, such as maximising natural lighting in order to reduce the use of artificial lighting. This was to be achieved through the use of large areas of translucent cladding (see Figure 3.1c). However, when the potential landscape and visual effects of this option were appraised it was considered that, taking into account the 24 hour nature of the operations, the resulting night time light spillage would lead to an increase in potential impacts and, as a result, the amount of translucent cladding was reduced to a simple band that breaks up the vertical form of the boiler hall.
- 3.3.21 Option 4 (Figure 3.1e) was developed from the initial layout of Option 1 (Figure 3.1a). A large area of HGV parking was provided and a flexible and legible route around site was created. The footprint of the building changed as the brief was developed through comments from the client and technology providers.
- 3.3.22 Option 5 (Figure 3.1f) included the integration of offices, to increase health and safety for members of the public and staff by minimising the pedestrian and vehicle cross over.
- 3.3.23 The discovery of great crested newts within the ponds to the north of the site during the EIA process and the subsequent need to provide appropriate stand-offs between those ponds and the built development (in order to minimise the potential for effects and provide for sufficient space for ecological enhancement) resulted in a decrease in the site area available for development. This dictated the requirement for a more efficient layout to be created and this was achieved by integrating the tipping hall into the bunker and waste transfer facility. Extensive vehicle tracking was completed to minimise the footprint of this area whilst ensuring the one way system was maintained.
- 3.3.24 The design selected for the December 2016 submission scheme was derived following a further refinement to the layout, which provided for visitor and staff parking closer to the offices, especially for cyclists and disabled bay users and a more detailed analysis of the process equipment.
- 3.3.25 An image of the design at the time of the 2016 application is provided in Figure 3.1h.

Design Process Since the 2016 Application

- 3.3.26 Following submission of the 2016 application, feedback on the design was received from West Sussex County Council and its consultees. The design has been amended to respond to the feedback, with amendments to three key aspects, as described below:
 - Height of built structures;
 - Roof design; and
 - Colour options.

Height

3.3.27 Throughout the design process, a key aim was to minimise the height of the building through:

- Lowering the ground level as much as possible, whilst maintaining the functional operation and sustainable characteristics of the facility; and
- Lowering the roof height of the tallest elements of the facility to the minimum requirement of the technology providers. This resulted in a stepped roof design for the boiler hall.
- 3.3.28 The maximum height of the building was defined by the height of the boiler drum, with an allowance for a crane rail and gib. The height of the boiler drum was in turn set by the pathway the flue gas needs to travel to meet two criteria:
 - The requirement by the Industrial Emissions Directive for the flue gas to be at a temperature above of 850 °C for more than 2 seconds from the last injection of oxygen (air); and
 - The heat transfer surface of the boiler required to achieve the transfer of the heat from the flue gas to the water/steam in the boiler and superheater tubes to achieve the required steam temperature.
- 3.3.29 The current design is much lower in height than the previous design options considered (by almost 13 metres for the main building compared to the December 2016 application). This has been achieved through space efficiency in terms of the internal process technology and through sinking the design into the ground.

Roof Design

- 3.3.30 The design solutions considered consisted of two new distinct options. These were a curved roof solution, known as the 'curvilinear' option, and a rectangular solution. known as the 'rectilinear' option. Both the curvilinear and rectilinear options had the benefit over previous proposed design schemes of significantly reduced external height (as set out above).
- 3.3.31 The curvilinear solution incorporates a large sweeping curve across the facility. The purpose of the curve is to visually bring all of the separate elements of the facility together and to visually reduce the building's height. The reduction in building height is also helped by allowing the higher elements of the facility to protrude through the curve rather than taking the roof above all elements. This would have generated additional unnecessary volume and accentuated external visual mass.
- 3.3.32 The rectilinear solution was considered as an alternative approach to the facility design. This option kept the building form as a simple reflection of the necessary required internal process elements. Rather than using a sweeping curve to harmonise all of the different elements together, the use of colour and materials was intended to visually declutter and rationalise the design as one coherent entity.
- 3.3.33 For both options the flue gas treatment elements and silos would be housed within mesh screens to rationalise their visual appearance.
- 3.3.34 Both design options were presented at a public exhibition. The curvilinear option was favoured by the majority of residents as they considered that this would lessen the visual impact of the building.

Colour

- 3.3.35 The design process further considered visual effects through the placement of colour and the proposed façade treatment.
- 3.3.36 Great care has been taken to follow "Guidance on the selection and use of colour in development" (High Weald Area of Outstanding Beauty Partnership, 2017). It is aimed at integrating new buildings into the landscape in a way that benefits both the landscape and the built form. This can range from effectively camouflaging or minimizing the visual appearance of a utilitarian building to emphasizing the specific qualities of a place through the architecture, expressed in colour, form and massing. Good colour choices depend upon a good understanding of the proposed development in relation to its landscape setting.

3.3.37 The final colours chosen for the elevational treatment of the design reflect the darker, autumnal nature of the High Weald colour palette, and the desire to minimise the visual impact of the proposed facility within the landscape.

Summary

- 3.3.38 The design of the facility was achieved following a number of iterations. The design for the application was selected as the preferred option as it provided both the most operationally efficient design for the site and also the most beneficial in environmental terms. Grouping the buildings together and lowering the facility into the ground assisted in reducing the visual effect of the facility, making the most efficient use of the land.
- 3.3.39 Key design outcomes included:
 - Economic, with the capability of the facility being used innovatively;
 - Sustainable materials and design;
 - Design that enables speed of installation/ construction;
 - Self-cleaning surfaces to reduce frequency of maintenance to high risk areas;
 - High acoustic, fire, vibration, odour, movement mitigation;
 - Adhering to strict building insurance requirements;
 - Complex and strict access and security control requirements;
 - Complex vehicular logistic and movement strategy;
 - Health and safety considerations; and
 - Accommodating a 3Rs Facility with a capacity of 230,000 tonnes per annum incorporating a thermal treatment plant with a capacity to recover energy from 180,000 tonnes of residual waste in a single line.

Summary and Conclusions

- 3.3.40 The applicant considered a number of different technology options before deciding on the final scheme to take forward.
- 3.3.41 Mechanical pre-treatment followed by thermal treatment was assessed to be the best technology choice primarily based on technical performance, reliability, and environmental performance including emissions. Gasification was felt to be a possible thermal treatment option, but it was dismissed primarily due to its significantly smaller operational experience base. Pyrolysis does not currently demonstrate any environmental benefit and has a significantly weaker business case.
- 3.3.42 In view of the type of material to be treated at the site, alternative treatment technologies, such as composting, anaerobic digestant or mechanical biological treatment (with either of the latter processes) were not considered to be a viable option.
- 3.3.43 Mechanical pre-treatment and energy recovery using modern, state of the art technology is flexible and robust and was consequently selected as the technology proposed for the proposed 3Rs Facility. The facility would achieve "Recovery" status in accordance with the Waste Framework Directive and provide an alternative to landfill in addition to much needed renewable energy.
- 3.3.44 The design of the buildings and the site layout has evolved throughout the design development process and has been influenced and shaped by technical and environmental impact considerations as well as stakeholder consultation.

3.3.45 The final design has been selected as the preferred option as it provides both the most operationally efficient design for the site and is also the most beneficial in environmental terms. Grouping the buildings together and lowering the development into the ground has assisted in reducing the visual impact of the development, together with the use of an amended curvilinear roof design and suitable colour palette.

3.4 References

Publications

Biffa (2017) The Reality Gap (2017) (<u>https://www.biffa.co.uk/wp-content/uploads/2015/11/048944_BIFFA_Reality-Gap_2017Single-150817-2.pdf</u>).

Defra (2018) UK Statistics on Waste. 22 February 2018

High Weald AONB (2017) High Weald Area of Outstanding Natural Beauty Guidance on the Selection and Use of Colour.

Suez Environment (2017) Mind the Gap (www. <u>http://www.sita.co.uk/wp-content/uploads/2017/09/MindTheGap20172030-1709-web.pdf</u>).

Environmental Services Association (2017) "UK Residual Waste: 2030 Market Review" http://www.esauk.org/esa_reports/UK_Residual_Waste_Capacity_Gap_Analysis.pdf

4 Environmental Assessment Methodology

4.1 Introduction

4.1.1 This chapter of the Environmental Statement (ES) sets out the approach taken to the Environmental Impact Assessment (EIA) of the project. The chapter also includes details of the consultation undertaken to date and the overall approach to the assessment of the likely effects of the project. Further details of topic specific methodologies, such as survey methods, are provided in each topic chapter of this ES.

4.2 Scoping and Consultation

Scoping

- 4.2.1 Scoping is the process of identifying the issues to be addressed during the EIA process. Scoping is an important preliminary procedure, which sets the context for the EIA process.
- 4.2.2 Regulation 15 of the EIA Regulations allows an applicant to request that the local planning authority sets out its opinion (known as a Scoping Opinion) as to the issues to be addressed in the ES. Whilst there is no formal requirement in the EIA Regulations to seek a Scoping Opinion prior to submission of an ES, it is recognised as best practice to do so.
- 4.2.3 In order to produce an adequate and focused EIA, and in the interests of transparency, a formal request for a Scoping Opinion was submitted to West Sussex County Council in November 2015, in addition to topic specific consultations with the relevant bodies. A Scoping Opinion was provided by the Council on 15th December 2015.
- 4.2.4 A copy of the Scoping Request and resulting Scoping Opinion are included as Appendices 4.1 and 4.2 respectively. Responses were received from the following organisations:
 - A local resident and member of the Britaniacrest Residents Liaison Committee and community representative for Station Cottages, Station Road, Warnham;
 - DMH Stallard, on behalf of Liberty Property Trust (the developers of the North Horsham Allocation);
 - Environment Agency;
 - Gatwick Airport Aerodrome Safeguarding;
 - Horsham District Council;
 - Langhurstwood Road Residents Group;
 - Natural England;
 - Warnham Parish Council;
 - West Sussex County Council (WSCC) Strategic Planning Environment & Heritage;
 - WSCC Strategic Planning Ecology; and
 - WSCC County Highways.

Additional Consultation and Publicity

- 4.2.5 Consultation with interested parties has been undertaken during the development of the project. This section of the ES summarises consultation undertaken with stakeholders with regard to the EIA process.
- 4.2.6 In addition to the formal scoping consultation detailed above, the project team has undertaken consultation with, or requested information from a number of organisations. Details of the organisations contacted, the comments received and how these have been considered in the ES, are set out in the individual topic chapters.
- 4.2.7 In addition to the formal scoping request to the planning authority and other topic specific consultations noted above and within specific chapters, Britaniacrest Recycling Ltd has undertaken an extensive programme of stakeholder engagement prior to the submission of the application to ensure that stakeholders were fully informed of the proposals and were given the opportunity to input into the design elements and the identification of key issues to be addressed through the EIA process.
- 4.2.8 Full details of this process are provided in the Statement of Community Involvement included at Appendix 4.3 and in summary included:
 - A liaison committee was held, and continues to be held between Britaniacrest and the local community called the Community Liaison Group (CLG). The CLG had already been established prior to proposals emerging for the new development. Consequently, it was possible to build on the existence of the liaison group to develop the community liaison on the 3Rs Facility. Britaniacrest commenced communications on the proposed development in January 2016. Communication with the public at large commenced in October 2016 and included two sets of twoday exhibitions. These were accompanied on both occasions by information leaflets, called Britania Bulletin that were posted directly to the nearest residences. Britaniacrest has given consideration to comments received throughout the process, together with various other communications with local residents, businesses, councillors and officers. The prime objective of the pre-application communications programme was to provide the community with necessary information about the proposed development and planning application, and to answer questions and respond to concerns. This community engagement over time shaped the proposed development taking into account the opinion made by residents and the councils overwhelmingly wishing the building height to be as low as possible. This involved significant engineering redesign of the facility and a reduction % in height from the 2016 design has been achieved.
 - Communication with Elected Members: Britaniacrest gave elected members the opportunity to ensure that they were fully briefed on the proposals, the timing of exhibitions and the availability of formation so that Members could respond knowledgeably to residents if asked.
 - Engagement with Resident Community: Stakeholders were identified and made aware of the proposals by:
 - Briefings at the CLG: As described above.
 - Newspaper adverts: To raise the maximum possible awareness of the proposed development it was decided in consultation with the Liaison Group to advertise the public exhibitions in the District Post and the West Sussex County Times. The West Sussex County Times is a paid for paper which has a circulation of around 45,000 weekly readers in West Sussex. http://www.jplocalbusiness.co.uk/about/?ref=WSC. For the 2016 exhibition adverts were placed in the District Post on 30th September and in the West Sussex County Times on 6th October. For the 2018 exhibition, adverts were placed in the District Post on 19th January, and in the West Sussex County Times on 18th January and 25th January.
 - Facebook posts: To broaden and diversify the audience reached, Britaniacrest posted an advertisement regarding the forthcoming exhibition on the Britaniacrest Facebook page, which has 179 followers, on September 30th 2016. This received 25 likes and was shared 3 times by

the local community and remained on the top of their Facebook page newsfeed. The Britaniacrest advert post was also shared by the Horsham community Facebook page on the 1st October 2016, which has a greater following of 27,006 people. Horsham contains approximately 21,000 households and has a population of 49,000, making this is a substantial outreach into the local Horsham community.

- A dedicated website page: The Britaniacrest website (http://www.britaniacrestrecycling.co.uk) 0 has been in operation for a number of years and has incorporated information about the site 2015 "Wealden Works", and can be since August titled found on: http://www.britaniacrestrecycling.co.uk/wealden-works-clg. The website also includes a dedicated page about the proposed development of the application site on: http://www.britaniacrestrecycling.co.uk/wealden-works-dp including an advert about the public exhibition, site specific newsletter and graphic panels.
- Newsletter: Britaniacrest produced an A4 newsletter titled 'Britania Bulletin'. The first issue was circulated in early October 2016 to inform people about the 3Rs Facility and invite residents, businesses and all those interested to the public exhibition to find out more. A second Britania Bulletin was produced in January 2018 to update people on how the feedback given at the last exhibition has changed the new proposals and provide summarised information about the final submission and invite readers to attend the public exhibition, which took place over two days in late January 2018.
- A leaflet drop: a leaflet drop of the Britania Bulletin issue 1 newsletter was undertaken to all homes in Langhurstwood Road and Station Road. This distribution took place on the 5th October 2016. Prior to the second exhibition, the area of distribution was increased to include properties in Mercer Road, Bell Road, the east side of Church Street and Wyvern Place, in Warnham. All businesses in Langhurstwood Road also received the Britania Bulletin.
- Mailing List: A mailing list was started in August 2015 to ensure everyone who expresses a wish is kept informed about the site. Initially details pertaining to the Community Liaison Group were provided. Mailings will now also provide updates such as the Britania Bulletin newsletter. This is for the benefit of local residents in particular, so there is no need for them to keep checking the website to see if there is any new information on the 3Rs project. This mailing list is being added to all the time and will continue to ensure all those who want to be informed are kept up-to-date.
- o Public Exhibition and Graphic Panels: An exhibition was held at the Roffey Millennium Hall, Crawley Road, Horsham, on 7th October 2016 between 5pm and 7pm and 8th October 2016 between 10am and 1pm. A further exhibition was held at the Roffey Millennium Hall, Crawley Road, Horsham, on 26th January 2018 between 5pm and 7pm and 27th January 2018 between 10am and 1pm. Information panels were exhibited informing of the development, and images of these were also placed on the website. Copies of the latest newsletter were also available at the exhibition and for viewing and downloading from the website along with the advert. Key staff were on hand to show visitors around the information panels and to answer their questions. There was also supporting literature, maps and photomontages giving potential views from various locations, including views from local residential properties.
- Engagement with the Local Business Community: Local business neighbours in the Langhurstwood Road Wealden Brickworks industrial area, which are the immediate neighbours of the applicant site were also contacted.

4.3 Scope of this Environmental Statement

4.3.1 Taking account of the nature, size and location of the project, the information provided within the Scoping Opinion and other consultation responses provided throughout the EIA process, the following topics have been identified as key issues to be considered within the ES:

- Landscape and Visual Assessment;
- Traffic and Transport;
- Air Quality and Odour;
- Noise and Vibration;
- Archaeology and Cultural Heritage;
- Hydrology and Flood Risk;
- Hydrogeology and Ground Conditions; and
- Ecology and Nature Conservation.
- 4.3.2 Table 4.1 sets out the contents of this ES.

Table 4.1: Contents of this ES

Structure of ES	
Non-Technical Summary	Summary of the ES using non-technical terminology
Volume 1: Text	
	Glossary
Chapter 1	Introduction
Chapter 2	Site Description and Description of Development
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Landscape and Visual Assessment
Chapter 6	Traffic and Transport
Chapter 7	Air Quality and Odour
Chapter 8	Noise and Vibration
Chapter 9	Archaeology and Cultural Heritage
Chapter 10	Hydrology and Flood Risk
Chapter 11	Hydrogeology and Ground Conditions
Chapter 12	Ecology and Nature Conservation
Chapter 13	Population and Health
Chapter 14	Summary of Mitigation and Monitoring
Volume 2: Figures	
Including all figures and draw	ings to accompany the text.
Volume 3: Appendices	
Including specialist reports for	ming technical appendices to the main text.

4.3.3 Table 4.2 summarises some of the key environmental related concerns/topics raised through feedback received from the consultation process and sets out where the issues are addressed in the ES. Details of comments received within the formal Scoping Opinion and how these have been considered in the ES are set out in the individual topic chapters.

Topic Area	Location with ES	
Site Selection	Chapter 3: Need and Alternatives Considered	
	(also considered in the Planning Statement)	
Need	Chapter 3: Need and Alternatives Considered	
	(also considered in the Planning Statement)	
Operational Details	Chapter 2: Site Description and Description of Development	
Construction Details	Chapter 2: Site Description and Description of Development	
	See also construction effects section of topic chapters (Chapters 5-	
	13)	
Visual Impact	Chapter 5: Landscape and Visual Assessment	
Traffic	Chapter 6: Traffic and Transport	
Air Quality	Chapter 7: Air Quality and Odour	
	Chapter 13: Population ad Health	
Noise	Chapter 8: Noise and Vibration	
Safety & Pollution Control	Chapter 2: Site Description and Description of Development	
	Chapter 7: Air Quality and Odour	
Potential impacts to	Chapter 11: Hydrogeology and Ground Conditions	
groundwater		
Potential Cumulative	Topic chapters (Chapters 5-13)	
Impacts with other		
developments		
Regulation	Chapter 2: Site Description and Description of Development	
Community Liaison	Chapter 4: Environmental Assessment Methodology	
	(see also Statement of Community Involvement)	

Table 4.2: Topic Areas Identified During Public Consultation

Climate Change

Climate Change Resilience

4.3.4 Resilience to future climate change has been considered during the design process. The design has taken into account, for example, future flood risk and resilience to extreme weather events. The conceptual surface water drainage strategy for the project demonstrates that surface water run-off can be practicably managed, mimicking existing flows rates and, where possible, providing a betterment. Attenuation would comprise a mix of techniques including permeable paving and underground storage in line with SuDS guidance (Appendix 10.1). Further details are provided in Chapter 2 (Site Description and Description of Development) and Chapter 10 (Hydrology and Flood Risk).

Changes to Future Environmental Conditions

- 4.3.5 Consideration of predicted changes in baseline environmental conditions, including changes resulting from climate change, has been set out within each ES topic chapter (Chapters 5 to 13), where robust information is available at the time of writing. Details are provided in the methodology section of this chapter.
- 4.3.6 The assessment of effects for each topic has taken into account identified trends or changes predicted to arise as a result of climate change.

Effects of the Project on Climate

4.3.7 Atmospheric emissions associated with use of the project are assessed within Chapter 7 (Air Quality) of the ES. These include emissions from construction traffic. An evaluation of the effect of the project on greenhouse gases is provided in Appendix 2.3.

Topics Scoped Out of the EIA Process

4.3.8 Effects on other aspects of the environment are not likely to be significant. The topics scoped out of the assessment are summarised below.

Planning Policy

4.3.9 A chapter on planning policy context is not included in the ES. The draft guidance on EIA from the Department for Communities and Local Government 'EIA: A Guide to Good Practice and Procedures' (DCLG 2006) (paragraph 155) states that there is no requirement to provide chapters on planning and sustainability in Environmental Statements. A separate Planning Statement has been submitted with the planning application and the environmental topic chapters within the ES each set out the policy context relevant to that topic.

Material Assets

4.3.10 The EIA Regulations refer to 'material assets', including architectural and archaeological heritage. The phrase 'material assets' has a broad scope, which may include assets of human or natural origin, valued for socio-economic or heritage reasons. Material assets are in practice considered across a range of topic areas within an ES, in particular the population and historic environment chapters. These topics are included within this ES. Therefore, no separate consideration of material assets is considered necessary.

Radiation and Heat

4.3.11 Given the nature of the proposed development, no significant radiation or heat effects are anticipated and these effects have been scoped out of the assessment.

Aerodrome Safeguarding:

- 4.3.12 Whilst the site is located within the designated Aerodrome Safeguarding zone of London Gatwick Airport, the proposed height of the stack is clear of the takeoff/landing zones and the outer horizontal surface zone. The facility has been designed to ensure that the development does not compromise the operational integrity and safety of the airport and therefore the requirement for a specific ES chapter assessing aerodrome safety has been scoped out.
- 4.3.13 In addition, the following issues have been scoped out of specific topic chapters:
 - Chapter 6: Traffic A quantitative assessment of operational traffic has been scoped out on the basis that the facility would not result in an increase in operational traffic over and above that permitted for the existing Waste Transfer Station operations at the site.
 - Chapter 7: Air Quality and Chapter 12: Ecology and Nature Conservation The requirement for an assessment of the potential effects of emissions to air on nature conservation sites has been scoped out given that there are no nationally or internationally designated sites within 10 km of the site and that the Warnham Local Nature Reserve is located more than 1 km downwind of the site.
 - Chapter 7: Air Quality A detailed assessment of operational vehicle-related emissions has been scoped out on the basis that the proposed development would not generate a substantial number of traffic movements when compared with the approved development.
 - Chapter 8: Noise and Vibration A quantitative operational vibration assessment has also been scoped out as significant operational vibration effects are considered unlikely.
 - Chapter 9: Archaeology The need for intrusive archaeological surveys has been scoped out given that previous work at the site demonstrated that there was little or no potential for archaeological remains to be present within the site.
 - Chapter 11: Hydrogeology and Ground Conditions An intrusive ground investigation has been scoped out given the information that already exists in relation to the site.

- Chapter 13: Population and Health Consideration of socio-economics effects, as no significant effects on population or employment are considered likely (as agreed at the scoping stage).
- 4.3.14 Further details regarding the rationale and agreement to scope out these issues is provided in the relevant topic chapters.
- 4.4 Environmental Assessment Methodology

Relevant EIA Guidance

- 4.4.1 The EIA process has taken into account relevant government or institute guidance, including:
 - Department for Communities and Local Government (2014) Planning Practice Guidance at http://planningguidance.planningportal.gov.uk;
 - Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO;
 - Highways Agency et al. (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08;
 - Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;
 - Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report;
 - Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment Guide to Shaping Quality Development;
 - Institute of Environmental Management and Assessment (2015b) Climate Change Resilience and Adaptation; and
 - Institute of Environmental Management and Assessment (2016) Guide to Delivering Quality Development.
- 4.4.2 Other topic specific legislation and good practice guidance, including the National Planning Policy Framework (DCLG 2012), has been considered and details of these can be found in the topic chapters within this ES.

Key Elements of the General Approach

- 4.4.3 The assessment of each environmental topic forms a separate section of this ES. For each environmental topic in this ES, the following are addressed:
 - Assessment methodology;
 - Description of the environmental baseline conditions (existing and future conditions);
 - Identification of likely effects and evaluation and assessment of the significance of identified effects, taking into account any measures designed to reduce or avoid environmental effects which form part of the project and to which the developer is committed;
 - Identification of any further mitigation measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the project); and
 - Assessment of any cumulative effects with other developments planned in the area.

Methodology and Assessment Criteria

- 4.4.4 Each topic chapter provides details of the methodology for baseline data collection and the approach to the assessment of effects. Each environmental topic has been considered by a specialist in that area.
- 4.4.5 Each topic chapter defines the scope of the assessment within the methodology section, together with details of the study area, desk study and survey work undertaken and the approach to the assessment of effects. The identification and evaluation of effects has been based on the information set out in the project description contained within Chapter 2 of this ES, EIA good practice guidance documents and relevant topic-specific guidance where available.

Description of the Environmental Baseline Conditions (Including Future Baseline Conditions)

- 4.4.6 The existing and likely future environmental conditions in the absence of the project are known as 'baseline conditions'. Each topic based chapter includes a description of the current (baseline) environmental conditions. The baseline conditions at the site and within the study area form the basis of the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.
- 4.4.7 The baseline for the assessment of environmental effects is primarily drawn from existing conditions during the main period of the EIA work in the period 2015 to 2018.
- 4.4.8 The baseline for the assessment should represent the conditions that will exist in the absence of the project at the time that the project is likely to be implemented. The anticipated start date for construction is 2019. The programme would be of approximately three years duration (including enabling works). Full operation of the site has been assumed to take place in 2022. Further information about the construction programme assessed as part of the EIA process can be found in Chapter 2 of this ES.
- 4.4.9 Consideration has been given to any likely changes between the time of survey and the future baseline for the construction of the project from 2019 and for operation of the project from 2022. In some cases, these changes may include the construction or operation of other planned developments in the area. Where such developments are built and operational at the time of writing and data collection, these have been considered to form part of the baseline environment. Where sufficient and robust information is available, such as expected traffic growth figures, other future developments have been considered as part of the future baseline conditions. In all other cases, planned future developments are considered within the assessment of cumulative effects.
- 4.4.10 The consideration of future baseline conditions has also taken into account the likely effects of climate change, as far as these are known at the time of writing. This has been based on information available from the UK Climate Projections project (UKCP09), which provides information on plausible changes in climate for the UK (Environment Agency and Met Office, 2016) and on published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016).
- 4.4.11 Climate data from the UKCP09 database has been compiled for a 25 km² grid square containing the site, based on a medium emissions scenario. Mean air temperature and annual average precipitation data for the period 2020 to 2079 have been used to inform the consideration of how environmental conditions may change at the site and within the study area in future.

Mitigation Measures Adopted As Part of the Project

- 4.4.12 The EIA process is an integral part of the project appraisal and design process. During the EIA process, environmental issues have been taken into account as part of an ongoing design process. The process of EIA has therefore been used as a means of informing the design.
- 4.4.13 The project assessed within this ES therefore includes a range of measures that have been designed to reduce or prevent significant adverse effects arising. In some cases, these measures result in enhancement

of environmental conditions. The assessment of effects has taken into account measures that form part of the project and to which the applicant is committed.

- 4.4.14 The topic chapters set out the measures that form part of the project and that have been taken into account in the assessment of effects for that topic. These include:
 - Measures included as part of the project design (sometimes referred to as primary mitigation);
 - Measures to be adopted during construction to avoid and minimise environmental effects, such as pollution control measures. These measures would be implemented through the Construction Environmental Management Plan (CEMP); and
 - Measures required as a result of legislative requirements.

Assessment of Effects

4.4.15 The EIA Regulations require the identification of the likely significant environmental effects of the project. This includes consideration of the likely effects during the construction, operation and decommissioning phases of the project. This is based on consideration of the likely magnitude of the predicted impact and the sensitivity of the affected receptor. The process by which effects have been identified and their significance evaluated is set out within each individual topic chapter.

Sensitivity or Importance of Receptors

- 4.4.16 Receptors are defined as the physical or biological resource or user group that would be affected by a project. For each topic, baseline studies have informed the identification of potential environmental receptors. Some receptors will be more sensitive to certain environmental effects than others. The sensitivity or value of a receptor may depend, for example, on its frequency, extent of occurrence or conservation status at an international, national, regional or local level.
- 4.4.17 Sensitivity is defined within each ES topic chapter and takes into account factors including:
 - Vulnerability of the receptor;
 - Recoverability of the receptor; and
 - Value/importance of the receptor.

Magnitude of Impact

- 4.4.18 Impacts are defined as the physical changes to the environment attributable to the project. For each topic, the likely environmental impacts have been identified. For each topic the likely environmental change arising from the project has been identified and compared with the baseline (the situation without the project). Impacts are divided into those occurring during the construction and operation phases.
- 4.4.19 The categorisation of the magnitude of impact is topic-specific but generally takes into account factors such as:
 - Extent;
 - Duration;
 - Frequency; and
 - Reversibility.

Significance of Effects

4.4.20 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'). This is identified by considering the magnitude of the impact and the sensitivity or value of the receptor.

- 4.4.21 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national value, or a large impact on a resource of local value. In broad terms, therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity or importance of the receptor.
- 4.4.22 Significance levels are defined separately for each topic. Unless separately defined in the topic chapters, the assessments take into account relevant topic specific guidance, based on the following scale and guidance:
 - Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity;
 - Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process;
 - Moderate: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor;
 - Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and
 - Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
- 4.4.23 The terms minor, moderate, major and substantial apply to either beneficial or adverse effects. Effects may also be categorised as direct or indirect, secondary, short, medium or long term, or permanent or temporary as appropriate.
- 4.4.24 Each chapter defines the approach taken to assessment of significance. Unless set out otherwise in each topic chapter, effects assessed as moderate or above are considered to be significant in terms of the EIA Regulations within this assessment.

Further Mitigation and Future Monitoring

- 4.4.25 Where required, further mitigation measures have been identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment.
- 4.4.26 Where relevant and necessary, future monitoring measures have been set out within the topic chapters.

Assessment of Cumulative Effects

- 4.4.27 The EIA Regulations require consideration of cumulative effects, which are effects on a receptor that may arise when the project is considered together with other proposed developments in the area.
- 4.4.28 The cumulative effects of the project in conjunction with other proposed schemes have been considered within each topic chapter of the ES. Other developments considered within the cumulative assessment include those that are:
 - Under construction;
 - Permitted, but not yet implemented;
 - Submitted, but not yet determined; and

- Identified in the Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.
- 4.4.29 It is noted that developments that are built and operational at the time of submission are considered to be part of the existing baseline conditions.
- 4.4.30 Details of the developments included as part of the cumulative assessment are provided in Appendix 4.4.

Interrelationships

4.4.31 Each topic chapter considers whether or not there are any inter-related effects with other topics included within the EIA that have not already been considered in order to identify any secondary, cumulative or synergistic effects.

Summary Tables

4.4.32 Summary tables have been used to summarise the effects of the project for each environmental topic.

4.5 References

Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017.

Department for Communities and Local Government (DCLG) (2006) Environmental Impact Assessment: A Guide to Good Practice and Procedures – A Consultation Paper.

Department for Communities and Local Government (2012) National Planning Policy Framework.

Department for Communities and Local Government (2014) Planning Practice Guidance. Available at: http://planningguidance.planningportal.gov.uk

Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO.

Environment Agency and Met Office (2017) UKCP09 Website http://ukclimateprojections.metoffice.gov.uk/ Accessed February 2018.

Highways Agency, Transport Scotland, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2008) Assessment and Management of Environmental Effects. Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08.

Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment.

Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report.

Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment Guide to Shaping Quality Development.

Institute of Environmental Management and Assessment (2015b) Climate Change Resilience and Adaptation.

Institute of Environmental Management and Assessment (2016) Environmental Impact Assessment Guide to Delivering Quality Development.

5 Landscape and Visual Impact Assessment

5.1 Introduction

General

- 5.1.1 The purpose of this chapter is to identify and assess the landscape and visual effects which would result from the proposed development of the proposed Recycling, Recovery and Renewable Energy (3Rs) Facility at Langhurstwood Road, Horsham, West Sussex.
- 5.1.2 The site is situated on part of the redundant Wealden Brickworks site, to the north west of Horsham. The northern boundary of the site is formed by hardstanding and an area of woodland surrounding two large ponds. Further to the north, is Brookhurst Wood landfill site and Brookhurst Wood landfill site extension. The eastern boundary is the western side of the access road to Biffa Waste Services. To the south of the site lies Weinerberger's brick and tile manufacturing and distribution depot. The site's western boundary is formed by the railway line that runs north-south from Dorking to Horsham. The site includes the access road east from to Langhurstwood Road. A plan showing the location of the site is shown on Figure 5.1 and relevant landscape designations and main planning allocations within the study area are shown on Figure 5.2.

Scope of Study

- 5.1.3 This chapter provides an assessment of the effects of the proposed development on the existing landscape receptors and character and on the visual resources and receptors of the surrounding environment. These assessments have been carried out in accordance with the methodologies set out below and described in more detail in Section 5.3 of this chapter.
- 5.1.4 This chapter provides an overview of the site within the landscape and visual context of the surrounding area and sets out the planning context of the site with reference to landscape and visual matters (Figure 5.2). The existing landscape features, elements and landscape characteristics, which together make up the landscape character or resource, are described and reference is made to published landscape character studies and landscape designations. The current visibility of the site from a variety of representative viewpoints in the surrounding landscape is also assessed.
- 5.1.5 A description of the proposed development is provided and the potential effects of these proposals on the landscape resource and the visual environment are identified. Where appropriate, mitigation measures are proposed to prevent, reduce or offset adverse effects.
- 5.1.6 An assessment of the effects of the proposed development on the landscape and visual environment has been made. The assessment has been undertaken for the construction phase, operational and maintenance phase, as well as the decommissioning phase of the proposed development (although as this would be subject to a decommissioning environmental management plan closer to the time of the proposed decommissioning of the facility, the impacts have not been detailed). The operation and maintenance phase assessment includes an assessment of the potential effect during the first winter following completion of the development (year 1) after the mitigation measures have been implemented, but at which time their effect would be limited (worst case).
- 5.1.7 Landscape effects refer to changes arising from the proposed development on the physical elements that make up the landscape and which influence its character. These, together, form the landscape resource. Visual effects refer to the changes to existing views available from viewpoints within the landscape surrounding the site.

- 5.1.8 Drawings and photographs are used to illustrate the assessment. The extent of the potential visibility and the location of photographic viewpoints are indicated on Zones of Theoretical Visibility (ZTV) which are used to help inform the scope of the assessment by excluding from consideration areas that would not be influenced by the proposed development. Viewpoints within the ZTV were agreed with Tim Dyer, Team Manager of Environment and Heritage at West Sussex County Council. Photographs were taken from the viewpoints on 3rd October 2016, 3rd March 2017, 30th May 2017, 20th December 2017 and 9th February 2018, looking towards the site from the surrounding landscape and are included in this chapter (Figures 5.9 to 5.37).
- 5.1.9 The *Guidelines for Landscape and Visual Impact Assessment: Third Edition* (Landscape Institute and Institute of Environmental Management and Assessment, 2013) (GLVIA3), recommend a proportional approach to landscape and visual assessment. This chapter focuses on those receptors that are considered most likely to experience significant effects. The receptors that are unlikely to experience significant effects have been omitted from the assessment.

Study Area

- 5.1.10 The study area for the assessment extends to a 20 km radius from the outer edges of the site. The ZTV coincides with areas of the low ground surrounding the site as well as some areas of higher ground further from the site boundary. Much of the land within the study area is occupied by mature vegetation that significantly limits views for a high number of visual receptors.
- 5.1.11 The ZTV coincides with south facing slopes of the Surrey Hills Area of Outstanding Natural Beauty (AONB) to the north of the site as well as west facing slopes of the High Weald AONB to the east of the site and the South Downs National Park (SDNP) to the south and west.

5.2 Legislation and Policy Context

- 5.2.1 This section summarises relevant legislation and policies that are directly relevant to landscape and visual issues.
- 5.2.2 The site is located within an area allocated as a 'built waste site' in the West Sussex Waste Local Plan (West Sussex County Council and South Down National Park Authority, 2014). Designations within the study area are shown on Figure 5.2, they include the nationally designated South Downs National Park the High Weald Area of Outstanding Natural Beauty (AONB) and the Surrey Hills AONB. There are no specific landscape or cultural designations within the site boundary, or adjoining the site.
- 5.2.3 Planning policy context with regard to the proposed development and landscape and visual issues is addressed below. The aims of the various policies, at national, county and local level, are outlined.

European Landscape Policy

European Landscape Convention (2006)

5.2.4 The European Landscape Convention (Council of Europe, ratified 2006) (ELC) requires that each party (member state) *"establish and implement landscape policies aimed at landscape protection, management and planning..."* through the adoption of specific measures (Article 5). Landscape Protection is defined in Article 1d as *"actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity."* The specific measures set out at Article 6 require, amongst other matters, each party to undertake an analysis of the characteristics and the forces and pressures on its landscapes (Article 6C, 1a (ii)) and *"to assess the landscapes identified taking into account the specific values assigned to them by the interested parties and the population concerned"* (Article 6C, 1b).

National Policy and Guidance

National Policy Statements

5.2.5 Whilst the proposed facility is not a Nationally Significant Infrastructure Project, the National Policy Statements (NPSs) are recognised as a material consideration in decisions on planning applications. The relevant sections within the NPSs are set out below.

Overarching National Policy Statement for Energy (NPS EN-1)

- 5.2.6 NPS EN-1 (DECC, 2011a), Part 5 Generic Impacts, Section 5.9 discusses the generic landscape (including seascape and townscape) and visual impacts that might result as from energy infrastructure. The NPS recognises that the impacts will vary, depending on the type, location and context of the development (paragraph 5.9.1).
- 5.2.7 Paragraph 5.9.2 notes that cooling towers, exhaust stacks and the associated steam plumes have the most obvious impact on the landscape.
- 5.2.8 Paragraphs 5.9.5 to 5.9.7 set out what an assessment of the effects on landscape and visual resources should include. Paragraph 5.9.7 specifically requires light pollution to be included in the assessment.
- 5.2.9 The aim of the development is to minimise harm of the development on landscape and visual resources (paragraph 5.9.8).
- 5.2.10 As a development outside, but potentially within sight of, a nationally designated landscape, paragraph 5.9.12 of the NPS is relevant. Any large energy developments should aim not to compromise the purpose of the designation of the nationally designated landscape. Such projects should be designed sensitively, given locational and operational constraints. However, paragraph 5.9.13 states that "*the fact that a proposed project will be visible from within a designated area should not in itself be a reason for refusing consent."*
- 5.2.11 The proposed development will not be in a locally designated landscape, however, paragraphs 5.9.14 to 5.9.17 are relevant, in respect of landscape and visual impacts. Paragraph 5.9.15 recognises that the scale of such projects means that they are often visible within may miles of the location. The judgement to be made is *"whether any adverse impact on the landscape would be so damaging that is not offset by the benefits (including need) of the project"* (paragraph 5.9.16). The NPS explains that the project should be designed carefully, taking into account the effects on landscape and taking into operational and other relevant constraints and should *"minimise harm to the landscape, including by reasonable mitigation"* (paragraph 5.9.17).
- 5.2.12 Visual impact is considered in paragraphs 5.9.18 to 5.9.20. The NPS recognises that all proposed energy infrastructure is likely to have a visual effect for many people. The judgement, as with landscape impacts, is whether the visual effects on sensitive receptors, outweigh the benefits of the project. The NPS recommends referring to existing permitted infrastructure with similar magnitudes of impact, to assist in judging weight to be given. The NPS raises the importance of assessing the visible plume from stacks (paragraph 5.9.20).
- 5.2.13 Different types of mitigation are explored in paragraphs 5.9.21 to 5.9.23. These include reducing scale, appropriate siting, design (including colours and materials) and landscaping schemes where possible. Offsite planting may be appropriate to mitigate long distance views.

National Policy Statement for Renewable Energy Infrastructure (NPS EN-3)

5.2.14 Section 2.5 of the NPS (DECC, 2011b) is concerned with biomass and waste combustion. The recovery of energy from waste combustion is considered to be a renewable energy supply and will form an increasingly

important role in meeting the UK energy targets (paragraph 2.5.2). With regards to location, the sequential approach does not apply.

- 5.2.15 With regards to landscape and visual impacts of energy from waste facilities NPS EN-1 provides the information on the generic impacts (as set out above). Specific considerations for energy from waste facilities are that *"the proposed generating station is of appropriate quality and minimises adverse effects on the landscape character and quality"* (paragraph 2.5.47). Paragraph 2.5.50 notes that good design, including materials, will go some way to mitigating adverse landscape and/or visual effects. Paragraph 2.5.51 notes that *"mitigation is achieved primarily through aesthetic aspects of site layout and building design including size and external finish and colour of the landscape to minimise intrusive appearance in the landscape as far as engineering requirements permit."*
- 5.2.16 With regards to landscape treatment applicants should seek to visually enclose facilities *"at low level as seen from the surrounding external viewpoints. This makes the scale of the generating station less apparent, and helps conceal its lower level, smaller scale features. Earth bunds and mounds, tree planting or both may be used for softening the visual intrusion..."* (paragraph 2.5.52).

National Planning Policy Framework (2012)

- 5.2.17 National Planning Policy Framework (NPPF) (DCLG, 2012) paragraph 17 sets out the core land-use planning principles. The principles should include; Securing high quality design and good standards of amenity for all existing and future occupants; taking account of different character of different areas; recognising the intrinsic character and beauty of the countryside; conserving and enhancing the natural environment; and, reusing land that that has been previously developed.
- 5.2.18 Section 7 of the NPPF is concerned with good design. Paragraph 56 emphasises the fact that good design is a key aspect of sustainable development and should contribute positively to making places better for people. Paragraph 57 explains that all development should be of high quality and inclusive. Paragraph 61 notes that whilst visual appearance and architecture is important, high quality and inclusive design goes beyond aesthetic considerations. The integration of new development into the natural and built environment is also an important consideration.
- 5.2.19 NPPF Section 11 Conserving and enhancing the natural environment, is of particular relevance to this chapter. Paragraph 109 explains that the *"planning system should contribute to and enhance the natural and local environment."*
- 5.2.20 Paragraph 110 requires local plans to minimise adverse effects on the local and natural environment and that *"plans should allocate land with the least environmental and amenity value, where consistent with other policies"* in the NPPF.
- 5.2.21 The NPPF, at paragraph 111, requires that *"planning policies and decisions should re-use land that has been previously developed (brownfield land), provided that it is not of high environmental value."*
- 5.2.22 Paragraph 115 states that "Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty".
- 5.2.23 Paragraph 125 requires planning policies and decisions to *"limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation"* by encouraging good design.
- 5.2.24 In the chapter on plan-making, the section on Local Plans emphasises the need to deliver sustainable development (paragraph 150) and that Plans must be prepared to achieve this (paragraph 151). Significant adverse impacts on economic, social and environmental dimensions of sustainable development should be avoided and *"where adverse impacts are unavoidable, measures to mitigate the impact should be*

considered. Where adequate mitigation measures are not possible, compensatory measures may be appropriate" (paragraph 152).

- 5.2.25 *"Local Plans should set out the strategic priorities for the area in the Local Plan. This should include strategic policies to deliver" ... "waste management"* and *"conservation and enhancement of the natural and historic environment, including landscape" (*paragraph 156). Local Plans should indicate land-use designations on a proposals map and *"identify land where development would be inappropriate, for instance because of its environmental or historic significance"* (paragraph 157).
- 5.2.26 The site is a brownfield site, allocated in the West Sussex Waste Local Plan (2014) Policy W10 for a 'built waste site', i.e. a waste facility contained within a building (illustrated on Policy Map 4) (see below). It is not within a nationally designated landscape and it is not in an area identified as inappropriate due to environmental or historic reasons.

Development Plan Policy

West Sussex Waste Local Plan (2014)

- 5.2.27 Policies contained within the West Sussex Waste Local Plan that are considered relevant to this chapter of the ES are detailed below.
- 5.2.28 Policy W10: Strategic Waste Allocations allocates the Brookhurst Wood site (the site) as one of five strategic sites allocated to meet identified shortfalls in transfer, recycling and recovery capacity, which are: *"acceptable, in principle, for the development of waste management facilities for the transfer, recycling, and/or recovery of waste (including the recycling of inert waste)"* (see Policy Map 4), of a scale (300,000tpa) consistent with the 3Rs Facility. The West Sussex Waste Local Plan (Sustainability Appraisal Report), Appraisal Objective G: to protect and, where possible, enhance landscape and townscape character, indicates that development of the site offers positive short and medium term and neutral long-term opportunities. It notes that the site currently has adequate screening and that development of the site represents an opportunity to improve the appearance of/or replace the existing derelict buildings.
- 5.2.29 The development of the allocated sites must satisfactorily address the 'development principles' for each identified site. The site specific supporting text to Policy W10 is at paragraph 7.3.14 and 7.3.15. It notes that the site is a brownfield site, allocated in Policy AL14 of the Horsham Local Development Framework for mixed-use development, including waste management. The development principles for the Brookhurst Wood site includes:

"assessment of impact (e.g. traffic, noise odour) on the amenity of nearby dwellings and businesses and possible mitigation required."

- 5.2.30 Chapter 8 of the West Sussex Waste Local Plan sets out the Development Management Policies (Policy W11 to Policy W23) which are *"designed to ensure that there would be no unacceptable harm to amenity, character and the environment or to other material considerations from waste development proposals"* (paragraph 8.1.1). Those relevant to landscape and visual resources are summarised below).
- 5.2.31 Paragraph 8.2.1 explains that, regarding landscape character, the relevant strategic objective is "8: To protect and where possible enhance the special landscape and townscape character of West Sussex." The policy to achieve this is Policy W11: Character. The policy states that "proposals for waste development will be permitted provided they do not have an unacceptable impact" on character and distinctiveness and sense of place. The policy requires that any waste development should "reflect and, where possible, reinforce the character of the main natural character areas (including the retention of important features or characteristics)." The supporting text recognises that the scale, appearance and level of activity associated with waste facilities can result in adverse impacts to the existing landscape character and requires that "such impacts are kept to an acceptable level" (paragraph 8.2.3). Paragraph 8.2.4 explains that proposed development should take account of the character of the area within which it is to be located and that

"particular attention should be given to the design of facilities to safeguard character and the need for techniques of mitigation to minimise the potential impacts of the proposals."

- Paragraph 8.3.1 of the West Sussex Waste Local Plan repeats the strategic objective (13) to protect and 5.2.32 enhance the special landscape character of West Sussex, in the need for Policy W12: High Quality Development. The policy requires that proposals for waste development "will be permitted provided that they are of high quality and, where appropriate, the scale, form, and design (including landscaping) take into account the need to" ... "have regard to the local context" including: The character of that part of the county in which it is located; the characteristics of the proposed site, including both natural and man-made features; and, the topography, landscape and skyline of the surrounding area. The supporting text explains that the quality of a proposed facility is not just its appearance, but also how it fits with the surroundings, which can include the material from which it is constructed. Paragraph 8.3.3 notes that achieving high guality development can help to reduce the impact of such facilities. The text explains that poor quality development will not be permitted and points developers of such facilities to the County Council's High Quality Waste Facilities Supplementary Planning Document (2006) (not generally available) (paragraph 8.3.4). The need to work with the characteristics of the site and surrounding area and the need to protect existing views are emphasised in paragraph 8.3.6. The role of landscaping and planting in improving the guality of the environment is noted as part of achieving high guality design (paragraph 8.3.7).
- 5.2.33 The strategic objective of Policy W13: Protected Landscapes, is "*9: To protect the SDNP and the two AONB from unnecessary and inappropriate development"* (paragraph 8.4.1). It notes that, with specific exceptions, proposals within such designated landscapes will not be permitted. The policy states that *"proposals for waste development located outside protected landscape will be permitted provided that they do not undermine the objectives of the designation."* Within West Sussex, the 15 km study area includes parts of the South Downs National Park and the High Weald AONB. The purposes of the South Downs National Park and the AONBs include conserving and enhancing the natural beauty of the area (paragraphs 8.4.2 and 8.4.3). The AONBs have also been designated due to their distinctive character and remote and tranquil nature (paragraph 8.4.3). Development inside, or outside these designated areas must not undermine the objectives of their designation (paragraph 8.4.4).
- 5.2.34 The relevant strategic objective for public health and amenity is *"13: To protect and, where possible, enhance the health and amenity of residents, businesses and visitors"* (paragraph 8.10.1). West Sussex Waste Local Plan Policy W19: Public Health and Amenity, explains that proposals for waste development will be permitted provided that, amongst other emissions, lighting, would not have an unacceptable impact on public health and amenity. The supporting text explains that light pollution can be mitigated by careful design of light sources and that *"The appropriate measures will depend on the characteristics of the proposal. The site, and the surrounding area"* (paragraph 8.10.4).
- 5.2.35 The strategic objectives for cumulative impact are *"10: To protect and, where possible, enhance the natural and historic environment and resources of the County, and 13: To protect and, where possible, enhance the amenity and safety of residents, businesses, and visitors" (paragraph 8.12.1). Policy W21: Cumulative Impact notes that proposals for waste development will be permitted provided that an unreasonable level of disturbance to the environment and/or local communities will not result from the development. <i>"Account will be taken of the potential cumulative impact of waste management and other operations on the locality"* (paragraph 8.12.2).

Horsham District Planning Framework (2015)

5.2.36 The Warnham and Wealden Brickworks are shown as Allocation AL14, as a site for employment use, on Inset Map 21 of the Horsham District Planning Framework (Horsham District Council, 2015). The District's Spatial Vision recognises the contribution the high quality natural environment plays to the District's overall attractiveness and identity. It states that the landscape will be valued, enhanced and promoted, ensuring an attractive place for communities, business and welcoming additional visitors (paragraph 3.10). The environmental resources and environmental quality of the area will have been maintained and enhanced (paragraph 3.11).

- 5.2.37 The Spatial Objectives (SO) are listed in paragraph 3.14 and include: A need to ensure a balance between economic, social and environmental priorities (SO1); a need to promote businesses in Horsham, whilst preserving its attractiveness (SO4); to locate new development in sustainable locations, encouraging the appropriate re-use of brownfield sites (SO7); and, to identify and preserve the unique landscape character of the District, ensuring that new development minimises the impact on the countryside (SO10).
- 5.2.38 The Spatial Portrait for Horsham District sets out Strategic Development Principles up to 2031. The strategy accommodates necessary, sustainable change, but with the emphasis on *"respecting the local character wherever possible"* (paragraph 3.15). It recognises that a mixed urban/rural environment present challenges, but that these should be met, whilst at the same time maintaining and enhancing the natural beauty of the area (paragraph 3.17). The diversity of the landscapes, townscapes and settlement pattern that characterise the District is recognised as an environmental and cultural asset which needs to be respected and enhanced, whilst at the same time recognising that there is a need to plan for new infrastructure (paragraph 3.18). Paragraph 3.26 notes that it is *"critical that the character* [of] *the district is conserved and enhanced, but this must be integrated with the need to accommodate change in order to address social or economic objectives and meet the needs of communities. In doing so it will be necessary to ensure not only that harm to the environment is minimised but that where possible opportunities are taken to bring about improvements".* The gradual effect of cumulative development on character is noted.
- 5.2.39 Sustainable Development Policies that are of relevance to this application include Policy 1 Strategic Policy: Sustainable Development. The supporting text explains that "*the final bullet point of this policy relates to development which could impact* [on] *the setting of the South Downs National Park and the High Weald AONB*" (paragraph 4.3). The policy echoes the NPPF's positive approach to sustainable development and states that adverse impacts have to significantly and demonstrably outweigh the positive benefits of a development, before a development is refused planning permission, or (the final bullet point) that "*specific policies in the Framework indicate that development should be restricted*". Strategic Policy 2 Strategic Development, point 8. "*encourages the effective use of land that has been previously developed (brownfield land) provided it is not of high environmental value.*" Point 12 of Policy 2 requires development *to "retain and enhance natural environmental resources, including landscapes...*".
- 5.2.40 Strategic allocation policies include policy SD1, which is the policy setting out the requirements for the North of Horsham development (subject to a resolution to grant outline permission). It provides information on this mixed-use development, which lies to the east of Langhurstwood Road. The landscape and visual resources of the development site are described in paragraphs 7.24 to 7.29 and the landscape and open space proposals are outlined in paragraphs 7.31 to 7.33. Policy SD6 sets out the requirements for the North of Horsham development in terms of the landscape buffer, landscape character and green infrastructure. The part of the development closest to Langhurstwood Road forms part of that landscape buffer (a cemetery, public open space and allotments) (point 4). It also requires advance planting in key visually sensitive locations (point 6).
- 5.2.41 Chapter 9 of the Horsham District Planning Framework, is concerned with conserving and enhancing the natural and built environment. The supporting text to Policy 24: Environmental Protection, explains that "appropriate types and locations of lighting should be used, so as not to give rise to unnecessary light pollution, particularly in rural areas." The policy itself requires developments to minimise light pollution. It also requires that the cumulative impact of all relevant committed developments is appropriately assessed (point 7). District character is discussed in the introduction, in paragraphs 9.3 to 9.5. The paragraphs note the differences in character within the District, as well as noting the designated landscapes. Paragraph 9.5 also explains that although not designated, other rural areas are valued by people who live and work in the district and has relatively unspoilt qualities. However, it recognises that changes are required to meet the District's strategic objectives "It is therefore important that the attractive qualities of the District are retained, whilst accommodating change to meet the District's wider and social and economic objectives." Design of new development is discussed in paragraph 9.8, which states that it should draw on local characteristics which should be considered with visual and functional concerns. Good design as environmental mitigation is thus incorporated in the development. Environmental protection, including from light pollution, is discussed in the supporting text to Policy 24, at paragraph 9.10 "appropriate types and locations of lighting should be

used, so as to give rise to unnecessary light pollution, particularly in rural areas." Policy 24 expects developments "to minimise exposure to pollutants including ... light pollution".

- 5.2.42 The supporting text to Policy 25: The Natural Environment and Landscape Character, is set out in paragraphs 9.14 to 9.17. The rural quality of the District is highly valued by residents and visitors. Even small changes can cumulatively impact on the landscape and proposed development will *"need to demonstrate that proposals conserve and enhance the character of the district as identified in documents such as the Horsham District Landscape Character Assessment 2003, and that development is located in in areas with the greatest landscape capacity to accommodate development as indicated in the Landscape Capacity Assessment 2014" (paragraph 9.14). Paragraph 9.17 explains that <i>"whilst the undeveloped nature of rural areas must be protected, it is acknowledged that there may be circumstances where development is necessary to ensure the continued sustainable development of rural areas"* including upgrades to infrastructure and renewable energy. Policy 25 states that the landscape character, taking into account areas identified as being of landscape importance, will be supported by the Council (point 1). The policy also refers to conserving the setting of the South Downs National Park (point 7).
- 5.2.43 The supporting text for Policy 26: Countryside Protection, explains that the Council is seeking to identify the most valued parts of the District for protection and notes that it important that the unique characteristics of the district landscapes are retained and where practicable enhanced. New development should take into account the key characteristics of the District's landscape character areas (paragraph 9.18). The Policy states that the countryside location and must also meet certain criteria, one being that the development must require a countryside location and must also meet certain criteria, one being that the development must enable the extraction of minerals or the disposal of waste (point 2). The second part of Policy 26, requires that in addition to the first part, new development must be of a *"scale appropriate to its countryside character and location"*. The Policy explains that *"development will be considered acceptable where it does not lead, either individually or cumulatively, to a significant increase in the overall level of activity in the countryside, and protects, and/or conserves, and/or enhances, the key features and characteristics of the landscape character area in which it is located."*
- 5.2.44 Strategic Policy 32: The Quality of New Development, is supported by paragraph 9.36, which explains that the Policy seeks to promote a high standard of architectural and landscape design in the District. Development will be required to enhance and protect locally distinctive characters, through good design and landscaping, amongst other matters. The Policy requires high quality and inclusive design, which, amongst other requirements: Provides an attractive, functional, accessible space (point 1); complements the locally distinctive characters of the District (point 2); and, contributes to a sense of place (point 3).
- 5.2.45 Strategic Policy 33: Development Principles, ensures that development is of high quality, well-designed and takes account of the existing character of the area (paragraph 9.37). The Policy requires the new development to: Make efficient use of land and prioritise previously developed (brownfield) land (point 1); avoid unacceptable harm to residents and users of nearby properties and land, e.g. through overlooking (point 2); ensure that the scale and massing and appearance of the development is of a high standard and where relevant relates sympathetically to the impact on the skyline and important views (point 3); respect the character of the surrounding area, including views (point 4); use high standards of building materials, finishes and landscaping (point 5); and, retain, where possible, existing important landscape and natural features (point 6).

Horsham Landscape Capacity Assessment (2014)

5.2.46 The Horsham District Landscape Capacity Assessment (Horsham District Council, 2014) was undertaken to assist in the decision-making process for the location of sustainable development. The Council's Landscape Officer undertook the detailed Landscape Capacity Analysis (supported by NPPF, paragraph 170) which was used to inform the Horsham District Local Development Framework (paragraph 1.3). The site falls within Zone 1: North Horsham and West of Crawley. The report explains that the levels of sensitivity and capacity are general statements and provide pointers to landscape and visual matters, that would need to be

addressed. Areas that have been identified as having moderate or high capacity may not have that capacity over the whole of the area (paragraph 1.8). The report makes judgements about whether the amount of change proposed can be accommodated without having an unacceptable adverse effect on the character of the landscape, or the way that is perceived (visual resources and views) without compromising landscape value.

5.2.47 The area in which the site is located is identified as Area 15 on the 'Zone 1 – North Horsham to Crawley Landscape Capacity of Local Landscape Character areas for Employment Development' map (Figure 5.6). The extract from the Landscape Capacity Assessment, for Area 15 (page 32) is set out in Section 5.5 of this chapter.

South Downs National Park and AONB Policy Documents

5.2.48 In addition to the planning policy and guidance set out above, the South Downs National Park Local Plan, the High Weald AONB Management Plan and the Surrey Hills AONB Management Plan were considered during the preparation of this ES chapter, as they form a material consideration in the planning process. The reasons for the designation of the AONBs within the study area and their special qualities were reviewed. Additional documents used to inform the design of the proposed building include 'Guidance on the selection and use of colour in development' (High Weald AONB, 2017).

South Downs National Park Local Plan (pre-submission draft) (2017)

5.2.49 The pre-submission draft Local Plan (South Downs National Park, 2017) notes that the foremost duty of the South Downs National Park Authority is to conserve and enhance the landscapes and the special qualities of the NP. It notes that landscape is the key to all seven of the special qualities of the South Downs National Park (paragraph 1.13) which are illustrated on Figure 1.2 of the plan. The special qualities which relate to the area within the National Park do not apply. However, Special Quality 1. Diverse, inspirational landscapes and breath-taking views, relates to land both inside and outside the NP boundary. The text within the Local Plan refers to *"sweeping views north across the Weald"* from the scarp slope (paragraph 3.36). As the site is 15.4 km to the north and east of the South Downs National Park at its closest point it is unlikely that the views of the Weald will be significantly impacted from the proposed development.

High Weald AONB Management Plan 3rd Edition (2014 – 2019)

- 5.2.50 Areas of Natural Beauty are designated by the Government for the purpose of ensuring that the special qualities of the finest landscapes in England, Wales and Northern Ireland are conserved and enhanced. The primary purpose of the AONB designation is to conserve and enhance the natural beauty of the area.
- 5.2.51 The importance of the setting of an AONB is discussed at paragraph 2.5 of the Management Plan (High Weald AONB, 2014). It explains that AONBs are not isolated units and that development within the setting of an AONB can affect views of the AONB or from it. The site is 2.9 km to the west of the High Weald AONB.
- 5.2.52 The Statement of Significance (High Weald AONB Management Plan, page 26) defines the natural beauty of the AONB, its character and Special Qualities associated with it. The Statement provides the criteria against which impacts on the AONB can be judged. The description of the Special Qualities of the AONB relates to the area of the AONB. Only the description of *"wonderful views"* (last paragraph of the Statement of Significance) could be applied to land outside the AONB's boundary.
- 5.2.53 High Weald AONB Understanding and Enjoyment Objective UE5: To promote the perceptual and aesthetic qualities that people value, is to ensure that the *"special qualities that people value are recognised and taken account of in AONB management."* One of the AONB Targets for 2019 is to produce guidance on the protection of views and the assessment of visual impact (point c.).

High Weald AONB Guidance on the selection and use of colour in development (September 2017)

- 5.2.54 The guidance (High Weald AONB, 2017) explains that colour makes a key contribution to the landscape character and local distinctiveness of the area. Choosing the correct colours for new development will help to contribute to local distinctiveness (paragraphs 1.1) while poor design and generic solutions to new development is a major threat to distinctiveness and will increase a sense of urbanisation (paragraph 1.2).
- 5.2.55 The colours of the AONB have been analysed and synthesised into existing colour palettes and then suggestions made for developed palettes (paragraph 1.5). Whilst not within the AONB boundary the site can be seen from it and therefore, the advice given in the guidance has been taken into consideration when designing of the building. This is discussed in more detail in Section 5.5 of this chapter.

Surrey Hills AONB Management Plan (2014 – 2019)

- 5.2.56 As explained above, the primary purpose of the AONB designation is to conserve and enhance the natural beauty within the AONB. The features that define the special character of the Surrey Hills, 6.4 km from the site, are listed as: Views; woodland; heathland; tranquillity; commons; chalk grassland; country lanes; farmland; historic buildings; and, parkland (paragraph 1.6), of these, views are of most relevance to this application.
- 5.2.57 One of the aims of the AONB Management Plan (Surrey Hills AONB, 2014) is that *"New development enhances local character and the environmental quality of its nationally important setting"* (page 26). Land use planning management policies LU2 and LU5 are relevant. Policy LU2 requires new development to respect the special landscape character of the AONB, paying particular attention to ridgelines, public views, light pollution and colour of new buildings. Policy LU5 states that *"development that would spoil the setting of the AONB, by harming public views into or from the AONB will be resisted."*

5.3 Assessment Methodology

- 5.3.1 The landscape, townscape and visual assessment considers the potential effects of the development upon:
 - Individual landscape or townscape features and elements;
 - Landscape and townscape character;
 - Visual amenity and the people who view the landscape or townscape; and
 - Visual resources in general.

Baseline Methodology

5.3.2 A desk top review of published data, such as landscape character assessments, OS maps and aerial photography was carried out. This identified potential landscape, townscape and visual receptors that could be affected by the project. A field survey was carried out on 3rd March 2016 in order to confirm the initial findings of the desk top review and to assess the likely effects on landscape, townscape and visual receptors.

Distinction between Landscape and Visual Effects

- 5.3.3 In accordance with the 'Guidelines for Landscape and Visual Impact Assessment Third Edition' 2013 by the Landscape Institute and Institute of Environmental Management and Assessment, landscape and visual effects have been assessed separately, although the procedure for assessing each of these is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:
 - Landscape effects relate to the effects of the project on the physical and other characteristics of the landscape and its resulting character and quality: and

• Visual effects relate to the effects on views experienced by visual receptors (e.g. residents, footpath users, tourists etc.) and on the visual amenity experienced by those people.

Duration of Landscape and Visual Effects

- 5.3.4 The appraisal assesses the short-term effects of the construction phase and the permanent effects relating to the projects operational phase.
- 5.3.5 Consideration has been given to the likely seasonal variations in the visibility of the development in a context including deciduous vegetation.
- 5.3.6 Consideration has been given to changes in the level of effects likely to take place as new planting, proposed as part of the project, and existing planting matures.

Landscape and Visual Assessment Process

- 5.3.7 The assessment of the landscape or townscape effects of the project has followed a recognised process set out below:
 - Identify the baseline landscape and townscape resource (e.g. individual elements and character) and its value;
 - Identify forces for change in the landscape of the surrounding area;
 - Evaluate the sensitivity of the landscape and townscape resource and its susceptibility to change as a result of the type of development proposed;
 - Identify potential landscape and townscape effects of the project through review of initial plans;
 - Develop measures to avoid, reduce and ameliorate adverse effects and to maximise the positive benefits of the project;
 - Identify scale or magnitude of likely impact of the project;
 - Assess the level of effects of the project on the landscape and townscape, taking into account the integral mitigation measures proposed; and
 - Report the findings of the assessment.
- 5.3.8 The assessment of visual effects follows a similar recognised process set out below:
 - Identify potential visual receptors of the project (i.e. people who will have views of the development);
 - Select an appropriate number of representative or sensitive viewpoints to be illustrated through photography and to reflect the full range of different views towards the project;
 - Describe the nature of the baseline views towards the project for each representative viewpoint;
 - Identify forces for change in the visual amenity of the surrounding area;
 - Evaluate the sensitivity of the visual receptors and their susceptibility to change as a result of the project represented by the viewpoints;
 - Identify potential visual effects of the project through review of initial plans;
 - Develop measures to avoid, reduce and ameliorate adverse effects and to maximise the positive benefits of the project;
 - Identify the scale or magnitude of the likely impact of the project;
 - Assess the level of effects on the view from representative viewpoints, taking into account the visual context of the development and the measures proposed;

- Assess the level of effects on overall visual amenity; and
- Report the findings of the assessment.
- 5.3.9 The assessment of representative viewpoints has been supplemented by scheduling of specific visual receptors to determine visual effects upon those likely to be affected to the greatest degree.

Assessment Criteria

- 5.3.10 The purpose of the assessment is to evaluate the magnitude of change to landscape, townscape and visual resources to enable the likely key effects of the project to be identified.
- 5.3.11 Published guidance states that the level of effects is ascertained by professional judgement based on consideration of the intrinsic sensitivity of the baseline landscape, townscape or visual receptor, the receptors susceptibility to the development and the magnitude of change as a result of the project.

Sensitivity of Receptor

- 5.3.12 The sensitivity of a landscape or townscape to change varies according to the nature of the existing resource and the nature of the proposed change. Considerations of value, integrity and capacity are all relevant when assessing sensitivity. For the purpose of this assessment, these terms are defined as follows:
 - Value: the relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons. Landscapes can be recognised through national, regional or local designation. Views tend not to be designated, but value can be recognised through a named location shown on a map, or through the creation of a parking lay-by or location of a bench to appreciate a view;
 - Integrity: the degree to which the value has been retained, the condition and integrity of the landscape or the view; and
 - Capacity: the ability of a landscape, townscape or view to accommodate the proposed change while retaining the essential characteristics which define it.
- 5.3.13 Sensitivity is not readily graded in bands. However, in order to provide both consistency and transparency to the assessment process, Table 5.1 defines the criteria which have guided the judgement as to the sensitivity of the receptor and the susceptibility to change.
| Sensitivity | I ypical Descriptors | | |
|-------------|---|--|--|
| | Landscape/Townscape | Visual | |
| Very High | Very high importance and rarity, international designation and very limited potential for substitution. | Visual receptors travelling on National Trail
or recreational routes within nationally
designated landscapes. Promoted paths or
recognised viewpoints. Receptors within wild
and undeveloped landscapes. | |
| High | Landscape/townscape value recognised by
national designation. Sense of tranquillity or
remoteness specifically noted in Landscape
Character Assessment. High sensitivity to
disturbance specifically noted in Landscape
Character Assessment.
The qualities for which the
landscape/townscape is valued are in a good
condition, with a clearly apparent distinctive
character and absence of detractors. This
distinctive character is susceptible to
relatively small changes and has a limited
potential for substitution. | Large number or high sensitivity of viewers
assumed. Viewers' attention very likely to be
focused on landscape. Residents
experiencing views from dwellings; users of
strategic recreational footpaths and
cycleways; people experiencing views from
important landscape features of physical,
cultural or historic interest, beauty spots and
picnic areas. | |
| Medium | Landscape/townscape value is recognised or
designated regionally; the
landscape/townscape is relatively intact, with
a distinctive character and few detractors;
and is reasonably tolerant of change with a
limited potential for substitution. | Viewers' attention may be focused on
landscape, such as users of secondary
footpaths, and people engaged in outdoor
sport or recreation. e.g. horse riding or golf.
Occupiers of vehicles in scenic areas or on
recognised tourist routes. | |
| Low | Landscape/townscape value is low, with local designations; landscape/townscape integrity is low, with a poor condition and a degraded character with the presence of detractors such as dereliction; and the landscape/townscape has the capacity to potentially accommodate significant change. | May include people at their place of work, or
engaged in similar activities, whose attention
may be focussed on their work or activity and
who may therefore be potentially less
susceptible to changes in view. Occupiers of
vehicles whose attention may be focused on
the road. | |
| Negligible | Very low importance and rarity, local scale. | Visual receptors within places of work or
recreation where no views out are available,
such as warehouses or sports centres.
Views are only gained from the car parks. | |

Table 5.1: Definitions of Sensitivity

Magnitude of Change

5.3.14 The magnitude of change affecting landscape, townscape or visual receptors depends on the nature, scale and duration of the particular change within the landscape/townscape, the location of it and the overall impact on a particular view. This may be very small if the development is at some distance. In a landscape, the magnitude of change will depend on the loss or change in any important feature or characteristic or a change in backdrop to, or outlook from, a landscape/townscape that affects its character. The angle of view, duration of view, distance from the development, degree of contrast with the existing characteristics of the view, prominence of the development and the extent of visibility can all influence the magnitude of the change in view. In addition, the general visibility and combination of impacts of elevation and topography on openness and degree of obstruction by trees and buildings affect the magnitude of change.

Magnitude	Typical Descriptors		
	Landscape/Townscape	Visual	
High	Where there are substantial changes affecting the character of the landscape/townscape, or important elements through loss of existing features. Proposed development within or close to affected landscape/townscape. Scale, mass and form of development out of character with existing elements.	The change would be dominant for visual receptors and have a defining influence on view.	
Medium	The proposed development forms a visible and recognisable feature in the landscape/townscape. The proposed development is within or adjacent to affected character area/type. Scale of development fits with existing features.	The change would be prominent and have an important, but not defining influence on view; is a key element in the view.	
Low	Changes to the physical landscape/townscape, its character and the perception of the landscape/townscape are slight. Long distance to affected landscape/townscape with views toward the character area/type the key characteristic.	The change would be visible, but not prominent. Would comprise a minor component and no marked effect on view.	
Negligible	The amount of change in the perception of the landscape/townscape and the physical features or the character is barely discernible.	There is either no view or the character of the view will not be altered by the proposed development. The proposed development is at such a distance as to be barely perceptible, and may only be visible in clear conditions. May go unnoticed.	
No Change	No loss or alteration of characteristics, features or elements; no observable impact.	No change to views.	

Table 5.2: Definitions of Magnitude

5.3.15 The following considerations are relevant when evaluating the magnitude of visual change:

- Distance: the distance between the receptor and the development. Generally, the greater the distance, the lower the magnitude of change;
- Extent: the extent of the proposal which is visible;
- Proportion: the arc of view occupied by the development in proportion to the overall field of view. A panoramic view, where the development takes up a small part of it, will generally be of lower magnitude than a narrow, focussed view, even if the arc of view occupied by the proposal is similar;
- Duration: the duration of the effect. An effect experienced in a single location over an extended period of time is likely to result in a higher magnitude of change than an effect which is of a short duration, such as a view from a road;
- Orientation: the angle of the view in relation to the main receptor orientation, where there is a dominant direction to the vista; and
- Context: the elements, which in combination provide the setting and context to the proposal.

Significance of Effect

5.3.16 The significance of the landscape, townscape and visual effects is assessed through consideration of the sensitivity or susceptibility of the receptor and the magnitude of change. The following table outlines the broad approach adopted to assess the level of effect, together with professional judgement. This may lead some effects falling between two categories.

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No Effect	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No Effect	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No Effect	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No Effect	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very High	No Effect	Minor	Moderate or Major	Major or Substantial	Substantial

Table 5.3: Assessment Matrix

- 5.3.17 The effect of relevant aspects of the project on the landscape and townscape has been described and evaluated against the following criteria, defined as:
 - Substantial adverse: Where the proposed changes cannot be mitigated; would be completely uncharacteristic and would substantially damage the integrity of a valued and important landscape or townscape.
 - Major adverse: Where the proposed changes cannot be fully mitigated; would be uncharacteristic and would damage a valued aspect of the landscape or townscape.
 - Moderate adverse: Where some elements of the proposed changes would be out of scale or uncharacteristic of an area.
 - Minor adverse: Where the proposed changes would be at slight variance with the character of an area.
 - Negligible adverse: Where the proposed changes would be barely discernible within the landscape/townscape.
 - No Effect: Where the proposals would be in keeping with the character of the area and/or would maintain the existing quality or where on balance the proposals would maintain quality (e.g. where on balance the adverse effects of the proposals are offset by beneficial effects).
 - Negligible beneficial: Where the proposed changes would be barely discernible within the landscape/townscape.
 - Minor beneficial: Where the proposed changes would reflect the existing character and would slightly improve the character and quality of the landscape or townscape.
 - Moderate beneficial: Where the proposed changes would not only fit in well with the existing character of the surrounding landscape or townscape, but would improve the quality of the resource through the removal of detracting features.

- Major beneficial: Where the proposed changes would substantially improve character and quality through the removal of large scale damage and dereliction and provision of far reaching enhancements.
- 5.3.18 The effect of relevant aspects of the project on views has been described and evaluated as follows:
 - Substantial adverse: Where the proposed changes would form the dominant feature, or would be completely uncharacteristic and substantially change the scene in highly valued views.
 - Major adverse: Where the proposed changes would form a major part of the view, or would be uncharacteristic, and would alter valued views.
 - Moderate adverse: Where the proposed changes to views would be out of scale or uncharacteristic with the existing view.
 - Minor adverse: Where the proposed changes to views would be at slight variance with the existing view.
 - Negligible adverse: Where the proposed changes would be barely discernible within the existing view.
 - No Effect: Where the project would be imperceptible or would be in keeping with and would
 maintain the existing views or, where on balance, the proposals would maintain the quality of the
 views (which may include adverse effects of the proposals which are offset by beneficial effects for
 the same receptor).
 - Negligible beneficial: Where the proposed changes would be barely discernible within the existing view.
 - Minor beneficial: Where the proposed changes to the existing view would be in keeping with and would improve the quality of the existing view.
 - Moderate beneficial: Where the proposed changes to the existing view would not only be in keeping with, but would greatly improve the quality of the scene through the removal of visually detracting features.
 - Major beneficial: Where the proposed changes to existing views would substantially improve the character and quality through the removal of large scale damage and dereliction and provision of far reaching enhancements.
- 5.3.19 The significance of effects is described as substantial, major, moderate, minor or negligible. Where negligible adverse and beneficial effects occur within the same view or same landscape/townscape, the effect can be described as neutral on balance. The level of effects varies according to individual circumstances and the baseline situation, for example the presence of landscape designations and/or visual detractors.
- 5.3.20 A conclusion regarding the significance of each effect on a landscape, townscape or visual receptor needs to combine separate judgements about the sensitivity of receptors and magnitude of change as a result of the proposed development. The GLVIA (2013) states at paragraph 5.55 that a sequential approach can be taken to assessment of significance; "susceptibility to change and value can be combined into an assessment of sensitivity for each receptor, and size/scale, geographical extent and duration and reversibility can be combined into an assessment of magnitude for each effect. Magnitude and sensitivity can then be combined to assess overall significance".
- 5.3.21 In the assessment, those levels of effect indicated as being of 'substantial' or 'major' may be regarded as significant effects in terms of the EIA Regulations. An accumulation of individual 'moderate' effects on a single receptor, for instance various effects experienced during a single journey, may also be regarded as significant.

Methodology for Photography

- 5.3.22 To produce photographs of suitable quality to be used in the photomontages, the following approach has been adhered to as much as possible:
 - Photographs are taken in weather conditions of clear visibility;
 - The same exposure is used for all the frames i.e. manual exposure is used to avoid the photographs having different exposures. Alternatively, a camera with exposure lock with a carefully set exposure is used especially where wider panoramas are taken where a proportion of the panorama may be taken partially looking towards the sun (which can be the case in early morning/late afternoon/winter);
 - A 50 mm lens is used in a 35 mm format (as recommended in Landscape Institute / IEMA Guidelines, 2013);
 - A 50% overlap is taken between photos to allow the sides of each photo to be removed when splicing the photos together to minimise distortion;
 - Panoramas are produced by splicing standard photographs with recognised software (e.g. Adobe Photoshop) and not by the use of specialist cameras in order to minimise distortion;
 - A levelled tripod is used. In addition, the camera is also levelled using a spirit level that sits in the flash socket of an SLR camera;
 - A very high quality camera lens is used, the Canon 5D full frame sensor camera;
 - When taking the photograph the precise location is recorded using a hand held GPS. The orientation to the proposed development, approximate altitude (ground level), date, time of day and weather conditions are recorded for each viewpoint;
 - The height from ground to centre of camera lens is recorded;
 - If, when on site, the proposed viewpoint location is screened by trees or minor variations in topography, the viewpoint is relocated and the new location details recorded and submitted to the relevant parties with reasons for relocation. Winter views if feasible will ensure maximum visibility through vegetation cover;
 - Where possible, the site is positioned in the middle of the view with frames taken either side to give context;
 - Where viewpoints are to be used for the cumulative assessment a wide enough panorama is taken to cover the locations of all the developments to be assessed; and
 - To ensure all photos align all shots are taken from the same location/grid co-ordinate by turning the camera on the tripod on the same spot.

Methodology for the Production of Computer Models (Visualisation)

- 5.3.23 The proposed facility has been modelled as to be superimposed on the photograph to generate the wirelines as follows:
 - Base mapping and height data of the relevant area are set up to real-world OS co-ordinates;
 - The proposed mass model parameters are located according to the scheme design. These are positioned to match real-world OS co-ordinates. An assumed site level is calculated using LIDAR data;
 - The parameters of the scheme are modelled in accordance with the planning application;
 - Viewpoint locations are inputted using GPS data collected on site;

- The panoramic photography is then aligned for the relevant viewpoint using GPS data collected on site of existing reference markers visible in the photographs;
- The direction and viewing angle of the perspective is then matched with each photographic frame in the panoramic views and the wireline is generated;
- Photographs are corrected for colour, brightness and contrast to ensure that image quality is optimised. Model lighting is corrected to match photographic conditions.
- 5.3.24 The methodology for showing the visible plume in the photomontages is presented in Appendix 5.1: Visible Plume Assessment Methodology.

Presentation

5.3.25 Photomontages have been provided as a series of figures within the Environmental Statement (ES). Each viewpoint is presented on an A3 sheet showing the existing view and the proposed view with specific camera information and distances to site. The A3 format allows for a 75° field of view, which should be viewed at approximately 300 mm from the image. If the print is curved around the viewer to give a constant 300 mm distance it produces an accurate reproduction of how the viewer would perceive things on site.

Zone of Theoretical Visibility

- 5.3.26 In order to determine both landscape and visual receptors that are likely to experience impacts as a result of the proposed scheme, the production of maps that determine the Zone of Theoretical Visibility (ZTV) is essential. The ZTV is the theoretical area from which part or the entire proposed development would be potentially visible and broadly defines the study area for both the character and visual assessment.
- 5.3.27 The ZTV calculation was performed in ArcGIS 10.4.1 using the Viewshed Analysis tool (part of the 3D Analyst extension). A ZTV is a line of site indication between an object (e.g. a stack) and an observer location over a digital terrain model (DTM). If the object is visible a value of one is returned, otherwise the value is zero.
- 5.3.28 The ZTVs have been calculated with raster height data (the DTM) interpolated to a 1 metre grid. That is to say, the scene is split into individual cells (pixels/squares) of 1 by 1 metre. Each cell has a single height value representing the average height for the whole cell. When making the calculation the following variables were used.

Offset A = the height of the object.

Offset B = the height of the observer. Assumed to be the eye level of a standing adult and set at 1.5 metres.

Diagram 5.1: Zone of Theoretical Visibility Methodology



- 5.3.29 Corrections for the curvature of the earth and refraction have also been incorporated.
- 5.3.30 The ZTV shows two coverages of the study area, a blue area and a yellow area. The blue area shows where views of the proposed stack at a height of 95 metres are likely to be available. The yellow area shows where views of the proposed building at a height of 35.9 metres would be available. The areas covered by the yellow tone also cover areas of blue tone.

Relevant Guidance

- 5.3.31 The assessment methodology has been informed by guidance contained within the following documents:
 - Countryside Agency and Scottish Natural Heritage (2002) Landscape Character and Assessment
 – Guidance for England and Scotland;
 - Countryside Commission for Wales, Brady Shipman Martin, University College Dublin (2001) Guide to Best Practice in Seascape Assessment, INTERREG Report No. 5;
 - Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3); and
 - Natural England (2014) An approach to Landscape Character Assessment.

Consultation

- 5.3.32 The issues raised through the consultation process that are relevant to landscape and visual assessment are summarised in Table 5.4 below.
- 5.3.33 A full copy of the Scoping Opinion is contained in Appendix 4.2.

Table 5.4: Consultation Responses Relevant to Landscape and Visual Impact Assessment

Date/Source	Consultee and Issues Raised	How/ Where Addressed	
October 2015: Scoping	Horsham District Council		
Opinion	"Given the scale of the development (i.e. the height of the stack) it is considered that, contrary to paragraph 5.16 of the Scoping Report, either photomontages or verifiable wireframe should be provided. This would allow full consideration of the impact of the development in terms of landscape and visual effects."	Photomontages produced.	
	"The 15 km study area identified in the Scoping Report excludes, by a small measure, the South Downs National Park. The desk and field work should establish whether the Park should be included or not."	Established in the introduction	
	"The viewpoints identified on Figure 4 of the Scoping Report are thought appropriate but should be assessed and updated if required following fieldwork. It is suggested that viewpoint 1 (north of Coophurst Farm) would be better located at Leith Hill to capture impacts on the Surrey Hills AONB."	Viewpoint amended during initial site visit.	
	"Additional points should also be included, namely: - from within the North Horsham allocation to the	Additional viewpoints included during initial site visit and during later site visits	

Date/Source	Consultee and Issues Raised	How/ Where Addressed
	east of the site; and - the Warnham Conservation Area."	
	"The inclusion of 'Graylands Copse Moated Site' Scheduled Monument [SM] should also be considered so that impacts on the setting of that historic feature can be verified."	No access to private land and nearest publicly accessible location for photography heavily screened by foreground vegetation. Effects upon the scheduled monument are considered in Chapter 9: Archaeology and Cultural Heritage.
	"The impact of the development in its entirety should be considered, including existing and new buildings, landscaping (including any bunds which may be proposed), outside storage of materials, fencing and lighting, including of the stack. If planting is proposed as low-level mitigation, consideration should be given over a period of 15 years to allow for growth. Views into the site during winter months should be assessed as a 'worst case scenario' when vegetative screening is least effective."	All visual effects are assessed as a worst- case scenario during winter months when foliage levels are lowest.
	"The height and design/finish of the stack, and the potential scale of the plume should be established as early as possible in the process so that this can feed into considerations of landscape and visual impact. If there is any doubt over the height, a 'worst case scenario' should be presented."	Visible plume assessment included, recommendations on stack colour provided
	"The ES should also consider the impact of lighting, both on the site and on the stack. This should take particular account of the 24-hour operations that are typical of an EfW facility, compared with the operating hours of the existing operation and that on adjacent sites. Any lighting will need to take account of the adjacent rail corridor."	The effects of lighting the development has been considered in the visual assessment.
16 th February	Horsham District Council	
Regulation 22 request for further information and evidence in respect of an Environmental Statement	"Include an assessment of impact on the South Downs National Park [SDNP] and its setting (i.e. expand the Study Area – as per the Scoping Opinion)."	Study area expanded to include the South Downs National Park (SDNP). The ZTV has been re-run to show where the proposed development may be potentially visible. Effects on the SDNP dealt with in the landscape and visual baseline and assessment sections of this chapter.
	<i>"Provide further evidence to clarify how the conclusions have been reached that the impact on P1: Upper Arun Valley (para 5.7.6) and K2: Faygate and Warnham Vale (para 5.7.5) would be moderate and minor adverse respectively."</i>	Landscape assessment expanded to provide additional information and justification of conclusions reached on the effects upon each character area.
	"Clarify the methodology used to calculate the visible plume (paragraph 5.3.31), and include consideration of night/dawn/dusk (i.e. with the influence of light pollution) and in different	Visible plume methodology revised and expanded. The methodology is presented in Appendix 5.1.

Date/Source	Consultee and Issues Raised	How/ Where Addressed
	temperatures."	
	<i>"Include consideration of the plume impact from each visual receptor identified by the visual assessment."</i>	Visual assessment expanded to include consideration of visible plume for all receptors considered in the assessment.
	"Assess the impact on the allocated areas of public open space and cemetery on farm/parkland which form part of the North Horsham Strategic Allocation to the east of the site. "	Areas of public open space, cemetery and parkland within the Horsham Strategic Allocation have been added to the visual assessment.
	"Assess the impact on the Graylands Copse Moated Site (Scheduled Monument)."	Effects upon the scheduled monument are considered by an expert in Archaeology and Cultural Heritage in Chapter 9: Archaeology and Cultural Heritage. They are also considered within this chapter.
		The Land North of Horsham development is subject to a resolution to grant outline consent. The master plan includes the moated site to the north of Graylands Farm in an area of public open space. The available views from this area of land, and of the proposed cemetery to the north have been considered in this chapter as the Land North of Horsham development forms part of the future baseline.
	"Provide a revised Figure 5.6 with clearly identifiable, legible viewpoints. Revise Figures 5.7 to 5.17 to show the worst-case scenario (including plume visibility) and provide a methodology for the visualisations included in the figures."	All figures revised to include the expanded study area. Additional Detailed Viewpoint Location Figures added to make identification of locations easier. Methodology for visualisations included.
10 th May 2017:	West Sussex County Council	
Email from Jane Moseley	"The need for this additional viewpoint was not raised in our Regulation 22 letter, but I can confirm that residents have raised it, namely in the representation from NI4H with reference to the Great Daux roundabout (at the A24/A264 junction)"	Additional viewpoint from the Great Daux roundabout on the A24 (where it meets the A264) included in the visual assessment and photomontage provided.
W/B 24 th July 2017: Meeting between Keith Riley, Chris	West Sussex County Council The evidential statements should be strengthened to support the conclusions	This chapter addresses this comment.
Moseley and Tim Dyer	The visual assessment to be reviewed as a result of any new plan configuration.	This chapter assesses the impact of the updated design of the building on landscape and visual resources and receptors.
	Suggestions for the colour palette of the new building were made by WSCC.	The design of the facility has used the 'Western High Weald Woodland and Heath Sub Palette', set out in the High Weald AONB <i>Guidance on the selection and use</i>

Date/Source	Consultee and Issues Raised	How/ Where Addressed
		<i>of colour in development</i> (High Weald AONB, 2017) document.
	The impact of the proposed development on the Land North of Horsham development should be explored in more detail.	This revised has assessed the impact on the Land North of Horsham development.
4 th and 5 th	White Young Green	
2017: Emails between Corinna Demmar and Phil Blackshaw	Tim Dyer suggested that CD contact PB to discuss additional viewpoints, as PB is the Landscape Architect that worked on the Land North of Horsham project.	CD contacted PB and agreed viewpoints from in and around Land North of Horsham development.
	PB sent CD images from his site visit and suggested a number of viewpoints based on this fieldwork.	
7 th December	West Sussex County Council	
December: Emails between Corinna	Consultation between CD and TD regarding additional viewpoints.	
Demmar and Tim Dyer	CD suggested 17 new/relocated viewpoints, including the White Young Green viewpoints, within or adjacent to Land North of Horsham.	
	TD requested that the viewpoints within the Archaeology and Cultural Heritage chapter of the ES be used and also requested that a viewpoint from the public right of way east of Kingsfold (to the north of the site) be included.	New viewpoints taken, including from the footpath to the east of Kingsfold.
10 th January	West Sussex County Council	
2018: Meeting between Jane Moseley, Tim Dyer, Keith Riley Chris	Meeting called to update WSCC on the new design of the building and the design process leading up to it. Meeting also called to explain the further work being undertaken on the LVIA.	
Foss, Dan Smyth, Mark Hilton and Corinna Demmar	DS noted that the site is allocated site for waste. JM agreed, noting that the building form was WSCC concern. DS noted that the EfW would be a valid way of managing waste at an allocated site and that the purpose of the meeting was to explain the design evolution.	
	KR explained that the roof height of the proposed building has been reduced through working with different suppliers and going sub ground level.	
	Two options, a curvilinear form and rectilinear form, were presented by MH, both of which are designed to break up the building mass. Both options are the same height, which has been reduced to 35.92 m above AOD, at the highest point of the roof. DS noted the input of the whole team in the evolution of the design, including technical advisers and specialists, the architectural team and the landscape team to achieve this outcome. It was acknowledged that	A new ZTV has been generated using the reduced building height.

Date/Source	Consultee and Issues Raised	How/ Where Addressed
	both designs were valid approaches. TD expressed a preference for the curvilinear option.	
	MH and CD explained the approach to the façade treatment/materials. TD and JM recommended that the colour palette of the High Weald AONB was adopted for the building.	The design of the facility has used the 'Western High Weald Woodland and Heath Sub Palette', set out in the High Weald AONB <i>Guidance on the selection and use</i>
	DS noted that the facility was one of the most visually contained he knew. TD agreed and noted that there was a good tree screen around the site, that designated landscapes were a reasonable distance from the site and that not many public rights of way were affected close to the site.	AONB, 2017) document.
	TD also recognised that the height of the stack was dictated by air quality considerations, but the height of the stack was of concern. DS explained that the stack was a slender feature, unlike other stacks associated with energy plants. TD asked whether the material of the stack could be given more consideration.	
	CD presented the new and revised photomontages. The viewpoints were discussed, including those located within the Land North of Horsham site. TD explained which of the remaining viewpoints should be included in the revised LVIA as photomontages and which would be sufficient as annotated photographs. TD requested that the plume be assessed as a visible feature. DS noted that the plume (water vapour) would not be visible all of the time.	
	TD welcomed the fact that the redesign led to a reduction in height of the building below the tree lines from the photomontages presented.	
	JM advised that the evolution/process of the design of the building should be set out within the ES/Application documents, including the façade treatment (materials and colour).	
	JM confirmed the final restoration of the landfill site would be 85 m AOD and the current height was approximately 97 m AOD.	
26th and 27th January 2018: Public Consultation	Roffey Millenium Hall, Horsham Several topics were discussed at the public consultation, including the need for the facility, the technology, emissions/health, traffic, access, safety of pedestrians and cyclists, origin of waste and enquiries about community benefits. Those relevant to landscape and visual resources included:	

Date/Source	Consultee and Issues Raised	How/ Where Addressed
	Location of the site:In the countrysideProximity to existing housing	The site is a brownfield site that was allocated for waste management in 2014 Waste Local Plan (see paragraph 5.2.29, above).
	• Proximity to new housing and schools (Land North of Horsham).	The Landscape and Visual chapter of the Land North of Horsham ES Addendum considered the proposed 3Rs Facility. The Land North of Horsham assessment is considered in the future baseline section of this chapter (Section 5.5) and the impact of the facility on the Land North of Horsham development is assessed in sections 5.7 and 5.8.
	Scale of the building and stack: • Height of building	The height of the building has been reduced from approximately 48.75 to 35.9 metres by burying as much of the building as possible and still allow vehicular access and by using a different supplier. This aspect of the re-designed building as well as the other built-in mitigation measures is explained in The Design and Access Statement accompanying the application, in Chapter 2: Site Description and Description of Development and Section 5.6 of this chapter.
	Height of stack.	The height of the stack is dictated by the requirements of the air quality regulations.
	Design of the building: • A majority favoured the curvilinear option	The curvilinear option has been taken forward and assessed in this ES.
	 Brighter colours were suggested by some, more muted colours by others - the light grey bunker should be darker, as it will appear white in some weather conditions or at different times of day. 	A decision was made with WSCC that the colour palette of the High Weald AONB should be used to minimise the visual impact. This is described in in the Design and Access Statement accompanying this ES and summarised in Section 5.6 of this chapter. The light grey of the bunker has been darkened.
	Green roof suggested	Green roofs are usually used to replace lost biodiversity, increase it where there is a lack of biodiversity and to ameliorate increased rainwater run-off. None of these matters are necessary in this location.
	• Break in the curvilinear roof where there were lower elements suggested.	
	Impact Assessment: • ZTV on the website suggested	Putting the ZTV on the website was considered, but as the ZTV is a part of a process, it was felt that an explanation as to how it is used is required. This is fully explained in this chapter and the ZTV is included in the chapter as Figure 5.7 and

Date/Source	Consultee and Issues Raised	How/ Where Addressed
		Figure 5.8.
	 Impact from Mercer Road, Station Cottages, Station Road and A24 (to the west and the south) raised and alternative/additional viewpoints suggested. 	Photographs from these locations were taken/retaken, following the public consultation. Video clips from the A24 (both sections) were taken and the distance and time that the facility would be visible for was calculated.
9th February	West Sussex County Council	
between Jane Moseley, Tim Dyer, Keith Riley, Dan	Meeting called to update WSCC on the public consultation held on the 23 rd and 24 th January 2018 as well as an update on the progress of the ES and likely submission date.	
Corinna Demmar	KR reported that the consultation had been discursive and questions were well-informed. The majority of the questions were on location, emissions, noise, visual impacts and traffic. KR noted the amount of positive comments made. Note: The responses from the Britaniacrest website had not been collated by the time of this meeting.	
	CD provided an update on the visual impacts, including the new photography from Mercer Road, Station Cottages, Station Road, the A24 to the south (dual carriageway) and the A24 to the west (single carriageway). CD explained that this further work confirmed that the most open views would be from the west. The view from the A24 to the south of the site is direct and channelled, appreciated by drivers approaching the Great Daux roundabout from the south only.	Photographs from these locations were taken/retaken, following the public consultation. These have been included in the figures to this chapter. Video clips from the A24 (both sections) were taken and the distance and time that the facility would be visible for was calculated.
	With regards to height of stack, both TD and JM accepted that it had to be that height for air quality reasons.	
	DS asked for clarification on the applicable planning documents, which JM provided. CD asked specifically about the High Quality Waste Facilities, Supplementary Planning Document (2006). JM explained that this was not generally available. However, the changes to the design and the reasons for those changes should be explained within the Landscape and Visual Resources chapter.	Changes to the design and the reasons for those changes are given the Design and Access Statement accompanying the ES, as well as in Chapter 3: Need and Alternatives Considered. The changes relevant to landscape and visual resources are described in Section 5.6 of this chapter.
	DS outlined the progress on the various elements of the application and confirmed the submission date of the week commencing the 5 th March 2018.	

5.4 Limitations of the Assessment

ZTV

- 5.4.1 It should be noted the accuracy of the ZTV methodology is entirely dependent on the accuracy and resolution of the underlying DTM. This provides height data at 1 metre point intervals to an accuracy that is one half the vertical interval of the source data (OS Profile Contour lines), typically better than ±5 metres root mean square error (RMSE).
- 5.4.2 A further caveat is the nature of a DTM, which considers elevation only. Other landscape features such as buildings and vegetation, are not included. Therefore, the ZTV will tend to provide a worst-case scenario, as if there were no built features or other obstructions within the landscape to act as visual barriers above the existing relief. In this case, LiDAR data has been used to further refine the ZTV using significant blocks of vegetation and buildings. This has helped to eliminate some areas from the ZTV coverage but not all screening is captured.

Visual Assumptions and Limitations

Earth Curvature and Refraction of Light

- 5.4.3 The curvature of the earth and the refraction of light in the area have an impact on lines of sight. Ordnance Survey co-ordinates are not fully 3-dimensional as they are measured relative to the earth's surface. In reality the earth is round, and so a correction has to be made in order to position geographical features correctly when determining the geographical extent from which views to the proposed development may be gained; this geographical extent is known as the ZTV.
- 5.4.4 In practice, rays of light over long distances also curve as a result of refraction of light through the atmosphere, allowing a viewer to see beyond an expected horizon. The vertical correction needed to compensate for earth curvature and subsequently atmospheric refraction is compounded over longer distances.

Acuity of eye

5.4.5 Visual acuity is the ability to see fine details of an object. There are limitations on the actual ability of the human eye to see detail within the viewed landscape, thereby there is a visual acuity threshold below which an object would go undetected / be indistinguishable. The *Guide to Best Practice in Seascape Assessment* (Countryside Commission for Wales *et al.*, 2001) explains visual acuity at page 8. At a distance of 1 km, in conditions of good visibility, an object of 100 mm wide would become very difficult to see. At 2 km acuity threshold this would increase to 200 mm wide and at 5 km this would increase to 500 mm wide and so forth.

Meteorological conditions

- 5.4.6 The clarity and distance of views is also influenced by meteorological conditions. Actual visibility varies considerably from day to day and season to season, depending on the prevailing weather and atmospheric conditions. However, this assessment has considered the impacts in the clearest weather conditions, i.e. maximum visibility.
- 5.4.7 Overall, the assessment has taken into account known limitations in line with good practice. The information provided is considered to be sufficient to inform a robust assessment of effects.

5.5 Baseline Conditions

Designated Landscapes

- 5.5.1 Landscape designations are shown in relation to the site on Figure 5.2.
- 5.5.2 The South Downs National Park is covered by the South Downs Integrated Landscape Character Assessment (Land Use Consultants, 2005). As the National Park is a nationally designated landscape, it is considered to have a very high sensitivity to change. As the site is not located within the National Park and at its closest point is situated 15.4 km to the south west, the proposed facility would not cause any direct effects upon the character of designation. The ZTV for the 3Rs Facility stack coincides with Character Area O: Low Weald, but only perceived changes to character would be apparent where the proposed development is visible. The distance of the site from the designation and the high level of landscape separation provided by the intervening development, vegetation, transport corridors, farmland and topographical features means that no significant effects upon the character of the National Park designation would arise. As a result, the effect of the proposed development upon the character of the South Downs National Park landscape is not considered further in this landscape assessment.
- 5.5.3 As the site is not located within either the High Weald AONB or the Surrey Hills AONB, the proposed development would not give rise to any direct changes to either of the designations and where perceived changes to the character of the designations arise, they are not considered to be significant due to the level of landscape separation provided by the roads, railway lines and woodlands in the landscape. As such, effects upon the designated landscapes of the High Weald AONB and the Surrey Hills AONB are not considered further in this assessment.
- 5.5.4 Individual landscape character assessments have been prepared for each of the designated landscapes, which are each considered overall to have a high sensitivity to change.
- 5.5.5 Warnham Court and its associated deer park, a Grade II Registered Park and Garden (RPaG) lies 1.1 km to the south west of the site. The effect of the proposed development on the setting of the house and park are assessed in Chapter 9: Archaeology and Cultural Heritage. The formal gardens lie largely to the south and west of the house. The south and east of the house are described as parkland. To the north and north east (where the ZTV indicates that there is the potential for views) are informal gardens, a pinetum and areas of arable land. This arable farmland was imparked at one stage, but no longer forms part of the Registered Park and Garden. A public footpath runs along part of the northern boundary. The site is considered to have a high sensitivity to change.

Landscape Baseline

National Landscape Character

- 5.5.6 The National Character Area (NCA) profile published by Natural England (Natural England, 2013) has been reviewed to develop an appreciation of the wider landscape, landscape character and context of the area (see Figure 5.2).
- 5.5.7 The site lies within NCA 121: Low Weald, and the key characteristics of the NCA that are of relevance to the site and its surroundings include:
 - Broad, low-lying, gently undulating clay vales;
 - The underlying geology has provided materials for industries including brick making, leaving pits, and quarries;
 - Land use is predominantly agricultural but with urban influences, particularly around Gatwick, Horley and Crawley;

- Small towns and villages are scattered among areas of woodland, permanent grassland and hedgerows on the heavy clay soils where larger 20th-century villages have grown around major transport routes;
- Frequent north-south routeways and lanes, many originating as drove roads, along which livestock were moved to downland grazing or to forests to feed on acorns;
- The Low Weald boasts an intricate mix of woodlands, much of it ancient, including extensive broadleaved oak over hazel and hornbeam coppice, shaws, small field copses and tree groups, and lines of riparian trees along watercourses. Veteran trees are a feature of hedgerows and in fields;
- Abundance of ponds, some from brick making and quarrying; and
- Traditional rural vernacular of local brick, weatherboard and tile-hung buildings plus local use of distinctive Horsham slabs as a roofing material. Weatherboard barns are a feature.
- 5.5.8 The Low Weald is considered to have a medium sensitivity to the proposed development due to its large scale and areas of noticeable decline, such as Gatwick, coupled with designated landscapes and some stronger characteristics.

County Landscape Character

- 5.5.9 The Landscape Character Assessment of West Sussex (West Sussex County Council, 2018, 2005) identifies 42 unique areas and provides land management guidelines for each one. The site lies within Landscape Character Area (LCA) LW8: Northern Vales (see Figure 5.3). The key characteristics of the Northern Vales LCA that are found at the site and the surrounding area include:
 - Flat to gently undulating narrow clay vale;
 - Crossed by the upper reaches of the River Arun in the south west including one of its main tributaries, Boldings Brook;
 - Pattern of small, medium and large fields with a variable density of hedgerows;
 - Predominantly pasture farmland in the north east changing to arable farmland with smaller areas
 of pasture around Warnham and Faygate to the south west;
 - Scattered tree cover, isolated woodlands and copses;
 - Distinctive field trees and farm ponds;
 - Major road and rail corridors and pylon lines;
 - Strong suburban and urban fringe influences of Crawley, Horsham and Gatwick Airport;
 - Some localities retain an enclosed rural character, for instance, west of Ifield;
 - Significant area of historic parkland of Warnham Court; and
 - Visual intrusion in parts from retail and industrial areas, housing, and sand and gravel workings.
- 5.5.10 The Northern Vales are considered to have a moderate sensitivity to change due to the thick hedgerows, hedgerow trees and woodlands. As such, this would equate to a medium sensitivity to the proposed development.

District Landscape Character

5.5.11 Horsham District Landscape Character Assessment (Horsham District Council, 2003) identifies 32 different LCAs. The site straddles two LCAs, P1: Upper Arun Valleys, and K2: Faygate and Warnham Vale (see Figure 5.4).

- 5.5.12 The key characteristics of LCA K2: Faygate and Warnham Vale that are found at, or surrounding, the site are set out below:
 - Flat to gently undulating clay vale;
 - Medium to large scale field pattern of arable farmland, with smaller areas of pasture;
 - Isolated patches of woodland;
 - Semi-enclosed or open character;
 - Dominance of major road and rail communication routes;
 - Significant area of historic parkland of Warnham Court; and
 - Visual intrusion in parts from retail and industrial areas, housing and sand and gravel workings.
- 5.5.13 The condition of this LCA is considered to be declining overall. Some areas are locally poor due to intensive arable agriculture, visual and noise intrusion of major traffic routes, and visual impact of industrial/retail areas in the Broadbridge Heath area. As a result, the sensitivity of the Faygate and Warnham Vale LCA to the proposed development is considered to be low.
- 5.5.14 The key characteristics of LCA P1: Upper Arun Valleys that are found at or surrounding the site, are set out below:
 - Mostly narrow valleys with undulating valley sides;
 - Lush valley bottoms with small and drained irregularly shaped pastures;
 - Occasional curving strips of woodland on valley sides;
 - Tightly meandering and steeply banked river and stream courses;
 - A few widely dispersed small farms on elevated valley sides; and
 - Mostly rural character, except for urban edge influence around Horsham and some road and aircraft noise in places.
- 5.5.15 The overall condition of the landscape character area is good with some local areas of unspoilt character that are in decline around the Horsham area. As a result, the sensitivity of the Upper Arun Valley to the proposed development is considered to be medium.

Horsham Landscape Capacity Assessment Character Areas

5.5.16 The area in which the site is located is identified as Area 15 on the 'Zone 1 – North Horsham to Crawley Landscape Capacity of Local Landscape Character Areas for Employment Development' map (Figure 5.6 of this chapter). The extract from the Landscape Capacity Assessment, for Area 15 (page 32) is set out below:

Local Landscape Character Area 15: Warnham Brickworks

"Landscape Character Sensitivity:

- Very large quarry and brickworks and existing employment development, which adjoins Brookhurst Wood Landfill;
- Hidden by surrounding ancient woodland and tree belts; and
- The development in this area has contributed to a poor landscape condition.

Visual Sensitivity:

The visual sensitivity of the area is low as any development would be well hidden within the quarry.

Landscape Value:

- Low tranquillity due to the noise arising from the site and surrounding uses;
- No public access; and
- Lack of any attractive landscape features with the exception of some enclosing woodland.

Landscape Capacity:

This area has a high landscape capacity for development due to the existing urbanising influences on the site which have contributed to poor landscape condition and low landscape sensitivity and value."

5.5.17 The study includes the following table, summarising the key characteristics of Area 15.

Table 5.5: Extract from Horsham Landscape Capacity Assessment (Area 15) Assessment Summary

	Medium Scale Housing	Large Scale Housing	Large Scale Employment
Landscape Character Sensitivity	Low	Low	Low
Visual Sensitivity	Low	Low	Low
Combined Landscape Sensitivity	Low	Low	Low
Landscape Value	Low	Low	Low
Overall Landscape Capacity	High	High	High

5.5.18 Warnham Brickworks is described in the conclusions to the assessment as being impacted on by urbanising influences. The landscape value of the areas with greater capacity, such as Warnham Brickworks, is noted as being lower, with for example *"low levels of tranquillity, and the loss of important landscape features such as hedgerows which result in a lower landscape condition"* (paragraph 5.3).

Visual Baseline

- 5.5.19 The land immediately to the west, north and east of the Warnham Brickworks/Brookfield landfill/Broadlands Business Campus, i.e. that land to the west of the railway, north of Langhurst Copse and east of Langhurstwood Road is currently a rural landscape of individual properties, farms, farmsteads and small hamlets set in a well-wooded landscape. However, to the north east lies the town of Crawley and to the south east lies the town of Horsham. The village of Warnham lies to the south west of the site. The views are characterised by the farmland that is interspersed by woodlands and tree belts along field boundaries. The majority of views in the study area are short-range, due to the high level of visual screening provided by the woodlands and mature trees. However, some long views are available from the higher land of the Surrey Hills AONB, the High Weald AONB and potentially from the South Downs National Park.
- 5.5.20 The views from the North of Horsham development are considered in the section describing the future baseline conditions.
- 5.5.21 To establish the potential extent of visibility of the proposed development, a ZTV was produced (Figures 5.7 and 5.8). The ZTV has been used with desktop and field surveys to determine visual receptors that could potentially experience a significant effect from the proposed development. The existing views of these receptors are described below. The views described, are those that would be seen in winter months, with the deciduous trees and other vegetation without leaves. Views in summer months, with the vegetation 'in leaf' would, for the most part be considerably more restricted, if not screened completely. The views have been categorised into close, medium and long-range views and general descriptions of what can be seen by receptors are outlined below:

- Up to 2.5 km The closest views, to the immediate south, south-south west and east of the site, are in the main screened by a high level of foreground vegetation and the existing topography, including the Brookhurst Wood landfill. The woodlands and other vegetation surrounding the Wealden Brickworks site also provide screening, or partial screening, to those receptors slightly further from the site. However, to the west, receptors such as those in residential properties set back from the woodland surrounding the Wealden Brickworks site have views of the top of the existing building and chimney stack on the site, in the context of the Brookhurst Wood landfill site and the Weinerberger Brickworks. The most open views are those that have low amounts of vegetation between the site and the receptor location and that are also on elevated or rising ground.
- From 2.5 km to 5 km Close to mid-range views towards the site are possible from more open landscapes and hillsides in the wider area. From locations north and west of the site, in particular, the top of the existing buildings and chimney stack can be seen in the context of the Brookhurst Wood landfill site and the Weinerberger Brickworks. These existing structures on the site and in the immediate vicinity of it are smaller elements in these more open views. Many of the longer views tend to be glimpses of short duration, from footpaths and roads that traverse the gently undulating terrain. However, there are also views towards the site from residential properties.
- From 5 km to 10 km A few mid to long-range views of the site are available at this distance. However, the site does not form a prominent element in views. The existing structures on and around the site form part of the wider panorama from areas of higher ground.
- From 10 km to 20 km Long-range views towards the site are only possible from a limited number of locations. The site is only visible during optimum weather conditions. In most views its location can only be found by identifying the Brookhurst Wood landfill site.
- 5.5.22 Desk top and field surveys were used to establish existing important views of and over the site from various receptors. The viewpoint locations were agreed with the Landscape Officer at West Sussex County Council and augmented with some of the viewpoints requested at public consultation. This section describes the baseline views available where visual receptors are considered most likely to witness significant effects as a result of the proposed development after considering desktop studies of the ZTV and field studies. Views that receptors experience that are unlikely to be significant are not described, following the GLVIA3 emphasis on proportional assessments.

Residential Properties

5.5.23 The description of the existing views from residential properties where visual receptors have the potential to experience significant effects as a result of the proposed development are outlined below. The properties have been grouped, where possible and are described starting with those in the north-north east.

Properties on the northern section of Langhurstwood Road, north-north east of the site

5.5.24 The residential properties along this elevated section of Langhurstwood Road include Langhurst, Boxer Retreat, Deise, Two Acres, Langhurst Close and Blackfriars Farm. They are situated amongst a significant amount of woodland vegetation and are heavily enclosed. The views available to receptors in these properties are short distance and do not extend beyond the woodland that occupies the foreground, creating a sense of isolation and giving the properties a rural feel. There are no views of the site or the more prominent Brookhurst Wood landfill site. The foreground screening provided by the dense vegetation in the local areas means that views to the south west are significantly limited. As such, views from these properties are not considered further in this assessment

Graylands Lodge and South Lodge, north east of the site

5.5.25 These properties are located to the north of the site to the east and west of Langhurstwood Road. The views towards the site from South Lodge, a single storey building, are blocked by the Brookhurst Wood landfill site. Graylands Lodge is a single storey building. It has one window that faces west, towards Langhurstwood Road, views in this direction are constrained by woodland to the west of the road. Views from the windows facing south, towards the site, are directly of the access road to the complex of buildings at Graylands. Evergreen vegetation on the southern side of the access road blocks any longer views. As the views from these properties are very limited, they are not considered further in this assessment.

Properties to the south of the access road to the Wealden Brickworks site, east of the site

- 5.5.26 Three properties are situated to the west of Langhurstwood Road and south of the access road to the site and existing industrial/commercial complex. These are Wealdon, Langhurst Moat Cottage and Bramblehurst. The property Bramblehurst, at the junction of the access road to the Wealden Brickworks site and Langhurstwood Road, is owned by Britaniacrest.
- 5.5.27 Wealdon and Langhurst Moat Cottage are the two southernmost properties and there are mature trees and other vegetation within and to the rear of these properties. There is less vegetation to the rear of Bramblehurst. Residents in all three properties currently have views of the Weinerberger Brickworks, including the chimney stack and storage yard, those views from Bramblehurst being more open. All three have oblique views towards the site, albeit through areas of mature trees and other vegetation, particularly to the north of the access road.

Properties in and around Holbrook, east and south east of the site

5.5.28 Visual receptors within residential properties in the vicinity of Holbrook, including Moathouse Farm, Cuckmere Farm, Rapelands Farm, Morris Farm, Leaside Cottage, Cedar Farm, Cuckmere Bungalow and Northlands Farm, are afforded a high level of visual screening from the natural and ornamental vegetation in the local area. The residential properties are generally orientated to face Old Holbrook with views to the west limited by mature vegetation. Views from the residential properties are generally limited to areas within the curtilage of the properties where the enclosed gardens are ornamental and easily distinguished from the surrounding farmland and woodlands. Where views do extend into the surrounding landscape, they do not include any aspects of the site and no existing development adjacent to the site is visible from the residences along Old Holbrook.

Group of Properties at Graylands Farm, Langhurstwood Road, south east of the site

- 5.5.29 To the east of Langhurstwood Road ia a group of properties associated with Graylands Farm, including Graylands Farm, Graylands Cottages, Haybarn Cottage, Stable Cottage, Northlands Cottage, Southlands Cottage, Meadowview Cottage and Midsummer Barn. These properties lie to the east of Langhurstwood Road immediately north of its junction with Mercer Road.
- 5.5.30 Graylands Cottages are two storey buildings with traditional tile-hung upper storeys. The gable end of the cottages faces the site and has no windows. Available views from the cottages are to the north east and the south west. The gardens are enclosed by a high wooden fence.
- 5.5.31 The remaining properties are single storey barn conversions or new barns, the gardens of which are enclosed by a wooden fence along Langhurstwood Road and dividing the gardens of the properties. The views from these properties are to the north-north west and west-south west. Any oblique views towards the site from these properties are curtailed by the mature hedgerows on the eastern and western sides of Langhurstwood Road and the mature woodland to the west of Langhurstwood Road.

Properties on the southern part of Langhurstwood Road, south-south east of the site

5.5.32 Residential properties to the south east of the site, situated along this section of Langhurstwood Road include Pondtail Farm, Pondtail House, Pondtail Cottage, Abbotslea and Home Farm. They are situated on lower lying land than the site, with an area of higher, wooded land between the residences and the Weinerberger Brickworks, as well as woodland to the west of Pondtail House. Rows of trees lining Mercer Road also form another layer of screening. The properties are largely orientated to face the road and are for the most part enclosed with mature vegetation, allowing only filtered views over the surrounding farmland. In winter months there may be views of the Weinerberger Brickworks stack, but if there are, from this distance, the stack is unlikely to be discernible through the depth of the branches of the trees that are in the intervening landscape.

Horsham, south-south east of the site

5.5.33 The northern residential edge of Horsham is formed by the main road of the A264 that is lined by dense mature vegetation that prevents views to the north from the residential properties. Properties on the northern edge have views limited by the vegetation along the road while properties south of these have no views to the north due to the high level of enclosure that is experienced in the dense settlement pattern. Although some three storey properties are located amongst the residential development, roofs and depth of vegetation prevent visual receptors from gaining any longer views from the upper floor windows of these properties. There are no views of the site, or any of the existing development adjacent to it, from these residential properties. As such, these residential visual receptors are not considered further in this assessment.

Station Road Cottages and properties on Mercer Road, south of the Application

- 5.5.34 The residents of the properties located along Station Road and Mercer Road, approximately 300 metres to the south west of the site, have short-range views towards the site.
- 5.5.35 Hudson House and Station Cottages (nos. 1 to 18 Station Road) are located to the west of the railway line. Views towards the site from both the ground floor and the back gardens are constrained by topography (they are at a lower level than the site) in combination with numerous outbuildings and garages to the rear of the houses. Views from a few of the rear first floor rooms and the converted roof room in one of the easterly properties are across the rear gardens of the properties, and a large yard containing outbuildings and containers. Mature trees and other vegetation along the railway and around the yard limit views even during winter months, a dense row of conifers blocks views from the more westerly cottages. Where views are possible, past the outbuildings and the large commercial building (Knight's Commercials) to the rear of Hudson House (no. 1 Station Road) the large barn-like structure belonging to Kam Trucking can be seen in winter months, through the vegetation, as can part of Warnham Station buildings. The upper part of the Weinerberger Brickworks chimney stack is also glimpsed through the vegetation in winter.
- 5.5.36 Residents of Tockholes and Lower Gate House on Mercer Road, immediately to the east of the railway line, have views towards the site, from first floor windows, during winter months. The upper part of the Weinerberger brickworks stack is visible in the background of the view. In the foreground is Warnham Station and car park, the Kam Trucking shed and other commercial buildings, including Greens of Horsham. These views are limited by vegetation within the gardens of the properties, the trees around the car park to the north and the woodland to the south of the Weinerberger Brickworks site.

Properties to the south east of Great Daux roundabout, south of the site

5.5.37 Views from these residences, to the south of the site (which include Warnham Place Farm, Warnham Farm Cottage and Warnhamplace Farm) are contained by the A24 and the A264 and the railway line. Vegetation that lines these communication routes provides the land within them a high level of enclosure that is enhanced by the fairway trees of the Rockwood Farm Golf Course. This foreground vegetation amounts to a very high level of screening that visual receptors in these residential properties are afforded. The receptors in

these residential properties have no views of the site or of any existing development adjacent to the site. As such, these visual receptors will not be considered further in this assessment.

Warnham Court and properties at Goosegreen, south west of the site

5.5.38 Views from these residential properties are generally limited by the mature vegetation of Warnham Park. The ornamental parkland trees and woodland limit views over the surrounding landscape, with views to the north east from these residential properties short in extent and restricted to the immediate foreground. There are no views from Warnham Court of the site or any of the existing development in its vicinity, due to the enclosed location. The parkland does have some views towards the site, however, where longer views are available, the parkland landscape draws the attention of visual receptors.

Group of properties at Westons Place and Westons Farm, south west of the site

- 5.5.39 These properties are situated north of the A24 Dorking Road, to the north west of the Great Daux roundabout junction with the A264.
- 5.5.40 The Granary, Westons Place and Westons Farm are situated on elevated ground and the complex of buildings, outbuildings and barns are interspersed with mature trees, hedgerows and other areas of vegetation. The high level of vegetation that is situated in the immediate foreground of the residential properties at Westons Farm means that visual receptors within the properties generally have enclosed views. During winter months, those properties/buildings on the north east of the complex may have filtered views towards the site.
- 5.5.41 Westons Cottages and the Great Daux properties are situated on lower-lying ground and the potential views towards the site are restricted further by the amount of vegetation surrounding these residences, particularly in the case of Great Daux. Westons Cottages may have views towards the site filtered by this vegetation, during winter months.

Group of properties at Andrews Farm, Station Road, west-south west of the site

5.5.42 Further to the west along Station Road is a small group of properties located to the north of the road, associated with Andrew's Farm, these include Henley's Barn, The Dairy, South Barn, Andrews Farm, Andrew's Farm House and Andrews Farm Cottages. The properties have views across mostly open fields, gently sloping down to the sewage works and Boldings Brook beyond, which runs north to south through mature woodland. Tributaries of the brook run west to east to the north and the south of the properties. A belt of vegetation, including mature trees is associated with the northern tributary and this provides another layer of vegetation between the Andrews farm properties and the site, as it curls to the south to join the main woodland west of the site. Through the intervening trees and woodland there are first floor views of the upper part of the chimney stack on the site.

Properties at Knob Hill Corner, Warnham, west-south west of the site

- 5.5.43 Similar, but oblique views, to those properties at Andrews Farm are available from the rear of some of the properties on the southern side of Knob Hill and School Hill, Warnham, to the west of the A24. The views are more elevated, but further from the site. The properties have views of the top of the existing chimney stack above the woodland, from some windows. The properties may also have glimpses of the roof of the existing facility through the tops of the trees from first floor windows.
- 5.5.44 Receptors in the residential properties along Bell Road, on the eastern edge of Warnham, have views to the north and south heavily restricted by vegetation in the foreground that prevents long views over the surrounding landscape. Similarly, visual receptors in the residential properties along Wyvern Place and Knob Hill have views over the surrounding landscape restricted by vegetation that occupies the immediate foreground of views. There are no views of the site to the north east for visual receptors in residential properties at Warnham and there are no views of the existing development adjacent to the site.

Properties to the west of the A24, north of Warnham, west of the site

5.5.45 The residential properties include Little London, Geerings, Lower Chickens Farm, Cider Mill Farm, Knob Cottage and Old Manor. Views from the majority of these properties are well contained by the high level of mature vegetation that is located within the farmland between them and the site. The woodland vegetation along Chickens Gill, and Andrew's Gill as well as Rats Plantation give the properties a high level of enclosure and limit many of the views to the immediate surroundings. Additionally, vegetation that lines the local roads and forms field boundaries limits views over the farmland with the mature vegetation that lines the A24 forming a strong visual barrier for properties to the west. However, visual receptors at Cider Mill Farm and Old Manor Farm have some longer views over the surrounding landscape and particularly to the east as the residential properties have a more open and slightly elevated setting that allows visual receptors within them and the curtilages some slightly longer views to the east. Some parts of the Brookhurst Wood landfill and existing development adjacent to the site are visible, but they are not noticeable elements and views are generally focused on the foreground.

Properties on high land to the east of the A24, west-north west of the site

- 5.5.46 Cox Farm Lodge is located to the east of the A24 on an area of high ground and has oblique views of the site, through vegetation surrounding the house. Direct views of the site are through mature vegetation to the east of the property and are all but non-existent. However, direct views from the conservatory are possible. The views towards the site from the lower-lying Cox Farm are screened by the intervening woodland.
- 5.5.47 Tylden House is the headquarters of Sussex Health Care, with residential accommodation. It lies to the north of Cox Farm Lodge, at approximately the same elevation. Residents of the care home buildings to the south of Tylden House itself have more open views of the Brookhurst Wood landfill site, but views of the site are constrained by topography and the significant amount of mature woodland associated with a tributary of Boldings Brook and around the assart-type fields between the residential building and the site.
- 5.5.48 Residential properties to the north of the Sussex Health Care facility (and Denham's Auctioneers) do not have views of the site, due to the topography of the intervening land and the mature woodland vegetation lining Boldings Brook and another tributary of the brook.

Properties on either side of Mayes Lane, north west of the site

5.5.49 These properties include Tanners Farm, Little Tanners, Mayes Park House, Mayes Park Farm. The residential properties that are located along this section of Mayes Lane to the west of the site offer visual receptors some rural views into the surrounding parkland and farmland landscape. The woodland belts and vegetation ensure that where views into adjacent land are available, they are relatively short in extent and are characterised by the parkland or horse paddock landscapes of the large properties that are often set within their own landscaped grounds. There are no views of the site from residences in this location due to the intervening vegetation. Similarly, no views of existing development on land adjacent to the proposed facility are available.

Properties on either side of the A24, north-north west of the site

5.5.50 These properties include The Oaks, Upper Chickens, Gunbarn, Nowhere House, Durfold Hill Farm, Orchard Lodge and Durfold. Visual receptors within the residential properties that line this section of the A24 to the north-north west of the site have a high level of visual enclosure from vegetation that occupies the foreground of views. The properties are generally orientated to face the carriageway of the A24 and properties to the east of the road have long gardens which, in the main, form the extent of views east. Whilst views of parts of the Brookhurst Wood landfill site are possible, the majority is screened by vegetation on the intervening land. Visual receptors in these properties and the residential curtilages have no views of the site or existing development adjacent to the site.

Kingsfold, north of the site

- 5.5.51 Visual receptors in residential properties on the south east edge of the settlement of Kingsfold, to the north of the site, have some views over the farmland and woodland of the Boldings Brook valley. Pollards, Holmlea and Fern Cottage lie to the west of the A24, with open fields sloping down towards Boldings Brook and the site. However, the views of Pollards and Holmlea are restricted by tall, evergreen hedges and mature trees, along their boundaries with the A24. The garden of Fern Cottage also has an evergreen hedge along most of its boundary. Immediately to the front of the cottage a wooden fence prevents views towards the A24 and the site from ground floor windows. Oblique views of the site are possible from first floor windows.
- 5.5.52 Views from properties on the eastern side of Kingsfold are restricted by mature woodland and other vegetation. However, Kingsfold Place may have oblique views of the Brookhurst Wood landfill site, through mature vegetation, part of the site may be seen beyond it.

Public Rights of Way

- 5.5.53 The public access within the study area includes public rights of way (PRoW) on the areas of higher land of the nationally designated landscapes, but also lower lying land as well, with footpaths, bridleways and byways in the vicinity of the site including some promoted paths such as the West Sussex Literary Trail, the Sussex Border Path, the Downs Link, the Greensand Way and the High Weald Landscape Trail. Apart from the two promoted paths mentioned below, this section concentrates on the local PRoW close to the site as illustrated on Figure 5.8.
- 5.5.54 The Greensand Way provides access to Leith Hill, the tallest hill in southern England (294 m AOD) and the tower thereon, in the Surrey Hills AONB. Views south towards the site from Leith Hill are elevated and distant, looking down into The Weald.
- 5.5.55 The West Sussex Literary Trail is the closest promoted path to the site, crossing through the deer park at Warnham Court, to the south west of the site. There are no views of the site from this PRoW.
- 5.5.56 With regards to non-promoted PRoW, there are none that cross the Wealden Brickworks site. In the land surrounding the Wealden Brickworks there are few PRoW. Barring public footpath 1574-1 there are no PRoWs between the site and the A24 to the west of the site. Footpath 1574-1 is routed along Station Road and does not deviate from it. The western section of the footpath has some views of the roof and chimney stack on the existing buildings on the site. However, these are mostly restricted by hedgerow vegetation the topography that the road crosses.
- 5.5.57 The footpath crosses the railway at Warnham Station and is coincidental with Mercer Road. This section of the route is public footpath 1574-2. It stops at the junction with Langhurstwood Road. Views towards the site from footpath 1574-2 are restricted by the topography, the land rises to the Wealden Brickworks from Mercer Road, also by the mature woodland that surrounds the Wealden Brickworks site. The chimney stack of the Weinerberger Brickworks can be seen through the trees. However, from the entrance to the commercial units to the junction with Langhurstwood Road, glimpses of the upper parts of the Weinerberger Brickworks building can be gained through the mature woodland.
- 5.5.58 To the north of the Brookhurst Wood landfill site public bridleways 1570-1 and 1570-2 link the A24 to Langhurstwood Road, crossing the railway. A short section of the bridleway, immediately to the west of the railway may have very restricted views towards the site, but the site itself is screened by mature woodland and the landfill site.
- 5.5.59 Further north, PRoW 1489-2 lies to the east of Kingsfold and the railway line. The higher part of this footpath has very occasional glimpses towards the site, primarily through one field gate, as it runs to the north of a hedgerow. Through the field gate the Wealden Brickworks site can be seen with the Brookhurst Wood landfill to the fore and parts of the existing buildings on the site and the Weinerberger Brickworks behind it.

- 5.5.60 Public footpath 1489-3 is a continuation of footpath 1489-2 to the east of the railway line. This does not have views of the site due to topography, it descends and then ascends from Boldings Brook, and mature woodland on higher ground.
- 5.5.61 Public footpath 1573-1, follows the northern access road to Graylands, running east from Langhurstwood Road. Views from the footpath are restricted by the mature vegetation, including evergreen species, on either side of the road. Views towards the site are gained through a field entrance, the site itself is not visible, nor is the other development on the Wealden Brickworks site, due to the density of the mature woodland on either side of Langhurstwood Road.
- 5.5.62 Footpath 1573-1 joins PRoW 1421-2 within woodland. Footpath 1421-2 runs approximately north to south down the wooded slope towards Horsham. The views towards the site from the upper part of this footpath are across open fields. However, woods within the fields curtail these views and the mature woodland on either side of Langhurstwood Road. Views from the lower section of the road are shorter, as the footpath passes through a smaller more enclosed field. Here the views towards the site are prevented by the topography, the vegetation along the field boundaries and the woodland along Langhurstwood Road.
- 5.5.63 PRoW 1575-1 is a footpath that runs west to east, linking Northlands Road with Hurst Hill. The majority of views towards the site from the footpath are screened by the buildings of Moated House Farm and the properties at Holbrook. However, a length of the footpath to the west of the farm crosses fields and mid-range views are available, although these are again stopped by the buildings at Holbrook.
- 5.5.64 Public footpath 1577-2 crosses north west to south east through farmland to the west of the Great Daux roundabout. The views towards the site are constrained by both the nature of the landform and mature woodland as well as hedgerow vegetation. The chimney stack of the Weinerberger Brickworks is visible above the vegetation lining the A24, Dorking Road.
- 5.5.65 PRoW 1578-1 joins footpath 1577-2 to the east of Warnham. This short PRoW similarly does not have views of the site or existing structures on the Wealden Brickworks Site.
- 5.5.66 Public footpath 1428-2 winds its way through the village of Warnham. Views towards the site are blocked by both housing and mature vegetation. Public footpath 1430-1 also runs through Warnham, as with footpath 1428-2, no views are available of the site.
- 5.5.67 West-north west of the site, PRoW 1420-1 crosses farmland west of Mayes Lane, and runs east from Mayes Lane to the A24 Dorking Road. The views towards the site are of undulating farmland hedgerows with mature trees and woodland. No views of the site and the existing buildings on it are possible.
- 5.5.68 PRoW 1426-1 runs roughly parallel and to the north of public footpath 1420-1. Crossing similar terrain, the views from the public footpath towards the site are more restricted by mature woods and hedgerow trees. There are no views of the site or the existing buildings on the Wealden Brickworks site.
- 5.5.69 A short section of public footpath (shown on the OS mapping, but un-numbered) links PRoW 1420-1 and PRoW 1426-1. It has similarly constrained views towards the site as PROW 1426-1.
- 5.5.70 There are two lengths of PRoW to the east and west of Kingsfold (north of the site). Footpath 1425-2 lies to the east and links Tickfold Farm to Kingsfold. There are no views of the site, or the existing buildings on the Wealden Brickworks site due to topography, the land rises gently between the footpath and the buildings in Kingsfold and these prevent any views further south.

Roads and Railways

5.5.71 The A24, Dorking Road and the A264 are the main arterial roads, that lie to the west, south and east of the site. They are busy roads, the southern section of the A24 is a dual carriageway, as is the A264, to the east of the Great Daux roundabout. Both roads carry a high level of fast moving traffic, particularly the dualled

sections of road. The dual carriageway routes are lined by sometimes dense, mature vegetation that channels views along them. The southern (duelled) section of the A24 has embankments on either side, which channel views further. However, views towards the site are available from both roads, travelling south on the single carriageway section of the A24 and north on the dual carriageway section of the A24, as well as glimpses from the dualled section of the A264, travelling west. The description of representative viewpoints 13 and 29 provides more detail on the dynamic views from these roads towards the site.

- 5.5.72 The 'B' roads and minor, local roads that pass through the rural parts of the study area are generally more winding in nature. Mature vegetation along field boundaries as well as residential properties line the roads and generally limit the views from vehicles travelling along them to glimpses of the wider landscape only.
- 5.5.73 Minor roads local to the site are predominantly orientated approximately north to south, descending from higher farmland through wooded slopes towards Horsham. The local exception to this is Station Road/Mercer Road.
- 5.5.74 Old Holbrook/Northlands Road and Rusper Road/Hurst Hill road descend through woodland towards Horsham, east of the site. Old Holbrook is a narrow treelined lane with no views of the site, all the views from the road being channelled along it. Rusper Road has a wide belt of trees/linear woodland lining the western side of the road for much of the higher part of it as it descends out of the wooded slopes to the north of Horsham. This prevents views towards the site, barring through field gates. The lower-lying part of the road has less vegetation on its western boundary. However, views are restricted by a continuous mature hedge and trees, only punctuated by the entrance to Moated House Farm, the access road to which is also lined with dense mature hedges, restricting and channelling views.
- 5.5.75 Knob Hill, Warnham, runs north east towards the site. Views are restricted by the mature hedgerows and hedgerow trees that line the road, but glimpses of the roof and chimney stack of the existing buildings on the site are possible, above the hedgerows in places.
- 5.5.76 Mayes Lane runs north to south, to the west of the site. Views are channelled along the lane by the mature vegetation lining it. However, there are longer views towards the Wealden Brickworks site across a gently undulating parkland-like landscape and farmland, to the south of Mayes Park Farm. At Threestiles Corner there is a junction with Tilletts Lane, there are views of the existing buildings on the site at this point and a little further to the east, at a high point (89 metres AOD) on Threestiles Road, at the junction with the access road to Cider Mill Farm and cottages. However, as with all other views from the more minor local roads the views are fleeting. The laurel hedge planted at the entrance to the farm will screen views from the road at this point. The new woodland also planted within the farm curtilage will also assist in screening views from the road at the order At the junction of Threestiles Road and the drive to Old Manor views open up again, but due to the lower elevation of the road at this point there are no views of the site.
- 5.5.77 The railway between Dorking and Horsham runs along the western boundary of the site, with Warnham Railway Station located to the south of the site. When approaching the site from the north views are screened by both the Brookhurst Wood landfill and the mature woodland on the eastern side of the railway line. Views of the site are available where the woodland ends (approximately in line with the current toe of the landfill site) and views close down again at the woodland that encloses Warnham Station (adjacent to the Weinerberger Brickworks). Travelling north, passengers have a view of the site once the train has passed Warnham Station. The existing buildings on the site are seen with the Brookhurst landfill as a backdrop. The length of time that the site is visible to northbound passengers is shorter than for southbound passengers, as the woodland on the eastern side of the railway lies closer to the site and therefore provides more screening.

Industrial and Commercial Premises

5.5.78 Visual receptors within commercial premises are considered to have a low sensitivity to change in views as their views are focused on the work that they are conducting. These visual receptors at their place of work are considered to have a low sensitivity to change in visual amenity. Where commercial premises do not

have windows, views out over the surrounding landscape are not available due to the type of building or workplace, the visual receptors within them are considered to have a negligible sensitivity to change.

- 5.5.79 Industrial/commercial premises immediately adjacent to the site such as the Wienerberger Brickworks and Biffa Waste Services offer employees views that are heavily cluttered by the existing development in the immediate vicinity. The site is visible to some receptors, including customers of the Weinerberger Brickworks, as they pass it entering and leaving the works. The high level of existing industrial/commercial development in the immediate vicinity of the site characterises the views that receptors gain. There are no views out over the surrounding landscape for receptors working in these premises, as the site is contained by dense, mature woodland, built development and the Brookhurst landfill site.
- 5.5.80 Fisher Clinical Services is located to the north of the site and is situated amongst mature woodland which heavily restricts views over the adjacent landscape. Receptors at the premises have views contained by the woodland vegetation that provides the site with a high level of enclosure. Similarly, visual receptors at Broadlands Business Campus have views from the business units heavily enclosed by the woodlands and mature vegetation that surrounds them. Receptors have no views of the site or any existing development adjacent to it from the campus.
- 5.5.81 Views available to receptors working and visiting the complex of business units at Graylands are generally contained within the site by the high level of mature vegetation that surrounds it. However, some views are available to the south from the main building. There are no views to the west or south west from the business units. However, there are views towards the site from the access road to the cluster of buildings. None of the existing buildings or chimney stacks on the Wealden Brickworks site are visible. Planning permission has been granted to convert some of the business premises within Greylands to residential use. The views of these potential residents are considered in the section on future baseline conditions.
- 5.5.82 Kam Trucking, Greens of Horsham and Panel2Paint are located to the south of the Wealden Brickworks site. The mature woodland to the south of the site restricts most views of the site, particularly from the Kam Trucking site. However, the chimney stack and roof of the Weinerberger Brickworks are visible. Views of the south west corner of the site can be gained along the short access road between Greens of Horsham/Panel2Paint and the Weinerberger Brickworks, from the car park and the western side of these commercial buildings.
- 5.5.83 To the north west of the site, Denhams Auction House and Sussex Health Care are situated to the east of the A24, Dorking Road. The existing views of the residents at the care facility are described above. Visual receptors at this location have views filtered through mature trees towards the Wealden Brickworks site to the east. The Brookhurst landfill site is seen above the vegetation lining the railway.

Designated Landscapes

- 5.5.84 Visual receptors located within the South Downs National Park have a variety of views available to them in all directions. Where there are views towards the north east from elevated locations, long views over the low-lying landscape of The Weald are possible. However, the existing development on land adjacent to the site and the large area of landfill are not noticeable or recognisable in these distant views. The settlement of Horsham is not a noticeable part of views for visual receptors. The elevated land of the Surrey Hills AONB forms the extent of views to the north and the undulating landscape of the South Downs forms the extent of views to the west, south west and south.
- 5.5.85 Visual receptors within the Surrey Hills AONB have some expansive views to the south where the elevated ground of the AONB meets the low-lying land, allowing panoramic views. The existing development adjacent to the site and the landfill site is not noticeable in views to the south and the settlement of Horsham is not discernible. Views for visual receptors within the Surrey Hills AONB are described in representative Viewpoint 11.

- 5.5.86 Visual receptors within the High Weald AONB have some views over the site but the existing development does not form a noticeable element in views from the High Weald AONB. The high level of woodland vegetation within the designated area means that views over land surrounding the AONB are limited to a small number of locations on the north western edge. Representative Viewpoint 4 considers views from the High Weald AONB.
- 5.5.87 Warnham Court Registered Park and Garden lies to the south west of the site, beyond the A24, Dorking Road. Views towards the Wealden Brickworks are limited due to the amount of vegetation within and on the edges of the park. However, the stack on the Weinerberger Brickworks is visible over the intervening vegetation along the A24, from the northern edge of the park. Representative Viewpoint 6 considers the views from Warnham Court Registered Park and Garden.

Representative Viewpoints

5.5.88 Representative viewpoints have been used with field studies to identify the visual baseline of the area. Figure 5.7 and Figure 5.8 shows the location of these viewpoints while Figures 5.9 to 5.37 are the corresponding viewpoints.

Viewpoint 1 – Public Footpath north of Friday Farm, 2.8 km to the north of site (Figure 5.9)

- 5.5.89 People using the public footpath generally have short range views as they pass through the agricultural landscape. The public footpath offers views that are rural in character. The trees that surround the fields curtail some of views from the path. The short views available from this part of the rural landscape do not feature any key elements or focal points. People using the footpath are able to see into adjacent fields through foreground vegetation. The undulating landform prevents long views. The site is not visible, nor are any of the buildings on the Wealden Brickworks site. The Brookhurst Wood landfill site to the north of it is not visible either.
- 5.5.90 Views to the south from this section of the footpath are focused upon the immediate foreground, which is pasture. The tree belt that forms the southern boundary of the pasture forms the extent of the view and contains the views available to users of the PRoW to the immediate area.

Viewpoint 2 – Footpath 1569-1, south of Old Park Farm, 2.6 km to the north east of site (Figure 5.10)

5.5.91 People using this footpath pass through arable fields. The views along this section of the PRoW are primarily short-range. The undulating topography and woodland to the west and south west curtail views, preventing any of the site or the existing buildings on the Wealden Brickworks site. The farmland does not contain any notable landscape elements.

Viewpoint 3 – Footpath 1571-1 at Moated House Farm (a green way in the Land North of Horsham Development) 1.6 km east of site (Figure 5.11)

5.5.92 People walking west along this section of the footpath have views of paddocks, which occupy the foreground in the views. Hedgerows mark the field boundaries. Holbrook Park and other residential properties can be seen amongst the ornamental vegetation above the hedgerows. Graylands Copse and Holbrook Plantation form the skyline to the west and north west. The electric fences dividing the paddocks introduce clutter into the views. Neither the site nor the existing buildings on the Wealden Brickworks site are visible from this location, due to the intervening vegetation and buildings.

Viewpoint 4 – Public Footpath at Roffey Park, High Weald AONB, 3.9 km to the east of site (Figure

5.12)

5.5.93 People using the public footpath through land at Roffey Park have elevated views over the undulating landscape, from some locations. Elements in the fore and mid-ground are the focus of some views. The

hills to the north are covered by woodland vegetation and form the extent of views, channelling longer views to the west through gaps in the woodland at High Wood and the ornamental vegetation within residential gardens. Views to the west extend over the farmland and include some of the wooded landscape surrounding the site. However, there are no views of the site itself or any of the existing buildings on the Wealden Brickworks site. Residential properties in the middle distance and telegraph poles in the foreground introduce an element of clutter to views.

Viewpoint 5 – Public Footpath at Ashlands Farm, 4.9 km to the south west of site (Figure 5.13)

5.5.94 People walking along the footpath have short range views over the rural farmland in the immediate vicinity. The gently undulating landform limits views. Vegetation within the farmland further limits views with trees on the slightly elevated topography forming the skyline. The intimate views available from the footpath are rural in character with few detracting features. Views are restricted to short-range only.

Viewpoint 6 – Public Footpath at Warnham Court, 1.1 km to the south west of site (Figure 5.14)

As people pass to the north of the Warnham Court estate along this PRoW, views are of open farmland. The 5.5.95 higher land adjacent to the site can be seen beyond the intervening vegetation, including that surrounding the A24, Dorking Road. The chimney stack of the Weinerberger Brickworks adjacent to the site is visible amongst the vegetation that occupies intervening land but is not prominent and is easily missed. Some residential properties can be seen amongst the vegetation but are minor elements in views that are characterised by the farmland in the foreground.

Viewpoint 7 – Churchyard of St. Margaret's Church, Church Street, Warnham, 1.3 km to the south west of site (Figure 5.15)

5.5.96 The churchyard of the Grade I listed St. Margaret's Church includes a garden of remembrance, which is located just to the north of the PRoW 1577-2. The extent of views from within the churchyard, towards the site are limited by the vegetation on the boundaries of the both the churchyard and adjacent properties. Woodland planting within adjacent fields also limits views of the site.

Viewpoint 8 – Warnham Conservation Area at the Cricket Ground, 1.6 km south west of site (Figure 5.16)

5.5.97 People using Warnham recreation and cricket ground have some short views over the amenity space with the extent of views to the north east curtailed by large mature trees around the amenity space and within adjacent gardens. The focus of views in this location is the foreground which is typical of an amenity space within a settlement.

Viewpoint 9 – Public Footpath at Mayes Park Farm, 1.5 km to the west of site (Figure 5.17

5.5.98 Visual receptors on the public footpath that passes through Mayes Park Farm are afforded some clear views over farmland. The views available have a parkland character with individual parkland trees and tree belts. Mature belts of vegetation mark field boundaries and form strong visual barriers, limiting most views into the wider landscape, although some of the hills further east can be seen above the tree tops or in filtered views through them. The tree belts screen any views of the site and the existing buildings on it.

Viewpoint 10 – Horsham Road, 4.7 km to the west of site (Figure 5.18)

People travelling along Horsham Road get glimpses of the lower-lying land to the east, where gaps in tree 5.5.99 cover allow. As they pass this driveway, longer views to the east over the undulating landscape are available with farmland occupying the foreground. Much of the view east is occupied by woodland with some arable fields visible amongst the mature trees, a mix of broadleaved with pockets of evergreen plantations. The woodlands on the hills form the skyline. The site and the existing buildings on the Wealden Brickworks site are not visible from this location.

Viewpoint 11 – Leith Hill Tower, Surrey Hills AONB, 9.2 km to the north of site (Figure 5.19)

5.5.100 The public vantage point on the steep elevated land at Leith Hill offers panoramic views over a large area of land to the south. The views are wide and long ranging, extending over the farmland and woodland that occupy the undulating land of The Weald to the south. Patches of lighter green mark fields, which are mainly screened from view by the hedgerows, tree belts copses and woodland. The Brookhurst Wood landfill site can be seen from the vantage point but is not noticeable in the scale of views available and is only recognisable to those receptors that are searching for it. Where the landfill site can be seen, it sits well below the skyline in views and blends into the wooded hills beyond.

Viewpoint 12 – Great Daux Roundabout, 1 km to the south west of site (Figure 5.20) and Viewpoint 13

- Layby on the A24, 1.3 km to the south-south west of the site (Figure 5.21)

- 5.5.101 Viewpoints 12 and 13 are static representations of dynamic views available from the north-bound, dualcarriageway section of the A24. Viewpoint 12 is located at the roundabout junction itself. In winter there are glimpses towards the site through the vegetation on and surrounding the roundabout. However, while the Brookhurst Wood landfill site is discernible through the vegetation, the remainder of the Wealden Brickworks Site is not, as it is screened by the depth of vegetation on the roundabout and the mature woodland to the south and east of the brickworks site.
- 5.5.102 Viewpoint 13 is at the northern end of the layby on the northbound carriageway of the A24. The Brookhurst Wood landfill site forms the skyline in this channelled view, with vehicles, road signs and the lighting columns on the roundabout visually cluttering the views along the road. Apart from the landfill site, the Wealden brickworks site is screened by the dense vegetation on and around the Great Daux roundabout.
- 5.5.103 People travelling northbound along the dual carriageway section of the A24 towards the Great Daux roundabout have views of the upper part of the landfill site, above the trees, to the north of the site for approximately 525 metres (in the outside lane). Travelling at an average of 60 mph the top of the landfill is visible for approximately 20 seconds. As the road approaches the roundabout, it turns to the north and the landfill site is glimpsed to the north-north east through the vegetation on and around the roundabout (in winter views). In summer views the landfill site is screened prior to and at this point. Views are channelled along the route by the mature vegetation on the embankments either side of the carriageways. Road signs and street lights add a high level of clutter to the views. As receptors approach the Great Daux roundabout, the drivers of vehicles are focused upon the road junction itself.

Viewpoint 14 – Station Road/footpath1574-1, 650 m to the south west of the site (Figure 5.22)

5.5.104 Two different types of receptors use this route, pedestrians and people in vehicles. Views of both towards the site are constrained by the orientation of road and the mature hedgerows on either side of it. The views open up as the road curves to the east-north east. The view is of the roof and chimney stack of the existing building on the site, with the woodland along Langhurstwood Road and the elevated land beyond. The woodland through which Boldings Brook runs screens the lower parts of the buildings and other buildings on the Wealden Brickworks site. As the road curves to the east, the road slopes downwards and the views of the site buildings are screened by high hedges and mature woodland.

Viewpoint 15 – Rear of Station Road Cottages, 270 m to the south of the site (Figure 5.23)

5.5.105 The view across the yard from the rear of station cottages is to the north of the outbuilding and garages that screen the majority of views from the residences themselves. People working within the yard and accessing the rear gardens of Station Cottages have views to land sloping up towards the site. In winter the communications mast and chimney stack on the Weinerberger Brickworks site can be glimpsed through the trees on either side of the railway, as can the railway station buildings on either side of the tracks and the

Kam Trucking shed to the east of the railway line. The views are primarily of the yard itself, enclosed by woodland and with abandoned coaches, container, sheds and oil drums.

Viewpoint 16 – Entrance to Warnham Station/footpath 1574-2, Mercer Road, 330 m to the south of the site (Figure 5.24)

5.5.106 As with Viewpoint 15, the land rises towards the site with the woodland on the slope screening all but the chimney stack of the Weinerberger Brickworks. From this location the view is into the Kam Trucking yard and the green shed is seen to the rear of the yard. The most intrusive elements in the view are the vehicles associated with the business, parked around the station building and cars for the station parked on Mercer Road. Different types of receptors experience this view, pedestrians, road users, employees and residents of the houses to the south of the viewpoint. The views vary, with the residents experiencing the most restricted views.

Viewpoint 17 – Mercer Road/footpath 1574-2, 330 m to the south-south east of the site (Figure 5.25)

5.5.107 Two types of receptors experience views towards the site from Mercer Road, pedestrians using it as a footpath and people in vehicles, using it as a road. Views towards the site are through the hedgerow and trees on the northern side of the road, across a field of pasture, that slopes up to mature woodland located to the south of the Weinerberger Brickworks. The upper parts of the brickworks can be seen through the woodland in winter, as can the chimney stack. The buildings containing Greens of Horsham and Panel2Paint are seen beyond the western boundary of the field.

Viewpoint 18 – Moated site to the east of Langhurstwood Road (within Land North of Horsham public

open space) 270 m to the east of the site (Figure 5.26)

5.5.108 The location of this viewpoint is within the Land North of Horsham development, in an area that will be public open space. Existing views towards the site are screened by dense woodland along Langhurstwood Road and the entrance road to the Wealden Brickworks site. Apart from views along the entrance road, views towards the Weinerberger Brickworks are also blocked by the three properties to the south of the entrance road on the western side of Langhurstwood Road. Views from the wider area that is to be public open space are also screened from the brickworks by the vegetation associated with the moated site itself.

Viewpoint 19 – Southern entrance drive to Graylands, 480 m to the north east of the site (Figure 5.27)

and Viewpoint 20 – Northern Entrance drive to Graylands, 560 m to the north east of the site (Figure

5.28)

- 5.5.109 The complex of commercial properties at Graylands is accessed by two roads, albeit now a one-way system. The south drive retains some of the original avenue of oaks on either side, and commands views over the farmland that slopes down towards Horsham to the South Downs on the horizon. This land will form part of the Land North of Horsham cemetery site (future baseline). The views towards the site are across open, arable farmland, but are screened by mature woodland, including evergreen species, along Langhurstwood Road. The plumes from the Weinerberger Brickworks, emerging from the woodland, are the only indication of the Wealden Brickworks in this view. People in vehicles working and visiting the complex of commercial buildings will not appreciate this view, as vehicles using the one-way system are travelling east, away from the Wealden Brickworks site.
- 5.5.110 People using the north drive to exit the complex at Graylands descend west to Langhurstwoood Road. Views from the north drive are channelled along the road, by the mature vegetation on either side. Views towards the site are restricted to those gained through the field gates on the southern side of the road. Where views are available, the Wealden Brickworks site is screened by the woodland on either side of Langhusrtwood Road and the topography of the intervening land.

Viewpoint 21 – Field south of Graylands (land allocated as a cemetery within Land North of Horsham development) 610 m north east of the site (Figure 5.29) and Viewpoint 22 – Field east of moated site (close to land allocated as allotments within Land North of Horsham development) 600 m east of the site (Figure 5.30)

5.5.111 Both these viewpoints are located within the Land North of Horsham development area. Viewpoint 21 is on elevated farmland, to the south of Graylands, that will form part of the future cemetery site. Viewpoint 22, is on lower-lying land, within the future cemetery site, but adjacent to the planned allotments. Both views towards the site are across arable farmland containing occasional lone trees. From the higher viewpoint part of the Weinerberger Brickworks can be seen through the gap in the woodland along Langhurstwood Road, where the entrance to the Wealden Brickworks is located. The top of the chimney stack at the Weinerberger Brickworks is visible above the woodland. Views from Viewpoint 22 are more contained by the mature woodland, which screens the Wealden Brickworks site, barring the edge of the Weinerberger Brickworks site along the entrance road. No other buildings on the Wealden brickworks site are visible.

Viewpoint 23 – Footpath 1421-2 (land planned as edge of residential/landscape buffer within Land

North of Horsham development) 800 m7 to the south east of the site (Figure 5.31)

5.5.112 People using this section of the public footpath have views of a meadow enclosed by a mature hedgerow. Glimpses of the wooded slope to the south of the Wealden brickworks are possible. This location lies within the Land North of Horsham development area and is approximately at the edge of a planned residential area, adjacent to the landscape buffer that lies between the areas of housing and Langhurstwood Road.

Viewpoint 24 – Footpath 1421-2 (land planned to be a green way, adjacent to a school site within Land

North of Horsham development) 740 m to the east-south east of the site (Figure 5.32)

5.5.113 People using the public footpath have views towards the site across arable farmland. The views are interrupted by mature hedgerows and hedgerow trees, as well as by large blocks of woodland (including coniferous trees) and the woodland either side of Langhurstwood Road. The Wealden brickworks site is not visible from this location. Future visual receptors at or near this location may also include staff and students at the school.

Viewpoint 25 – Footpath 1421-2 west of Morris' Farm, 840 m to the east of the site (Figure 5.33) and Viewpoint 26 – Footpath 1421-2 north west of Morris' Farm, 900 m to the east-north east of the site (Figure 5.34)

5.5.114 People walking on this public footpath have changing views as the path descends through arable farmland from the wooded ridge to the north. This part of the footpath is not part of the Land North of Horsham development and the land between the viewpoints and site will not have built structures, as the planned cemetery lies between the arable farmland and Langhurstwood Road. Viewpoint 26 is the more elevated view and the topography of the hill and the woodland along Langhurstwood Road helps to screen views of the site. The break in the woodland at the entrance road to the Wealden brickworks site allows glimpses of part of the Weinerberger Brickworks building. While views are currently possible, planting in and around the cemetery will screen these in the future. Viewpoint 25 is taken from lower-lying land on more gently sloping land, views are correspondingly shorter and more influenced by the existing woodland in and around the farmland. However, the views towards the Wealden brickworks site are similar.

Viewpoint 27 – Rusper Road/Hurst Hill, 2 km to the east of the site (Figure 5.35)

5.5.115 People travelling along Rusper Road/Hurst Hill have few views towards the site, as the road is lined with either belts of trees, or high hedgerows. Views west, towards the site, can be glimpsed through field entrances only. Views are across low-lying arable farmland and mature hedgerows and woodland prevent

any long views to the Wealden Brickworks. This viewpoint is on the boundary of the Land North of Horsham development area, adjacent to a school expansion site. Students and staff will not have views towards the 3Rs Facility site due to the amount of mature vegetation on the eastern side of the road.

Viewpoint 28 – Footpath 1489-2, east of Kingsfold, 2.1 km north of the site (Figure 5.36)

5.5.116 People using public footpath 1489-2 gain views through field gates only, as the footpath follows a route north of a mature hedgerow boundary. Views are not possible from the higher land, closer to the village of Kingsfold due to vegetation and buildings within the village. From the viewpoint location Brookhurst Wood landfill site forms the skyline, but the remainder of the Wealden Brickworks site, including the existing buildings, are screened by woodland in the intervening landscape.

Viewpoint 29 – View from A24, immediately to the south of Kingsfold, 2 km from the site (Figure 5.37)

- 5.5.117 This is a static representation of the dynamic views from the A24, Dorking Road. Taken on the southern edge of Kingsfold, this elevated view is across arable farmland. Mature hedgerows divide the fields, many with individual mature trees. Farm buildings can be seen in the lower-lying land amongst the woodland associated with Boldings Brook. Brookhurst Wood landfill site forms an obvious element in this view. The plumes from the Weinerberger Brickworks can be seen above the vegetation. The buildings on the site are glimpsed behind intervening vegetation.
- 5.5.118 Dynamic views from the single carriageway section of the A24 (east and south of the site) towards the site start from The Owl public house, in Kingsfold. Direct towards the site and then oblique, to the east, views are available intermittently for approximately 500 metres in winter months. Travelling at an average speed of 50 mph the top of the landfill is intermittently visible for approximately 22 seconds. Views towards the site for the majority of this section of the A24 are screened by the intervening land form, as well as roadside and intervening vegetation, including high hedges along the boundary of the road. When the vegetation is in leaf the views will be much more restricted and due to the undulating and winding nature of the road, much less noticeable.

Night Time Views

- 5.5.119 The site does not lie in a tranquil area, illustrated on the Campaign to Protect Rural England (CPRE) Tranquillity Map (Figure 5.39). Although tranquillity comprises a number of factors, the amount of artificial light forms an important part of it. Figure 5.39 also indicates the Gatwick flight paths, which lie to the north, south and west of the site. of the site and which contribute aerial points of light, in addition to terrestrial light sources. Night time lighting at Horsham and Crawley are the most noticeable large areas of artificial light in the area, with the vehicles and any street lighting on the A24 and the A264 providing linear sources of light. Warnham, the business park, the commercial properties at Graylands and other small hamlets are also sources of light. The Land North of Horsham development will introduce a larger light source to the north of Horsham, in an area that is currently undulating farmland.
- 5.5.120 Within the Wealden Brickworks site, the Weinerberger Brickworks, Biffa Waste Management Facility and the Britaniacrest waste management facility are lit at night.

Future Baseline Conditions

5.5.121 Only those developments that have the potential to have significant effects on the landscape and visual resources of the area/future receptors are considered in the section below. Consideration of potential cumulative effects that may arise when the proposed 3Rs Facility is considered alongside other proposed developments is set out in Section 5.10 of this chapter.

Land North of Horsham (DC/16/1677)

- 5.5.122 With regards to the future visual receptors within the Land North of Horsham development area, the Land North of Horsham ESA explains that appropriate mitigation measures within the proposed Land North of Horsham development area will significantly reduce effects of that development when seen from the surrounding areas (paragraph 11.5.45). The landscape mitigation proposed will also help to screen views out from the Land North of Horsham development area. The Land North of Horsham ESA describes structural landscape buffers up to 30 metres in width along the western, eastern and southern edges of the development. The buffer on the western edge of the Land North of Horsham development will include screen planting (paragraph 11.6.5, B). East-west green links and greenways will also have areas of new planting and tree and shrub buffers associated with them (paragraph 11.6.5, E) providing further screening of views towards the site. Views towards the site from residential areas will be limited to views from the outer edges of the residential areas, views from within the areas of housing will be largely constrained by other properties. Paragraph 11.8.4 notes that due to the low-lying nature of the Land North of Horsham site, most views into the site would only see a small portion of the site. It also explains that the existing belts of hedgerow trees, and copses within and on the boundaries of the site effectively prevent middle and longdistance views into and across the Land North of Horsham site. Views out of the development area would be similarly restricted.
- 5.5.123 The closest residential areas are part of Phase 3 of the Land North of Horsham development that are due to be constructed between 10 and 15 years after the start of the construction on the wider site. In addition to the substantial existing hedgerows, copses and woods that form the boundary of the Phase 3 residential areas, advance planting will ensure that the landscape buffer around these areas will be established and be providing a significant screen, by the time this part of the development is constructed. The Phase 3 residential areas are situated on low-lying land to the south and south east of the Graylands Farm complex and views towards the site will be limited by the properties of that complex.
- 5.5.124 People visiting the cemetery, using the public open space around the moated site adjacent to Langhurstwood Road and using the allotments that lie to the south of the cemetery will have more open views towards the site than the residents of the Phase 3 housing. The lower-lying public open space and allotments will have views restricted by topography and intervening vegetation and while the views from within the cemetery are from higher ground, the views of the site are still restricted by tree belts and woodland along Langhurstwood Road. The longer views from the elevated land extend over the flat landscape to the south east, south and south west. The tall buildings of Christ's Hospital School form recognisable features in views to the south.

Graylands House change from B1(A) to C3 use (Planning Reference DC/14/2618)

5.5.125 The change of use of parts of ground and first floor from use class B1(A) office to use class C3 residential for eleven dwellings will introduce more sensitive visual receptors into the complex of commercial buildings at Graylands.

5.6 Incorporated Enhancement and Mitigation

5.6.1 This section provides information on the Illustrative Landscape Proposals (Figure 5.38) that form part of the design of the facility. Chapter 2 of this ES summarises the measures proposed as part of the 3Rs Facility design. In relation to Landscape and Visual Assessment, key measures are set out below. Further details of the design are provided in the Design and Access Statement that accompanies the application.

Building Height and Form

5.6.2 Following consultation with the potential suppliers of the technology, the facility has been reduced in height from that proposed originally. The building has been buried so far as it can be, without compromising the

angles of the access slopes into and out of the facility. The supplier of the technology used in the facility has also been changed and the height reduced.

- 5.6.3 The form of the building has been changed from a functional-looking rectilinear design to a predominantly curvilinear form, visually simplifying and unifying the multiple elements of the facility.
- 5.6.4 The 3Rs Facility would be seen rising out of a wooded landscape, with the broad dome of the Brookhurst Wood landfill site evident to the north of the proposed facility. The surrounding woodland would screen the low level 'human-scale' clutter, reducing comparisons of scale.

Colour of the Building

5.6.5 On the advice of West Sussex County Council's planning and landscape officers, the High Weald AONB 'Guidance on the selection and use of colour in development' has been used in selecting the colours for the 3Rs Facility. The Western High Weald Woodland and Heath Sub Palette was considered the most appropriate for the proposed development. Muted greys, greens and browns have been used, as described in the Design and Access Statement. This would enable the building to be more readily absorbed, in visual terms, into the landscape and therefore minimising the visual impact of the development, particularly from the designated landscapes of the Surrey Hills AONB and the High Weald AONB.

Landscape Proposals

- 5.6.6 The landscape proposals (Figure 5.38) are also designed to assist in screening low level clutter, such as vehicles in the car park, giving a simplicity to the front of the facility and providing as much screening of as much 'human-scale' activity as possible.
- 5.6.7 The planting at the front of the building would be a simple palette of predominantly evergreen trees in hedgerows or ground cover. At the internal roundabout, a line of trees within a curved hedgerow would help to screen direct views along the access road from Langhurstwood Road. Trees and hedgerows would provide a softening element to the building in views from the Biffa waste management facility and the Weinerberger Brickworks. To the north of the facility areas of native woodland containing both evergreen and deciduous species would complement the existing, retained woodland.
- 5.6.8 The use of a simple wildflower mix would provide an additional ecological habitat within the site.

Construction and Decommissioning Phases

- 5.6.9 During the construction phase of the proposed development, lighting of the site would be kept to a minimum. Focused lighting would be used where illumination of the site is required during the short-term construction phase of the proposed development. Night time construction works would be limited to an absolute minimum and only conducted where necessary.
- 5.6.10 Cranes would remain on the site for the period that they are required and would have aviation warning lights on during hours of darkness. Construction would be undertaken in accordance with a Construction Environmental Management Plan (CEMP).
- 5.6.11 In the event of decommissioning, similar measures would be taken, implemented through a decommissioning environmental management plan.

Operational Phase

5.6.12 During the operational phase of the proposed development, the building would be clad in muted brown, green and grey colours while the stack would be a muted grey colour. This would help the proposed development to blend into the sky and the woodland, which would minimise the visibility of the building and stack in views from the local and wider area.

- 5.6.13 Details of the proposed site lighting are provided in Appendix 2.2.
- 5.6.14 As the proposed development would operate for 24 hours a day, task specific lighting would be used for external elements. Movement activated lighting would mean that it would only be switched on during the times when it is needed. These measures would enable the light spill from the proposed development to be minimised. Aviation warning lights fitted to the stack and corners of the building would be medium intensity red steady obstacle lights and would be positioned to be visible from the air.
- 5.6.15 The lighting design has been based on the use of appropriate lighting to provide safe working conditions in all areas of the site, whilst minimising light pollution and the visual effect on the local environment. This would be achieved by the use of luminaries that eliminate the upward escape of light.
- 5.6.16 Within the internal process areas, outside of normal working hours, operators would be in the control room and thus lighting would generally remain switched off, with the exception of emergency and escape route lighting. The lighting would be controlled with movement detection locally and from the control room and lighting groups would be switched on only as and when necessary.
- 5.6.17 Lighting would generally be installed along the walkways and stairways around the process equipment to provide illumination for safe access and operational tasks, and at night would only be switched on when operators need access to a specific level.
- 5.6.18 The waste processing hall and bunker area lighting would be switched on permanently as feeding of waste from the bunker to the hopper is essential for the 24-hour operation of the facility. Maintenance on the pretreatment plant would be carried out overnight and visual spectrum smoke detection would be used as part of the fire protection. These buildings would be covered with solid cladding, which would minimise fugitive light emissions from this area.
- 5.6.19 For the administration/visitors' building, lighting would generally be switched off out of normal working hours, unless nightshift operators need specific access to the offices or mess facilities.
- 5.6.20 A dimmable lighting scheme is proposed to facilitate lower levels of lighting in the evening to suit low level site activity.

5.7 Assessment of Construction Effects

Landscape Effects

- 5.7.1 The construction works on the site would not be out of character with the high level of disturbance and movement that is evident from the current operation on the site and on the adjacent Brookhurst Wood landfill site, at the Wienerberger Brickworks and at the Biffa Waste Services sites. The construction phase of the proposed development would add to the vehicles and noise that are typical of the land uses in the vicinity of the site.
- 5.7.2 The short-term construction phase of the proposed development would introduce an additional level of activity to the Low Weald NCA that is large in scale and characteristically rural. Construction activities for the proposed development would not compromise the key characteristics of the Low Weald NCA where noise and movement are part of the urban influences that are associated with Gatwick, Horley and Crawley. The temporary construction work on the site would not create a noticeable intensification of the urban characteristics of the NCA and would cause a negligible change. This would result in a Negligible adverse effect upon the medium sensitivity Low Weald NCA.
- 5.7.3 Short-term construction activities on the site would exist within the urban edge influence that is characteristic of the Northern Vales, as identified by the Landscape Character Assessment of West Sussex. The construction works would not affect the semi-enclosed or rural character and the existing disturbance from
road and aircraft noise means that the temporary construction phase would not detract from any experiences of tranquillity (see CPRE Tranquillity Map, Figure 5.39). The short-term construction activities would take place amongst existing industrial development. The temporary construction phase of the proposed development would cause a low change to the medium sensitivity Northern Vales LCA. This would result in a Minor adverse effect.

- 5.7.4 The construction phase of the proposed development would introduce some temporary features into the Horsham District Landscape Character Area K2: Faygate and Warnham Vale. Cranes and other elevated elements would add to the level of visual intrusion that is evident in some parts of the character area and described as a defining characteristic. The semi-enclosed character of the Faygate and Warnham Vale LCA means that the construction phase of the proposed development would not influence the whole Character Area. The high level of enclosure of the site within the Character Area means that the construction phase of the proposed development would not influence the whole of the Faygate and Warnham Vale LCA. Construction activities would not be out of character with the high level of movement and disturbance that is generated by the existing activities on land adjacent to the site. The temporary construction phase of the proposed development would not destroy any of the defining characteristics of the LCA and would occur alongside the ongoing activities that provide disturbance in terms of noise, odour, movement and sound. The construction works would cause a medium change to the character of the Faygate and Warnham Vale LCA. This short-term change would result in a Minor adverse effect upon the low sensitivity Horsham District LCA.
- 5.7.5 Similarly, the construction activities on the site would give rise to some direct effects upon the Horsham District LCA P1: Upper Arun Valley, but would not cause the loss of any characteristic features. The temporary construction phase of the proposed development would introduce new elements to the Upper Arun Valley that would be set within the context of existing disturbance at the site. The temporary construction phase of the proposed development would occur alongside the existing levels of disturbance on land adjacent to the site and would not constitute a loss of any defining characteristics of the Upper Arun Valley. The high level of enclosure the site enjoys, afforded by the vegetation and landform of the local area, means that the construction activities would not have influence on the whole of the Character Area. Construction works would not compromise any of the key characteristics of the Upper Arun Valley where the tranquillity around Horsham is reduced with high levels of road and aircraft noise notable (Figure 5.39). The short-term construction operations would cause a medium change to this medium sensitivity LCA. This would result in a Moderate adverse effect.
- 5.7.6 The temporary construction phase of the proposed development would occur within the Local Landscape Character Area (LLCA) 15: Warnham Brickworks, which makes up part of Zone 1: North Horsham to Crawley. The construction activities would not affect the value that the LLCA is considered to have and would be well enclosed by the ancient woodland and tree belts which hide the existing development on adjacent land. The temporary construction phase would not be out of character with the existing activities in the area that have contributed to the poor landscape condition and low tranquillity exhibited in the Warnham Brickworks LLCA. The high level of enclosure and the existing disturbance means that the temporary construction phase of the proposed development would cause a medium change to this low sensitivity LLCA. This would result in a Minor adverse effect.
- 5.7.7 The distance between the site and the High Weald AONB, the Surrey Hills AONB and National Park designations coupled with the high level of landscape separation, means that no direct physical landscape impact on the designations would be anticipated. Similarly, there would be no direct physical landscape impact on the Warnham Court Registered Partk and Garden. However, there would be direct visual impacts that may have an indirect impact on the special qualities (and hence character) of the designated landscapes. Any impacts on the special qualities of three of these high sensitivity designated landscapes would be negligible, leading to a Minor adverse effect. The Warnham Court RPaG would experience a low impact, leading to a Minor adverse effect.

Visual Effects

Residential Properties

Properties to the south of the access road to the Wealden Brickworks site, east of the site

5.7.8 All three properties, Wealden, Langhurst Moat Cottage and Bramblehurst would have view of the construction works for the 3Rs Facility. Views of the cranes and the most elevated construction activities at the top of the building and of the stack would be seen by residents in these properties through mature vegetation and above the Weinerberger Brickworks. Given the amount and type of activity already taking place at the Wealden Brickworks site, the temporary construction phase of the proposed development would cause a medium change to views of the Wealden Brickworks site. This would result in a Moderate adverse effect upon the high sensitive receptors in these properties.

Properties in and around Holbrook, east and south east of the site

5.7.9 The construction phase of the proposed development would be almost entirely screened from view for the visual receptors within these residential properties, as the high level of mature vegetation in the foreground and on intervening land would screen all but the highest parts of the construction works. Some partial views of the cranes and most elevated construction activities for the top of the building and the stack would be seen by some receptors in some properties along this section of Old Holbrook. The temporary construction phase of the proposed development would cause a negligible change to views west and would not form a noticeable element amongst the trees. This would result in a Minor adverse effect upon the high sensitive receptors in these properties.

Group of Properties at Graylands Farm, Langhurstwood Road, south east of the site

5.7.10 Visual receptors within the properties that are located off this section of Langhurstwood Road would have the majority of construction activities on the site screened from view by the high level of mature vegetation on intervening land. The high level of close range vegetation would prevent all but some filtered views of higher level works at the top of the building and on the stack, if available at all. Where visible in filtered views, the temporary construction activities on the site would cause a negligible change to views from these residential properties for the high sensitivity receptors within them. This would result in a Minor adverse effect.

Properties on the southern part of Langhurstwood Road, south-south east of the site

5.7.11 As with the properties on the eastern side of Langhurstwood Road, visual receptors within the properties that are located off this section of Langhurstwood Road would have all but the highest construction activities screened from view by the high level of mature vegetation around these properties and in intervening land. Where visible in filtered views, the temporary construction activities on the site would cause a negligible change to views from these residential properties for the high sensitivity receptors within them. This would result in a Minor adverse effect.

Station Road Cottages and properties on Mercer Road, south of the site

5.7.12 The temporary construction works on the site would be almost entirely screened from view for the duration of the works by the high level of foreground visual screening that is provided by mature vegetation. The excavation, ground level and lower level works would be entirely screened from view by intervening vegetation but the construction activities at the top of the building and from about halfway up the stack would be visible to some visual receptors in some of these residential properties. Where these construction elements appear above the foreground vegetation in views to the north, they would be visible but would not change the context of views where some existing clutter is visible in the foreground. The construction works and cranes would be seen amongst a skyline that is created by individual trees, telegraph poles, radio masts and existing development in the foreground where the construction works would not noticeably modify it. The

short-term construction phase of the proposed development would cause a negligible change to views that the high sensitivity visual receptors witness. This would result in a Minor adverse effect.

Warnham Court and properties at Goosegreen, south west of the site

5.7.13 The short-term construction activities on the site would be almost entirely screened from view for the visual receptors in these residential properties. The ground and low-level works would be screened from view by vegetation that occupies intervening land but there may be some visibility of the most elevated construction activities for the top of the building and the stack. The temporary construction works on the site would cause a negligible change to views that visual receptors witness from these properties and their curtilages. This would result in a Minor adverse effect upon the high sensitivity receptors.

Group of properties at Westons Place and Westons Farm, south west of the site

5.7.14 Visual receptors in the residential properties at Westons Farm would have the majority of construction activities on the site screened by foreground vegetation. Where views to the north east are available, they may feature partial views of the most elevated construction activities above vegetation on intervening land but they would not detract from the focus of views and would not alter the character of the existing views. The short-term construction phase of the proposed development would cause a negligible change to views that might be available to these high sensitivity visual receptors. This would result in a Minor adverse effect.

Group of properties at Andrews Farm, Station Road, west-south west of the site

5.7.15 The high level construction activities on the site would be seen by residents of the properties at Andrews Farm, although the woodland surrounding Boldings Brook would restrict views of the ground and lower level operations. The temporary construction works would not alter the context of the views, which would remain enclosed by the close-range vegetation. The construction operations would cause a medium to high change to views east from these properties and these high sensitivity visual receptors gain from the properties and curtilage. This would result in a Moderate to Major adverse effect.

Properties at Knob Hill Corner, Warnham, west-south west of the site

5.7.16 The views from these residences are similar to those from the properties at Andrews Farm, but more elevated and further from the site. Visual receptors in the residential properties that make up the north eastern edge of Warnham would not have views of the lower construction activities, due to the high level of screening provided by mature vegetation on the intervening land. However, some partial views of the higher construction works would be visible. The short-term construction phase of the proposed development would cause a low change to views that are generally focused upon the immediate foreground. This would result in a Minor adverse effect upon the high sensitivity receptors, where the construction activities can be seen.

Properties to the west of the A24, north of Warnham, west of the site

5.7.17 The majority of construction works would be screened from view for the visual receptors within these residential properties by the mature vegetation on intervening land. Lower level construction activities would be heavily screened by the intervening vegetation of the woodland at Chicken Gill, Andrew's Gill and Rats Plantation. The high level of screening means that views for receptors at these properties would remain relatively unaffected by the temporary construction activities, although some of the more elevated works may be more visible from the more elevated properties of Cider Mill Farm and Old Manor. The higher-level construction works for the top of the building and the stack may be seen in the wider views available from these two properties but would not alter the character of views. The temporary construction phase of the proposed development would cause a negligible change to views for the high sensitivity visual receptors in these residential properties. This would result in a Minor adverse effect.

Properties on high land to the east of the A24, west-north west of the site

5.7.18 The temporary construction operations on the site may be partially visible in views to the south east for visual receptors at these residential properties. Intervening vegetation such as that along the railway line would prevent any visibility of the lower level construction activities, but there may be some partial views of the most elevated activities required to construct the top of the building and the stack. Where construction works can be seen from the residential properties and their curtilages, they would not form a prominent element in views and would not alter the context of views from these properties. The temporary construction phase of the proposed development would cause a negligible change to views from the properties, resulting in a Minor adverse effect upon the high sensitivity receptors.

Properties on either side of Mayes Lane, north west of the site

5.7.19 Visual receptors in the residential properties on this section of Mayes Lane would have few views of the construction activities on the site due to the high level of visual screening that the intervening field boundaries and woodland vegetation provide. The most elevated activities to construct the stack may be visible in the east, but would not be noticeable and would not alter the character of the available views. The focus of the views from these residential properties and their curtilages would remain the immediate foreground and any aspects of the short-term construction activities would not be apparent. The construction phase of the proposed development would cause a negligible change to views for the high sensitivity visual receptors. This would result in a Minor adverse effect.

Properties on either side of the A24, north-north west of the site

5.7.20 Partial views of the short-term construction phase may be available from the residential properties, such as The Oaks, Upper Chickens and Durfold Hill Farm or Orchard Lodge, or their curtilages along this section of the A24. The high level of vegetation in the foreground and on intervening land means that there would be no visibility of any lower level construction activities but there may be partial views of cranes and more elevated activities such as the construction of the stack. The short-term construction phase of the proposed development would not form a noticeable feature in oblique views from these properties and would not alter the character of any views. Where visible, the construction operations would cause a negligible change to the views that high sensitivity receptors witness. This would result in a Minor adverse effect.

Kingsfold, north of the site

5.7.21 The construction phase of the proposed development would be partly screened from view by the Brookhurst Wood landfill site and the mature vegetation on intervening land. The construction activities on the site would be visible in the wider view that includes the Brookhurst Wood landfill site and the Weinerberger Brickworks. However, due to the significant amount of screening within the curtilage of properties on the A24, views are restricted from all but one property, Fern Cottage, on the western side of the A24. Kingsfold Place may also have glimpses of the construction activities, through mature vegetation. Where partial views of the more elevated construction works are visible, the construction works and cranes would not alter the context of views and would not be noticeable elements. Where visible, they would be seen as subsidiary elements in views over the rural farmland. The short-term construction phase of the proposed development would cause a negligible change to views for the high sensitive visual receptors in the residential properties on the edge of Kingsfold. This would result in a Minor adverse effect.

Public Rights of Way

Promoted paths

5.7.22 Where the longer promoted paths pass over more elevated land, longer and wider panoramas are available and the most elevated aspects of the construction activities may form visible elements but would not be recognisable in these wider, panoramic views. No ground or lower level construction activities would be visible due to the high level of vegetation in close proximity to the site but the most elevated construction

works may be visible. The construction activities would be barely perceptible and would not alter the character of any views. The construction activities on the site would cause a negligible change to views for high sensitivity receptors passing along the long-distance routes of West Sussex Literary Trial, the Sussex Border Path, the Downs Link, the Greensand Way and the High Weald Landscape Trail and the very high sensitivity receptors using the South Downs National Trail. This would result in a Minor adverse effect upon the high sensitivity receptors on the longer routes.

Local Public Rights of Way

- 5.7.23 Views from local routes that pass through the landscape surrounding the site are generally short distance due to the high level of enclosure that they receive from mature vegetation that would prevent views of the majority of construction activities. In the main, only partial views of the most elevated construction works would be possible, however, there are more open views from the west. More detail is given on individual PRoWs below.
- 5.7.24 Public footpaths 1574-1 and 1574-2 follow the route of Station Road and Mercer Road to the south of the site. Pedestrians walking east along Station Road would have views of the middle and upper construction level activities, for a short stretch of the road, before the high hedges and woodland enclose views. The remainder of the route would have few views of the construction activities. For this short stretch of Station Road there would be a medium impact on these high sensitivity receptors, who would experience a Moderate adverse effect. Pedestrians walking west, along Mercer Road may have glimpses of the high level construction activities, through the mature woodland to the south of the Weinerberger Brickworks. Users of this route would experience a negligible impact and a Minor adverse effect on views.
- 5.7.25 Public bridleways 1570-1 and 1570-2 link the A24 to Langhurstwood Road. It is possible that the views of the high level construction works might be visible from a short section of this bridleway. However, the activities would be barely discernible and the impact on views would be negligible. The high sensitivity receptors using the bridleway would experience a Minor adverse effect on views.
- 5.7.26 Public footpaths 1425-2, 1489-2 and 1489-3 run from the west of Kingsfold to the east of the village and into the farmland to the north of the site. Due to topography and the buildings within Kingsfold the available views of the construction activities from the footpath east of Kingsfold would be non-existent. There would be occasional views from the footpaths west of Kingsfold. The high sensitivity receptors would experience glimpses of the high level construction activities, however, from this distance the impact on views would be either no change or negligible in the context of the other activity on the Wealden Brickworks site, resulting in No Effect or a Minor adverse effect.
- 5.7.27 Public footpath 1573-1 runs along the northern access road to Graylands. Only glimpses of the construction of the stack would be visible above the tree line, through field gates. The impact on the views of these high sensitivity receptors would be negligible, resulting in a Minor adverse effect.
- 5.7.28 Public footpath 1421-2 follows a north-south route, descending from the wooded slopes, towards the lowerlying land of Horsham. While there are open views of the farmland that the footpath passes through, the construction activities on the site would largely be screened by the significant amounts of woodland that lie between the footpath and the Wealden Brickworks site. The highest construction activities, the cranes constructing the stack would be seen above the tree line. The low impact on the high sensitivity receptors would result in a Minor adverse effect.
- 5.7.29 Public footpath 1575-1 crosses low-lying farmland, linking Rusper Road to Northlands Road. Due to the lowlying nature of the footpath and the amount of vegetation and building in between the footpath and the construction activities on the site the impact on the high sensitivity receptors using the footpath would be negligible, resulting in a Minor adverse effect.
- 5.7.30 Public footpaths 1577-2 and 1578-1 cross farmland to the south west of the A24. There would be views of the high level construction activities on the roof and stack of the 3Rs Facility from footpath 1577-2. The

impact on the views of the high sensitivity receptors would be no change or low resulting in No Effect or a Minor adverse effect.

5.7.31 Public footpaths 1420-1 and 1426-1 run approximately parallel to each other, west to east, from Mayes Lane to the A24. Views of the construction activities on the site would be restricted by the undulating terrain and the intervening vegetation. However, there may be glimpses of the high level construction activities. Any impact on views would be negligible and the high sensitivity receptors would only experience a Minor adverse effect.

Roads and Railways

Arterial Roads

- 5.7.32 Visual receptors travelling along the busy routes of the A24 and A264 have the majority of views towards the site, and of the construction activities screened by vegetation lining the carriageways. However, there are two sections of the A24 where longer views are available due to the elevation of the road, the orientation of the road and gaps in the roadside vegetation. A stretch of the A24 immediately south of Kingsfold affords the low sensitivity receptors travelling in vehicles glimpses of the high level construction activities on the site, in the context of the other activities within the Wealden Brickworks site. The impact of the change in these views would be low, resulting in a Minor adverse effect.
- 5.7.33 Views from the Northbound dualled section of the A24 are channelled. As the road curves round to meet the A264 at the Great Daux roundabout, there is a short section of the road that is orientated at the Wealden Brickworks site. The lower level construction activities would be screened from view by vegetation that occupies intervening land. However, the high level activities would be visible, with the Brookhurst Wood landfill site forming a backdrop to the construction works. The temporary construction phase of the proposed development would cause a medium change in this view, resulting in a Minor adverse effect.

Local Roads

- 5.7.34 Similarly, where views over the surrounding landscape are available for visual receptors travelling along the more local roads they would only witness glimpsed views of the higher construction activities at the site. The construction works would be easily missed by receptors in vehicles and vegetation on intervening land would screen the majority of construction works from view. Where glimpsed views through gaps in the roadside vegetation are possible, the construction activities would not form a noticeable part in most views. The views from specific local roads are considered below.
- 5.7.35 People travelling east in vehicles along Station Road would have views of the middle and upper construction activities, for a short stretch of the road, before the high hedges and woodland enclose views. For this short stretch of Station Road there would be a medium impact on these low sensitivity receptors, who would experience a Minor adverse effect. People travelling west along Mercer Road may have glimpses of the high level construction activities, through the mature woodland to the south of the Weinerberger Brickworks. There would be a negligible impact on these receptors, resulting in a Minor adverse effect.
- 5.7.36 Views from Old Holbrook/Northlands Road and Rusper Road/Hurst Hill are very restricted, as the roads are lined with mature vegetation and high hedges for most of their lengths. There would be little or no views of the construction activities from these roads. There would be Negligible adverse effect to No Effect on views from these roads, during the construction phase.
- 5.7.37 People travelling north east along Knob Hill might get glimpses of the higher construction activities at the site. These low sensitivity receptors would experience a low impact on views with a resulting Minor adverse effect.
- 5.7.38 People travelling along Mayes Lane and Threestiles Road have a variety of views towards the site. However, from a high point on Threestiles Road an entrance road affords more open views towards the site.

However, due to the distance from the site, the construction activities would be viewed in the context of the Wealden Brickworks site as a whole and will only form a small part of the view. The low sensitivity receptors would experience a low impact on the available views, resulting in a Minor adverse effect.

Railways

5.7.39 Passengers travelling on the Dorking to Horsham stretch of railway would have the closest views of the travelling public of the construction activities on the site. None of the construction activities would be screened from view, however, the construction work would be seen in the context of the other activities taking place within the Wealden Brickworks site, including the operational Brookhurst Wood landfill site. The medium sensitivity, dynamic receptors would experience a medium impact on existing views, resulting in a Moderate adverse effect.

Industrial and Commercial Premises

- 5.7.40 The temporary construction phase of the proposed development would be seen at close-range by visual receptors immediately adjacent to the site such as employees at the Wienerberger Brickworks and Biffa Waste Services sites. All aspects of the construction works would be visible, but would be seen within the context of the existing development surrounding the site and would not alter the character of the views available in the vicinity greatly. The construction phase of the proposed development would cause a medium change to the close-range views where it would be clearly visible. This would result in a Minor adverse effect upon the low sensitivity receptors.
- 5.7.41 Due to the high level of visual screening around the business units at Graylands, the temporary construction phase of the proposed development would be screened from most views by foreground vegetation that surrounds the units. The construction works on the site would cause a negligible to no change to the low sensitivity visual receptors (employees) in these business units and to the medium sensitivity (customers) visiting the units. This would result in a Negligible adverse effect to No Effect.
- 5.7.42 Similarly, the high level of visual screening around Fisher Clinical Services means that the temporary construction phase of the proposed development would be screened from view by foreground vegetation that surrounds the units. The construction works on the site would cause no change to the low sensitivity visual receptors at these premises, resulting in No Effect.
- 5.7.43 Kam Trucking, Greens of Horsham and Panel2Paint are businesses located to the south of the Wealden Brickworks site, accessed from Mercer Road. Employees and customers would see the high level construction activities, the lower level construction works would be screened by the mature vegetation to the south of the Wealden Brickworks site. There would be a negligible to low impact on close views experienced by low and medium sensitivity receptors, resulting in a Negligible to Minor adverse effect.
- 5.7.44 The ground and lower level activities of the short-term construction phase for the proposed development would be almost screened from view by vegetation that forms the eastern boundaries of the Denhams Auction Site and Sussex Health Care and the vegetation that occupies the intervening land. Some of the more elevated activities would be visible through the boundary vegetation and above vegetation on intervening land. The temporary construction phase of the proposed development would not alter the context of views available from these employment sites and would cause a low change to available views of the low and medium sensitivity receptors employed in, or visiting the complex. This would result in a Minor adverse effect.

Public Open Space and Cemetery within the Land North of Horsham Development Area

5.7.45 People using the planned public open spaces within the Land North of Horsham development, such as the village green, would have the majority of views of the temporary construction phase of the proposed development screened from view by the foreground vegetation and vegetation that lines the local Langhurstwood Road. Only the most elevated construction activities would be partly visible above the

vegetation. Visual receptors on the lower-lying land would not witness any of the ground level construction activities. However, visual receptors on the more elevated south facing slope of the planned cemetery would have more open views of the high level construction activities above the woodland lining Langhurstwood Road. The construction activities would be seen in views to the south west with the existing development on land adjacent to the site and the stacks associated with it as well as the top of St Margaret's Church in Warnham. The lower construction activities would be screened from view by the mature vegetation around the site and along either side of Langhurstwood Road. Existing levels of disturbance from the ongoing activities adjacent to the site mean that additional movement for the construction phase of the proposed development would not be noticeable in views. The temporary construction phase of the proposed development would cause a negligible to low change to views for the high sensitivity receptors. This would result in a Minor adverse effect.

Designated Landscapes

- 5.7.46 Visual receptors located within the South Downs National Park are a long distance from the site and the temporary construction activities would not be noticeable in views from the South Downs National Park. As such, the temporary construction phase of the proposed development would not cause any noticeable changes to views for visual receptors in the South Downs National Park, resulting in No Effect.
- 5.7.47 The effect of the temporary construction activities at the site on visual receptors within the Surrey Hills AONB is considered at representative Viewpoint 11 below.
- 5.7.48 The effect of the temporary construction activities at the site on visual receptors within the High Weald AONB is considered at representative Viewpoint 4 below.
- 5.7.49 The effect of the temporary construction activities at the site on Warnham Court RPaG are considered at representative Viewpoint 6 below.

Representative Viewpoints

5.7.50 The representative viewpoints have been used to identify the visual impacts of the construction phase on available views. Figures 5.7 and 5.8 show the location of these viewpoints and Figures 5.9 to 5.37 are photographs of the views from the corresponding viewpoint locations.

Viewpoint 1 – Public Footpath north of Friday Farm, 2.8 km to the north of site (Figure 5.9)

5.7.51 Only the highest construction activities would be visible from this location due to the intervening landform and the mature vegetation, as well as vegetation in the foreground. Such construction activities would not form a recognisable element in views and would not alter the context or focus of views that are available at this location. The cranes and construction activity would be easily missed by receptors experiencing the view. There would be a negligible change to the existing views. This would result in a Minor adverse effect upon the high sensitivity receptors using the local footpath.

Viewpoint 2 – Public Footpath south of Old Park Farm, 2.6 km to the north east of site (Figure 5.10)

5.7.52 All construction works on the site would be screened from views in the vicinity of the location, due to the intervening landform and mature vegetation. Visual amenity would remain unaffected by the construction activities on the site and there would be no change to views for the high sensitivity visual receptors using this route. This would result in No Effect.

Viewpoint 3 – Public Footpath at Moathouse Farm, 1.6 km east of site (Figure 5.11)

5.7.53 The construction phase of the proposed development would be almost entirely screened from view for the visual receptors travelling west along the public footpath due to the high level of mature vegetation on intervening land. The ground and lower level construction activities would be screened from view but some partial views of the highest construction activities would be available. The focus of the views available would remain unaffected by the construction works on the site, which would be seen against the skyline amongst the ornamental trees at Holbrook Park. The temporary construction phase of the proposed development would cause a negligible change to views west and would not form a noticeable element amongst the trees. This would result in a Minor adverse effect upon the high sensitive receptors using this local route.

Viewpoint 4 – Public Footpath at Roffey Park, 3.9 km to the east of site (Figure 5.12)

5.7.54 Temporary construction activities on the site would be partly visible in the wide and long ranging views west from Roffey Park. The elevated location and more open views available from the footpath passing through the parkland means that construction work for the proposed development would be seen amongst the mature vegetation that surrounds the site. The construction works would not be immediately noticeable and may be missed in the large-scale views available from this location, due to the distance from the site. The construction activities would not form noticeable elements in views gained from Roffey Park and would not alter the character of the views. The short-term construction activities would cause a low change to views for the high sensitivity visual receptors using the footpath. This would result in a Minor adverse effect.

Viewpoint 5 – Public Footpath at Ashlands Farm, 4.9 km to the south west of site (Figure 5.13)

5.7.55 The short, enclosed views that are available to receptors in this vicinity do not include any aspect of the site, which is screened from view by the landform and vegetation in the intervening land. There would be no change to views that the high sensitivity visual receptors gain at this location, resulting in No Effect.

Viewpoint 6 – Public Footpath at Warnham Court Registered Park and Garden, 1.1 km to the south east of site (Figure 5.14)

5.7.56 The majority of the activities taking place on the site during the temporary construction phase of the proposed development would be screened from view from within the parkland landscape of Warnham Court Registered Park and Garden by mature vegetation that occupies the intervening land. Low level construction works would be entirely screened from view by vegetation and slight undulations in landform. However, there may be some views of the highest construction activities on the site for visual receptors in this part of Warnham Court. Construction of the highest part of the building and the stack would be visible above the mature vegetation that otherwise contains views to the landscape of Warnham Court but would not alter the context of views that receptors witness. The construction activities that feature in oblique views would be easily missed amongst the mature vegetation and would have a low impact on views available to the high sensitivity receptors using the footpath. This would result in a Minor adverse effect.

Viewpoint 7 – Churchyard of St. Margaret's Church, Church Street, Warnham, 1.3 km to the south west of the site (Figure 5.15)

5.7.57 Views from this location are limited by the undulating topography and woodland that lies between the churchyard and the site. The plant used in the construction of the stack would be the only activity visible from this location. This would form a minor part of views gained within the churchyard. The impact on the existing view would be low and high sensitivity receptors would experience a Minor adverse effect.

Viewpoint 8 – Warnham Conservation Area at the Cricket Ground, 1.6 km south west of the site (Figure 5.16)

5.7.58 No views of the site are available from this location and the construction activity would have No Effect.

Viewpoint 9 – Public Footpath at Mayes Park Farm, 1.5 km to the west of site (Figure 5.17)

5.7.59 The temporary construction activities at the site would be almost entirely screened from view for receptors in the vicinity of this viewpoint, due to the amount of vegetation on intervening land, including mature hedgerows and hedgerow trees. Where filtered views of the temporary construction operations can be glimpsed through the vegetation, the activities would not be noticeable amongst the trees and would be easily missed by visual receptors. The focus and character of views for receptors in this vicinity would remain unaffected by the temporary construction activities, which would have a negligible impact on views. This would result in a Minor adverse effect being experienced by these high sensitivity receptors.

Viewpoint 10 – Horsham Road, 4.7 km to the west of site (Figure 5.18)

5.7.60 The short-term construction phase of the proposed development would be almost entirely screened from view from this location, due to the high level of mature vegetation that occupies the gently undulating landscape. Construction works to erect the stack would be partly visible above the tops of the trees but would be seen at such a distance and in such a wide vista that they would not be noticeable and would be missed by visual receptors not specifically searching for them. People travelling along Horsham Road would have short, glimpsed views to the east, the character and context of which would remain unchanged. The construction phase of the proposed development would cause a negligible change to views for the low sensitivity visual receptors passing along Horsham Road. This would result in a Negligible adverse effect.

Viewpoint 11 – Leith Hill Tower, Surrey Hills AONB, 9.2 km to the north of site (Figure 5.19)

5.7.61 The temporary construction works of the proposed development would be visible in the long-range views from the public vantage point of Leith Hill Tower, within the Surrey Hills AONB. The construction activities would be seen amongst the woodland and farmland of the gently undulating landscape of the Weald. Where visible, the construction works would form a subsidiary element in the vast panoramic views available from Leith Hill Tower where the view has a predominantly rural character. The construction works would not break the skyline and would be seen against the backdrop of indistinct wooded hills and farmland. Construction activities on the site would have a negligible impact on the views available from this location. This would result in a Minor adverse effect experienced by the very high sensitivity receptors at the viewpoint.

Viewpoint 12 – Great Daux Roundabout, 1 km to the south west of site (Figure 5.20) and Viewpoint 13

– Layby on the A24, 1.3 km to the south-south west of the site (Figure 5.21)

- 5.7.62 People travelling northbound on the A24 towards the Great Daux Roundabout junction with the A264 have views north partly screened by the vegetation on the northern boundary of the roundabout and by the vegetation on the roundabout. The temporary construction activities at the site would be hard to discern through the vegetation with only the highest activities at the top of the stack, visible above the vegetation to the north of the roundabout. The construction activities would be seen amongst the clutter of highway signs, lighting columns and traffic. Road users would have views focused on the traffic and road as they approach the Great Daux roundabout. The activities during the temporary construction phase of the proposed development would cause a low change to views for the low sensitivity visual receptors. This would result in a Minor adverse effect.
- 5.7.63 Viewpoint 13 is from the layby on the northbound carriageway of the A24. From this location the lower construction activities on the site would be screened by the vegetation on and around the roundabout. High construction activities would be visible above this vegetation, but seen with the back drop of, and in the context of, the Brookhurst Wood landfill site. The low sensitivity receptors, travelling along this section of busy

dual carriageway would experience a medium magnitude of impact by the proposed construction works, resulting in a Minor adverse effect on existing views.

Viewpoint 14 – Station Road/footpath 1574-1, 650 m to the south west of the site (Figure 5.22)

5.7.64 Station Road is also the route of a public footpath. For a short section of the road, views open up to the east and the middle and highest construction activities at the site would be visible. Lower construction operations would be screened by the mature woodland that lies between the viewpoint location and the site. The view closes as the road curls to the east and south east and descends towards Boldings Brook. High hedgerows and woodland screen views. The magnitude of impact of the construction works would be medium. For those low sensitivity receptors, travelling in vehicles there would be a Minor adverse effect on views. For the high sensitivity pedestrians, there would be a Moderate adverse effect on views.

Viewpoint 15 – Rear of Station Road Cottages, 270 m to the south of the site (Figure 5.23)

5.7.65 Employees working in this yard and people accessing the rear gardens of Station Cottages, would have no views of the construction of the 3Rs Facility, but would be able to see the construction of the stack, in the context of many other vertical elements in the landscape. The impact on views would be low, receptors are considered to be both high sensitivity (residents) and low sensitivity (employees). The residents would experience a Minor adverse effect on views and the employees, focussed on their work, would experience a Negligible adverse effect.

Viewpoint 16 – Entrance to Warnham Station/footpath 1574-2, Mercer Road, 330 m to the south of the

site (Figure 5.24)

5.7.66 Views are similar to, but a little more open than, those gained at Viewpoint 15. There are three types of receptors, residents of the two properties to the south of Mercer Road, pedestrians using the footpath that runs along Mercer Road, and employees at Kam Trucking, Greens of Horsham and Panel2Paint. Only the highest construction activities would be visible. The impact on views would be low, receptors are considered to be both high sensitivity (residents and pedestrians) and low sensitivity (employees). Although the views are generally more open, the residential properties are well-screened and would experience a Minor adverse effect on views, as would pedestrians. Employees, focussed on their work, would experience a Negligible adverse effect.

Viewpoint 17 – Mercer Road/footpath 1574-2, 330 m to the south-south east of the site (Figure 5.25)

5.7.67 Views towards the site are gained from Mercer Road by both pedestrians (high sensitivity) and people in vehicles (low sensitivity). The majority of the construction activities on the site would be screened by the Weinerberger Brickworks and the mature woodland to the south. The construction of the stack would be visible above the woodland. The impact on views would be negligible. Pedestrians would experience a Minor adverse effect and people in vehicles would experience a Negligible adverse effect.

Viewpoint 18 – Moated site to the east of Langhurstwood Road (within Land North of Horsham public

open space) 270 m to the east of the site (Figure 5.26)

5.7.68 Views experienced by people using the Land North of Horsham public open space would have views towards the site screened by new planting within the public open space. As it is, the existing views of the construction activities on site would be barely discernible through the dense woodland. However, the movement and noise would be apparent. The users of the public open space will have a high sensitivity, but the proposed planting will provide further screening. The impact of the construction activities is considered to be negligible and the resulting significance on views would be a Minor adverse effect.

Viewpoint 19 – Southern entrance drive to Graylands, 480 m to the north east of the site (Figure 5.27) and Viewpoint 20 – Northern Entrance drive to Graylands, 560 m to the north east of the site (Figure 5.28)

- 5.7.69 People travelling in vehicles along this entrance road are moving away from the Wealden Brickworks site. However, should vehicles stop, all that people would see of the construction activities on the site would be the construction of the stack, as the lower construction work would be screened by mature woodland. The magnitude of impact on these low sensitivity receptors would be low, resulting in a Minor adverse effect.
- 5.7.70 Views from the northern access road are more restricted and the magnitude of the impact on receptors travelling in vehicles, or walking along PRoW 1573-1 would be negligible. The low sensitivity receptors travelling in cars would experience a Negligible adverse effect and the high sensitivity pedestrians would experience a Minor adverse effect to existing views.

Viewpoint 21 – Field south of Graylands (land proposed as a cemetery within Land North of Horsham development) 610 m north east of the site (Figure 5.29) and Viewpoint 22 – Field east of moated site (close to land proposed as allotments within Land North of Horsham development) 600 m east of the site (Figure 5.30)

5.7.71 People visiting the cemetery and using the allotments would have different views to those that are currently available, as there will be significant amounts of planting associated with the cemetery and the public open space that lies to the west of the allotments. Views of the construction activities on the site would be limited to the work to construct the stack, as dense woodland prevents views of the lower construction activities. The receptors are deemed to have a high sensitivity. The magnitude of impact would be low, and people in these areas would experience a Minor adverse effect on views.

Viewpoint 23 – Footpath 1421-2 (land planned as edge of residential/landscape buffer within Land

North of Horsham development) 800 m to the south east of the site (Figure 5.31)

5.7.72 Views will be different to those that now exist, as there will be much more planting between the site and this viewpoint, within the western landscape buffer. However, the existing views of the construction activities would be restricted to the construction of the stack as lower construction work is screened by intervening vegetation. People using the PRoW have a high sensitivity and the magnitude of impact is considered to be low. This results In a Minor adverse effect on views.

Viewpoint 24 – Footpath 1421-2 (land planned to be a green way, adjacent to a school site within Land North of Horsham development) 740 m to the east-south east of the site (Figure 5.32)

5.7.73 Views of the construction activities on the site would be of the construction of the stack only, as lower construction activities would be screened by the dense woodland either site of Langhurstwood Road. The receptors have a high sensitivity and the magnitude of impact would be low. The resulting significance would be a Minor adverse effect.

Viewpoint 25 – Footpath 1421-2 west of Morris' Farm, 840 m to the east of the site (Figure 5.33) and Viewpoint 26 – Footpath 1421-2 north west of Morris' Farm, 900 m to the east-north east of the site (Figure 5.34)

5.7.74 Views of the construction activities on the site from these public footpaths would be of the construction of the stack only, as lower construction activities would be screened by the dense woodland either site of Langhurstwood Road. The receptors have a high sensitivity and the magnitude of impact would be low. The resulting significance would be a Minor adverse effect.

Viewpoint 27 – Rusper Road/Hurst Hill, 2 km to the east of the site (Figure 5.35)

5.7.75 The construction activities would not be visible from Rusper Road, due to the amount of dense vegetation. There would be No Effect on existing views.

Viewpoint 28 – Footpath 1489-2, east of Kingsfold, 2.1 km north of the site (Figure 5.36)

5.7.76 There would be occasional views from the footpath to the west of Kingsfold. The high sensitivity receptors would experience glimpses of the high level construction activities, however, from this distance the impact on views would be negligible in the context of the other activity on the Wealden Brickworks site, resulting in a Minor adverse effect.

Viewpoint 29 – View from A24, immediately to the south of Kingsfold, 2 km from the site (Figure 5.37)

5.7.77 This is an open view from the stretch of the A24 immediately south of Kingsfold. It affords the low sensitivity receptors travelling in vehicles glimpses of the high level construction activities on the site, in the context of the other activities within the Wealden Brickworks site. The magnitude of impact in these views would be low, resulting in a Minor adverse effect.

Night Time Views

5.7.78 The lighting proposed during construction is described in Section 5.6, above. In summary, night time construction works would be limited to mainly internal works with any external works only undertaken where necessary. Any lighting that is used during construction would be seen in the context of the existing lighting at the other businesses on the Wealden Brickworks site. Aviation warning lights on any tall construction plant, would be visible, seen in the context of the lights from aircraft using Gatwick Airport and not intrusive. It is anticipated that there would be a negligible to low increase in the amount of lighting on the Wealden Brickworks site after 19:00 and the varied sensitivity receptors would experience a Negligible to Minor adverse effect.

5.8 Assessment of Operational Effects

5.8.1 The operational phase of the proposed development is considered to be permanent. Views of the proposed development are considered for both day time and night time hours due to the 24-hour operation of the facility.

Landscape Effects

- 5.8.2 The distance between the site and the High Weald AONB, the Surrey Hills AONB and National Park designations coupled with the high level of landscape separation, means that there would be no direct physical landscape impact upon the designations would be anticipated. Similarly, there would be no direct physical landscape impact on the Warnham Court Regsitered Park and Garden. However, there would be direct visual impacts that may have an indirect impact on the special qualities (and hence character) of the designated landscapes. Any impacts on the special qualities views of three of these high sensitivity designated landscapes would be negligible, leading to a Minor adverse effect, i.e. not significant. The Warnham Court Registered Park and Garden would experience a low impact, leading to a Minor adverse effect.
- 5.8.3 The proposed 3Rs Facility on the site would introduce an additional element of industrial development to the already industrial setting of the site at a location allocated for this type of development. The operation of the facility would marginally increase the level of visual intrusion on the site during the day where it would be within the character of the existing development on adjacent land. In the evening and at night-time, there would be much lower levels of activity, with no HGV deliveries and minimal activity outside the buildings, although the facility would remain operational, with some task specific low level outdoor lighting.

- 5.8.4 The permanent operational phase of the proposed development would introduce an additional level of activity to the large National Character Area (NCA) of the Low Weald that is large in scale and characteristically rural. Full operation of the proposed development would not compromise the key characteristics of the Low Weald NCA, offering an imperceptible addition to its overall characterisation. The proposed development would cause a negligible change to the medium sensitivity Low Weald NCA, resulting in a Negligible adverse effect.
- 5.8.5 The proposed development would operate within the urban edge influence that is characteristic of the Northern Vales LCA, as identified by the Landscape Character Assessment of West Sussex. The 24-hour operation of the facility would not affect the semi-enclosed or rural character of the surrounding landscape. The site and the surrounding landscape is already affected by traffic and aircraft noise and the 3Rs Facility would not add to this, or detract from any perceived tranquillity experienced in the Northern Vales LCA. Although taller (but of a smaller scale than the landfill), the proposed building would not alter the characteristic elements in the wider Northern Vales LCA. The proposed development would cause a low change to the medium sensitivity Northern Vales LCA and result in a Minor adverse effect upon the LCA.
- 5.8.6 The proposed development would introduce an industrial development into the Horsham District LCA K2: Faygate and Warnham Vale. The 3Rs Facility would add to the level of visual intrusion that is evident in some parts of the character area and described as a defining characteristic. The semi-enclosed character of the Faygate and Warnham Vale LCA means that the proposed development would not influence the whole Character Area. The high level of enclosure that the site itself has within the LCA means that the proposed development would not influence the whole of the Faygate and Warnham Vale LCA. The proposed development would not remove any of the key elements and defining characteristics of the LCA. The magnitude of impact of the 3Rs Facility, on the LCA during the operational phase would be medium. This would result in a Moderate adverse effect upon the medium sensitivity LCA.
- 5.8.7 The 3Rs Facility would have direct effects upon the Horsham District LCA P1: Upper Arun Valley, during the permanent operational phase of the development, as introducing an additional industrial unit into the LCA would intensify the industrial character of this part of the LCA. The existing disturbance provided by development adjacent to the site means that the proposed development would not compromise any of the key characteristics that define the Upper Arun Valley LCA. The proposed development would be located within an area already disturbed by road, rail and air traffic, which is notable in the vicinity of Horsham, and would be located adjacent to existing sources of disturbance on land around the site. The high level of enclosure the site is afforded by the surrounding woodland and landform of the local area means that the proposed development would not compromise any of the key characteristics of the Upper Arun Valley LCA and would cause a medium change to this medium sensitivity LCA, resulting in a Moderate adverse effect.
- 5.8.8 The proposed development lies within Local Landscape Character Area (LLCA) 15: Warnham Brickworks, which forms part of the 'Landscape capacity of local landscape character areas for employment development', Zone 1: North Horsham to Crawley. It would not affect the inherent value that the LLCA is considered to have. It would be enclosed by the woodland and tree belts which help to screen the existing development from the adjacent farmland. The 3Rs Facility would not be out of character with the existing industrial development on the Wealden Brickworks site as the facility would be located amongst similar development types. The poor quality of the LLCA contributes to the lack of tranquillity at the brickworks site. However, the high level of enclosure afforded by the woodland surrounding the site would limit the visibility and characterising influence that the proposed development would have on adjacent LCAs and LLCAs. The 3Rs Facility would have a medium magnitude of impact on the low sensitivity LLCA, resulting in a Minor adverse effect.
- 5.8.9 Impacts on adjacent LCAs would be indirect and limited to the visual influence of the proposals. Due to the high level of enclosure provided both by the landform and the well-wooded landscape, there would be a lack of significant effects on adjacent areas. As such, the effects of the proposed building during the operational phase upon LCAs that the site is not located in are not considered in this assessment. Similarly, the distance

between the site, the AONBs and the National Park, means that no significant effects upon these designated landscapes would occur.

Visual Effects

5.8.10 In addition to the building and the stack, the visual assessment considers the incidence of any visible plumes for the likely receptors that could witness changes as a result of the proposed development. Visible plumes can arise when hot, wet exhaust gases are cooled to ambient temperature, resulting in the condensation of water vapour and a water vapour plume. The extent of the plume is dependent on the volumetric flow rate of gases from the source, the amount of water vapour in the cooled gases, the relative humidity of the atmosphere and the extent of plume dispersion in the atmosphere. When present, it tends to be up to two to three times the diameter of the stack and up to a few tens of metres in length, although this varies with the weather. A methodology for the assumptions made on visible plume is presented at Appendix 5.1: Visible Plume Assessment Methodology.

Residential Properties

Properties to the south of the access road to the Wealden Brickworks site, east of the site

5.8.11 All three properties on the western side of Langhurstwood Road, i.e. Wealden, Langhurst Moat Cottage and Bramblehurst would have views of the proposed 3Rs Facility, through mature vegetation to the west (rear) of the houses. Residents would have oblique views towards the building, located beyond the Weinerberger Brickworks and storage yard. The tallest element of the building i.e. the boiler hall, is towards the centre of the site, near the railway and is well screened. The landscape proposals (Figure 5.38) would assist in screening low level clutter, such as vehicles in the car park, giving a simple frontage to the facility, for views at ground level from the access road. Views from upper floors to the rear and through intervening vegetation of the building and stack may be possible. The proposed development would be seen in the context of existing industrial development and the Brookhurst Wood landfill site. The proposed 3Rs Facility would have a low to medium impact on these high sensitivity receptors. Residents in the properties would experience a Minor to Moderate adverse effect on views. The significance of these views will diminish as the proposed planting to the south and east of the 3Rs Facility matures.

Properties in and around Holbrook, east and south east of the site

5.8.12 The 3Rs Facility would be almost entirely screened in views west from these properties, due to the large amount of mature vegetation in the foreground and on intervening land and topography. The stack would be seen by some receptors in properties in Old Holbrook. The proposed development would have a negligible impact on views west and would not form a noticeable element amongst the trees. This would result in a Minor adverse effect upon the high sensitive receptors in these properties.

Group of Properties at Graylands Farm, Langhurstwood Road, south east of the site

5.8.13 Receptors within the properties located at this part of Langhurstwood Road would not have views of the buildings, due to density of mature vegetation on intervening land. However, they would have views of the top of the stack. The proposed facility would have a negligible impact on the views experienced by these high sensitivity receptors, which would result in a Minor adverse effect.

Properties on the southern part of Langhurstwood Road, south-south east of the site

5.8.14 As with the properties on the eastern side of Langhurstwood Road, visual receptors within the properties that are located off this section of Langhurstwood Road would not have views of the buildings, due to the amount of mature vegetation around the properties and on the intervening land. However, some views of the top of the stack may be possible. The proposed 3Rs Facility would have a negligible impact on views from these residential properties. These high sensitivity receptors would experience a Minor adverse effect.

Station Road Cottages and properties on Mercer Road, south of the Application

5.8.15 Station Road Cottages are set at a lower level and are well screened from the site by a combination of topography and trees. The 3Rs Facility would be almost entirely screened from view by the landform and the mature vegetation between these receptors and the site. There would be views of the stack through and above the surrounding vegetation. The proposed building would have a low impact on views, and the high sensitivity visual receptors would experience a Minor adverse effect. The two properties on Mercer Road face away from the site but would have some views of the upper parts of the building and the stack. Here the proposed building would have a medium impact on views, and the high sensitivity visual receptors would experience a Moderate adverse effect.

Warnham Court and properties at Goosegreen, south west of the site

5.8.16 The 3Rs Facility would be almost entirely screened from view from the properties at Goosegreen, due to the amount of vegetation that lies between these properties and the site. However, there may be some views of the stack. The buildings of and around Warnham Court would not have views of the buildings or stack, due to the mature woodland to the north east of the estate. The 3Rs Facility would have a negligible impact on the views that are available. These high sensitivity receptors would experience a Minor adverse effect.

Group of properties at Westons Place and Westons Farm, south west of the site

5.8.17 Residents at Westons Farm and adjacent properties would have most views of the 3Rs Facility screened by foreground vegetation. Where views to the north east are available, they would be glimpses of the highest parts of the building or of the stack. The elements of the facility that would be visible would not alter the dominant rural character of the existing views. The proposed development would have a negligible impact on the views that might be available. These high sensitivity visual receptors would experience a Minor adverse effect.

Group of properties at Andrews Farm, Station Road, west-south west of the site

5.8.18 The group of properties at Andrews Farm, Station Road would experience the largest visual impacts from the facility. There would be relatively uninterrupted views from parts of the properties and parts of their access from Station Road. Careful attention has been given to the design of this western façade, to break up its massing, reduce the overall height and employ a sensitive colour scheme, based on the High Weald AONB approved colour palette. Nonetheless, upper parts of the 3Rs Facility would be clearly seen from the rear of the properties, above the mature woodland that surrounds Boldings Brook, with the woodland on Langhurstwood Road as a backdrop. This would represent a difference in scale in the existing local context, which includes a small sewage works as well as the existing development at the site, which is of a smaller scale in this view than the proposed 3Rs Facility. The proposed facility would have a medium impact on the views to the immediate east from these properties. These high sensitivity receptors would experience a Moderate to Major adverse effect.

Properties at Knob Hill Corner, Warnham, west-south west of the site

5.8.19 The views from these residences are similar to those from the properties at Andrews Farm, but more elevated and further from the site. Visual receptors in the residential properties that make up the north eastern edge of Warnham would not have views of the lower parts of the building, due to the high level of screening provided by mature vegetation on the intervening land. However, some views of the higher parts of the building would be visible. The proposed development would have a low to medium impact on views that are generally focused upon the immediate foreground. The high sensitivity receptors would experience a Minor to Moderate adverse effect.

Properties to the west of the A24, north of Warnham, west of the site

5.8.20 The majority of the 3Rs building would be screened from views from these residential properties by the mature vegetation on intervening land, such as the woodland at Chicken Gill, Andrew's Gill and Rats Plantation. The high level of screening means that views for receptors at these properties would remain relatively unaffected by the proposed development, although the stack may be visible from the more elevated properties of Cider Mill Farm and Old Manor. The top of the building and the stack may be seen in the wider views from these two properties but would not alter the character of views. The proposed development would have a negligible impact on views from these residential properties. The high sensitivity receptors would experience a Minor adverse effect.

Properties on high land to the east of the A24, west-north west of the site

5.8.21 The 3Rs Facility may be partly visible in south easterly views from these properties. Intervening vegetation, such as that along the railway line, would prevent any views of the lower level parts of the building, but there may be some views of the top of the building and the stack. Where the building can be seen it would not form a prominent element in views and would not alter the context of views from these properties. The proposed development would have a negligible impact on views from the properties, resulting in a Minor adverse effect upon the high sensitivity receptors.

Properties on either side of Mayes Lane, north west of the site

5.8.22 Views of the 3Rs Facility from properties on this section of Mayes Lane would be few, due to the high level of visual screening provided by the mature hedgerows and woodland within the farmland between these receptors and the site. The stack may be visible, but would not be very noticeable and would not alter the character of the available views. The focus of the views from these residential properties and their curtilages would remain the immediate foreground. The proposed development would have a negligible impact on the existing views. These high sensitivity visual receptors would experience a Minor adverse effect on some views.

Properties on either side of the A24, north-north west of the site

5.8.23 There may be views of the 3Rs Facility from some parts of the residential properties, such as The Oaks, Upper Chickens and Durfold Hill Farm or Orchard Lodge, or their curtilages along this section of the A24. The large amount of vegetation in the foreground and on intervening land means that there would be no visibility of lower parts of the building, but there may be views of the higher parts of the building and the stack. The proposed development would not form a noticeable feature in oblique views from these properties and would not alter the character of any views. Where visible, the proposed development would have a negligible impact on the existing views. The high sensitivity receptors would experience a Minor adverse effect on their views.

Kingsfold, north of the site

5.8.24 The proposed development would be partly screened from view by the Brookhurst Wood landfill site, which dominates the view, and the mature vegetation on intervening land. The 3Rs Facility would be visible in the wider view that includes the Brookhurst Wood landfill site and the Weinerberger Brickworks. However, due to the significant amount of screening within the curtilage of properties on the A24, views are restricted from all but one property on the western side of the A24, Fern Cottage. Kingsfold Place may also have glimpses of the facility, through mature vegetation. Where parts of the facility are visible, the building would not alter the context of views and would not be a prominent element. The building would be seen in the context of the Brookhurst landfill site as a subsidiary element in views over the rural farmland. The proposed development would have a negligible impact on views from properties on the edge of Kingsfold. The high sensitivity receptors would experience a Minor adverse effect.

Public Rights of Way

Promoted paths

5.8.25 Where the promoted paths pass over more elevated land, longer and wider panoramas are available and the highest parts of the 3Rs building may form visible elements, but would be barely perceptible and would not alter the character of any views. The proposed building would have a negligible impact on views for people using the long-distance routes, such as the West Sussex Literary Trial, the Sussex Border Path, the Downs Link, the Greensand Way and the High Weald Landscape Trail and the very high sensitivity receptors using the South Downs National Trail. These high and very high sensitivity receptors would experience a Minor adverse effect.

Local Public Rights of Way

- 5.8.26 Views from local routes that pass through the landscape surrounding the site are generally short distance due to the large amount of enclosure afforded by mature vegetation. These hedgerows, trees and woodlands would prevent most views of the lower parts of the building. In the main, only the highest parts of the building and the stack would be possible. However, there are more open views from the west. More detail is given on individual PRoWs below.
- 5.8.27 Public footpaths 1574-1 and 1574-2 follow the route of Station Road and Mercer Road to the south of the site. Pedestrians walking east along Station Road would have views of the middle and upper parts of the 3Rs Facility, including the stack, for a short stretch of the road, before the high hedges and woodland enclose views. The remainder of the route would have few views of the proposed development. For this short stretch of Station Road there would be a medium impact on high sensitivity receptors, who would experience a Moderate to Major adverse effect. Pedestrians walking west, along Mercer Road may have glimpses of the stack, through the mature woodland to the south of the Weinerberger Brickworks. Users of this route would experience a negligible impact and a Minor adverse effect on views.
- 5.8.28 Public bridleways 1570-1 and 1570-2 link the A24 to Langhurstwood Road. It is possible that the roof of the building might be visible from a short section of this bridleway. However, the building would be barely discernible through the woodland and other vegetation and the impact on views would be negligible. The high sensitivity receptors using the bridleway would experience a Minor adverse effect on views.
- 5.8.29 Public footpaths 1425-2, 1489-2 and 1489-3 run from the west of Kingsfold to the east of the village and into the farmland to the north of the site. Due to topography and the buildings within Kingsfold there would be no available views of the 3Rs Facility from the footpath east of Kingsfold. There would be occasional views from the footpaths west of Kingsfold. The high sensitivity receptors would experience glimpses of the top of the roof and the stack, however, from this distance the impact on views would be negligible in the context of the other activity on the Wealden Brickworks site, resulting in a Minor adverse effect.
- 5.8.30 Public footpath 1573-1 runs along the northern access road to Graylands. Only glimpses of the stack would be visible above the tree line, through field gates. The impact on the views of these high sensitivity receptors would be negligible, resulting in a Minor adverse effect.
- 5.8.31 Public footpath 1421-2 follows a north-south route, descending from the wooded slopes, towards the lowerlying land of Horsham. While there are open views of the farmland that the footpath passes through, the 3Rs Facility would largely be screened by the significant amounts of woodland that lie between the footpath and the Wealden Brickworks site. The highest built elements would be seen above the tree line. The low impact on the high sensitivity receptors will result in a Minor adverse effect.
- 5.8.32 Public footpath 1575-1 crosses low-lying farmland, linking Rusper Road to Northlands Road. Due to the lowlying nature of the footpath and the amount of vegetation and buildings in between the footpath and the 3Rs Facility, the impact on the high sensitivity receptors using the footpath would be negligible, resulting in a Minor adverse effect.

- 5.8.33 Public footpaths 1577-2 and 1578-1 cross farmland to the south west of the A24. There would be views of the roof and stack of the 3Rs Facility from footpath 1577-2. The impact on the views of the high sensitivity receptors would be low, resulting in a Minor adverse effect.
- 5.8.34 Public footpaths 1420-1 and 1426-1 run approximately parallel to each other, west to east, from Mayes Lane to the A24. Views of the 3Rs Facility would be restricted by the undulating terrain and the intervening vegetation. However, there may be glimpses of the top of the roof and the stack of the building. Any impact on views would be negligible and the high sensitivity receptors would only experience a Minor adverse effect.

Roads and Railways

Arterial Roads

- 5.8.35 The majority of views towards the 3Rs Facility available to people travelling along the A24 and A264 are screened by vegetation lining the carriageways. However, there are two sections of the A24 where longer views are available due to the elevation and/or orientation of the road and gaps in the roadside vegetation. A stretch of the A24 immediately south of Kingsfold allows the low sensitivity receptors travelling in vehicles, glimpses of the 3Rs Facility, in the context of the other activities within the Wealden Brickworks site. The impact of the change in these views would be low, resulting in a Minor adverse effect.
- 5.8.36 Views from the northbound dualled section of the A24 are channelled. As the road curves round to meet the A264 at the Great Daux roundabout, there is a short section of the road that is orientated towards the Wealden Brickworks site. The lower parts of the 3Rs Facility would be screened from view by vegetation that occupies intervening land. However, the higher parts of the building and the stack would be visible, with the Brookhurst Wood landfill site forming a backdrop to the facility. The proposed development would have a low to medium impact on this view, with these low sensitivity receptors experiencing a Minor adverse effect.

Local Roads

- 5.8.37 Similarly, where views over the surrounding landscape are available for visual receptors travelling along the more local roads they would only witness glimpsed views of the higher parts of the 3Rs Facility. The vegetation on intervening land would screen the facility in most views. Where glimpsed views through gaps in the roadside vegetation the buildings would not form a noticeable part of the views. The views from specific local roads are considered below.
- 5.8.38 People travelling east in vehicles along Station Road would have views of the middle and upper parts of the facility, for a short stretch of the road, before the high hedges and woodland enclose views. For this short stretch of Station Road there would be a medium impact on these low sensitivity receptors, who would experience a Minor adverse effect. People travelling west along Mercer Road may have glimpses of the stack through the mature woodland to the south of the Weinerberger Brickworks. There would be a negligible impact on these receptors, resulting in a Negligible adverse effect.
- 5.8.39 Views from Old Holbrook/Northlands Road and Rusper Road/Hurst Hill are very restricted, as the roads are lined with mature vegetation and high hedges for most of their lengths. There would be little or no views of the 3Rs Facility from these roads. There would be Negligible adverse effect to No Effect on views from these roads.
- 5.8.40 People travelling north east along Knob Hill might get glimpses of the higher parts of the 3Rs facility. These low sensitivity receptors would experience a low impact on views with a resulting Minor adverse effect.
- 5.8.41 People travelling along Mayes Lane and Threestiles Road have a variety of views towards the site. However, from a high point on Threestiles Road an entrance road affords more open views towards the site. Due to the distance from the site, the 3Rs Facility would be viewed in the context of the Wealden Brickworks

site as a whole and will only form a small part of the view. The low sensitivity receptors would experience a low impact on the available views, resulting in a Minor adverse effect.

Railways

5.8.42 Passengers travelling on the Dorking to Horsham stretch of railway would have the closest views of the travelling public of the 3Rs Facility. As with the rest of the site and the landfill, none of the western side of the facility would be screened from view from the railway. The proposed development would be seen in the context of the other activities taking place within the Wealden Brickworks site, including the landfill. The medium sensitivity, transient receptors and users of Warnham Station would experience a medium impact on existing views, resulting in a Moderate adverse effect.

Industrial and Commercial Premises

- 5.8.43 The proposed development would be seen at close-range by visual receptors immediately adjacent to the site such as employees at the Wienerberger Brickworks and Biffa Waste Services sites. The facility would be seen within the context of the existing development surrounding the site and it would not alter the character of the views available in the vicinity. The proposed development would cause a medium change to the close-range views where it would be clearly visible. This would result in a Minor adverse effect upon the low sensitivity receptors. The significance of the impact would reduce over time, as the proposed planting matures.
- 5.8.44 Due to the high level of visual screening around the business units at Graylands, the 3Rs Facility would be screened from most views by foreground vegetation that surrounds the units. The proposed facility would cause no change to negligible impacts to the low and medium sensitivity visual receptors. This would result in No Effect to Negligible adverse effects.
- 5.8.45 Similarly, the high level of vegetation around Fisher Clinical Services means that the proposed development would be screened from view. The 3Rs Facility would cause no change to the low sensitivity visual receptors at these premises, resulting in No Effect.
- 5.8.46 Kam Trucking, Greens of Horsham and Panel2Paint are businesses located to the south of the Wealden Brickworks site, accessed from Mercer Road. Employees and customers would see the top of the stack, with potential glimpses of a sliver of the building along a small access road linking the Greens of Horsham site with the Weinerberger Brickworks. There would be a low impact on close views experienced by low and medium sensitivity receptors, resulting in a Negligible to Minor adverse effect.
- 5.8.47 The lower parts of the 3Rs Facility would be screened from view by vegetation that forms the eastern boundaries of the Denhams Auction Site and Sussex Health Care and the vegetation that occupies the intervening land. Some higher parts of the building and the stack would be visible through the boundary vegetation and above vegetation on intervening land. The proposed development would not alter the context of views available from these employment sites and would cause a low change to those views available for the low and medium sensitivity receptors employed in, or visiting the complex. Depending on the receptor type, this would result in a Minor to Negligible adverse effect.

Public Open Space and Cemetery within the Land North of Horsham Development Area

5.8.48 People using the planned public open spaces within the Land North of Horsham development, such as the village green, would have the majority of views of the 3Rs Facility screened by the foreground vegetation and vegetation that lines Langhurstwood Road. Only parts of the stack would be visible above the woodland. The building might be seen through the dense woodland in views towards the south west, with the existing development on land adjacent to the site and the stacks associated with it as well as the top of St Margaret's Church in Warnham. The lower parts of the building would be screened from view by the mature vegetation around the site and along either side of Langhurstwood Road. The proposed development would have a

negligible to low impact on existing views. These high sensitivity receptors would experience a Minor adverse effect.

Designated Landscapes

- 5.8.49 Visual receptors located within the South Downs National Park are a long distance from the site and the 3Rs Facility would not be noticeable in views from the South Downs National Park. As such, the proposed development would have a negligible impact on views for visual receptors in the South Downs National Park, resulting in MInor adverse effect
- 5.8.50 The effect of the proposed development on visual receptors within the Surrey Hills AONB is considered at representative Viewpoint 11 below.
- 5.8.51 The effect of the proposed development on visual receptors within the High Weald AONB is considered at representative Viewpoint 4 below.
- 5.8.52 The effect of the proposed development on Warnham Court RPaG are considered at representative Viewpoint 6 below.

Representative Viewpoints

5.8.53 The representative viewpoints have been used to identify the visual impacts on available views. Figures 5.7 and 5.8 show the location of these viewpoints and Figures 5.9 to 5.37 are photographs of the views from the corresponding viewpoint locations.

Viewpoint 1 – Public Footpath north of Friday Farm, 2.8 km to the north of site (Figure 5.9)

5.8.54 Only the stack of the 3Rs Facility would be visible from this location due to the intervening landform and the mature vegetation, as well as vegetation in the foreground of the view. The stack would not be a recognisable element in views and would not alter the context or focus of views that are available at this location. There would be a negligible impact on existing views. This would result in a Minor adverse effect upon the high sensitivity receptors using the local footpath.

Viewpoint 2 – Public Footpath south of Old Park Farm, 2.6 km to the north east of site (Figure 5.10)

5.8.55 The 3Rs Facility would be screened from views in the vicinity of the location, due to the intervening landform and mature vegetation. Visual amenity would remain unaffected and there would be no change to views for the high sensitivity visual receptors using this route. This would result in No Effect.

Viewpoint 3 – Public Footpath at Moathouse Farm, 1.6 km east of site (Figure 5.11)

5.8.56 The 3Rs building would be screened from the view for those people walking west along the public footpath, due to the high level of mature vegetation on intervening land, but the upper part of the stack would be visible. However, the general views available would remain unaffected by the proposed development. The facility would have a negligible impact on views towards the west. The high sensitivity receptors would experience a Minor adverse effect.

Viewpoint 4 – Public Footpath at Roffey Park, 3.9 km to the east of site (Figure 5.12)

5.8.57 The proposed development would be partly visible in the wide and long-ranging views west from Roffey Park. The elevated location and more open aspect from the footpath passing through the parkland means that the 3Rs Facility would be seen amongst the mature vegetation that surrounds the site. The building would not be immediately noticeable and may be missed in the large-scale views available from this location, due to the distance. The stack would be visible above the skyline, but again indistinct due to distance and would not alter the character of the views. The proposed development would have cause a low impact on views. The high sensitivity receptors using the footpath would experience a Minor adverse effect.

Viewpoint 5 – Public Footpath at Ashlands Farm, 4.9 km to the south west of site (Figure 5.13)

5.8.58 The short, enclosed views that are available to receptors in this vicinity do not include any aspect of the site, which is screened from view by the landform and vegetation in the intervening land. There would be no change to views that the high sensitivity visual receptors gain at this location, resulting in No Effect.

Viewpoint 6 – Public Footpath at Warnham Court Registered Park and Garden, 1.1 km to the south east of cite (Figure F. 14)

of site (Figure 5.14)

5.8.59 The building of the 3Rs Facility would be all but screened from view from within the parkland landscape of Warnham Court Registered Park and Garden by mature vegetation that occupies the intervening land. The lower parts of the building would not be seen. Only the top of the roof and the stack would be visible above the mature vegetation that otherwise contains views to the landscape of Warnham Court. These glimpses of the facility would not alter the general character of the available views. The proposed development would have a low impact on views available to the high sensitivity receptors using the footpath, who would experience a Minor adverse effect.

Viewpoint 7 – Churchyard of St. Margaret's Church, Church Street, Warnham, 1.3 km to the south west of the site (Figure 5.15)

5.8.60 Views of the 3Rs Facility from this location are limited by the undulating topography and woodland that lies between the churchyard and the site. Only the top of the stack would be visible from this location. This would form a minor part of views gained within the churchyard. The impact on the existing view would be negligible and high sensitivity receptors would experience a Minor adverse effect.

Viewpoint 8 – Warnham Conservation Area at the Cricket Ground, 1.6 km south west of the site

5.8.61 No views of the proposed development would be available from this location and the 3Rs Facility would have No Effect on the existing views.

Viewpoint 9 – Public Footpath at Mayes Park Farm, 1.5 km to the west of site (Figure 5.16)

5.8.62 The 3Rs Facility would be almost entirely screened from the views of receptors in the vicinity of this viewpoint, due to the amount of vegetation on intervening land, including mature hedgerows and hedgerow trees. Where views of the facility would be glimpsed through the vegetation, it would not be noticeable amongst the trees and would easily be missed by visual receptors. The focus and character of views in this vicinity would remain unaffected by the proposed development, which would have a negligible impact on views. This would result in a Minor adverse effect being experienced by these high sensitivity receptors.

Viewpoint 10 – Horsham Road, 4.7 km to the west of site (Figure 5.18)

5.8.63 The proposed development would be almost entirely screened from view from this location, due to the high level of mature vegetation that occupies the gently undulating landscape. The stack would be barely visible above the tops of the trees and as it would be seen at such a distance and in such a wide vista it would be hardly noticeable. The proposed development would have a negligible impact on views for the low sensitivity visual receptors passing along Horsham Road. This would result in a Negligible adverse effect.

Viewpoint 11 – Leith Hill Tower, Surrey Hills AONB, 9.2 km to the north of site (Figure 5.19)

5.8.64 Depending on weather conditions, the proposed development would be visible in the long-range views from the public vantage point of Leith Hill Tower, within the Surrey Hills AONB. The facility would be barely

discernible amongst the woodland and farmland of the gently undulating landscape of the Weald. The stack does not break the skyline when seen from this elevated view. The 3Rs Facility would have a negligible impact on the views available from this location. This would result in a Minor adverse effect experienced by the very high sensitivity receptors at the viewpoint.

Viewpoint 12 – Great Daux Roundabout, 1 km to the south west of site (Figure 5.20) and Viewpoint 13 – Layby on the A24, 1.3 km to the south-south west of the site (Figure 5.21)

- 5.8.65 Owing to the bend in the road, embankments and trees on either side of the A24, people travelling north from the Robin Hood Roundabout initially have no view of the facility, which would be completely screened. As vehicles travel north towards the Great Daux Roundabout, these views open up for a short stretch of the A24 (less than 500 metres in length, or for approximately 30 seconds at 30 mph).
- 5.8.66 Viewpoint 13 is from the layby on the northbound carriageway of the A24. For travellers stopping or passing here the lower parts of the 3Rs Facility would be screened by the vegetation on and around the roundabout. Tall elements of the building would be visible above these trees and the facility would be seen with the back drop of, and in the context of, the Brookhurst Wood landfill site and traffic in this busy stretch of dual carriageway. The low sensitivity receptors would experience a medium magnitude of impact by the proposed works, resulting in a Minor adverse effect on existing views.
- 5.8.67 People travelling northbound along the A24 towards the Great Daux Roundabout junction with the A264 have views north partly screened by vegetation on the northern boundary of the roundabout and by the vegetation on the roundabout. The 3Rs Facility would be glimpsed through the vegetation and the stack would be visible above the vegetation to the north of the roundabout. The proposed development would be seen amongst the clutter of highway signs, lighting columns and traffic. Road users would have views focused on the traffic and the road as they approach the Great Daux roundabout. The proposed development would have a negligible impact on these views. The low sensitivity receptors would experience a Negligible adverse effect when seen from Viewpoint 12.

Viewpoint 14 – Station Road/footpath1574-1, 650 m to the south west of the site (Figure 5.22)

5.8.68 Station Road is also the route of a public footpath. For a short section of the road views open up to the east and the middle and upper parts of the 3Rs Facility would be visible. Lower parts of the building would be screened by the mature woodland that lies between the viewpoint location and the site. The view closes as the road curls to the east and south east and descends towards Boldings Brook. High hedgerows and woodland helping to screen views. The magnitude of impact on the existing view would be medium. For those low sensitivity receptors, travelling in vehicles there would be a Minor adverse effect on views. For the high sensitivity pedestrians, there would be a Moderate to Major adverse effect on views.

Viewpoint 15 – Rear of Station Road Cottages, 270 m to the south of the site (Figure 5.23)

5.8.69 Employees working in this yard and people accessing the rear gardens of Station Cottages would have no views of the 3Rs building, but would be able to see the stack, in the context of many other vertical elements in the landscape. The impact on views would be low, receptors are considered to be both high sensitivity (residents) and low sensitivity (employees). The residents would experience a Minor adverse effect on views and the employees, focussed on their work, would experience a Negligible adverse effect.

Viewpoint 16 – Entrance to Warnham Station/footpath 1574-2, Mercer Road, 330 m to the south of the

site (Figure 5.24)

5.8.70 Views of the 3Rs Facility from Viewpoint 16 are similar to, but a little more open to those gained at Viewpoint 15. There are three types of receptors using Mercer Road: residents of the two properties to the south of Mercer Road; pedestrians using the footpath that runs along Mercer Road; and, employees at Kam Trucking, Greens of Horsham and Panel2Paint. Only the stack would be visible from this location. The impact on

views would be low, receptors are considered to be both high sensitivity (residents and pedestrians) and low sensitivity (employees). Although the views are generally more open, the residential properties are well-screened and would experience a Minor adverse effect on views, as would pedestrians. Employees, focussed on their work, would experience a Negligible adverse effect.

Viewpoint 17 – Mercer Road/footpath 1574-2, 330 m to the south-south east of the site (Figure 5.25)

5.8.71 Views towards the site are gained from Mercer Road by pedestrians (high sensitivity) and small numbers of people in vehicles (low sensitivity). Lower parts of the facility would be screened by the Weinerberger Brickworks, hedgerows and the mature woodland to the south, except through the gateways of the industrial units east of Warnham station. The stack would be visible above the woodland. The impact on views would be low. Pedestrians would experience a Minor/Moderate adverse effect and people in vehicles would experience a Negligible adverse effect.

Viewpoint 18 – Moated site to the east of Langhurstwood Road (within Land North of Horsham public

open space) 270 m to the east of the site (Figure 5.26)

5.8.72 Views experienced by people using the Land North of Horsham public open space would have views towards the site screened by new planting within the public open space. As it is, the existing views of 3Rs Facility would be barely discernible through the dense woodland. However, the upper part of the stack would be visible. The users of the public open space would have a high sensitivity, but the proposed planting would provide further screening. The impact is considered to be negligible and the resulting effect on views would be a Minor adverse effect.

Viewpoint 19 – Southern entrance drive to Graylands, 480 m to the north east of the site (Figure 5.27)

and Viewpoint 20 – Northern Entrance drive to Graylands, 560 m to the north east of the site (Figure 5.28)

- 5.8.73 People travelling in vehicles along the southern entrance road are moving away from the Wealden Brickworks site. However, should vehicles stop, people would only see the stack, as the building is screened by mature woodland. The magnitude of impact on these low sensitivity receptors would be low, resulting in a Minor adverse effect.
- 5.8.74 Views from the northern access road are more restricted and the magnitude of the impact on receptors travelling in vehicles, or walking along PRoW 1573-1 would be negligible. The low sensitivity travellers in cars would experience a Negligible adverse effect and the high sensitivity pedestrians would experience a Minor adverse effect to existing views.

Viewpoint 21 – Field south of Graylands (land proposed as a cemetery within Land North of Horsham

development) 610 m north east of the site (Figure 5.29) and Viewpoint 22 – Field east of moated site

(close to land proposed as allotments within Land North of Horsham development) 600 m east of the

site (Figure 5.30)

5.8.75 People visiting the cemetery when it is eventually developed and using the allotments would have different views to those that are currently available, as there would be significant amounts of planting associated with the cemetery and the public open space that lies to the west of the allotments. Views of the 3Rs Facility would be limited to the stack, above dense woodland which prevents views of the building. The receptors are deemed to have a high sensitivity. The magnitude of impact would be low, and people in these areas would experience a Minor adverse effect on existing views.

Viewpoint 23 – Footpath 1421-2 (land planned as edge of residential/landscape buffer within Land

North of Horsham development) 800 m to the south east of the site (Figure 5.31)

5.8.76 Views would be different to those that now exist, as there would be much more planting between the site and this viewpoint, within the western landscape buffer of the Land North of Horsham development. However, views of the 3Rs Facility would be restricted to the stack as the building would be screened by intervening vegetation. People using the PRoW have a high sensitivity and the magnitude of impact is considered to be low. This would result In a Minor adverse effect on views.

Viewpoint 24 – Footpath 1421-2 (land planned to be a green way, adjacent to a school site within Land North of Horsham development) 740 m to the east-south east of the site (Figure 5.32)

5.8.77 Views would be of the stack only, as the 3Rs building would be screened by the dense woodland either side of Langhurstwood Road. The receptors have a high sensitivity and the magnitude of impact would be low. The resulting significance would be a Minor adverse effect.

Viewpoint 25 – Footpath 1421-2 west of Morris' Farm, 840 m to the east of the site (Figure 5.33) and Viewpoint 26 – Footpath 1421-2 north west of Morris' Farm, 900 m to the east-north east of the site (Figure 5.34)

5.8.78 Views of the 3Rs Facility from these public footpaths would be of the stack only, as the 3Rs building would be screened by the dense woodland either site of Langhurstwood Road. The receptors have a high sensitivity and the magnitude of impact would be low. The resulting significance would be a Minor adverse effect.

Viewpoint 27 – Rusper Road/Hurst Hill, 2 km to the east of the site (Figure 5.35)

5.8.79 The 3Rs Facility would not be visible from Rusper Road, due to the amount of dense vegetation. There would be No Effect on existing views.

Viewpoint 28 – Footpath 1489-2, east of Kingsfold, 2.1 km north of the site (Figure 5.36)

5.8.80 There would be occasional views of the 3Rs Facility from the footpath to the west of Kingsfold. The high sensitivity receptors would experience glimpses of the top of the facility and the stack. However, from this distance the impact on views would be negligible in the context of the other activity on the Wealden Brickworks site, resulting in a Minor adverse effect.

Viewpoint 29 – View from A24, immediately to the south of Kingsfold, 2 km from the site (Figure 5.37)

5.8.81 This would be an open view of the 3Rs Facility from the stretch of the A24 immediately south of Kingsfold. It would afford the low sensitivity receptors travelling in vehicles, glimpses of the upper parts of the building and the stack. However, the building would be seen in the context of the other activities within the Wealden Brickworks site. The magnitude of impact in these views would be low, resulting in a Minor adverse effect.

Plume Visibility

5.8.82 Under certain meteorological conditions, representing less than 5% of the hours in the year, a visible plume of water vapour would be seen as an extension to the stack, which is typical of combustion processes. Where the visible plume forms, typically during cooler weather conditions, it would sometimes be seen against the backdrop of a clear sky or high cloud and sometimes it would be seen against the backdrop of cloud, when it would be less discernible. When the plume is visible, it would increase the perception of the development for visual receptors within the study area but would not make any of the effects that are likely to arise significant.

Night Time Views

5.8.83 The lighting proposed during operation is described above in Section 5.6. In summary the lighting would comply with safety regulations, but would be low level lighting with downlighters where necessary to reduce light spill. The stack would have red aviation warning lights. However, the lighting would be seen in the context of the existing lighting at the other businesses on the Wealden Brickworks site and the lights used on aircraft landing and taking off from Gatwick. It is anticipated that there would be a negligible to low impact from the increase in the amount of lighting on the Wealden Brickworks site and the various sensitivity receptors would experience a Negligible adverse to Minor adverse effect.

5.9 Assessment of Decommissioning Effects

- 5.9.1 Planning permission is sought for permanent development on the site and therefore it is not considered necessary to consider the impacts of the decommissioning phase within the ES.
- 5.9.2 However, in the event of decommissioning becoming necessary, any decommissioning phase would be a temporary phase and considered to be short to medium term and would be similar in nature and impact to the construction phase but would be a much shorter duration. The works would be subject to a decommissioning environmental management plan closer to the time of the proposed decommissioning of the facility. It is therefore considered that the potential landscape and visual effects of the decommissioning phase would be equivalent to those assessed for the construction phase of the development and as such they have not been reported separately.

5.10 Assessment of Cumulative Effects

- 5.10.1 A review of proposed or possible future third party projects that may have a cumulative impact with the development proposals has been undertaken and used to inform this Environmental Statement. The projects identified are summarised in Appendix 4.4.
- 5.10.2 In relation to Landscape and Visual impacts, those developments that have the potential to introduce new sensitive receptors into the study area have been identified and are considered to be part of the future baseline and have therefore been examined as part of the assessment in section 5.8.

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- 5.10.3 A resolution has been made to grant outline planning permission with all matters reserved except access, for a mixed use strategic development to include housing (up to 2,750 dwellings), business park (up to 46,450 m²), retail, community centre, leisure facilities, education facilities, public open space, landscaping and related infrastructure.
- 5.10.4 The Landscape and Visual Resources chapter of the Land North of Horsham Mixed Use Strategic Development Environmental Statement (July 2016) did not assess future baseline scenarios and did not mention the allocation of the site in the cumulative section of the chapter. It did state that "of the listed committed development proposals [in chapter 3] in the area surrounding the application site none would result in additional cumulative landscape and visual impacts arising from the proposed development" (paragraph 11.6.1).
- 5.10.5 The Land North of Horsham Mixed Use Strategic Development Environmental Statement Addendum (ESA) (March 2017) considered the potential cumulative impact of the proposed 3Rs Facility (then higher than is now proposed).

- 5.10.6 With regards to the cumulative landscape effects of both the Land North of Horsham development and the 3Rs Facility, the Land North of Horsham ESA concluded that there would be minimal change to the character of Local LCA No. 15, but that due to the height of the scale and massing of the development and the height of the stack they would have an effect on adjacent LCAs further (in addition to the Land North of Horsham) urbanising the area (paragraph 11.5.36). The Land North of Horsham ESA did not consider the cumulative impact of the two projects to be significant (paragraph 11.5.37).
- 5.10.7 Regarding cumulative visual effects, the Land North of Horsham ESA noted that the ZTV of the 3Rs Facility (then higher than now proposed) indicated that there was potential extensive visibility between the two developments (paragraph 11.5.38). However, it explains that visual receptors close to the 3Rs Facility would only get glimpsed/partial views due to the extent of mature vegetation around the Wealden Brickworks. It also notes that in medium and more distant views vegetation in the foreground and other intervening vegetation would assist in limiting and restricting the extent of views of the 3Rs Facility, with the stack being the more noticeable change in views (paragraph 11.5.40). Since this assessment, the height of the 3Rs Facility has been reduced to just below 36 m in height. Therefore, there would be a reduction in the impact compared to that assessed in the Land North of Horsham ESA.

5.11 Residual Effects

- 5.11.1 The proposed development includes a landscape strategy and the design has taken measures to reduce impact as far as possible. Therefore, no further mitigation is required. Therefore, the residual effects are as described in the assessment (Sections 5.8 and 5.9) above.
- 5.11.2 Table 5.6 summarises the significance of effects for the construction and the operational phase for the project taking into account the mitigation measures incorporated into the development proposals (the 'designed in' mitigation).

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Construction Diseas									
Lonstruction Phase	and Decourage								
Lanuscape Receptors	and Resources								
South Downs NP	Hiah	Indirect	Short to	Nealiaible	Minor adverse	None	Nealiaible	Minor adverse	Not
			medium term						significant
High Weald AONB	High	Indirect	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Surrey Hills AONB	High	Indirect	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Warnham Court RPaG	High	Indirect	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Landscape Character	Areas			·					
National Character Area 121: Low Weald	Medium	Direct	Short to medium term	Negligible	Negligible adverse	None	Negligible	Negligible adverse	Not significant
West Sussex Character Area LW8: Northern Vales	Medium	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Horsham Character Area P1: Upper Arun Valleys	Medium	Direct	Short to medium term	Medium	Moderate adverse	None	Medium	Moderate adverse	Not significant
Horsham Character Area K2: Faygate and Warnham Vale	Low	Direct	Short to medium term	Medium	Minor adverse	None	Medium	Minor adverse	Not significant
Local Landscape Character Area 15	Low	Direct	Short to medium term	Medium	Minor adverse	None	Medium	Minor adverse	Not significant

Table 5.6: Summary of Likely Environmental Effects on Landscape and Visual

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Visual Receptors and	Resources								
Residential Receptors					1				1
Properties to the south of the access road to the Wealden Brickworks site, east of the site	High	Direct	Short to medium term	Medium	Moderate adverse	None	Medium	Moderate adverse	Not significant
Properties in and around Holbrook, east and south east of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Group of Properties at Graylands Farm, Langhurstwood Road, south east of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Properties on the southern part of Langhurstwood Road, south-south east of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Station Road Cottages and properties on Mercer Road, south of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Warnham Court and properties at Goosegreen, south west of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Group of properties at Westons Place and Westons Farm, south west of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Group of properties at Andrews Farm, Station Road, west- south west of the site	High	Direct	Short to medium term	Medium to High	Moderate to Major adverse	None	Medium to High	Moderate to Major adverse	Significant
Properties at Knob Hill Corner, Warnham, west- south west of the site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Properties to the west of the A24, north of Warnham, west of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Properties on high land to the east of the A24, west-north west of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Properties on either side of Mayes Lane, north west of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Properties on either side of the A24, north-north west of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Kingsfold, north of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public Rights of Way	•					-			
Promoted Paths and National Trail	High and Very High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpaths 1574-1 and 1574-2	High	Direct	Short to medium term	Medium (1574-1) and Negligible (1574-2)	Moderate adverse (1574- 1) and Minor adverse (1574-2)	None	Medium (1574-1) and Negligible (1574-2)	Moderate adverse (1574- 1) and Minor adverse (1574-2)	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Public bridleways 1570-1 and 1570-2	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpaths 1425-2, 1489-2 and 1489-3	High	Direct	Short to medium term	No Change (1425-2 and 1489-3) and Negligible (1489-2)	No Effect (1425-2 and 1489-3) and Minor adverse (1489-2)	None	No Change (1425-2 and 1489-3) and Negligible (1489-2)	No Effect (1425-2 and 1489-3) and Minor adverse (1489-2)	Not significant
Public footpath 1573-1	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpath 1421-2	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Public footpath 1575-1	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpaths 1577-2 and 1578-1	High	Direct	Short to medium term	Low (1577-2) and No Change (1578- 1)	Minor adverse (1577-2) and No Effect (1578-1)	None	Low (1577-2) and No Change (1578- 1)	Minor adverse (1577-2) and No Effect (1578-1)	Not significant
Public footpaths 1420-1 and 1426-1	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Roads and Railways			•	•		•	•	·	
Arterial Roads: A24 and A264	Low	Direct	Short to medium term	Medium to Low	Minor adverse	None	Medium to Low	Minor adverse	Not significant
Station Road and Mercer Road	Low	Direct	Short to medium term	Medium (Station Road) to Negligible (Mercer Road)	Minor adverse	None	Medium (Station Road) to Negligible (Mercer Road)	Minor adverse	Not significant
Old Holbrook/Northlands Road and Rusper Road/Hurst Hill	Low	Direct	Short to medium term	No Change (Old Holbrook/Northlands Road) and Negligible (Rusper Road/Hurst Hill)	No Effects (Old Holbrook/Northlands Road) and Negligible adverse (Rusper Road/Hurst Hill)	None	No Change (Old Holbrook/Northlands Road) and Negligible (Rusper Road/Hurst Hill)	No Effects (Old Holbrook/Northlands Road) and Minor adverse (Rusper Road/Hurst Hill)	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Knob Hill	Low	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Mayes Lane and Threestiles Road	Low	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Passengers using the Dorking to Horsham railway line	Medium	Direct	Short to medium term	Medium	Moderate adverse	None	Medium	Moderate adverse	Not significant
Industrial and Comme	rcial Premises				· · · · · · · · · · · · · · · · · · ·				
Weinerberger Brickworks and Biffa Waste Services	Low	Direct	Short to medium term	Medium	Minor adverse	None	Medium	Minor adverse	Not significant
Graylands business units	Low and Medium	Direct	Short to medium term	No Change to Negligible	No Effect to Negligible adverse	None	No Change	No Effect to Negligible adverse	Not significant
Fisher Clinical Services	Low	Direct	Short to medium term	No Change	No Effect	None	No Change	No Effect	Not significant
Kam Trucking, Greens of Horsham and Panel2Paint	Low and Medium	Direct	Short to medium term	Negligible (Kam Trucking) and Low (Greens of Horsham and Panel2Paint)	Negligible adverse (Kam Trucking) and Minor adverse (Greens of Horsham and Panel2Paint)	None	Negligible (Kam Trucking) and Low (Greens of Horsham and Panel2Paint)	Negligible adverse (Kam Trucking) and Minor adverse (Greens of Horsham and Panel2Paint)	Not significant
Denhams Auction Site	Low and Medium	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Land North of Horshai	n					•			
Residential areas, cemetery, allotments and POS	High	Direct	Short to medium term	Negligible and Low	Minor adverse	None	Negligible and Low	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Viewpoint 1 – Public Footpath north of Friday Farm, 2.8 km to the north of site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 2 – Public Footpath south of Old Park Farm, 2.6 km to the north east of site	High	Direct	Short to medium term	No change	No Effect	None	No change	No Effect	Not significant
Viewpoint 3 – Public Footpath at Moathouse Farm, 1.6 km east of site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 4 – Public Footpath at Roffey Park, 3.9 km to the east of site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 5 – Public Footpath at Ashlands Farm, 4.9 km to the south west of site	High	Direct	Short to medium term	No Change	No Effect	None	No Change	No Effect	Not significant
Viewpoint 6 – Public Footpath at Warnham Court RPaG, 1.1 km to the south east of site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 7 – Churchyard of St. Margaret's Church, Church Street, Warnham, 1.3 km to the south west of the site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Viewpoint 8 – Warnham Conservation Area at the Cricket Ground, 1.6 km south west of the site	High	Direct	Short to medium term	No Change	No Effect	None	No Change	No Effect	Not significant
Viewpoint 9 – Public Footpath at Mayes Park Farm, 1.5 km to the west of site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 10 – Horsham Road, 4.7 km to the west of site	Low	Direct	Short to medium term	Negligible	Negligible adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 11 – Leith Hill Tower, Surrey Hills AONB, 9.2 km to the north of site	Very High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 12 – Great Daux Roundabout, 1 km to the south west of site	Low	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 13 – Layby on the A24, 1.3 km to the south- south west of the site	Low	Direct	Short to medium term	Medium	Minor adverse	None	Medium	Minor adverse	Not significant
Viewpoint 14 – Station Road/footpath1574- 1, 650 m to the south west of the site	High (pedestrians) and Low (vehicles)	Direct	Short to medium term	Medium	Moderate adverse (pedestrians) and Minor adverse (vehicles)	None	Medium	Moderate adverse (pedestrians) and Minor adverse (vehicles)	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Viewpoint 15 – Rear of Station Road Cottages, 270 m to the south of the site	High (residents) and Low (employees)	Direct	Short to medium term	Low	Minor adverse (residents) and Negligible adverse (employees)	None	Low	Minor adverse (residents) and Negligible adverse (employees)	Not significant
Viewpoint 16 – Entrance to Warnham Station/footpath 1574-2, Mercer Road, 330 m to the south of the site	High (pedestrians and residents) and Low (vehicles and employees)	Direct	Short to medium term	Low	Minor adverse (pedestrians and residents) and Negligible adverse (vehicles and employees)	None	Low	Minor adverse (pedestrians and residents) and Negligible adverse (vehicles and employees)	Not significant
Viewpoint 17 – Mercer Road/footpath 1574- 2, 330 m to the south-south east of the site	High (pedestrians) and Low (vehicles)	Direct	Short to medium term	Negligible	Minor adverse (pedestrians) and Negligible adverse (vehicles)	None	Negligible	Minor adverse (pedestrians) and Negligible adverse (vehicles)	Not significant
Viewpoint 18 – Moated site to the east of Langhurstwood Road (POS within LNOH) 270 m to the east of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 19 – Southern entrance drive to Graylands, 480 m to the north east of the site	Low	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 20 – Northern Entrance drive to Graylands, 560 m to the north east of the site	High (pedestrians) and Low (vehicles)	Direct	Short to medium term	Negligible	Minor adverse (pedestrians) and Negligible adverse (vehicles)	None	Negligible	Minor adverse (pedestrians) and Negligible adverse (vehicles)	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Viewpoint 21 – Field south of Graylands (cemetery within LNoH) 610 m north east of the site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 22 – Field east of moated site (close to land proposed as allotments within LNoH) 600 m east of the site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 23 – Footpath 1421-2 (edge of residential/landscape buffer within LNoH) 800 m to the south east of the site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 24 – Footpath 1421-2 (a green way, adjacent to a school site within LNoH) 740 m to the east-south east of the site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 25 – Footpath 1421-2 west of Morris' Farm, 840 m to the east of the site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
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Viewpoint 26 – Footpath 1421-2 north west of Morris' Farm, 900 m to the east-north east of the site	High	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 27 – Rusper Road/Hurst Hill, 2 km to the east of the site	Low	Direct	Short to medium term	No Change	No Effect	None	No Change	No Effect	Not significant
Viewpoint 28 – Footpath 1489-2, east of Kingsfold, 2.1 km north of the site	High	Direct	Short to medium term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 29 – View from A24, immediately to the south of Kingsfold, 2 km from the site	Low	Direct	Short to medium term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Night Time Views									
All receptors	Various	Direct	Short to medium term	Negligible to Low	Negligible to Minor Adverse	None	Negligible to Low	Negligible to Minor Adverse	Not significant
Operational Phase									
Landscape Receptors	and Resources	I		NI 11 11 1					
South Downs NP	High	Indirect	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
High Weald AONB	High	Indirect	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Surrey Hills AONB	High	Indirect	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Warnham Court RPaG	High	Indirect	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
National Character Area 121: Low Weald	Medium	Direct	Long term	Negligible	Negligible adverse	None	Negligible	Negligible adverse	Not significant
West Sussex Character Area LW8: Northern Vales	Medium	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Horsham Character Area P1: Upper Arun Valleys	Medium	Direct	Long term	Medium	Moderate adverse	None	Medium	Moderate adverse	Not significant
Horsham Character Area K2: Faygate and Warnham Vale	Low	Direct	Long term	Medium	Minor adverse	None	Medium	Minor adverse	Not significant
Local Landscape Character Area: 15	Low	Direct	Long term	Medium	Minor adverse	None	Medium	Minor adverse	Not significant
VISUAI Receptors and Residential Recentors	Resources								
Properties to the south of the access road to the Wealden Brickworks site, east of the site	High	Direct	Long term	Low to Medium	Minor to Moderate adverse	None	Low to Medium	Minor to Moderate adverse	Not significant
Properties in and around Holbrook, east and south east of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Group of Properties at Graylands Farm, Langhurstwood Road, south east of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Properties on the southern part of Langhurstwood Road, south-south east of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Station Road Cottages and properties on Mercer Road, south of the site	High	Direct	Long term	Low (Station Road Cottages) to Medium (Mercer Road properties)	Minor adverse (Station Road Cottages) to Moderate adverse (Mercer Road properties)	None	Low (Station Road Cottages) to Medium (Mercer Road properties)	Minor adverse (Station Road Cottages) to Moderate adverse (Mercer Road properties)	Not significant
Warnham Court and properties at Goosegreen, south west of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Group of properties at Westons Place and Westons Farm, south west of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Group of properties at Andrews Farm, Station Road, west- south west of the site	High	Direct	Long term	Medium	Moderate adverse to Major adverse	None	Medium	Moderate adverse to Major adverse	Significant
Properties at Knob Hill Corner, Warnham, west- south west of the site	High	Direct	Long term	Low to medium	Minor adverse to Moderate adverse	None	Low to medium	Minor adverse to Moderate adverse	Not significant
Properties to the west of the A24, north of Warnham, west of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Properties on high land to the east of the A24, west-north west of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Properties on either side of Mayes Lane, north west of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Properties on either side of the A24, north-north west of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Kingsfold, north of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public Rights of Way	I					1			
Promoted Paths	High and Very High (South Downs National Trail)	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpaths 1574-1 and 1574-2	High	Direct	Long term	Negligible and Medium	Moderate adverse to Major adverse (1574-1) and Minor adverse (1574- 2)	None	Negligible and Medium	Moderate adverse to Major adverse (1574-1) and Minor adverse (1574- 2)	Significant
Public bridleways 1570-1 and 1570-2	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpaths 1425-2, 1489-2 and 1489-3	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpath 1573-1	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpath 1421-2	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Public footpath 1575-1	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Public footpaths 1577-2 and 1578-1	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Public footpaths 1420-1 and 1426-1	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Roads and Railways	•								
Arterial Roads: A24 and A264	Low	Direct	Long term	Low to Medium	Minor adverse	None	Low to Medium	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Station Road and Mercer Road	Low	Direct	Long term	Medium (Station Road) to Negligible (Mercer Road)	Minor adverse (Station Road) to Negligible adverse (Mercer Road)	None	Medium (Station Road) to Negligible (Mercer Road)	Minor adverse (Station Road) to Negligible adverse (Mercer Road)	Not significant
Old Holbrook/Northlands Road and Rusper Road/Hurst Hill	Low	Direct	Long term	No Change to Negligible	No Effect to Negligible adverse	None	No Change to Negligible	No Effect to Negligible adverse	Not significant
Knob Hill	Low	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Mayes Lane and Threestiles Road	Low	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Passengers using the Dorking to Horsham railway line	Medium	Direct	Long term	Medium	Moderate adverse	None	Medium	Moderate adverse	Not significant
Industrial and Comme	rcial Premises	•	•		·				
Weinerberger Brickworks and Biffa Waste Services	Low	Direct	Long term	Medium	Minor adverse	Yes	Medium	Minor adverse (reducing over time as the planting matures)	Not significant
Graylands business units (employees and visitors)	Low and Medium	Direct	Long term	No Change to Negligible	No Effect to Negligible adverse	None	No Change to Negligible	No Effect to Negligible adverse	Not significant
Fisher Clinical Services	Low	Direct	Long term	No Change	No Effect	None	No Change	No Effect	Not significant
Kam Trucking, Greens of Horsham and Panel2Paint employees and customers)	Low and Medium	Direct	Long term	Low	Negligible adverse to Minor adverse	None	Low	Negligible adverse to Minor adverse	Not significant
Denhams Auction Site (employees and customers)	Low and Medium	Direct	Long term	Low	Negligible adverse to Minor adverse	None	Low	Negligible adverse to Minor adverse	Not significant
Land North of Horshan	n				1			1	
Residential areas, cemetery, allotments and POS	High	Direct	Long term	Negligible and Low	Minor adverse	None	Negligible and Low	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Representative Viewp	oints								
Viewpoint 1 – Public Footpath north of Friday Farm, 2.8 km to the north of site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 2 – Public Footpath south of Old Park Farm, 2.6 km to the north east of site	High	Direct	Long term	No Change	No Effect	None	No Change	No Effect	Not significant
Viewpoint 3 – Public Footpath at Moathouse Farm, 1.6 km east of site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 4 – Public Footpath at Roffey Park, 3.9 km to the east of site	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 5 – Public Footpath at Ashlands Farm, 4.9 km to the south west of site	High	Direct	Long term	No Change	No Effect	None	No Change	No Effect	Not significant
Viewpoint 6 – Public Footpath at Warnham Court RPaG, 1.1 km to the south east of site	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 7 – Churchyard of St. Margaret's Church, Church Street, Warnham, 1.3 km to the south west of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Viewpoint 8 – Warnham Conservation Area at the Cricket Ground, 1.6 km south west of the site	High	Direct	Long term	No Change	No Effect	None	No Change	No Effect	Not significant
Viewpoint 9 – Public Footpath at Mayes Park Farm, 1.5 km to the west of site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 10 – Horsham Road, 4.7 km to the west of site	Low	Direct	Long term	Negligible	Negligible adverse	None	Negligible	Negligible adverse	Not significant
Viewpoint 11 – Leith Hill Tower, Surrey Hills AONB, 9.2 km to the north of site	Very High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 12 – Great Daux Roundabout, 1 km to the south west of site	Low	Direct	Long term	Negligible	Negligible adverse	None	Negligible	Negligible adverse	Not significant
Viewpoint 13 – Layby on the A24, 1.3 km to the south- south west of the site	Low	Direct	Long term	Medium	Minor adverse	None	Medium	Minor adverse	Not significant
Viewpoint 14 – Station Road/footpath1574- 1, 650 m to the south west of the site	High (pedestrians) and Low (vehicles)	Direct	Long term	Medium	Moderate adverse to Major adverse (pedestrians) and Minor adverse (vehicles)	None	Medium	Moderate adverse to Major adverse (pedestrians) and Minor adverse (vehicles)	Significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Viewpoint 15 – Rear of Station Road Cottages, 270 m to the south of the site	High (residents) and Low (employees)	Direct	Long term	Low	Minor adverse (residents) to Negligible adverse (employees)	None	Low	Minor adverse (residents) to Negligible adverse (employees)	Not significant
Viewpoint 16 – Entrance to Warnham Station/footpath 1574-2, Mercer Road, 330 m to the south of the site	High (pedestrians and residents) and Low (people in vehicles and employees)	Direct	Long term	Low	Minor adverse (pedestrians) and Negligible adverse (people in vehicles and employees)	None	Low	Minor adverse (pedestrians) and Negligible adverse (people in vehicles and employees)	Not significant
Viewpoint 17 – Mercer Road/footpath 1574- 2, 330 m to the south-south east of the site	High (pedestrians) and Low (people in vehicles)	Direct	Long term	Low	Minor adverse to Moderate adverse (pedestrians) and Negligible adverse (people in vehicles and employees)	None	Low	Minor adverse to Moderate adverse (pedestrians) and Negligible adverse (people in vehicles and employees)	Not significant
Viewpoint 18 – Moated site to the east of Langhurstwood Road (POS within LNOH) 270 m to the east of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 19 – Southern entrance drive to Graylands, 480 m to the north east of the site	Low	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 20 – Northern Entrance drive to Graylands, 560 m to the north east of the site	High (pedestrians) and Low (vehicles)	Direct	Long term	Negligible	Minor adverse (pedestrians) and Negligible adverse (vehicles)	None	Negligible	Minor adverse(pedestrians) and Negligible adverse (vehicles)	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Viewpoint 21 – Field south of Graylands (cemetery within LNoH) 610 m north east of the site	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 22 – Field east of moated site (close to land proposed as allotments within LNoH) 600 m east of the site	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 23 – Footpath 1421-2 (edge of residential/landscape buffer within LNoH) 800 m to the south east of the site	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 24 – Footpath 1421-2 (a green way, adjacent to a school site within LNoH) 740 m to the east-south east of the site	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 25 – Footpath 1421-2 west of Morris' Farm, 840 m to the east of the site	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant

Receptor / Resources	Sensitivity of receptor	Potential impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Viewpoint 26 – Footpath 1421-2 north west of Morris' Farm, 900 m to the east-north east of the site	High	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Viewpoint 27 – Rusper Road/Hurst Hill, 2 km to the east of the site	Low	Direct	Long term	No Change	No Effect	None	No Change	No Effect	Not significant
Viewpoint 28 – Footpath 1489-2, east of Kingsfold, 2.1 km north of the site	High	Direct	Long term	Negligible	Minor adverse	None	Negligible	Minor adverse	Not significant
Viewpoint 29 – View from A24, immediately to the south of Kingsfold, 2 km from the site	Low	Direct	Long term	Low	Minor adverse	None	Low	Minor adverse	Not significant
Night Time Views	•						•		
All receptors	Various	Direct	Long term	Negligible to Low	Negligible adverse to Minor adverse	None	Negligible to Low	Negligible adverse to Minor adverse	Not significant

5.12 Conclusions

- 5.12.1 The site is situated within the context of the existing Brookhurst Wood Landfill site and existing industrial development to the north, south and east. The site is afforded a high level of enclosure by the mature vegetation and woodland that surrounds it and by the local topography.
- 5.12.2 The site is allocated to meet identified shortfalls in transfer, recycling and recovery capacity for a throughput of the scale proposed, as a strategic waste allocation that is acceptable in principle for the development of waste management facilities of the type proposed (Policy W10 (a), West Sussex Waste Local Plan, 2014).
- 5.12.3 The proposed development would not encroach on any farmland or woodland in the surrounding area. The proposed development would not give rise to any significant landscape effects at the local or wider scale and would not cause any significant effects upon the designated landscapes of the South Downs National Park, the High Weald AONB or the Surrey Hills AONB.
- 5.12.4 The proposed development would comprise a number of large elements but the scale and form of existing development such as the Brookhurst Wood Landfill Site and other industrial scale operations in the immediate vicinity of the site means that the LCAs within which the site sits and adjacent LCAs would be able to absorb the 3Rs Facility without compromising the key characteristics. The gently undulating landscape and high level of mature woodland that is present amongst the rural farmland provides a generally simple landscape when seen from more distant and elevated viewpoints that contributes to the ability of the surrounding landscape to remain uncompromised by the addition of the proposed development. The proposed development would not result in any significant effects upon the receiving landscape.
- 5.12.5 The main building of the facility would be of a large scale and the stack would be tall, but the building would be enclosed by a significant amount of existing screening when viewed from close range visual receptors. The surrounding landform and the substantial existing hedgerow vegetation, tree-belts and woodland in the local area mean that visibility of the proposed development would be very well screened. There are very few viewpoints that would see any more than the stack. From Station Road to the west and from a viewpoint on the A24 to the south more of the building would be visible. Having lowered the building, reduced the height of the technology and changed the design of the building to break up its massing and using muted colours from the approved High Weald AONB colour palette, the visibility of the proposed development has been minimised. Planting within the site would assist in screening low level elements from views within the Wealden Brickworks site and the planting to the north and west would create additional ecological habitats. Significant visual effects would be limited to a small number of local views.
- 5.12.6 In longer range views, the proposed development would be barely visible from some of the more elevated parts of the study area such as from the edge of the South Downs National Park, the Surrey Hills AONB and the High Weald AONB. If noticed it would be seen as a small part of expansive views that are predominantly of an undulating, wooded and farmland landscape and it would not compromise the special qualities of these designated landscapes or the purpose of the designations.
- 5.12.7 Under certain meteorological conditions, representing less than 5% of the hours in the year, a visible plume of water vapour would be seen as an extension to the stack, which is typical of combustion processes. Where the visible plume forms, typically during cooler weather conditions, it would sometimes be seen against the backdrop of a clear sky or high cloud and sometimes it would be seen against the backdrop of cloud, when it would be less discernible. When the plume is visible, it would increase the perception of the development for visual receptors within the study area but would not make any of the effects that are likely to arise significant.
- 5.12.8 Since the original application for the 3Rs facility was submitted, the Land North of Horsham development has been subject to a resolution to grant outline consent. When considered together with the Land North of Horsham site, the proposed 3Rs Facility would sit to the west of the urban extension into the currently rural

landscape north of Horsham. It would have less effect on the rural character than the urban extension and it would be well screened from it. Within the urban extension, elements of that development would dominate the local context and would further screen views of the proposed 3Rs Facility.

5.12.9 The proposed development would give rise to very limited effects during its construction and operation, consistent with the policies set out in the West Sussex Waste Local Plan, by WSCC, by HDC and in relevant national energy policy.

5.13 References

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6 Traffic and Transport

6.1 Introduction

6.1.1 This chapter summarises the assessment of traffic and transport effects associated with the proposed 3Rs facility. The assessment covers potential effects associated with the construction and operation of the project. The assessment was undertaken in accordance with the Institute of Environmental Assessment (IEA, now IEMA) guidance document 'Guidance Note Number 1: Guidelines on the Environmental Assessment of Road Traffic' (IEMA, 1993, hereafter referred to as 'the IEMA guidelines').

Scope of Study

6.1.2 This chapter considers the following topics:

- Road safety;
- Visual impact;
- Severance;
- Driver Delay;
- Pedestrian Delay; and
- Pedestrian Amenity.
- 6.1.3 The proposed 3Rs facility is accessed from the A264 via Langhurstwood Road. The location of the site in the context of the local highway network is shown on Figure 6.1.

Study Area

- 6.1.4 The study area has been determined by the road traffic associated with the construction and operational phases of the facility and the effects on the access route from the A264 along Langhurstwood Road.
- 6.2 Policy Context
- 6.2.1 This section summarises the relevant policy context that is relevant to traffic and transport issues.

National Policy

Overarching National Policy Statement for Energy EN-1 (2011)

6.2.2 Whilst the National Policy Statements are at the heart of the planning regime for Nationally Significant Infrastructure Projects, they are also recognised as a material consideration in decisions on planning applications. Therefore, relevant policies are considered here. NPS EN-1 (DECC, 2011) states in chapter 5.13 that:

"If a project is likely to have significant transport implications, the applicant's ES (see Section 4.2) should include a transport assessment, using the NATA/WebTAG139 methodology stipulated in Department for Transport guidance140, or any successor to such methodology. Applicants should consult the Highways Agency and Highways Authorities as appropriate on the assessment and mitigation.

Where appropriate, the applicant should prepare a travel plan including demand management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts."

The National Planning Policy Framework (NPPF)

- 6.2.3 The NPPF (DCLG, 2012) sets out the Government's planning policies for England and how these are expected to be applied (para. 1) and is therefore a material consideration.
- 6.2.4 Central to the NPPF is the presumption in favour of sustainable development and the need for the planning system to support economic growth. Para. 14 sets out the presumption in favour of sustainable development and the application of the policy for decision making, it states that:

"At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking".

6.2.5 Section 4 specifically relates to the promotion of sustainable transport, requiring all developments that generate significant amounts of movements to be supported by a Transport Statement or Assessment (para. 32). Development decisions should take account of whether safe and suitable access to the site can be achieved for all people.

National Planning Policy for Waste

6.2.6 The National Planning Policy for Waste (DCLG, 2014a) specifically refers to traffic and access in the criteria for selecting a suitable site for a waste facility (Appendix B, f). It states that:

"Considerations will include the suitability of the road network and the extent to which access would require reliance on local roads, the rail network and transport links to ports."

Local Policy

- 6.2.7 The relevant Development Plan documents that provide a context for this assessment are set out below: West Sussex Waste Local Plan (2014)
- 6.2.8 The West Sussex Waste Local Plan (West Sussex County Council and the South Downs National Park Authority, 2014) sets out a number of Strategic Objectives. Strategic Objective 7 outlines that:

"The use of road transport will be minimised and new sites or facilities will be located as close as possible to the Lorry Route Network to minimise the impact of road transport on local communities and rural areas."

6.2.9 SO7 is then expanded on through Policy W18, which outlines that proposals will be permitted if:

"Materials are capable of being transported using the Lorry Route Network with minimal use of local roads;

Vehicle movements associated with the development will not have an unacceptable impact on the capacity of the highway network;

There is safe and adequate means of access to the highway network and vehicle movements associated with the development will not have an adverse impact on the safety of all road users;

Satisfactory provision is made for vehicle turning and parking, manoeuvring, loading, and, where appropriate, wheel cleaning facilities; and

Vehicle movements are minimised by the optimal use of the vehicle fleet."

- 6.2.10 The Plan includes an assessment of the site (referred to as Brookhurst Wood within the document) as a potential waste processing site. Policy W10 outlines a series of conditions that are required to be fulfilled to allow development. The following conditions are considered to be relevant to the consideration of traffic and transport:
 - Assessment of impact (e.g. traffic, noise, odour) on the amenity of nearby dwellings and businesses and possible mitigation required;
 - Assessment of the possible use of rail for the movement of waste; and

 Assessment of impact of additional HGV (Heavy Goods Vehicle) movements on highway capacity and road safety, including at the Langhurstwood Road/A264 junction and on the A264, A24, A23/M23, and possible mitigation required.

Horsham District Planning Framework (2015)

- 6.2.11 The Horsham District Planning Framework (Horsham District Council, 2015) states that "West Sussex County Council is responsible for preparing statutory land use plans for minerals and waste. Proposals for development should have regard to the defined County Minerals Safeguarding Area and Minerals Consultations Area guidance and policy produced by West Sussex County Council. Preparation of site plans will require liaison with West Sussex County Council at an early stage to ensure that any potential minerals and waste interests are fully considered in planning development."
- 6.2.12 Policy 1, which sets out its strategic policy for sustainable development states:

"When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will always work pro-actively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

Planning applications that accord with the policies in this Local Plan (and, where relevant, with polices in neighbourhood plans) will be approved without delay, unless material considerations indicate otherwise."

6.2.13 Policy 2 which sets out its strategic policy for strategic development states:

"To maintain the district's unique rural character whilst ensuring that the needs of the community are met through sustainable growth and suitable access to services and local employment, the spatial strategy to 2031 is to:

8. Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.

9. Identify existing sites of important employment use, and to safeguard their function through flexible policies and designation of Key Employment Areas, together with supporting the rural economy, to allow people the opportunity to work close to where they live."

6.2.14 Policy 33 which sets out development principles states:

"In order to conserve and enhance the natural and built environment developments shall be required to:

1. Make efficient use of land, and prioritise the use of previously developed land and buildings whilst respecting any constraints that exist;

2. Ensure that it is designed to avoid unacceptable harm to the amenity of occupiers/users of nearby property and land, for example through overlooking or noise, whilst having regard to the sensitivities of surrounding development;"

6.2.15 Policy 35, a strategic policy on climate change states:

"Development will be supported where it makes a clear contribution to mitigating and adapting to the impacts of climate change and to meeting the district's carbon reduction targets as set out in the Council's Acting Together on Climate Change Strategy, 2009.

Measures which should be used to mitigate the effects of climate change include;

4. The use of patterns of development which reduce the need to travel, encourage walking and cycling and include good accessibility to public transport and other forms of sustainable transport; and

5. Measures which reduce the amount of biodegradable waste sent to landfill."

6.3 Assessment Methodology

Relevant Guidance

- 6.3.1 The assessment methodology has been informed by guidance contained within the following document:
 - Guidance Note Number 1: Guidelines on the Environmental Assessment of Road Traffic (IEMA, 1993, hereafter referred to as 'the IEMA guidelines')

Consultation

- 6.3.2 In carrying out the assessment consultation has included:
 - A formal ES scoping request to West Sussex County Council (WSCC); and
 - A formal transport scoping request to WSCC Highways.
- 6.3.3 The issues raised through the consultation outlined above that are relevant to the assessment are summarised in Table 6.1 below.
- 6.3.4 The Scoping Opinion is contained in Appendix 4.1. A copy of the Formal Transport Scoping Request and WSCC Highways associated response is included at Appendix 6.1.

Date/Source	Consultee and Issues Raised	How/ Where Addressed
January 2017 / West Sussex Highways response to previous planning application (Ref:WSCC/062/16/NH)	Ian Gledhill The permitted waste use already has permission for and the potential to generate up to 284 two way HGV movements per day, with 140 two way movements on a Saturday. The proposed use does not seek to vary from these already permitted numbers. Given that the A264 forms part of the advisory lorry network, providing all HGVs arrive and depart via Langhurstwood Road to the south then no further controls beyond this would be necessary. The NPPF states that development should only be prevented or refused on transport grounds where the residual cumulative impacts of the development are severe. In light of the permitted uses on the site, the LHA are satisfied that this proposal would not result in any severe highway safety or capacity impacts. No highway objection would be raised. In the event that this application is approved the number of HGV movements should be suitably controlled. A construction management plan would also be required.	N/A
September 2016 / West	Ian Gledhill Needs to be further discussion with	The scope of the EIA has
response to Transport	planning authority over how all waste	accordance with the ES

Table 6.1: Consultation Responses Relevant to Traffic and Transport

Date/Source	Consultee and Issues Raised	How/ Where Addressed
Scoping Note	inputs being sourced from the on-site Waste Transfer Facility would be secured. Need to clarify if there is any chance of two waste uses being independent of each other. Agreed that no Transport Assessment (TA) is needed. However, there needs to be a means of linking the two uses together. Refer to local planning authority to investigate and agree means of linking the two uses together. Scope of EIA should be agreed with local planning authority. Need to agree extent of cumulative assessment with local planning authority.	Scoping Report, the transport elements of which received no specific comments. As the proposed development is located within the same footprint as the approved Waste Transfer Station (and would involve demolition of the existing Waste Transfer Station building to enable its construction) the two developments could not be developed simultaneously. The cumulative assessment has been updated since scoping to reflect changes in status of the applications under consideration. Details of the projects considered are provided in Appendix 4.4.
November 2015 / West Sussex response to EIA scoping request	Jane Moseley / James Neave The impact of the development in terms of HGV movements, compared against the baseline will need to be made clear. Scope of the transport assessment should be agreed with WSCC Highways. Consideration will need to be given to North Horsham. The number, type and routeing of HGVs and other vehicles should be detailed as accurately as possible to ensure that the subsequent analysis is accurate. The outcome of the TA/TS should feed into the Traffic and Transportation chapter of the ES.	Agreed with WSCC Highways that no TA is needed. Section 6.7 sets out that the proposed 3Rs facility will not generate any HGV movements over and above the existing consent. Proposed development at North Horsham is considered in Section 6.9.

Baseline Surveys

- 6.3.5 In order to obtain the baseline traffic conditions, traffic surveys were undertaken by a specialist third party. A manual classified count (MCC) was undertaken at the site access junction with Langhurstwood Road, as well as automatic traffic counts (ATCs) on the Langhurstwood Road and the A264 East at the Langhurstwood Road / A264 junction.
- 6.3.6 The Trip End Model Presentation Programme v6.2 (TEMPRO) has been used to update observed traffic data obtained from 2013 to predict the likely level of traffic which will be using the road network in 2018, which is the anticipated construction year for the facility.
- 6.3.7 TEMPRO is produced by the Department for Transport (DfT) and uses a wide range of data so that accurate localised traffic growth projections can be predicted. As such, the use of TEMPRO for predicting the growth

in existing traffic flows for future baseline traffic assessment years for the proposed substation is considered to provide the most accurate prediction of baseline traffic flows for the construction year.

- 6.3.8 The 2013 2018 growth rate calculated by TEMPRO for principal urban roads in the Horsham area is 1.05141 for the average weekday and 1.05293 for a Saturday. These growth rates have been applied to the ATC at the A264 east of the junction with Langhurstwood Road.
- 6.3.9 The 2013 2018 growth rate calculated by TEMPRO for minor rural roads in the Horsham area is 1.05529 for the average weekday and 1.05682 for a Saturday. These growth rates have been applied to the ATC on Langhurstwood Road just north of the junction with the A264.
- 6.3.10 Traffic flows were calculated from the ATCs on Langhurstwood Road and the A264 East to provide data on the A264 West, as well as the site access MCC and the ATC on Langhurstwood Road to provide data on Langhurstwood Road between the site access and the junction with Mercer Road.

Assessment Criteria and Assignment of Significance

Methodology

6.3.11 The assessment methods used within this chapter follow the principles and approaches detailed in Chapter 4, with further chapter specific assessment parameters detailed below.

Relevant Guidance

6.3.12 As a matter of best practice, this assessment has been undertaken based on current relevant guidance for assessing the environmental effects of traffic. This is set out within The Institute of Environmental Assessment (IEA) (now the IEMA) publication 'Guidance Note Number 1: Guidelines on the Environmental Assessment of Road Traffic', 1993.

Magnitude of Impact

- 6.3.13 The IEMA guidelines recommend two rules to be considered when assessing the impact of development traffic on a road link:
 - Rule 1: Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%); and
 - Rule 2: Include any other specifically sensitive areas where total traffic flows have increased by 10% or more.
- 6.3.14 The above guidance is based upon knowledge and experience of environmental effects of traffic. The 30% threshold is based upon research and experience of the environmental effects of traffic, with less than a 30% increase generally resulting in imperceptible changes in the environmental effects of traffic. At a simple level, the guidance considers that projected changes in total traffic flow of less than 10% create no discernible environmental effect, hence the second threshold as set out in Rule 2.
- 6.3.15 In cases where the thresholds are exceeded, Column 3 in Table 2.1 of the IEMA guidelines set out a list of environmental impacts which should be assessed for their magnitude of change.
- 6.3.16 Definitions of each of the potential impacts identified in the IEMA guidelines are summarised below along with explanatory text relating to assessment criteria to determine the magnitude of impact. It is on this basis that the assessment in this chapter has been undertaken.
- 6.3.17 It is acknowledged at paragraph 2.4 of the IEMA guidelines that not all the effects listed in Column 3 of Table 2.1 would be applicable to every development. A detailed inspection of the surrounding road network incorporating the current geometric layout of the road, traffic management and regulation orders and general observations of existing road user movements has been undertaken to assist with the assessments.

Noise and Vibration

- 6.3.18 The potential effects relating to noise and vibration as a result of traffic are set out in Chapter 8 of this ES. Visual Effects
- 6.3.19 The visual effect of traffic is complex and subjective and includes both visual obstruction and visual intrusion. The IEMA guidelines state that obstruction refers to the blocking of views, by structures for example, and intrusion refers to the more subjective impact by traffic on an area of scenic beauty or of historical or conservation interest.
- 6.3.20 It goes on to state that increases in the number of large or high-sided vehicles may have an intrusive impact in areas of scenic beauty and in historic or conservation areas and acknowledges that in the majority of situations the changes in traffic resulting from a development will have little effect.
- 6.3.21 Where relevant, the visual effects of traffic are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the above guidance document. The visual effects of the proposed facility as a whole are considered in Chapter 5 of this ES.

<u>Severance</u>

- 6.3.22 Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places and other people. Severance can also result from difficulty in crossing a heavily trafficked road (IEMA, 1993).
- 6.3.23 The guidance indicates that severance effects are considered 'slight', 'moderate' and 'substantial' with changes in traffic flows of 30%, 60% and 90% respectively.
- 6.3.24 Where relevant, impacts on severance are considered within this chapter.

Driver Delay

- 6.3.25 Where roads affected by development are at or near capacity, the traffic associated with such development can cause or add to vehicle delays. Some roads are typically at or near capacity during the weekday AM (08:00 to 09:00) and PM (17:00 to 18:00) peak hours. Other sources of delay for non-development traffic can include:
 - At the proposed site access where there would be additional turning movements;
 - On the roads passing the site where there is likely to be additional traffic;
 - At other key intersections along the road which might be affected by increased traffic; and
 - At junctions where the ability to find gaps in the traffic may be reduced, thereby lengthening delays.
- 6.3.26 Where relevant, the impacts on driver delay are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the above guidance document.

Pedestrian Delay

- 6.3.27 Highly trafficked roads and changes to the volume or speed of traffic may affect the ability of people to cross roads. Studies have shown that pedestrian delay is perceptible or considered significant beyond a lower delay threshold of 10 seconds, for a link with no crossing facilities. A 10 second pedestrian delay in crossing a road broadly equates to a two-way link flow of approximately 1,400 vehicles per hour (IEMA, 1993).
- 6.3.28 Where relevant, the impacts on pedestrian delay are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the above guidance document.

Pedestrian Amenity

- 6.3.29 The term pedestrian amenity is broadly defined as the relative pleasantness of a journey. It is considered to be affected by traffic flow, speed and composition as well as footway width and the separation/protection from traffic.
- 6.3.30 There is no commonly agreed guidance for determining the magnitude of change for pedestrian amenity. However, guidance refers to the Manual of Environmental Assessment which suggests that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or its lorry component) is halved or doubled.
- 6.3.31 Pedestrian amenity encompasses the overall relationship between pedestrians and traffic, including fear and intimidation which is the most emotive and difficult impact to quantify and assess. There are no commonly agreed thresholds for quantifying the changes in pedestrian amenity, although the IEMA guidelines refer to a useful study which could be referenced when considering any impact. These thresholds are replicated in Table 6.2.

Degree of Hazard	Average Traffic Flow over 18 hour day (veh/hour)	Total 18 hour heavy goods vehicle flow	Average Speed over 18 hour day (mile/hour)
Extreme	1,800 +	3,000 +	20 +
Great	1,200–1,800	2,000-3,000	15-20
Moderate	600–1,200	1,000-2,000	10-15

Table 6.2: Example of Fear and Intimidation Criteria

6.3.32 Where relevant, the impacts on pedestrian amenity are considered within this chapter and the magnitude of impact identified using the above example of fear and intimidation.

Accidents and Safety

- 6.3.33 It is possible to estimate the impacts of increased traffic on accidents and safety from existing accident records, national statistics, the type and quantity of traffic generated, journey lengths and the characteristics of the routes in question.
- 6.3.34 Where relevant, the impacts on accidents and safety are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the IEMA guidance document.

Hazardous Loads

6.3.35 Some developments may involve transporting hazardous loads by road such as special wastes, toxic materials and chemicals. Where appropriate, the risks associated with accidents on such movements are identified or quantified within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the IEMA guidance document.

Dust and Dirt

- 6.3.36 Certain types of development, particularly construction sites, can give rise to deposition of dust and dirt on surrounding roads. The overall impact of this phenomenon normally depends to a large extent on the management practices adopted at the site in question, such as vehicle sheeting and wheel washing.
- 6.3.37 Problems with dust and dirt are unlikely to occur at distances greater than 50 metres from the road (IEMA, 1993).
- 6.3.38 Where relevant, the effects relating to dust and dirt are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the IEMA guidance document.

Consideration of Receptors

6.3.39 Paragraph 2.5 of the IEMA guidelines explains that locations that may be sensitive to changes in traffic conditions could be:

- People at home;
- People in work places;
- Sensitive groups such as children, the elderly or the disabled;
- Sensitive locations such as hospitals, churches, schools or historical buildings;
- People walking or cycling;
- Open spaces;
- Recreational sites;
- Shopping areas;
- Sites of ecological/nature conservation value; and
- Sites of tourist/visitor attraction.
- 6.3.40 As a general guide, the determination of receptor sensitivity is based on the criteria of value, adaptability and tolerance. In terms of transport, receptors include people that are living in and using facilities, and using transport networks, in the area.
- 6.3.41 Given that all persons are deemed to be of equal value, sensitivity to changes in transport conditions is generally focussed on vulnerable user groups who are less able to tolerate, adapt to or recover from changes. Table 6.3 summarises the broad criteria for identifying receptor sensitivity

Table 6.3: Definitions of Sensitivity or Value

Sensitivity	Typical Descriptors
High	Receptors of greatest sensitivity to traffic flows: schools, colleges, playgrounds, accident black spots (with reference to accident data), retirement homes, urban/residential roads without footways that are used by pedestrians.
Medium	Traffic flow sensitive receptors including: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycleways, community centres, parks, recreation facilities.
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.

6.3.42 Road links with descriptions of high or medium sensitivity have been considered against the Rule 2 threshold described above. Other links with descriptions of low or negligible sensitivity have been considered against the Rule 1 threshold. Where necessary, professional judgement has been applied in identifying the relevant category for each link.

Assessment of Significance

- 6.3.43 The approach to the assessment of significance of effects follows the general principles set out in Chapter 4 and is summarised in Table 6.4 and Table 6.5 below, adapted from the Design Manual for Roads and Bridges (DMRB) HA 205/08 (Highways Agency *et al.*, 2008).
- 6.3.44 This takes into account the duration, magnitude, direction and location of each impact as well as the sensitivity of the receptor. Where there are any specific criteria available to determine impacts on specific aspects of traffic and transport, these have been taken into account assessed in conjunction with Table 6.4 to establish the impact magnitude.

Magnitude	Typical Descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Moderate loss of capability for movement along or across transport corridors, loss of access to key facilities and loss of highway safety. Substantial delays to travellers (Adverse).
	Moderate improvement in the capability for movement along and across transport corridors, major improvement in access to key facilities, in highway safety and in delays to travellers (Beneficial).
Low	Some measurable loss of capability for movement along and across transport corridors, some measurable loss of access to key facilities and some measurable loss of highway safety. Some measurable increase in delays to travellers (Adverse).
	Some measurable increase in the capability for movement along and across transport corridors, some measurable increase in access to key facilities and some measurable increase in highway safety. Reduced risk of negative impacts occurring (Beneficial).
Negligible	Very minor loss of capability for movement along and across transport corridors, very minor loss of access to key facilities and very minor loss of highway safety. Very minor increase in delays to travellers (Adverse).
	Very minor increase in capability for movement along and across transport corridors, very minor increase in access to key facilities and very minor increase in highway safety. Very minor decreases in delays to travellers (Beneficial).
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 6.4:	Definitions	of Impact	Magnitude
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Table 6.5: Assessment Matrix

Sensitivity	Magnitude of Impact				
	Negligible	Low	Medium	High	
Negligible	Negligible	Negligible or minor	Negligible or minor	Minor	
Low	Negligible or minor	Negligible or minor	Minor	Minor or moderate	
Medium	Negligible or minor	Minor	Moderate	Moderate or major	
High	Minor	Minor or moderate	Moderate or major	Major	

6.3.45 The broad definitions of the terms used to determine significance criteria are as follows:

- Major: These beneficial or adverse effects are likely to be very important considerations at a local or district scale and, if adverse, are potential concerns to the scheme and may become material in the decision making process.
- Moderate: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.

- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
- 6.3.46 In accordance with the IEMA guidance, the assessments are based upon the relative change between the baseline conditions and the baseline with construction / development conditions. For the purposes of this assessment, effects described as major are considered to be significant in terms of the EIA Regulations.

6.4 Baseline Conditions

Highway Network

Primary Road Network

6.4.1 The A264 is a high standard dual carriageway forming part of the county's Strategic Lorry Route and links Horsham to the M23 and Crawley. The A264 is subject to a derestricted national speed limit. It is a dual carriageway from the M23 east of the site access to the junction with the A24 west of the site access. There are no footways and it is bound by grass verges / embankments and fields.

Local Road Network

- 6.4.2 The site access is located approximately 800 metres north of the A264 on Langhurstwood Road, approximately 3.5 kilometres north of Horsham. The site access road is subject to a 10 mph speed limit and is generally 6.7 metres wide. It forms the minor arm of a simple priority junction with the western side of Langhurstwood Road, which is subject to a 40 mph restricted speed limit and is a rural single carriageway road. There is no street lighting along Langhurstwood Road and there are no footways. At its southern end, Langhurstwood Road forms a junction with the eastbound carriageway of the A264 via a left-in / left-out arrangement with associated acceleration and deceleration tapers.
- 6.4.3 There are no facilities provided for right turn movements into and out of Langhurstwood Road on the A264 and so u-turns must be made at junctions to the east and west to accommodate these.

Access to the Site via Sustainable Modes

- 6.4.4 The access to the site is from Langhurstwood Road, approximately 350 metres north of the simple priority junction with Mercer Road and approximately 800 metres north of the A264. The site is situated in a rural setting with few dwellings and amenities situated within a 1 kilometre radius of the site. The roads surrounding the site are not supported by formal pedestrian infrastructure as there is a negligible demand for pedestrian trips in this vicinity. There are no public rights of way in the immediate vicinity of the site.
- 6.4.5 Langhurstwood Road is aligned by soft grass verges and maintains good sightlines for vehicular traffic and pedestrians for the majority of the road. There is no formal cycling infrastructure in the vicinity of the site. There are no bus stops in the vicinity of the site.
- 6.4.6 Mercer Road links the site to Warnham Railway Station, with both platforms accessible via pedestrian level crossing. Mercer Road is a cul-de-sac with vehicles no longer able to cross the railway, and is thus sparsely trafficked. Warnham station is managed by Southern Rail and offers an hourly service toward Horsham and an hourly service to London Victoria via Hackbridge. It is approximately a 700 metre walk from the station to the site access.

Baseline Traffic Flows

6.4.7 The data observed during the traffic counts have been analysed and are summarised in Tables 6.6 and 6.7.

Table 6.6: Summary of Observed ATCs Traffic Flows

Count Location	Year of Count	12 Hour Annual Average Weekday Traffic (AAW)T		24 Hour AAWT		24 Hour Annual Average Daily Traffic Flow (AADT)		12 Hour Saturday	
		Total	HGV	Total	HGV	Total	HGV	Total	HGV
Langhurstwood Road (just north of A264)	2013	2,877	172	3,320	498	2,567	367	590	54
A264 (just east of junction with Langhurstwood Road)	2013	28,312	3,848	34,955	4,504	31,597	3,611	19,735	1,374

Table 6.7: Summary of Observed MCCs Traffic Flows

Movement	Year of	AM Peak		PM Peak	
	Count	Total	HGV	Total	HGV
Site Access to Langhurstwood Road North	2013	0	0	2	0
Site Access to Langhurstwood Road South	2013	16	13	31	5
Langhurstwood Road South to Site Access	2013	30	7	8	2
Langhurstwood Road South to Langhurstwood Road North	2013	339	4	29	1
Langhurstwood Road North to Site Access	2013	6	1	0	0
Langhurstwood Road North to Langhurstwood Road South	2013	30	5	320	0

6.4.8 The growth rates have been applied to the above base traffic flows and the resultant 2018 baseline traffic flows are set out in Table 6.8 below.

Table 6.8: 2018 Baseline Traffic Flows

	12 Hour		24 Hour		24 Hour		12 Hour	
Count Location	AAWT		AAWT		AADT		Saturday	
	Total	HGV	Total	HGV	Total	HGV	Total	HGV
Langhurstwood Road (just north of A264)	3,036	497	3,503	523	2,707	383	621	55
Langhurstwood Road (between Site Access and Mercer Road)	2,726	353	3,146	372	2,434	277	556	43
A264 (just east of the junction with Langhurstwood Road)	29,770	4,045	36,754	4,734	33,228	3,798	20,752	1,447

Count Location	12 Hour AAWT		24 Hour AAWT		24 Hour AADT		12 Hour Saturday	
	Total	HGV	Total	HGV	Total	HGV	Total	HGV
A264 (just west of the junction with Langhurstwood Road)	29,677	4,034	36,696	4,725	33,178	3,792	20,672	1,442

- 6.4.9 It is noted that a mechanical biological treatment (MBT) facility has permission within the wider site. Consent (WSCC/055/09/NH) was granted in 2010.
- At the time of the traffic surveys in December 2013, the MBT was being commissioned, but the MBT accepts 6.4.10 residual waste and that which was not going to the MBT was going to the landfill site. Therefore, the waste vehicle movements associated with the consented MBT are within the above observed traffic flows and no further adjustments are required.

Sensitivity of Receptors

- 6.4.11 Receptors to be considered within the assessment were selected based upon the access route to be taken by vehicles generated by the site and the assessment methodology set out above.
- Table 6.9 highlights the gualification of the sensitivity assessment of each receptor group for the proposals. 6.4.12

Receptor	Sensitivity	Qualification
Langhurstwood Road (south of site access)	Medium / High	Road link contains a very small number of residential properties that are set back from the carriageway and although there is no footway provision there is limited demand for pedestrian activity.
A264 East	Negligible	Road link does not contain any sensitive receptors as advised by the above guidance document.
	Nogligible	Road link does not contain any sensitive receptors as

Table 6.9: Sensitivity of Road Links

Negligible

6.4.13 On the basis of the above, Langhurstwood Road has been assessed against the Rule 2 threshold described above and the A264 has been assessed against the Rule 1 threshold.

advised by the above guidance document.

Future Baseline Conditions

A264 West

- 6.4.14 The above describes the existing baseline conditions, as well as current traffic flows. This section considers the potential future changes in baseline conditions due to foreseeable changes, including those arising as a result of climate change. It provides a description on how climate change might change the baseline in the future.
- 6.4.15 In traffic and transport terms and in specific relation to this chapter, this relates to how climate change may affect movement (for example traffic flows, pedestrian movement or cyclist movement) and how it may alter the sensitivity of receptors.
- 6.4.16 In terms of sensitivity, receptors that are sensitive to changes in traffic flows should not be altered by climate change and neither would their assessment of sensitivity (i.e. negligible, low, medium or high) i.e. the receptors identified within Table 6.3 would remain relevant.
- People could be considered able to adapt to the effects of climate change in the sense that if a movement is 6.4.17 needed by a particular mode of transport, then it is reasonable to assume that movement would still occur regardless of climate change (e.g. a person would still walk to a local shop or a person would still drive to and from work). It is perhaps not climate change that would affect such movement in the future but rather technological advances, which are difficult to predict over the lifetime of the project.

- 6.4.18 On this basis, it is considered that climate change is unlikely to affect future baseline conditions to such an extent that it would affect the conclusions reached in this chapter.
- 6.4.19 A review of proposed or possible future third party projects that may result in future changes to baseline conditions has been undertaken and used to inform this assessment. The projects identified are set out in Appendix 4.4 of this ES.
- 6.4.20 The review is detailed in Section 6.9 of this chapter and concludes that none of the proposed development would result in any significant change to the transport network in the immediate vicinity of the site or would affect the conclusions reached within this chapter.

Data Limitations/Limitations of the Assessment

- 6.4.21 The above data cover the proposed access route and have been obtained from traffic surveys undertaken specially for the project. The data are considered to be representative and reflective of baseline conditions.
- 6.4.22 It is therefore considered that there are no 'information gaps' in the baseline data or information available.

6.5 Incorporated Enhancement and Mitigation

Construction Phase

- 6.5.1 A Construction Traffic Management Plan (CTMP) will be prepared and agreed with the local highway authority as an enhancement measure prior to construction. The applicant is fully committed to the preparation of the CTMP and will accept a planning condition for its preparation, once a contractor has been appointed and prior to the construction phase commencing.
- 6.5.2 It is not envisaged that the CTMP would be a mitigation measure as such; rather, it will ensure good working practices throughout the construction period. The CTMP will provide the following information:
 - Approved access routes and any necessary restrictions;
 - Temporary signage in the vicinity of the site warning of construction traffic;
 - Arrangements for road maintenance and cleaning; and
 - Wheel cleaning arrangements and regular road sweeping runs (to ensure dust and dirt is not transported onto the public roads etc).

6.6 Assessment of Construction Effects

- 6.6.1 The construction traffic predicted to be generated by the 3Rs facility has been estimated, with calculations setting out each stage of the construction process, the number of working days for each, the number of daily construction staff on site for each and the total number of HGV movements generated by each.
- 6.6.2 To estimate the daily HGV movements for each stage, the total number generated has been divided by the number of working days for each. This then allows for the total number of daily vehicle movements and daily HGV movements to be calculated for each stage of the construction process.
- 6.6.3 It is expected that construction of the facility would take place over a 31 month period and that during that time the average number of workers on site would be 50. The level of work is anticipated to fluctuate over the 31 months relative to the construction programme. The peak level of workers on site is likely to be in months 7-9 and would peak at 182 people.
- 6.6.4 Car sharing would be encouraged, but this is unlikely to exceed 1.5 persons per car on average, for which the peak level of movements translates to 122 car trips to and from the site per weekday and an average of 34 car trips to and from the site per weekday.

- 6.6.5 Normal hours of working during construction would be Monday to Friday 07.30 to 19.00 hours and Saturday 0800 to 1600 hours. The profile of worker arrivals would be linked closely to the construction hours with some 70% of workers expected to arrive between 07.00 and 07.30, then 10% arriving between 07.30 and 08.00 hours, with the remaining 20% arriving between 08.00 and 09.00 hours.
- 6.6.6 It is likely that workers would leave the site between 16.00 and 19.00 hours. The departure profile is likely to be less peaked than in the morning period with 50% likely to leave between 16.00 and 17.00, 40% leaving between 17.00 and 18.00 hours and the remaining 10% leaving between 18.00 and 19.00 hours. The estimated car movements for the peak levels and for the average level are shown in Table 6.10.

Peak Construction Month Average Construction Month Time Period Car Movements Car Movements 07.00 - 08.0098 27 08.00 - 09.00 24 7 16.00 - 17.0061 17 17.00 - 18.00 49 14

 Table 6.10: Construction Worker Car Movements

18.00 - 19.00

6.6.7 The construction profile for the import and export of materials to the site has been considered in relation to the construction build programme and the numbers of loads determined. Three scenarios were devised from this as follows:

3

• Average daily construction traffic over the 31 month period;

12

- Peak daily HGV construction traffic (where the HGV construction traffic is greatest); and
- Peak net construction traffic (where the net construction traffic is greatest).
- 6.6.8 A typical profile of HGV movements over the 31 month construction period for daily HGV movements has been estimated. To calculate the daily HGV traffic levels it has been assumed that site work would be carried out over 22 working days on average per month. The construction HGV traffic levels would be likely to peak around month 6 with approximately 36 daily HGV arrivals at the site during the month. This equates to 72 two-way HGV movements per day. The hours of operation are projected to be between 07.30 and 19.00. However, it is anticipated that the majority of HGV movements would occur between 09.00 and 17.00, giving approximately up to 4 two-way HGV movements per hour in/out of the site. At the peak net construction traffic, there would be 18 HGV arrivals or 36 two-way HGV movements a day. Over the 31 month period of construction, there would likely be an average of 11 HGV deliveries per day (22 two-way HGV movements per day).
- 6.6.9 The daily construction traffic flows throughout the 31 month construction period are set out in Table 6.11.

Month	Personnel Daily	HGV Daily	Combined
1	13	8	21
2	13	16	29
3	28	16	44
4	35	19	54
5	41	30	71
6	80	36	116
7	113	23	136
8	122	18	140
9	113	18	131
10	79	17	96
11	67	17	84
12	63	23	86

Table 6.11: Daily Construction Flows Month By Month

Month	Personnel Daily	HGV Daily	Combined
13	47	9	56
14	27	2	29
15	20	4	24
16	20	3	23
17	20	3	23
18	20	3	23
19	20	6	26
20	23	6	29
21	23	6	29
22	27	6	33
23	27	5	32
24	20	4	24
25	20	7	27
26	13	7	20
27	13	3	16
28	13	3	16
29	13	3	16
30	13	3	16
31	13	3	16

- 6.6.10 The above peak and average construction traffic flows have been assessed against the 2018 baseline traffic flows in accordance with the IEMA guidance document in order to determine their impact, as set out below. <u>Average Construction Traffic Impact</u>
- 6.6.11 The average percentage impact of the facility is shown below in Tables 6.12, 6.13, 6.14 and 6.15.

Table 6.12: Average Construction Traffic Percentage Impact on Langhurstwood Road (betweenSite Access and Mercer Road)

Langhurstwood Road (between Site Access and Mercer Road)													
Time			Wee	kday					Satu	urday			
Bogin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact	
Deyin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	
0000	5	0	0	0	0%	0%	5	0	0	0	0%	0%	
0100	16	0	0	0	0%	0%	2	0	0	0	0%	0%	
0200	4	0	0	0	0%	0%	3	0	0	0	0%	0%	
0300	11	2	0	0	0%	0%	1	0	0	0	0%	0%	
0400	13	1	0	0	0%	0%	6	1	0	0	0%	0%	
0500	111	3	0	0	0%	0%	63	1	0	0	0%	0%	
0600	82	7	0	0	0%	0%	41	3	0	0	0%	0%	
0700	210	28	29	2	14%	7%	39	5	0	0	0%	0%	
0800	438	31	7	0	2%	0%	31	5	29	2	95%	40%	
0900	238	38	1	1	0%	3%	60	12	9	2	14%	17%	
1000	154	49	2	2	1%	4%	56	4	2	2	4%	50%	
1100	111	38	2	2	2%	5%	61	4	2	2	3%	50%	
1200	180	28	2	2	1%	7%	46	5	2	2	4%	40%	
1300	247	39	2	2	1%	5%	41	1	2	2	5%	200%	
1400	226	39	2	2	1%	5%	71	3	19	2	27%	67%	

		Lai	nghurst	wood Rc	ad (betv	veen Site	Site Access and Mercer Road)						
Time			Wee	kday					Sati	urday			
Regin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact	
Degin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	
1500	130	33	2	2	2%	6%	48	1	19	2	40%	200%	
1600	187	17	19	2	10%	12%	33	2	0	0	0%	0%	
1700	409	8	14	0	3%	0%	36	1	0	0	0%	0%	
1800	196	5	4	1	2%	20%	34	0	0	0	0%	0%	
1900	57	3	0	0	0%	0%	20	0	0	0	0%	0%	
2000	23	1	0	0	0%	0%	10	0	0	0	0%	0%	
2100	17	1	0	0	0%	0%	27	2	0	0	0%	0%	
2200	74	1	0	0	0%	0%	3	0	0	0	0%	0%	
2300	7	0	0	0	0%	0%	6	1	0	0	0%	0%	
07-19	2726	353	86	18	3%	5%	556	43	84	16	15%	37%	
06-24	2986	366	86	18	3%	5%	663	49	84	16	13%	33%	
00-24	3146	372	86	18	3%	5%	743	51	84	16	11%	31%	

Table 6.13: Average Construction Traffic Percentage Impact on Langhurstwood Road (between Mercer Road and A264)

			Langhu	urstwood	l Road (l	between	en Mercer Road and A264)						
Timo			Wee	kday					Satu	urday			
Regin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact	
Degin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	
0000	5	0	0	0	0%	0%	5	0	0	0	0%	0%	
0100	18	0	0	0	0%	0%	2	0	0	0	0%	0%	
0200	4	0	0	0	0%	0%	3	0	0	0	0%	0%	
0300	12	2	0	0	0%	0%	1	0	0	0	0%	0%	
0400	15	1	0	0	0%	0%	6	1	0	0	0%	0%	
0500	123	5	0	0	0%	0%	69	1	0	0	0%	0%	
0600	90	9	0	0	0%	0%	45	3	0	0	0%	0%	
0700	220	35	29	2	13%	6%	43	6	0	0	0%	0%	
0800	441	46	7	0	2%	0%	35	6	29	2	84%	33%	
0900	288	57	1	1	0%	2%	67	17	9	2	13%	12%	
1000	170	55	2	2	1%	4%	62	5	2	2	3%	40%	
1100	139	53	2	2	1%	4%	68	5	2	2	3%	40%	
1200	203	47	2	2	1%	4%	52	7	2	2	4%	29%	
1300	309	52	2	2	1%	4%	46	1	2	2	4%	200%	
1400	274	52	2	2	1%	4%	80	3	19	2	24%	67%	
1500	152	44	2	2	1%	5%	53	1	19	2	36%	200%	
1600	232	34	19	2	8%	6%	37	3	0	0	0%	0%	
1700	429	14	14	0	3%	0%	40	1	0	0	0%	0%	
1800	179	8	4	1	2%	13%	38	0	0	0	0%	0%	
1900	65	4	0	0	0%	0%	22	0	0	0	0%	0%	
2000	25	2	0	0	0%	0%	10	0	0	0	0%	0%	
2100	18	1	0	0	0%	0%	30	2	0	0	0%	0%	

	Langhurstwood Road (between Mercer Road and A264)													
Time			Wee	kday			Saturday							
Bogin	2018	Base	Construction		% Impact		2018 Base		Construction		% Impact			
Begin Total HGVs Total HGVs Total HGVs							Total	HGVs	Total	HGVs	Total	HGVs		
2200	83	2	0	0	0%	0%	3	0	0	0	0%	0%		
2300	9	0	0	0	0%	0%	6	1	0	0	0%	0%		
07-19	3036	497	86	18	3%	4%	621	55	84	16	14%	29%		
06-24	06-24 3326 515 86 18 3% 3%							61	84	16	11%	26%		
00-24 3503 523 86 18 2% 3% 823 63 84 16 10%										25%				

Table 6.14: Average Construction	Traffic Percentage Impact on A264 East

	A264 East											
Timo			Wee	kday					Satu	rday		
Beai	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact
n	Total	HGV	Tota	HGV	Tota	HGV	Total	HGV	Tota	HGV	Tota	HGV
0000	171	24	0	0	0%	0%	380	23	0	0	0%	
0100	93	15	0	0	0%	0%	190	12	0	0	0%	0%
0200	61	17	0	0	0%	0%	141	22	0	0	0%	0%
0300	103	19	0	0	0%	0%	94	25	0	0	0%	0%
0400	211	39	0	0	0%	0%	160	26	0	0	0%	0%
0500	650	99	0	0	0%	0%	377	57	0	0	0%	0%
0600	1554	229	0	0	0%	0%	628	94	0	0	0%	0%
0700	2904	344	16	2	1%	1%	913	150	0	0	0%	0%
0800	3259	391	3	0	0%	0%	1481	175	16	2	1%	1%
0900	2430	400	2	2	0%	0%	1688	156	5	2	0%	1%
1000	1890	351	2	2	0%	1%	1923	116	2	2	0%	2%
1100	1870	335	2	2	0%	1%	2187	138	2	2	0%	1%
1200	1918	310	2	2	0%	1%	2074	132	2	2	0%	2%
1300	1985	332	2	2	0%	1%	1880	110	2	2	0%	2%
1400	2202	353	2	2	0%	1%	1874	113	28	2	1%	2%
1500	2419	384	2	2	0%	1%	1785	103	28	2	2%	2%
1600	2915	365	28	2	1%	1%	1813	102	0	0	0%	0%
1700	3373	308	21	0	1%	0%	1695	101	0	0	0%	0%
1800	2605	172	5	1	0%	0%	1439	51	0	0	0%	0%
1900	1534	98	0	0	0%	0%	1059	47	0	0	0%	0%
2000	885	50	0	0	0%	0%	627	25	0	0	0%	0%
2100	673	43	0	0	0%	0%	525	24	0	0	0%	0%
2200	654	34	0	0	0%	0%	530	22	0	0	0%	0%
2300	395	22	0	0	0%	0%	524	16	0	0	0%	0%
07-19	2977 0	4045	86	18	0%	0%	2075 2	1447	84	16	0%	1%
06-24	3546 5	4521	86	18	0%	0%	2464 5	1675	84	16	0%	1%
00-24	3675 4	4734	86	18	0%	0%	2598 7	1840	84	16	0%	1%

	A264 West											
Timo			Wee	kday					Satu	rday		
Begin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact
Degin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
0000	170	24	0	0	0%	0%	381	23	0	0	0%	0%
0100	77	15	0	0	0%	0%	190	12	0	0	0%	0%
0200	61	18	0	0	0%	0%	138	22	0	0	0%	0%
0300	108	19	0	0	0%	0%	95	25	0	0	0%	0%
0400	221	39	0	0	0%	0%	164	27	0	0	0%	0%
0500	749	101	0	0	0%	0%	429	58	0	0	0%	0%
0600	1605	231	0	0	0%	0%	640	95	0	0	0%	0%
0700	3055	353	43	2	1%	1%	926	155	0	0	0%	0%
0800	3570	393	10	0	0%	0%	1492	173	43	2	3%	1%
0900	2572	408	1	1	0%	0%	1691	160	12	2	1%	1%
1000	1913	350	2	2	0%	1%	1916	115	2	2	0%	2%
1100	1863	332	2	2	0%	1%	2175	134	2	2	0%	1%
1200	1877	303	2	2	0%	1%	2048	126	2	2	0%	2%
1300	2070	335	2	2	0%	1%	1872	111	2	2	0%	2%
1400	2088	341	2	2	0%	1%	1832	114	11	2	1%	2%
1500	2379	377	2	2	0%	1%	1788	102	11	2	1%	2%
1600	2779	363	11	2	0%	1%	1806	101	0	0	0%	0%
1700	3035	307	7	0	0%	0%	1695	100	0	0	0%	0%
1800	2476	172	3	2	0%	1%	1431	51	0	0	0%	0%
1900	1503	97	0	0	0%	0%	1049	47	0	0	0%	0%
2000	874	49	0	0	0%	0%	625	25	0	0	0%	0%
2100	670	42	0	0	0%	0%	507	24	0	0	0%	0%
2200	588	33	0	0	0%	0%	526	22	0	0	0%	0%
2300	393	23	0	0	0%	0%	528	17	0	0	0%	0%
07-19	29677	4034	86	18	0%	0%	20672	1442	84	16	0%	1%
06-24	35310	4509	86	18	0%	0%	24547	1672	84	16	0%	1%
00-24	36696	4725	86	18	0%	0%	25944	1837	84	16	0%	1%

Table 6.15: Average Construction Traffic Percentage Impact on A264 West

Peak (HGV) Construction Traffic Impact

6.6.12 The peak HGV construction traffic percentage impact of the facility is shown below in Tables 6.16, 6.17, 6.18 and 6.19.

		La	nghurst	wood Rc	oad (betv	ween Site	Site Access and Mercer Road)							
Timo			Wee	kday					Sati	urday				
Begin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact		
Dogin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs		
0000	5	0	0	0	0%	0%	5	0	0	0	0%	0%		
0100	16	0	0	0	0%	0%	2	0	0	0	0%	0%		
0200	4	0	0	0	0%	0%	3	0	0	0	0%	0%		
0300	11	2	0	0	0%	0%	1	0	0	0	0%	0%		
0400	13	1	0	0	0%	0%	6	1	0	0	0%	0%		
0500	111	3	0	0	0%	0%	63	1	0	0	0%	0%		
0600	82	7	0	0	0%	0%	41	3	0	0	0%	0%		
0700	210	28	68	4	33%	14%	39	5	0	0	0%	0%		
0800	438	31	16	0	4%	0%	31	5	72	8	233%	160%		
0900	238	38	7	7	3%	18%	60	12	24	8	40%	67%		
1000	154	49	7	7	5%	14%	56	4	8	8	14%	200%		
1100	111	38	8	8	7%	21%	61	4	8	8	13%	200%		
1200	180	28	8	8	4%	29%	46	5	8	8	17%	160%		
1300	247	39	8	8	3%	21%	41	1	8	8	20%	800%		
1400	226	39	8	8	4%	21%	71	3	48	8	68%	267%		
1500	130	33	8	8	6%	24%	48	1	48	8	100%	800%		
1600	187	17	47	7	25%	41%	33	2	0	0	0%	0%		
1700	409	8	32	0	8%	0%	36	1	0	0	0%	0%		
1800	196	5	15	7	8%	140%	34	0	0	0	0%	0%		
1900	57	3	0	0	0%	0%	20	0	0	0	0%	0%		
2000	23	1	0	0	0%	0%	10	0	0	0	0%	0%		
2100	17	1	0	0	0%	0%	27	2	0	0	0%	0%		
2200	74	1	0	0	0%	0%	3	0	0	0	0%	0%		
2300	7	0	0	0	0%	0%	6	1	0	0	0%	0%		
07-19	2726	353	232	72	9%	20%	556	43	224	64	40%	149%		
06-24	2986	366	232	72	8%	20%	663	49	224	64	34%	131%		
00-24	3146	372	232	72	7%	19%	743	51	224	64	30%	125%		

Table 6.16: Peak HGV Construction Traffic Percentage Impact on Langhurstwood Road (between Site Access and Mercer Road)

			Langhu	urstwood	l Road (l	between	Mercer	Road and	d A264)			
Timo			Wee	kday					Satu	urday		
Begin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact
Bogin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
0000	5	0	0	0	0%	0%	5	0	0	0	0%	0%
0100	18	0	0	0	0%	0%	2	0	0	0	0%	0%
0200	4	0	0	0	0%	0%	3	0	0	0	0%	0%
0300	12	2	0	0	0%	0%	1	0	0	0	0%	0%
0400	15	1	0	0	0%	0%	6	1	0	0	0%	0%
0500	123	5	0	0	0%	0%	69	1	0	0	0%	0%
0600	90	9	0	0	0%	0%	45	3	0	0	0%	0%
0700	220	35	68	4	31%	11%	43	6	0	0	0%	0%
0800	441	46	16	0	4%	0%	35	6	72	8	206%	133%
0900	288	57	7	7	2%	12%	67	17	24	8	35%	47%
1000	170	55	7	7	4%	13%	62	5	8	8	13%	160%
1100	139	53	8	8	6%	15%	68	5	8	8	12%	160%
1200	203	47	8	8	4%	17%	52	7	8	8	15%	114%
1300	309	52	8	8	3%	15%	46	1	8	8	17%	800%
1400	274	52	8	8	3%	15%	80	3	48	8	60%	267%
1500	152	44	8	8	5%	18%	53	1	48	8	91%	800%
1600	232	34	47	7	20%	21%	37	3	0	0	0%	0%
1700	429	14	32	0	7%	0%	40	1	0	0	0%	0%
1800	179	8	15	7	8%	88%	38	0	0	0	0%	0%
1900	65	4	0	0	0%	0%	22	0	0	0	0%	0%
2000	25	2	0	0	0%	0%	10	0	0	0	0%	0%
2100	18	1	0	0	0%	0%	30	2	0	0	0%	0%
2200	83	2	0	0	0%	0%	3	0	0	0	0%	0%
2300	9	0	0	0	0%	0%	6	1	0	0	0%	0%
07-19	3036	497	232	72	8%	14%	621	55	224	64	36%	116%
06-24	3326	515	232	72	7%	14%	737	61	224	64	30%	105%
00-24	3503	523	232	72	7%	14%	823	63	224	64	27%	102%

Table 6.17: Peak HGV Construction Traffic Percentage Impact on Langhurstwood Road (between Mercer Road and A264)

A264 East												
Timo	Weekda	ау					Saturda	ау				
Begin	2018 Ba	ase	Consti	ruction	% Imp	act	2018 Ba	ase	Constr	ruction	% Imp	act
Bogin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
0000	171	24	0	0	0%	0%	380	23	0	0	0%	0%
0100	93	15	0	0	0%	0%	190	12	0	0	0%	0%
0200	61	17	0	0	0%	0%	141	22	0	0	0%	0%
0300	103	19	0	0	0%	0%	94	25	0	0	0%	0%
0400	211	39	0	0	0%	0%	160	26	0	0	0%	0%
0500	650	99	0	0	0%	0%	377	57	0	0	0%	0%
0600	1554	229	0	0	0%	0%	628	94	0	0	0%	0%
0700	2904	344	36	4	1%	1%	913	150	0	0	0%	0%
0800	3259	391	8	0	0%	0%	1481	175	40	8	3%	5%
0900	2430	400	8	8	0%	2%	1688	156	16	8	1%	5%
1000	1890	351	7	7	0%	2%	1923	116	8	8	0%	7%
1100	1870	335	8	8	0%	2%	2187	138	8	8	0%	6%
1200	1918	310	8	8	0%	3%	2074	132	8	8	0%	6%
1300	1985	332	8	8	0%	2%	1880	110	8	8	0%	7%
1400	2202	353	8	8	0%	2%	1874	113	68	8	4%	7%
1500	2419	384	8	8	0%	2%	1785	103	68	8	4%	8%
1600	2915	365	68	8	2%	2%	1813	102	0	0	0%	0%
1700	3373	308	48	0	1%	0%	1695	101	0	0	0%	0%
1800	2605	172	18	7	1%	4%	1439	51	0	0	0%	0%
1900	1534	98	0	0	0%	0%	1059	47	0	0	0%	0%
2000	885	50	0	0	0%	0%	627	25	0	0	0%	0%
2100	673	43	0	0	0%	0%	525	24	0	0	0%	0%
2200	654	34	0	0	0%	0%	530	22	0	0	0%	0%
2300	395	22	0	0	0%	0%	524	16	0	0	0%	0%
07-19	29770	4045	232	72	1%	2%	20752	1447	224	64	1%	4%
06-24	35465	4521	232	72	1%	2%	24645	1675	224	64	1%	4%
00-24	36754	4734	232	12	1%	2%	25987	1840	224	64	1%	3%

Table 6.18: Peak HGV Construction Traffic Percentage Impact on A264 East
A264 West												
Timo			Weel	kday	-				Satu	rday		
Begin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact
	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
0000	170	24	0	0	0%	0%	381	23	0	0	0%	0%
0100	77	15	0	0	0%	0%	190	12	0	0	0%	0%
0200	61	18	0	0	0%	0%	138	22	0	0	0%	0%
0300	108	19	0	0	0%	0%	95	25	0	0	0%	0%
0400	221	39	0	0	0%	0%	164	27	0	0	0%	0%
0500	749	101	0	0	0%	0%	429	58	0	0	0%	0%
0600	1605	231	0	0	0%	0%	640	95	0	0	0%	0%
0700	3055	353	100	4	3%	1%	926	155	0	0	0%	0%
0800	3570	393	24	0	1%	0%	1492	173	104	8	7%	5%
0900	2572	408	7	7	0%	2%	1691	160	32	8	2%	5%
1000	1913	350	8	8	0%	2%	1916	115	8	8	0%	7%
1100	1863	332	8	8	0%	2%	2175	134	8	8	0%	6%
1200	1877	303	8	8	0%	3%	2048	126	8	8	0%	6%
1300	2070	335	8	8	0%	2%	1872	111	8	8	0%	7%
1400	2088	341	8	8	0%	2%	1832	114	28	8	2%	7%
1500	2379	377	8	8	0%	2%	1788	102	28	8	2%	8%
1600	2779	363	27	7	1%	2%	1806	101	0	0	0%	0%
1700	3035	307	16	0	1%	0%	1695	100	0	0	0%	0%
1800	2476	172	11	8	0%	4%	1431	51	0	0	0%	0%
1900	1503	97	0	0	0%	0%	1049	47	0	0	0%	0%
2000	874	49	0	0	0%	0%	625	25	0	0	0%	0%
2100	670	42	0	0	0%	0%	507	24	0	0	0%	0%
2200	588	33	0	0	0%	0%	526	22	0	0	0%	0%
2300	393	23	0	0	0%	0%	528	17	0	0	0%	0%
07-19	29677	4034	232	72	1%	2%	20672	1442	224	64	1%	4%
06-24	35310	4509	232	72	1%	2%	24547	1672	224	64	1%	4%
00-24	36696	4725	232	72	1%	2%	25944	1839	224	64	1%	3%

Table 6.19: Peak HGV Construction Traffic Percentage Impact on A264 West

Peak Construction Traffic Percentage Impact

6.6.13 The peak construction traffic percentage impact of the facility is shown below in Tables 6.20, 6.21, 6.22 and 6.23.

	Langhurstwood Road (between Site Access and Mercer Road)											
Timo			Wee	kday	-				Sati	urday	-	
Begin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact
Bogin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
0000	5	0	0	0	0%	0%	5	0	0	0	0%	0%
0100	16	0	0	0	0%	0%	2	0	0	0	0%	0%
0200	4	0	0	0	0%	0%	3	0	0	0	0%	0%
0300	11	2	0	0	0%	0%	1	0	0	0	0%	0%
0400	13	1	0	0	0%	0%	6	1	0	0	0%	0%
0500	111	3	0	0	0%	0%	63	1	0	0	0%	0%
0600	82	7	0	0	0%	0%	41	3	0	0	0%	0%
0700	210	28	100	2	48%	7%	39	5	0	0	0%	0%
0800	438	31	24	0	5%	0%	31	5	102	4	329%	80%
0900	238	38	4	4	2%	11%	60	12	28	4	47%	33%
1000	154	49	4	4	3%	8%	56	4	4	4	7%	100%
1100	111	38	4	4	4%	11%	61	4	4	4	7%	100%
1200	180	28	4	4	2%	14%	46	5	4	4	9%	80%
1300	247	39	4	4	2%	10%	41	1	4	4	10%	400%
1400	226	39	4	4	2%	10%	71	3	65	4	92%	133%
1500	130	33	4	4	3%	12%	48	1	65	4	135%	400%
1600	187	17	65	4	35%	24%	33	2	0	0	0%	0%
1700	409	8	49	0	12%	0%	36	1	0	0	0%	0%
1800	196	5	14	2	7%	40%	34	0	0	0	0%	0%
1900	57	3	0	0	0%	0%	20	0	0	0	0%	0%
2000	23	1	0	0	0%	0%	10	0	0	0	0%	0%
2100	17	1	0	0	0%	0%	27	2	0	0	0%	0%
2200	74	1	0	0	0%	0%	3	0	0	0	0%	0%
2300	7	0	0	0	0%	0%	6	1	0	0	0%	0%
								1				
07-19	2726	353	280	36	10%	10%	556	43	276	32	50%	74%
06-24	2986	366	280	36	9%	10%	663	49	276	32	42%	65%
00-24	3146	372	280	36	9%	10%	743	51	276	32	37%	63%

Table 6.20: Peak Construction Traffic Percentage Impact on Langhurstwood Road (between Site Access and Mercer Road)

	Langhurstwood Road (betwee							n Mercer Road and A264)						
Timo			Wee	kday					Sati	urday				
Beain	2018	Base	Consti	ruction	% In	npact	2018	Base	Const	ruction	% In	npact		
	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs		
0000	5	0	0	0	0%	0%	5	0	0	0	0%	0%		
0100	18	0	0	0	0%	0%	2	0	0	0	0%	0%		
0200	4	0	0	0	0%	0%	3	0	0	0	0%	0%		
0300	12	2	0	0	0%	0%	1	0	0	0	0%	0%		
0400	15	1	0	0	0%	0%	6	1	0	0	0%	0%		
0500	123	5	0	0	0%	0%	69	1	0	0	0%	0%		
0600	90	9	0	0	0%	0%	45	3	0	0	0%	0%		
0700	220	35	100	2	45%	6%	43	6	0	0	0%	0%		
0800	441	46	24	0	5%	0%	35	6	102	4	291%	67%		
0900	288	57	4	4	1%	7%	67	17	28	4	42%	24%		
1000	170	55	4	4	2%	7%	62	5	4	4	6%	80%		
1100	139	53	4	4	3%	8%	68	5	4	4	6%	80%		
1200	203	47	4	4	2%	9%	52	7	4	4	8%	57%		
1300	309	52	4	4	1%	8%	46	1	4	4	9%	400%		
1400	274	52	4	4	1%	8%	80	3	65	4	81%	133%		
1500	152	44	4	4	3%	9%	53	1	65	4	123%	400%		
1600	232	34	65	4	28%	12%	37	3	0	0	0%	0%		
1700	429	14	49	0	11%	0%	40	1	0	0	0%	0%		
1800	179	8	14	2	8%	25%	38	0	0	0	0%	0%		
1900	65	4	0	0	0%	0%	22	0	0	0	0%	0%		
2000	25	2	0	0	0%	0%	10	0	0	0	0%	0%		
2100	18	1	0	0	0%	0%	30	2	0	0	0%	0%		
2200	83	2	0	0	0%	0%	3	0	0	0	0%	0%		
2300	9	0	0	0	0%	0%	6	1	0	0	0%	0%		
07-19	3036	497	280	36	9%	7%	621	55	276	32	44%	58%		
06-24	3326	515	280	36	8%	7%	737	61	276	32	37%	52%		
00-24	3503	523	280	36	8%	7%	823	63	276	32	34%	51%		

Table 6.21: Peak Construction Traffic Percentage Impact on Langhurstwood Road (between Mercer Road and A264)

	A264 East											
Timo			Weel	kday					Satu	rday		
Begin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact
5	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
0000	171	24	0	0	0%	0%	380	23	0	0	0%	0%
0100	93	15	0	0	0%	0%	190	12	0	0	0%	0%
0200	61	17	0	0	0%	0%	141	22	0	0	0%	0%
0300	103	19	0	0	0%	0%	94	25	0	0	0%	0%
0400	211	39	0	0	0%	0%	160	26	0	0	0%	0%
0500	650	99	0	0	0%	0%	377	57	0	0	0%	0%
0600	1554	229	0	0	0%	0%	628	94	0	0	0%	0%
0700	2904	344	51	2	2%	1%	913	150	0	0	0%	0%
0800	3259	391	12	0	0%	0%	1481	175	53	4	4%	2%
0900	2430	400	4	4	0%	1%	1688	156	16	4	1%	3%
1000	1890	351	4	4	0%	1%	1923	116	4	4	0%	3%
1100	1870	335	4	4	0%	1%	2187	138	4	4	0%	3%
1200	1918	310	4	4	0%	1%	2074	132	4	4	0%	3%
1300	1985	332	4	4	0%	1%	1880	110	4	4	0%	4%
1400	2202	353	4	4	0%	1%	1874	113	96	4	5%	4%
1500	2419	384	4	4	0%	1%	1785	103	96	4	5%	4%
1600	2915	365	96	4	3%	1%	1813	102	0	0	0%	0%
1700	3373	308	74	0	2%	0%	1695	101	0	0	0%	0%
1800	2605	172	20	2	1%	1%	1439	51	0	0	0%	0%
1900	1534	98	0	0	0%	0%	1059	47	0	0	0%	0%
2000	885	50	0	0	0%	0%	627	25	0	0	0%	0%
2100	673	43	0	0	0%	0%	525	24	0	0	0%	0%
2200	654	34	0	0	0%	0%	530	22	0	0	0%	0%
2300	395	22	0	0	0%	0%	524	16	0	0	0%	0%
07-19	29770	4045	280	36	1%	1%	20752	1447	276	32	1%	2%
06-24	35465	4521	280	36	1%	1%	24645	1675	276	32	1%	2%
00-24	36/54	4/34	280	36	1%	1%	25987	1840	276	32	1%	2%

Table 6.22: Peak Construction Traffic Percentage Impact on A264 East

A264 West												
Timo			Wee	kday					Satu	rday		
Begin	2018	Base	Const	ruction	% In	npact	2018	Base	Const	ruction	% In	npact
Degin	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
0000	170	24	0	0	0%	0%	381	23	0	0	0%	0%
0100	77	15	0	0	0%	0%	190	12	0	0	0%	0%
0200	61	18	0	0	0%	0%	138	22	0	0	0%	0%
0300	108	19	0	0	0%	0%	95	25	0	0	0%	0%
0400	221	39	0	0	0%	0%	164	27	0	0	0%	0%
0500	749	101	0	0	0%	0%	429	58	0	0	0%	0%
0600	1605	231	0	0	0%	0%	640	95	0	0	0%	0%
0700	3055	353	149	2	5%	1%	926	155	0	0	0%	0%
0800	3570	393	36	0	1%	0%	1492	173	151	4	10%	2%
0900	2572	408	4	4	0%	1%	1691	160	40	4	2%	3%
1000	1913	350	4	4	0%	1%	1916	115	4	4	0%	3%
1100	1863	332	4	4	0%	1%	2175	134	4	4	0%	3%
1200	1877	303	4	4	0%	1%	2048	126	4	4	0%	3%
1300	2070	335	4	4	0%	1%	1872	111	4	4	0%	4%
1400	2088	341	4	4	0%	1%	1832	114	35	4	2%	4%
1500	2379	377	4	4	0%	1%	1788	102	35	4	2%	4%
1600	2779	363	35	4	1%	1%	1806	101	0	0	0%	0%
1700	3035	307	25	0	1%	0%	1695	100	0	0	0%	0%
1800	2476	172	8	2	0%	1%	1431	51	0	0	0%	0%
1900	1503	97	0	0	0%	0%	1049	47	0	0	0%	0%
2000	874	49	0	0	0%	0%	625	25	0	0	0%	0%
2100	670	42	0	0	0%	0%	507	24	0	0	0%	0%
2200	588	33	0	0	0%	0%	526	22	0	0	0%	0%
2300	393	23	0	0	0%	0%	528	17	0	0	0%	0%
							·	·				
07-19	29677	4034	280	36	1%	1%	20672	1442	276	32	1%	2%
06-24	35310	4509	280	36	1%	1%	24547	1672	276	32	1%	2%
00-24	36696	4725	280	36	1%	1%	25944	1839	276	32	1%	2%

	-		_			
Table 6 22. Deak	Construction	Troffic	Dorcontago	Imnact	$nn \Lambda 261$	Most
I ADIE U.Z.J. FEAN	CONSULUCION	Hallic	reiteillaue	IIIINAUL	011 A204	VVESL

- 6.6.14 As set out in Table 6.9, the sensitivity of the A264 is considered to be negligible. Therefore, the Rule 1 threshold (of a 30% change in total traffic flows or HGV traffic flows) set out in the IEMA guidelines is applicable to this link. As can be seen above, the percentage increases in total traffic flows and HGV traffic flows on along the A264 are all below the Rule 1 threshold. During the peak construction traffic period the maximum percentage increase in total traffic flows is estimated to be 5% over a weekday and 10% on a Saturday. During the peak HGV construction period the maximum percentage increase in HGV flows on the A264 is 4% on a weekday and 8% on a Saturday.
- 6.6.15 Taking into account that the predicted changes in traffic flow are below the relevant IEMA threshold (below which impacts are considered to be imperceptible) and the factors set out in Table 6.4, the magnitude of impact during construction along the A264 would be negligible. Therefore, the significance of effect arising from any increase in traffic flows along the A264 as a result of construction traffic would therefore be negligible. The effect would not be significant in terms of the EIA Regulations.

- 6.6.16 As set out in Table 6.9, the sensitivity of Langhurstwood Road is considered to be medium/high. Therefore, the Rule 2 threshold (of a 10% change in total traffic flows) set out in the IEMA guidelines is applicable to this link. As can be seen above, the percentage increases in total traffic flows and HGV traffic flows along Langhurstwood Road would exceed the Rule 2 threshold. During the peak construction traffic period the maximum percentage increase in total traffic flows is estimated to be 48% over a weekday and 329% on a Saturday. During the peak HGV construction period the maximum percentage increase in HGV flows on Langhurstwood Road is 140% on a weekday and 800% on a Saturday. Whilst there are large percentage increases, especially on Saturdays, this is a result of the low existing baseline traffic flow on this link. Therefore, an increase of only a small number of HGVs can result in large percentage increases (the number of additional HGVs for that give rise to the 800% increase is only 8 HGVs).
- 6.6.17 Nevertheless, as the threshold is predicted to be exceeded, an assessment of the environmental effects of this change is undertaken below.

Visual Effects

- 6.6.18 The construction traffic would travel via existing roads that already carry existing traffic and, therefore, the additional traffic flows are unlikely to result in any additional visual obstruction effects. Any effects would relate to visual intrusion from the increases in HGV movement along Langhurstwood Road.
- 6.6.19 The composition of traffic on Langhurstwood Road between the site access and the Mercer Road junction (link 1) and between Mercer Road and the A264 (link 2) has been considered to determine the magnitude of change.
- 6.6.20 The HGV content of total traffic flows along Langhurstwood Road Link 1 under baseline conditions over a 12 hour weekday and Saturday is 12.9% and 7.7% respectively. On Langhurstwood Road Link 2 the HGV content of total traffic flows are 16.3% and 8.9% respectively.
- 6.6.21 With the addition of average construction traffic flows, the HGV levels on Langhurstwood Road Link 1 are predicted to increase to 13.1% and 9.2% on a 12 hour weekday and Saturday respectively. On Langhurstwood Road Link 2 the HGV levels are predicted to increase to 16.4% and 10.1% respectively.
- 6.6.22 With the addition of peak HGV construction flows, the HGV levels on Langhurstwood Road Link 1 during a 12 hour weekday and Saturday are predicted to change to 14.3% and 13.8% respectively. On Langhurstwood Road Link 2 during a 12 hour weekday and Saturday the HGV levels are predicted to change to 17.4% and 14.1% respectively.
- 6.6.23 These changes are low and would be difficult to perceive visually in the context of existing traffic flows. It is therefore considered that the magnitude of impact on visual effects along Langhurstwood Road would be negligible. The significance of the visual effect as a result of the construction traffic along Langhurstwood Road would therefore be negligible to minor. The effect would not be significant in terms of the EIA Regulations.

Severance

- 6.6.24 Severance is only likely to occur on highly trafficked roads and would result from the perceived division the road and traffic create between either side.
- 6.6.25 Langhurstwood Road is lightly trafficked and, on that basis, severance is unlikely to occur. Notwithstanding this, the IEMA guidelines indicate that severance impacts may be considered 'slight', 'moderate' and 'substantial' with changes in traffic flows of 30%, 60% and 90% respectively.
- 6.6.26 The increases in traffic flows as a result of the average construction traffic flows are predicted to be 3% over a 12 hour weekday on Langhurstwood Road Link 1 and Langhurstwood Road Link 2. On a Saturday, increases of 15% and 14% over a Saturday are predicted on Langhurstwood Road Link 1 and Langhurstwood Road Link 2 respectively.
- 6.6.27 During the peak construction traffic flows, increases of 10% and 9% are predicted over a 12 hour weekday on Langhurstwood Road Link 1 and Langhurstwood Road Link 2. On a Saturday, increases of 50% and 44% are predicted on Langhurstwood Road Link 1 and Langhurstwood Road Link 2 respectively. It is noted

that Langhurstwood Road is not highly trafficked and, therefore, as the IEMA guidelines set out, severance is unlikely to occur.

- 6.6.28 Notwithstanding this, a further assessment has been undertaken for periods of the highest hourly traffic flows for completeness. On a Saturday between 08.00 and 09.00, the peak construction traffic flows are predicted to increase traffic flows on Langhurstwood Road Link 2 from 35 to 137 two-way vehicle movements per hour. With the inclusion of the peak construction traffic, this equates to an average of one vehicle movement every 26 seconds. This is not at a level where severance could occur. Furthermore, there are limited built up areas on either side of the road. Given the location, which does not have pedestrian footways and where pedestrian activity is infrequent, there is limited potential for any severance impact to be felt.
- 6.6.29 It is therefore considered that the magnitude of impact on severance in this location would be negligible. The significance of the severance effect as a result of the construction traffic along Langhurstwood Road would therefore be negligible to minor. The effect would not be significant in terms of the EIA Regulations.

Driver Delay

- 6.6.30 Driver delays occur when traffic flows are high and roads are at or near capacity. This occurs when traffic flows are at their peak, during the weekday AM (08:00 to 09:00) and PM (17:00 to 18:00) peak hours.
- 6.6.31 The majority of construction staff movements would occur outside peaks hours. However, 20% of staff arrivals and 40% of departures would still occur during these periods.
- 6.6.32 The peak construction traffic has the largest potential to impact upon the performance of the highway network and thus impact upon driver delay. These traffic flows have been assessed through the site access junction using the Department for Transport approved Junctions 9 computer modelling suite, the results of which are summarised below in Table 6.24.

Table 6.24:	Summary	of	Operational	Assessments	at	Site	Access	Junction	with	Peak
Construction ⁻	Traffic									

	AM Peak Hour	-		PM Peak Hour			
Arm	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)	RFC	
Site Access to Langhurstwood Road N / S	0.1	17.55	0.08	0.3	10.68	0.22	
Langhurstwood Road N to S / Site Access	0.0	8.18	0.01	0.0	0.0	0.0	

- 6.6.33 One of the key indicators of junction performance in Junctions 9 is the Ratio of Flow to Capacity (RFC) where a value of 1.0 indicates that demand traffic flows are equal to the junction capacity.
- 6.6.34 The above demonstrates that the site access junction is predicted to comfortably operate well within capacity with the peak construction traffic and thus any noticeable driver delay on Langhurstwood Road at the site access would not occur.
- 6.6.35 The Langhurstwood Road / A264 junction is a merge / diverge layout rather than a traditional give-way layout and other means of assessment are therefore required to determine driver delay at the southern end of Langhurstwood Road at the A264.
- 6.6.36 Delay on Langhurstwood Road as a result of its junction with the A264 junction relates to the ability of vehicles to merge into the mainline traffic on the A264. There is no traditional modelling tool available to model merges, and therefore the capacity of the mainline A264 carriageway has been compared to the demand traffic to identify how these compare.
- 6.6.37 The Congestion Reference Flow (CRF) of the A264 is an estimate of the total Annual Average Daily Traffic Flow (AADT) flow at which the carriageway is likely to be 'congested' in the peak periods. The CRF can be calculated using TA46/97 'Traffic Flow Ranges for use in the Assessment of New Rural Roads', contained in

Volume 5, Section 1, Part 3 of the Design Manual for Road and Bridges (DMRB) (Highways Agency *et al.*, 1997) and for the A264 has been calculated at 81,875 AADT. Although this is intended for the design of new roads, in the absence of any other relevant guidance, it has been used for assessment purposes only.

- 6.6.38 The A264 mainline carriageway is predicted to have an AADT of 33,228 in 2018 and this therefore equates to 40.6% of capacity.
- 6.6.39 On the basis of there being such spare capacity on the A264 mainline carriageway, there are gaps between vehicles that would not impede the ability of vehicles to merge from Langhurstwood Road.
- 6.6.40 The above assessments consider highway capacity connected to Langhurstwood Road and conclude that there would be no impact upon highway capacity as a result of the construction traffic. On this basis, there would be no noticeable driver delay on Langhurstwood Road.
- 6.6.41 It is therefore considered that the magnitude of impact on driver delay along Langhurstwood Road would be negligible. The significance of the driver delay effect as a result of the construction traffic along Langhurstwood Road would therefore be negligible to minor. The effect would not be significant in terms of the EIA Regulations.

Pedestrian Delay

- 6.6.42 There are no footways along Langhurstwood Road and pedestrian activity is limited and infrequent.
- 6.6.43 Pedestrian delay can be considered perceptible or considered significant beyond a lower delay threshold of 10 seconds, for a link with no crossing facilities, which broadly equates to a two-way link flow of approximately 1,400 vehicles per hour.
- 6.6.44 Peak hourly traffic flows with the addition of the peak construction traffic for Langhurstwood Road Link 1 reach 462 vehicle movements and for Langhurstwood Road Link 2 reach 478 vehicle movements. Both of these traffic flows are significantly below the threshold where pedestrian delay could be perceptible.
- 6.6.45 It is therefore considered that the magnitude of impact on pedestrian delay along Langhurstwood Road would be negligible. The significance of the pedestrian delay effect as a result of the construction traffic along Langhurstwood Road would therefore be negligible to minor. The effect would not be significant in terms of the EIA Regulations.

Pedestrian Amenity

- 6.6.46 There are no footways along Langhurstwood Road between the site and the A264. This is reflective of the rural setting and limited demand. Indeed, pedestrian activity is limited and infrequent along these roads.
- 6.6.47 In terms of pedestrian amenity, any pedestrians who currently walk along Langhurstwood Road experience passing traffic and passing HGVs, and thus may be more accustomed to passing traffic than pedestrians in other locations. There are limited generators of pedestrian movement in the vicinity of Langhurstwood Road, no public recreation areas and the pedestrian crossing of the dual carriageway A264 into Horsham is an uncontrolled crossing at derestricted vehicle speeds (70 mph).
- 6.6.48 As set out above, there is no commonly agreed guidance for determining the magnitude of change for such instances. However, guidance refers to the Manual of Environmental Assessment, which suggests that a tentative threshold for judging changes in pedestrian amenity would be where the traffic flow (or its lorry component) is halved or doubled.
- 6.6.49 During the peak construction traffic scenario, 18 hour total traffic flows on Langhurstwood Road are predicted to change from 3326 to 3606 with HGV components changing from 515 (15%) to 551 (15%). On a Saturday, respective changes in total traffic flows are 737 to 1013 with HGV components changing from 61 (8%) to 93 (9%).
- 6.6.50 During the peak HGV construction scenario, 18 hour total traffic flows on Langhurstwood Road are predicted to change from 3326 to 3558 with HGV components changing from 515 (15.5%) to 587 (16.5%). On a Saturday, respective changes in total traffic flows are 737 to 961 with HGV components changing from 61 (8.3%) to 125 (13%).

- 6.6.51 The IEMA guidelines suggest that moderate (the lowest category) fear and intimidation could be experienced when the average hourly traffic flow over an 18 hour day is around 600 to 1,200 vehicles per hour or when there are between 1,000 and 2,000 HGVs over an 18 hour day.
- 6.6.52 None of these thresholds are exceeded in the baseline scenario or following the addition of the peak construction traffic flows. Indeed, in 2018 with the peak construction traffic flows, the average hourly traffic flow over an 18 hour day along Langhurstwood Road would be 200 vehicle movements, whilst in 2018 with the peak HGV construction flows, the number of HGV movements over an 18 hour day along Langhurstwood Road would be 587.
- 6.6.53 The magnitude of the impact has been considered based upon the limited pedestrian activity, average construction traffic flows, the short temporary period of peak construction traffic flows and familiarity of existing users to vehicle movements and is considered to be low to medium. The significance of the pedestrian amenity effect as a result of the construction traffic along Langhurstwood Road would therefore be minor to moderate. The effect would not be significant in terms of the EIA Regulations.

Accidents and Safety

- 6.6.54 Records of Personal Injury Accidents have been reviewed using the online Crashmap database. This has determined that there have been no injury accidents along Langhurstwood Road and it can be concluded that there are no existing road safety issues along the route.
- 6.6.55 The construction vehicle movements would be similar to those already generated along Langhurstwood Road and there is no reason to suggest these would alter the injury accident rate.
- 6.6.56 It is therefore considered that the magnitude of impact on accidents and safety along Langhurstwood Road would be negligible. The significance of the accidents and safety effect as a result of the construction traffic along Langhurstwood Road would therefore be negligible to minor. The effect would not be significant in terms of the EIA Regulations.

Hazardous Loads

- 6.6.57 The IEMA guidelines acknowledge, in paragraph 2.4, that most developments would not result in an increase in the number of movements of hazardous or dangerous loads.
- 6.6.58 The construction process for the works is not expected to result in the transportation of any hazardous material. Any unforeseen hazardous waste that is found and which would require transportation would be managed and transported in a safe manner and in accordance with current regulations. Hazardous waste should not therefore represent a safety issue.
- 6.6.59 It is therefore considered that the magnitude of impact on hazardous loads along Langhurstwood Road would be negligible. The significance of the effect as a result of the construction traffic along Langhurstwood Road would therefore be negligible to minor. The effect would not be significant in terms of the EIA Regulations.

Dust and Dirt

- 6.6.60 Dust and dirt arising from traffic is mainly associated with HGV traffic undertaking particular activities. The extent of any impact of dust and dirt arising from traffic during the construction phase would be dependent upon the management practices adopted on site. As set out in Chapter 7 (Air Quality), dust control measures are proposed in accordance with guidance from the Institute of Air Quality Management (IAQM, 2014). These measures will be implemented through the Construction Environmental Management Plan (CEMP). In addition, those measures relevant to HGV movements will be included in the Construction Traffic Management Plan, which will be prepared and agreed with Highway Officers prior to construction commencing.
- 6.6.61 With the application of effective dust control measures, it is considered that the magnitude of impact on dust and dirt would be negligible. The significance of the dust and dirt effect as a result of the construction traffic along Langhurstwood Road would therefore be negligible to minor. The effect would not be significant in terms of the EIA Regulations.

6.7 Assessment of Operational Effects

- 6.7.1 The total volume of waste imported to the site for use in the 3Rs facility would be the same as is currently permitted for the existing Waste Transfer Station/Materials Recycling Facility i.e. 230,000 tpa. The proposals would involve the demolition of the existing waste transfer building and its replacement with the 3Rs facility, which would incorporate an enhanced version of the existing Waste Transfer Station/ Materials Recycling Facility within it as well as a thermal treatment facility. All waste inputs to the proposed thermal treatment facility would be sourced from the improved facility. This means that all waste inputs to the proposed 3Rs Facility already have permission to be imported to the site under its existing planning permission.
- 6.7.2 As such, the proposed facility would not result in any increase in vehicles coming to the site above those already permitted. There would therefore be no requirement for any additional waste related HGV movements to transport waste to the site over and above the sites extant consent. There would be a requirement to transport consumables via HGV.
- 6.7.3 Total HGV movements at the site would be managed so as to not exceed the numbers permitted by the extant permission. The applicant would accept a Condition to this effect to ensure that the proposed facility would not result in any increased HGV movement on site.
- 6.7.4 Therefore, it is anticipated that there would be no change to traffic flows to the site during the operation phase. No effects on traffic and transport are therefore predicted during this phase.
- 6.8 Assessment of Decommissioning Effects
- 6.8.1 The levels of traffic associated with decommissioning are anticipated to be similar to, or lower than, those required during construction. Such effects would be considered in accordance with relevant guidance at the time prior to decommissioning. At this stage, it is anticipated that effects would be similar to, or less than, those reported for the construction phase. Therefore, no significant effects are anticipated during decommissioning.

6.9 Assessment of Cumulative Effects

- 6.9.1 A review of proposed or possible future third party projects that may have a cumulative impact with the development proposals has been undertaken and used to inform this assessment. The projects identified are set out in Appendix 4.4 of this ES.
- 6.9.2 In relation to traffic and transport, the following developments have been identified as having the potential to impact cumulatively with the proposed 3Rs facility and have therefore been examined as part of the assessment:
 - Brookhurst Wood landfill site (development of a materials recycling facility, anaerobic digestion plant and extension to existing landfill site);
 - Land south of Brookhurst Wood landfill site (mechanical biological treatment);
 - Land west of Brookhurst Wood landfill site (proposed facility for compaction and baling of Refuse Derived Fuel);
 - Green's Accident Repair Centre, Horsham (parking and storage of vehicles, plant and equipment);
 - Land north of Horsham (proposed mixed use strategic development, including up to 2,750 dwellings, business park, retail, community centre, leisure facilities, education facilities and public open space);
 - Land west of Bewbush (Kilnwood Vale) (proposed construction of 2,500 dwellings);

- Land north of Old Guildford Road, Broadbridge Heath (construction of up to 165 dwellings, including affordable housing, care home, staff accommodation and open space);
- Land south of Broadbridge Heath (Construction of 963 residential units, community facility including land for primary school, neighbourhood centre, youth and recreational facilities, open space, eastwest link road, improvements to Five Oaks roundabout, realignment and partial closure of A264 Broadbridge Heath bypass); and
- Land west of Southwater (Construction of up to 540 dwellings and 54 retirement apartments).
- 6.9.3 In relation to the surrounding roads and highways, the Brookhurst Wood landfill site already generates vehicle movements (included within the baseline) and these would not change with the proposed development at the site, at the Brookhurst Wood mechanical biological treatment facility to the south or with the refuse derived fuel facility. There is therefore no need to take any different account of these in future year scenarios within this assessment.
- 6.9.4 It is understood from the application made for the Green's Accident Repair Centre that vehicle movements would be similar to its former use and, therefore, there is no need to take any different account of these in future year scenarios within this assessment.
- 6.9.5 The Land north of Horsham proposed mix use development includes a mix of up to 2,750 homes and 500,000 square feet of office space, as well as extensive improvements to the road and rail network, including realigning the A264 and Langhurstwood Road. However, the proposals in this location will be built out over a 15 year period with phasing from east to west meaning that the areas in proximity to the proposed 3Rs facility is likely to commence from the mid-2020s onwards.
- 6.9.6 Therefore, in the timescales for which the construction phase for the 3Rs facility is likely to be completed, there would be no alterations to the A624 and Langhurstwood Road. The traffic flows generated from the operational phase of the 3Rs facility would not increase over and above the extant consent and, therefore, the proposed 3Rs facility would not contribute to any cumulative effect during this phase.
- 6.9.7 Proposed development west of Bewbush (also known as Kilnwood Vale) has consent and will eventually deliver up to 2,500 dwellings. This proposal is now under construction. It is located some 6 km to the east of the proposed 3Rs facility. The site is located such that all traffic that it generates will have dispersed through the network by the time it enters the study area for this assessment. Combined with the low traffic flows that it will generate during the future year being considered for this assessment (i.e. the predicted year of construction for the 3Rs facility), it is considered that any changes in traffic flows within the study area for this assessment would be negligible such that significant cumulative effects are not likely.
- 6.9.8 Land to the north of Old Guildford Road, Broadbridge Heath, has planning consent for 165 dwellings and conditions are currently being discharged. It is located some 3 km south of the study area for this assessment. The traffic flows that would be generated by the site during the future year being considered for this assessment (i.e. the predicted year of construction for the 3Rs facility) would be low. The site is located such that its traffic will have dispersed through the network by the time it enters the study area for this assessment. It is therefore considered that any changes in traffic flows would be negligible such that significant cumulative effects are not likely.
- 6.9.9 Land to the south of Broadbridge Heath has consent for 963 dwellings plus associated infrastructure and is now under construction. It is located some 4 km south of the study area for this assessment. The site is located such that all traffic that it generates will have dispersed through the network by the time it enters the study area for this assessment. Combined with the low traffic flows that it will generate during the future year being considered (i.e. the predicted year of construction for the 3Rs facility), it is considered that any changes in traffic flows within the study area would be negligible such that significant cumulative effects are not likely.
- 6.9.10 Land west of Southwater has consent for 540 dwellings plus associated infrastructure. It is located some 7 km south of the study area. The site is located such that all traffic that it generates will have dispersed through the network by the time it enters the study area for this assessment. Combined with the low traffic flows that it will generate during the future year being considered for this assessment (i.e. the predicted year of construction for the 3Rs facility), it is considered that any changes in traffic flows within the study area would be negligible such that significant cumulative effects are not likely.

6.10 Inter-relationships

6.10.1 There is an inter-relationship with this chapter and the Chapters 7 and 8 in so far as these two chapters consider the air quality and noise/vibration effects of traffic. The traffic flows set out above have been made available and these two chapters have utilised these as part of their assessments and are therefore fully consistent with the above. Landscape and visual effects are considered in Chapter 5 of this ES.

6.11 Further Mitigation Measures

6.11.1 As set out in Section 6.5, a Construction Traffic Management Plan is proposed as part of the construction phase. In addition, a Construction Environmental Management Plan will be provided. Given the conclusions of the assessment, there is no requirement for any additional mitigation for traffic and transport.

6.12 Monitoring and Management Strategies

- 6.12.1 The Construction Traffic Management Plan and Construction Environmental Management Plan will include a range of management measures to minimise any effect of construction traffic.
- 6.13 Residual Effects
- 6.13.1 Table 6.25 summarises the significance of effects for the construction and the operational phases for the project taking into account the mitigation measures incorporated into the proposed 3Rs facility.

Parameter	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Construction Phas	e		•	•		•			
Road users along route (A264)	Negligible	Increase in traffic flows	Medium term	Negligible	Negligible	Construction Traffic Management	Negligible	Negligible	Not significant
Road users along route	Medium / High	Increase in traffic flows	Medium term	Negligible	Negligible to minor	Plan	Negligible	Negligible / minor	Not significant
(Langhurstwood Road)		Visual Effects	Medium term	Negligible	Negligible to minor		Negligible	Negligible / minor	Not significant
		Severance	Medium term	Negligible	Negligible to minor		Negligible	Negligible / minor	Not significant
		Driver Delay	Medium term	Negligible	Negligible to minor		Negligible	Negligible / minor	Not significant
		Pedestrian Delay	Medium term	Negligible	Negligible to minor		Negligible	Negligible / minor	Not significant
		Pedestrian Amenity	Medium term	Low / Medium	Minor to Moderate		Low / Medium	Minor / Moderate	Not significant
		Accidents and Safety	Medium term	Negligible	Negligible to minor		Negligible	Negligible / minor	Not significant
		Hazardous Loads	Medium term	Negligible	Negligible to minor		Negligible	Negligible / minor	Not significant
		Dust and Dirt	Medium term	Negligible	Negligible to minor		Negligible	Negligible / minor	Not significant
Operational Phase									
Road users along route (A264 and Langhurstwood Road)	Medium / High	Traffic flows	Long term	Negligible	Negligible		Negligible	Negligible	Not significant

Table 6.25: Summary of Likely Environmental Effects on Traffic and Transport

6.14 Conclusions

- 6.14.1 This chapter of the ES presents the assessment of the likely effects of the traffic generated by the proposed 3Rs facility. It has assessed the effects of the traffic generated during its construction phase and considered the cumulative effects with other known developments in the area.
- 6.14.2 The local roads have been characterised within and around the site through the evaluation of traffic survey data and studies. The assessments undertaken have considered the change in traffic flows along the road network as a result of the construction of the facility. The assessments have been made relative to the baseline conditions, which mean that roads with small baseline traffic volumes have larger magnitudes of impact from changes in traffic in comparison to those with larger baseline traffic volumes.
- 6.14.3 Effects on the A264 are considered to be negligible, given the low predicted percentage changes in traffic flow on that route arising from the construction phase. Due to the lower baseline flows, predicted changes in flow on Langhurstwood are higher. Therefore, an assessment of the environmental effects of these changes has been undertaken, including visual effects, severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety, hazardous loads and dust and dirt.
- 6.14.4 Construction phase effects would be managed through a Construction Environmental Management Plan and a Construction Traffic Management Plan. With such measures in place, no significant effects have been identified. Consideration of other proposed developments in the area has not identified the potential for the construction of the 3Rs facility to contribute to any significant cumulative effect.
- 6.14.5 No operational phase effects are anticipated as predicted traffic flows associated with the operation of the 3Rs facility would be no greater than traffic flows associated with the existing consent at the site.

6.15 References

Department for Communities and Local Government (DCLG) (2012) National Planning Policy Framework.

Department for Communities and Local Government (DCLG) (2014a) National Planning Policy for Waste.

Department of Energy and Climate Change (2011) Overarching National Policy Statement for Energy (EN-1).

Horsham District Council (2015) Horsham District Planning Framework (excluding South Downs National Park).

Highways Agency, The Scottish Office Development Department, The Welsh Office and The Department of the Environment for Northern Ireland (1997) Design Manual for Road and Bridges (DMRB), Volume 5, Section 1, Part 3, TA46/97 'Traffic Flow Ranges for use in the Assessment of New Rural Roads'.

Highways Agency, Transport Scotland, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2008) Assessment and Management of Environmental Effects. Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08.

IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction.

IEMA (1993) Guidance Note Number 1: Guidelines on the Environmental Assessment of Road Traffic. The Institute of Environmental Assessment (now IEMA), 1993.

West Sussex County Council and South Downs National Park Authority (2014) West Sussex Waste Local Plan. April 2014.

7 Air Quality and Odour

7.1 Introduction

7.1.1 This chapter summarises the assessment of air quality and odour effects associated with the proposed Recycling, Recovery and Renewable Energy (3Rs) Facility at Langhurstwood Road, Horsham, West Sussex.

Scope of Study

- 7.1.2 The potential air quality effects from the construction and operation of the proposed facility are considered to be:
 - Construction effects potential dust effects from construction activities; emissions from plant
 associated with on-site construction and potential effects associated with emissions from
 construction vehicles on the local road network;
 - Operational effects (from facility) potential air quality effects from the thermal treatment stack; potential fugitive dust, odour and bio-aerosol effects; and
 - Operational effects (from traffic): potential air quality effects from changes in traffic flow characteristics on the local road network associated with the operation of the proposed facility.
- 7.1.3 During construction, predicted traffic flows would be below the relevant indicative criteria set by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) for determining when an air quality assessment is required. Therefore, an assessment of construction phase emissions from traffic has been scoped out of the assessment. Further details are provided in Section 7.3 of this chapter.
- 7.1.4 As the Heavy Goods Vehicle (HGV) movements associated with the operational phase of the 3Rs Facility would be no greater than those associated with the existing consent at the site, an assessment of operational phase emissions from traffic has been scoped out of the assessment.
- 7.1.5 Bio-aerosol emissions during the operational phase are not expected to be significant and are not considered further within this assessment. Details are provided in Section 7.3.

Study Area

- 7.1.6 The study area for the assessment differs for the construction and operational phases. The study areas in each case are described in detail within the methodology that follows, referencing the relevant guidance documents.
- 7.2 Legislation and Policy Context
- 7.2.1 This section summarises relevant legislation and policies that are relevant to air quality and odour issues.Legislation

Industrial Emissions Directive Limits

7.2.2 The plant would be designed and operated in accordance with the requirements of the Industrial Emissions Directive (2010/75/EU), known hereafter as the IED, which requires adherence to emission limits for a range of pollutants.

- 7.2.3 Emission limits in the IED are specified in the form of half-hourly mean concentrations; daily-mean concentrations; mean concentrations over a period of between 30 minutes and 8 hours; or, for dioxins and furans, mean concentrations evaluated over a period of between 6 and 8 hours.
- 7.2.4 For the purposes of this assessment for those pollutants having only one emission limit (for a single averaging period), the facility has been assumed to operate at that limit. Where more than one limit exists for a pollutant, the half-hourly mean emission concentration limit has been used to calculate short-term (less than 24 hour average) peak ground-level concentrations (Scenario 1). The daily mean emission concentration limit has been used for these pollutants to calculate long-term (greater than 24-hour average) mean ground-level concentrations (Scenario 2). The IED emission limit values are provided in Table 7.1.

Pollutant	Scenario 1 Short-Term Emission Limits (mg.Nm ⁻³)	Scenario 2 Daily-Mean Emission Limits (mg.Nm ⁻ ³)
Particles	30	10
Hydrogen chloride (HCl)	60	10
Hydrogen fluoride (HF)	4	1
Sulphur dioxide (SO ₂)	200	50
Nitrogen oxides (NO _{x)}	400	200
Carbon monoxide (CO)	-	50
Group 1 metals ^(a)	-	0.05 ^(d)
Group 2 metals ^(b)	-	0.05 ^(d)
Group 3 metals (c)	-	0.5 ^(d)
Dioxins and furans	_	0.0000001 ^(e)

Table 7.1: Relevant Industrial Emission Directive Limit Values

Notes: All concentrations referenced to temperature 273 K, pressure 101.3 kPa, 11% oxygen, dry gas.

(a) Cadmium (Cd) and thallium (Tl).

(b) Mercury (Hg).

- (c) Antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni), and vanadium (V).
- (d) All average values over a sample period of a minimum of 30 minutes and a maximum of 8 hours.

(e) Average values over a sample period of a minimum of 6 hours and a maximum of 8 hours. The emission limit value refers to the total concentration of dioxins and furans calculated using the concept of toxic equivalence (TEQ).

Environmental Permitting Regulations

- 7.2.5 EU Directive 96/61/EC concerning Integrated Pollution Prevention and Control ("the IPPC Directive") applies an integrated environmental approach to the regulation of certain industrial activities. The Environmental Permitting Regulations 2016 implement the IPPC Directive relating to installations in England and Wales. The Regulations define activities that require an Environmental Permit from the Environment Agency.
- 7.2.6 Environmental permitting is a regulatory system that employs an integrated approach to control the environmental impacts of certain listed industrial activities including the generation of energy from waste. The intention of the regulatory system is to ensure that Best Available Techniques (BAT), required by the IPPC Directive, are used to prevent or minimise the effects of an activity on the environment, having regard to the effects of emissions to air, land and water via a single permitting process.
- 7.2.7 To gain a permit, operators have to demonstrate in their applications, in a systematic way, that the techniques they are using or are proposing to use are the BAT for their installation and meet certain other requirements taking account of relevant local factors. The permitting process also places a duty on the regulating body to ensure that the requirements of the IED are included for permitted sites to which these apply.

- 7.2.8 The essence of BAT is that the techniques selected to protect the environment should achieve a high degree of protection of people and the environment taken as a whole. Indicative BAT standards are laid out in national guidance and, where relevant, should be applied unless a different standard can be justified for a particular installation. The Environment Agency is legally obliged to go beyond BAT requirements where European Union (EU) Air Quality Limit Values may be exceeded by an existing operator.
- 7.2.9 The Environment Agency online guidance entitled 'Environmental management guidance, Air emissions risk assessment for your environmental permit' (Environment Agency, 2016) sets out guidelines for air dispersion modelling. The assessment of air quality effects for the proposed development is consistent with this guidance.

Waste Framework Directive

- 7.2.10 Directive 2008/98/EC of the European Parliament and Council on Waste requires member states to ensure that waste is recovered or disposed of without harm to human health and the environment. It requires member states to impose certain obligations on all those dealing with waste at various stages. Operators of waste disposal and recovery facilities are required to obtain a permit, or register a permit exemption. Retention of the permit requires periodic inspections and documented evidence of the activities in respect of waste.
- 7.2.11 The Waste Framework Directive (WFD) requires member states to take appropriate measures to establish an integrated and adequate network of disposal installations. The WFD also promotes environmental protection by optimising the use of resources, promoting the recovery of waste over its disposal (the "waste hierarchy").
- 7.2.12 Annex I and II of the WFD provide lists of the operations which are deemed to be "disposal" and "recovery", respectively. The terms are mutually exclusive and an operation cannot be a disposal and recovery operation simultaneously. Where the operation is deemed to be a disposal operation, the permit will contain more extensive conditions than for a recovery operation.
- 7.2.13 The principal objective of a recovery operation is to ensure that the waste serves a useful purpose, replacing other substances which would have been used for that purpose. Where the combustion of waste is used to provide a source of energy, the operation is deemed to be a recovery operation.
- 7.2.14 The proposed development is deemed to be a recovery operation on the basis that the operation falls under the description of the first operation listed under Annex II:

"R 1 Use principally as a fuel or other means to generate energy"

7.2.15 The Environmental Permitting Regulations 2016 implement the WFD in the UK. As such, the Environment Agency is responsible for implementing the obligations set out in the WFD.

Ambient Air Quality Criteria

- 7.2.16 There are several EU Air Quality Directives and UK Air Quality Regulations that will apply to the operation of the proposed facility. These provide a series of statutory air quality limit values, target values and objectives for pollutants, emissions of which are regulated through the IED.
- 7.2.17 There are some pollutants regulated by the IED which do not have statutory air quality standards prescribed under current legislation. For these pollutants, a number of non-statutory air quality objectives and guidelines exist which have been applied within this assessment. The Environment Agency provides further assessment criteria in its online guidance.

The Ambient Air Quality Directive and Air Quality Standards Regulations

7.2.18 The 2008 Ambient Air Quality Directive (2008/50/EC) aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants; it sets legally binding concentrationbased limit values, as well as target values. There are also information and alert thresholds for reporting purposes. These are to be achieved for the main air pollutants: particulate matter (PM₁₀ and PM_{2.5}), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), ozone (O₃), carbon monoxide (CO), lead (Pb) and benzene. This Directive replaced most of the previous EU air quality legislation and in England was transposed into domestic law by the Air Quality Standards (England) Regulations 2010, which in addition incorporates the 4th Air Quality Daughter Directive (2004/107/EC) that sets targets for ambient air concentrations of certain toxic heavy metals (arsenic, cadmium and nickel) and polycyclic aromatic hydrocarbons (PAHs). Member states must comply with the limit values (which are legally binding on the Secretary of State) and the Government and devolved administrations operate various national ambient air quality monitoring networks to measure compliance and develop plans to meet the limit values. The statutory air quality limit values are listed in Table 7.2.

Pollutant	Averaging Period	Limit Values	Not to be Exceeded More Than
Nitrogen	1 hour	200 µ g.m ⁻³	18 times pcy
Dioxide (NO ₂)	Annual	40 µ g.m ⁻³	-
Particulate	24 hour	50 µ g.m ⁻³	35 times pcy
Matter (PM10)	Annual	40 µ g.m ⁻³	-
Particulate Matter (PM _{2.5})	Annual	25 µ g.m ⁻³	-
Carbon Monoxide	Maximum daily running 8 hour mean	10,000 µg.m ^{.3}	-
	15 minute	266 µg.m ⁻³	> 35 times pcy
Sulphur Dioxide	1 hour	350 µg.m ⁻³	> 24 times pcy
(002)	24 hour	125 µg.m ⁻³	> 3 times pcy
Lead	Annual	0.25 µg.m⁻³	-
Arsenic (As)	Annual ^(b)	0.006 µg.m ⁻³	-
Cadmium (Cd)	Annual ^(b)	0.005 µg.m ⁻³	-
Nickel (Ni)	Annual ^(b)	0.02 µg.m ⁻³	-

Table	7.2:	Statutory	' Air	Ouality	l imit	Values
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Non-Statutory Air Quality Objectives and Guidelines

- 7.2.19 The Environment Act 1995 established the requirement for the Government and the devolved administrations to produce a National Air Quality Strategy (AQS) for improving ambient air quality, the first being published in 1997 and having been revised several times since, with the latest published in 2007 (Defra, 2007). The Strategy sets UK air quality standards and objectives for the pollutants in the Air Quality Standards Regulations plus 1,3-butadiene and recognises that action at national, regional and local level may be needed, depending on the scale and nature of the air quality problem. There is no legal requirement to meet objectives set within the UK AQS except where equivalent limit values are set within the EU Directives.
- 7.2.20 Non-statutory air quality objectives and guidelines also exist within the World Health Organisation Guidelines (WHO, 2005) and the Expert Panel on Air Quality Standards Guidelines (EPAQS) (2006). The non-statutory objectives and guidelines are presented in Table 7.3.

Pollutant	Averaging Period	Guideline	Target Date
Particulate Matter (PM _{2.5})	Annual	Target of 15% reduction in concentrations at urban background locations	Between 2010 and 2020 (a)
	Annual	25 µg.m ⁻³	2020 (a)
PAHs (as B[a]P equivalent)	Annual (a)	0.00025 µ g.m ⁻³	-
Sulphur Dioxide (SO ₂)	Annual (b)	50 µg.m ⁻³	-
Hydrogen Chloride	1 hour (c)	750 µg.m ⁻³	-
Hydrogen Fluoride	1 hour (c)	160 µg.m ⁻³	-

Notes:

(a) Target date set in UK Air Quality Strategy 2007

(b) World Health Organisation Guidelines

(c) EPAQS recommended guideline values

Environmental Assessment Levels

- 7.2.21 The Environment Agency online guidance entitled '*Environmental management guidance, Air emissions risk assessment for your environmental permit*' (Environment Agency, 2016) provides further assessment criteria in the form of Environmental Assessment Levels (EALs).
- 7.2.22 Table 7.4 presents all available EALs for the pollutants relevant to this assessment.

 Table 7.4: Environmental Assessment Levels (EALs)

Pollutant	Long-term EAL, µg.m ⁻³	Short-term EAL, µg.m- ³
Nitrogen dioxide (NO2)	40 (a)	200
Carbon monoxide (CO)	-	10,000
Sulphur dioxide (SO2)	50	267
Particulates (PM10)	40 (a)	50
Particulates (PM _{2.5})	25	-
Hydrogen chloride (HCl)	-	750
Hydrogen fluoride (HF)	16 (monthly average)	160
Arsenic (As)	0.003	-
Antimony (Sb)	5	150
Cadmium (Cd)	0.005	-
Chromium (Cr)	5	150
Chromium VI ((oxidation state in	0.0002	-
the PM ₁₀ fraction)		
Cobalt (Co)	0.2 (a)	6 (a)
Copper (Cu)	10	200
Lead (Pb)	0.25	-
Manganese (Mn)	0.15	1500
Mercury (Hg)	0.25	7.5
Nickel (Ni)	0.02	-
Thallium (TI)	1 (a)	30 (a)
Vanadium (V)	5	1
PAHs (as B[a]P equivalent)	0.00025	-

Note: (a) EALs have been obtained from the Environment Agency earlier Horizontal Guidance Note EPR H1 guidance note (Environment Agency, 2010) as no levels are provided in the current guidance.

7.2.23 Table 7.5 presents available soil quality criteria and maximum deposition rates from the Environment Agency (2016) for the pollutants relevant to this assessment.

Table 7.5: Maximum Deposition Rates (from Environment Agency, 2016)

Pollutant	Maximum Deposition Rate (mg.m ⁻² .d ⁻¹)
Arsenic (As)	0.02
Cadmium (Cd)	0.009
Chromium (Cr)	1.5
Copper (Cu)	0.25
Lead (Pb)	1.1
Mercury (Hg)	0.004
Nickel (Ni)	0.11

7.2.24 Within the assessment, the statutory air quality limit and target values (as presented in Table 7.2) are assumed to take precedent over objectives, guidelines and the EALs. In addition, for those pollutants which do not have any statutory air quality standards, the assessment assumes the lower of either the EAL or the non-statutory air quality objective or guideline where they exist.

National Policy and Guidance

National Planning Policy Framework (2012)

- 7.2.25 The National Planning Policy Framework (NPPF) (DCLG, 2012) is a material consideration for local planning authorities and decision-takers in determining applications. At the heart of the NPPF is a presumption in favour of sustainable development. For determining planning applications, this means approving development proposals if they accord with the local development plan, unless material considerations indicate otherwise. If the development plan is absent, silent or the policies are out of date, then planning permission should be granted unless any adverse impacts would significantly outweigh the benefits, or specific policies in the NPPF indicate development should be restricted.
- 7.2.26 The NPPF sets out 12 core land-use planning principles. The relevant core-principle in the context of this air quality assessment is that planning should *"contribute to conserving and enhancing the natural environment and reducing pollution"*. (Paragraph 17)
- 7.2.27 Under the heading 'Conserving and Enhancing the Natural Environment', the NPPF states that:

"The planning system should contribute to and enhance the natural and local environment by:

preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability... (Paragraph 109)

National Planning Policy for Waste

7.2.28 The National Planning Policy for Waste (DCLG, 2014a) specifically refers to emissions to air, including dust, in the criteria for selecting a suitable site for a waste facility. It states that:

"Considerations will include the proximity of sensitive receptors, including ecological as well as human receptors, and the extent to which adverse emissions can be controlled through the use of appropriate and well-maintained and managed equipment and vehicles."

Planning Practice Guidance Air Quality

- 7.2.29 The National Planning Practice Guidance (NPPG) was issued on-line on 6th March 2014 (DCLG, 2014b) and is periodically updated by Government. The Air Quality section of the NPPG describes the circumstances when air quality, odour and dust can be a planning concern, requiring assessment.
- 7.2.30 The NPPG advises that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).
- 7.2.31 The NPPG states that when deciding whether air quality is relevant to a planning application, considerations could include whether the development would:

"Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.

Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area;

Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.

Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.

Affect biodiversity. In particular, is it likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites."

7.2.32 The NPPG provides advice on how air quality impacts can be mitigated:

"Mitigation options where necessary will be locationally specific, will depend on the proposed development and should be proportionate to the likely impact. It is important therefore that local planning authorities work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met."

Development Plan Policy

West Sussex Waste Local Plan

7.2.33 Policy W16: Air, Soil, and Water of the West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2014) states that:

"Proposals for waste development will be permitted provided that:

(a) there are no unacceptable impacts on the intrinsic quality of, and where appropriate the quantity of, air, soil, and water resources (including ground, surface, transitional, and coastal

waters);

(b) there are no unacceptable impacts on the management and protection of such resources, including any adverse impacts on Air Quality Management Areas and Source Protection Zones;

(c) the quality of rivers and other watercourses is protected and, where possible, enhanced (including within built-up areas); and

(d) they are not located in areas subject to land instability, unless problems can be satisfactorily resolved."

Horsham District Planning Framework

7.2.34 The key policy of the Horsham District Planning Framework (Horsham District Council, 2015) relevant to this assessment is Policy 24: Environmental Protection which states that:

"The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution and ensure that they:

1. Address land contamination by promoting the appropriate re-use of sites and requiring the delivery of appropriate remediation;

2. Are appropriate to their location, taking account of ground conditions and land instability;

3. Maintain or improve the environmental quality of any watercourses, groundwater and drinking water supplies, and prevents contaminated run-off to surface water sewers;

4. Minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment;

5. Contribute to the implementation of local Air Quality Action Plans and do not conflict with its objectives;

6. Maintain or reduce the number of people exposed to poor air quality including odour. Consideration should be given to development that will result in new public exposure, particularly where vulnerable people (e.g. the elderly, care homes or schools) would be exposed to the areas of poor air quality; and

7. Ensure that the cumulative impact of all relevant committed developments is appropriately assessed."

7.3 Assessment Methodology

Consultation

- 7.3.1 In carrying out the air quality and odour assessment, consultation has included a formal request for a scoping opinion. The issues raised through the consultation that are relevant to air quality and odour are summarised in Table 7.6 below.
- 7.3.2 A full copy of the Scoping Opinion is contained in Appendix 4.2.

Date/Source	Consultee and Issues Raised	How/ Where Addressed
October 2015/ Scoping Opinion	 West Sussex County Council – Demonstrate that emissions would not give rise to human health impacts. The impact of emissions from vehicles. Reference to control and monitoring required by the Environmental Permitting Process. In-combination impacts with user of adjacent site users including Brookhurst Wood landfill. Visibility of the plume. 	 The results of an assessment of human health impacts associated with stack emissions are provided in Section 7.7. During the construction phase, the number of vehicle movements generated by activities is below the threshold for assessment and the effects can be considered insignificant. This is explained in Section 7.3. During the operational phase, the impact of emissions from vehicles has not been assessed as there will be no change in HGV movements over and above the site's extant consent. The monitoring required by the Environmental Permitting Process is referenced in Section 7.13. In-combination impacts with user of adjacent site users including Brookhurst Wood landfill. Cumulative impacts are considered in Section 7.9. The summary of the results of the plume visibility is provided in Section 7.7.
Letter dated 23 November 2015 to West Sussex County Council	Gatwick Airport Limited – request for 'plume dispersal' modelling including any 'maximum projected heights for the emissions'.	The summary of the results of the plume visibility is provided in Section 7.7.
Letter dated 7 October 2016 to Vismundi Limited	Gatwick Airport Limited – Requested that when available <i>"we have sight of</i> <i>details of any emissions from the stack</i> <i>to ensure that there will be no impact</i> <i>on either aircraft or navigational aids."</i>	The summary of the results of the plume visibility is provided in Section 7.7. The detailed modelled output has been provided to Gatwick Airport Limited.
Regulation 22 Responses – West Sussex County	Inclusion of sensitive receptors within the Land North of Horsham development.	See Table 7.11, paragraph 7.9.3, Table 7.24, Appendix 7.5, Figure 7.3 and Figure 7.4.
Council Consideration of NO ₂ and PM ₁₀ background concentrations at Langhurstwood Road.		See Appendix 7.5: Predicted Concentrations at Discrete Sensitive Receptors.
		See Appendix 7.4, paragraph 7.4.14.
	Justification for the use of Lullington Heath as a source of data for informing the background SO ₂ concentrations. Further consideration of metals deposition.	Metal deposition rates at sensitive receptors have now been provided in Appendix 7.5: Predicted Concentrations and Metal Deposition Rates at Discrete Sensitive Receptors. For mercury, a more realistic emission rate has been obtained from the draft BAT Ref Doc on Waste incineration

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Table 7.6. Consultation	Responses	Relevant to A	Air Quality ar	nd Odour
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Assessment Methodology - Construction

- 7.3.3 Regarding exhaust emissions from construction-related vehicles (contractors' vehicles and HGVs, diggers, and other diesel-powered vehicles), these are unlikely to have a significant effect on local air quality except for large, long-term construction sites. The Environmental Protection UK (EPUK)/Institute of Air Quality Management (IAQM) (2015) Land-Use Planning & Development Control: Planning For Air Quality document indicates that vehicle emissions should be assessed where developments increase annual average daily Heavy Duty Vehicle (HDV) traffic flows by more than 100 and annual average daily Light Duty Vehicle (LDV) traffic flows by more than 500, outside an Air Quality Management Area (AQMA). The maximum predicted number of HDVs in any month of construction for the 3Rs Facility is 36 and the maximum predicted number of LDVs in any month of construction is 122. These traffic flows are below the indicative criteria and the EPUK/IAQM guidance continues by stating that *"If none of the criteria are met, then there should be no requirement to carry out an air quality assessment... and the impacts can be considered as having an insignificant effect".* As the aforementioned EPUK/IAQM thresholds are not expected to be exceeded during the construction phase of the project, the air quality effects from construction-vehicle exhaust emissions are not considered significant.
- 7.3.4 Dust is the generic term used to describe particulate matter in the size range 1-75 µm in diameter (BSI, 1983). Particles greater than 75 µm in diameter are termed grit rather than dust. Dusts can contain a wide range of particles of different sizes. The normal fate of suspended (i.e. airborne) dust is deposition. The rate of deposition depends largely on the size of the particle and its density; together these influence the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before it settles out onto a surface. In addition, some particles may agglomerate to become fewer, larger particles; whilst others react chemically.
- 7.3.5 The effects of dust are linked to particle size and two main categories are usually considered:
 - PM₁₀ particles, those up to 10 µm in diameter, remain suspended in the air for long periods and are small enough to be breathed in and so can potentially impact on health; and
 - Dust, generally considered to be particles larger than 10 µm which fall out of the air quite quickly and can soil surfaces (e.g. a car, window sill, laundry). Additionally, dust can potentially have adverse effects on vegetation and fauna at sensitive habitat sites.
- 7.3.6 The *IAQM 'Guidance on the assessment of dust from demolition and construction'* (IAQM, 2014a) sets out 350 metres as the distance from the site boundary and 50 metres from the site traffic route(s) up to 500 m of the entrance, within which there could potentially be nuisance dust and PM₁₀ effects on human receptors. These distances are set to be deliberately conservative.
- 7.3.7 Concentration-based limit values and objectives have been set for the PM₁₀ suspended particle fraction, but no statutory or official numerical air quality criterion for dust annoyance has been set at a UK, European or WHO level. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.
- 7.3.8 The IAQM dust guidance aims to estimate the impacts of both PM₁₀ and dust through a risk-based assessment procedure. The IAQM dust guidance document states that: *"The impacts depend on the mitigation measures adopted. Therefore the emphasis in this document is on classifying the risk of dust impacts from a site, which will then allow mitigation measures commensurate with that risk to be identified."*
- 7.3.9 The IAQM dust guidance provides a methodological framework, but notes that professional judgement is required to assess effects: "This is necessary, because the diverse range of projects that are likely to be subject to dust impact assessment means that it is not possible to be prescriptive as to how to assess the impacts. Also a wide range of factors affect the amount of dust that may arise, and these are not readily quantified."

- 7.3.10 Consistent with the recommendations in the IAQM dust guidance, a risk-based assessment has been undertaken for the development, using the well-established source-pathway-receptor approach. The dust impact (the change in dust levels attributable to the development activity) at a particular receptor will depend on the magnitude of the dust source and the effectiveness of the pathway (i.e. the route through the air) from source to receptor.
- 7.3.11 The effects of the dust are the results of these changes in dust levels on the exposed receptors, for example annoyance or adverse health effects. The effect experienced for a given exposure depends on the sensitivity of the particular receptor to dust. An assessment of the overall dust effect for the area as a whole has been made using professional judgement, taking into account both the change in dust levels (as indicated by the Dust Impact Risk for individual receptors) and the absolute dust levels, together with the sensitivities of local receptors and other relevant factors for the area.
- 7.3.12 The detail of the dust assessment methodology is provided in Appendix 7.1.
- 7.3.13 The dust risk categories that have been determined for each of the three activities (earthworks, construction and trackout) have been used to define the appropriate site-specific mitigation measures based on those described in the IAQM dust guidance. The guidance states that provided the mitigation measures are successfully implemented, the resultant effects of the dust exposure will normally be "not significant".

Assessment Methodology - Operation

Vehicle-related Emissions

7.3.14 There will be no change in HGV movements during the operational phase over and above the site's extant consent. On that basis, vehicle-related emissions have not been assessed.

Stack Emissions

Pollutant Concentrations

- 7.3.15 In urban areas, pollutant concentrations are primarily determined by the balance between pollutant emissions that increase concentrations, and the ability of the atmosphere to reduce and remove pollutants by dispersion, advection, reaction and deposition. An atmospheric dispersion model is used as a practical way to simulate these complex processes; such a model requires a range of input data, which can include emissions rates, meteorological data and local topographical information. The model used and the input data relevant to this assessment are described in the following sub-sections.
- 7.3.16 The atmospheric pollutant concentrations in an urban area depend not only on local sources at a street scale, but also on the background pollutant level made up of the local urban-wide background, together with regional pollution and pollution from more remote sources brought in on the incoming air mass. This background contribution needs to be added to the fraction from the modelled sources, and is usually obtained from measurements or estimates of urban background concentrations for the area in locations that are not directly affected by local emissions sources.

Dispersion Model Selection

7.3.17 A number of commercially available dispersion models are able to predict ground level concentrations arising from emissions to atmosphere from elevated point sources. Modelling for this study has been undertaken using ADMS 5, a version of the ADMS (Atmospheric Dispersion Modelling System) developed by Cambridge Environmental Research Consultants (CERC) that models a wide range of buoyant and passive releases to atmosphere either individually or in combination. The model calculates the mean concentration over flat terrain and also allows for the effect of plume rise, complex terrain, buildings and deposition. Dispersion models predict atmospheric concentrations within a set level of confidence and there can be variations in results between models under certain conditions; the ADMS 5 model has been formally validated and is widely used in the UK and internationally for regulatory purposes.

Model Inputs – Meteorological Data

- 7.3.18 For meteorological data to be suitable for dispersion modelling purposes, a number of meteorological parameters need to be measured on an hourly basis. These parameters include wind speed, wind direction, cloud cover and temperature. There are only a limited number of sites where the required meteorological measurements are made.
- 7.3.19 The year of meteorological data that is used for a modelling assessment can have a significant effect on source contribution concentrations. Dispersion model simulations have been performed using five years of data from Charlwood, near Gatwick between 2011 and 2015.
- 7.3.20 Wind roses have been produced for each of the years of meteorological data used in this assessment and are presented in Figure 7.1.

Model Inputs – Stack Parameters and Emissions

- 7.3.21 Flue gases are emitted from an elevated stack to allow dispersion and dilution of the residual combustion emissions. The stack needs to be of sufficient height to ensure that pollutant concentrations are acceptable by the time they reach ground level. The stack also needs to be high enough to ensure that releases are not within the aerodynamic influence of nearby buildings, or else wake effects can quickly bring the undiluted plume down to the ground.
- 7.3.22 A stack height determination has been undertaken to establish the height at which there is minimal additional environmental benefit associated with the cost of further increasing the stack. The Environment Agency removed their detailed guidance, Horizontal Guidance Note EPR H1 (Environment Agency, 2010), for undertaking risk assessments on 1 February 2016; however, the approach used here is consistent with that guidance which required the identification of *"an option that gives acceptable environmental performance but balances costs and benefits of implementing it."*
- 7.3.23 The stack height determination has focused on identifying the stack height required to overcome the wake effects of nearby buildings. This involved running a series of atmospheric dispersion modelling simulations to predict the ground-level concentrations with the stack at different heights, starting at 50 metres and extending up in 5 metre increments, until a height of 100 metres was reached. The results of the stack height determination are provided in Appendix 7.2. The stack height determination indicated a 95 m stack height was appropriate.
- 7.3.24 Stack emissions characteristics modelled are provided in Table 7.7 and the mass emissions are provided in Table 7.8.

Parameter	Unit	Value
Stack height	m	95
Stack location	Х, У	517183,134337
Internal diameter	m	2
Efflux velocity	M.S⁻¹	21.2
Efflux temperature	٥C	140
Actual volumetric flow	Am ³ .s ⁻¹	66.4
Moisture content	%	14
Oxygen content (dry)	%	8.2
Normalised volumetric flow (11% O ₂ , 0°C, dry)	Am ³ .s ⁻¹	48.4

Table 7.7: Stack Characteristics

Table 7.8: Mass Emissions

Substance	Short-Term Mass Emission (g.s ⁻¹)	Long-Term(a) Mass Emission (g.s ^{.1})
Particles	1.5	0.5
HCI	2.9	0.5
HF	0.2	0.05
SO ₂	9.7	2.4
NOx	19.4	9.7
СО	4.8	2.4
Group 1 Metals Total (b)	-	0.002
Group 2 Metals ^(c)	-	0.002
Group 3 Metals Total ^(d)	-	0.024
Dioxins and furans	_	4.8 E-09
PCBs	_	2.4 E-04
PAHs – B[a]P	-	4.8 E-04

Notes:

(a) For averaging periods of 24 hours or greater.

(b) Cadmium (Cd) and thallium (Tl).

- (c) Mercury (Hg)
- 7.3.25 Emission limits in the IED are provided for total particles. For the purposes of this assessment, all particles are assumed to be less than 10 μ m in diameter (i.e. PM₁₀). Furthermore, all particles are also assumed to be less than 2.5 μ m in diameter (i.e. PM₂₅). In reality, the PM₁₀ and PM₂₅ concentrations will be a smaller proportion of the total particulate emissions and the PM₂₅ concentration will be a smaller proportion of the likely particulate emissions in each size fraction.

Model Inputs – Terrain

7.3.26 The presence of elevated terrain can significantly affect (usually increase) ground level concentrations of pollutants emitted from elevated sources such as stacks, by reducing the distance between the plume centre line and ground level and by increasing turbulence and, hence, plume mixing. A complex terrain file has been used within the model.

Model Inputs – Surface Roughness

- 7.3.27 The roughness of the terrain over which a plume passes can have a significant effect on dispersion by altering the velocity profile with height, and the degree of atmospheric turbulence. This is accounted for by a parameter called the surface roughness length.
- 7.3.28 A surface roughness length of 0.5 m has been used within the model to represent the average surface characteristics across the study area.

Model Inputs – Building Wake Effects

7.3.29 The movement of air over and around buildings generates areas of flow circulation, which can lead to increased ground level concentrations in the building wakes. Where building heights are greater than about 30 - 40% of the stack height, downwash effects can be significant. The buildings would be covered by a curved roof. Therefore, neighbouring buildings have been grouped together and modelled using the greatest height. The dominant structures (i.e. with the greatest dimensions likely to promote turbulence) included within the model are listed in Table 7.9.

Table 7 0. Dimensiona	of Duildingo	Included Within	the Dian	arolon	Madal
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	Ji Dununigo		the bisp	01011	1100001

	Approx Ce Location	entre		Length (m) /		
Name	X (m)	Y (m)	Height (m)	Diameter (m)	Width (m)	Angle (Degrees)
Boiler Hall	517113	134340	28.9	61	31	90
Turbine Hall/Waste Water Treatment/Compressed Air and Electrical	517118	134305	25.9	51	38	180
Air Cooled Condensers	517160	134321	25.9	69	33	90
Tipping Hall/Bunker/Waste Processing Hall	517058	134339	32.4	89	69	90

Notes: As set above, in some cases neighbouring buildings have been grouped. The table above provides details of the structures that have been modelled and are a reasonable representation of the actual building layout.

Model Outputs – Receptors

7.3.30 The air quality assessment predicts the impacts at locations that could be sensitive to any changes. Such sensitive receptors should be selected where the public is regularly present and likely to be exposed over the averaging period of the objective. LAQM.TG16 (Defra, 2016) provides examples of exposure locations and these are summarised in Table 7.10.

Table 7.10: Example of Where Air	r Quality Objectives Apply
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Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual-mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades or offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the buildings façades), or any other location where public exposure is expected to be short- term.
24-hour mean	All locations where the annual-mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expect to be short-term.
1-hour mean	All locations where the annual and 24-hour mean would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access

7.3.31 The modelling has predicted ground-level concentrations over a grid of 10 km by 10 km, with 100 metre spacing and a grid of 3 km by 3 km, with 30 metre spacing. The grid was centred on the facility stack.

7.3.32 In addition, ground-level concentrations have been modelled at discrete sensitive receptors, selected at representative properties where pollutant concentrations and/or changes in pollutant concentrations are anticipated to be greatest. All such human receptors have been modelled at a height of 1.5 metres, representative of typical head height. The locations of these discrete receptors are listed in Table 7.11 and illustrated in Figure 7.2. In addition, a sensitive receptor within the consented Land at North Horsham development (P10) has been modelled and the receptor at which the greatest impact was predicted in the air quality assessment for the North Horsham development (R4).

Receptor name	X(m)	Y(m)
Station Road 1	517026	133939
Langhurstwood Road 1	517390	134218
Cox Farm	516692	134709
Station Road 2	516539	134061
Langhurstwood Road 2	517422	134569
Langhurstwood Road 3	517491	134043
P10	518981	133573
R4	518942	133347

Table 7.11: Modelled Sensitive Receptors

Model Outputs – NOx to NO₂ Conversion

- 7.3.33 The NOx emissions will typically comprise approximately 90-95% nitrogen monoxide (NO) and 5-10% nitrogen dioxide (NO₂) at the point of release. The NO oxidises in the atmosphere in the presence of sunlight, ozone and volatile organic compounds to form NO₂, which is the principal concern in terms of environmental health effects.
- 7.3.34 There are various techniques available for estimating the proportion of NO_X converted to NO_2 by the time it has reached receptors. The methods used in this assessment are discussed below.

Model Outputs – NOx to NO₂ Assumptions for Annual-Mean Calculations

- 7.3.35 Total conversion (i.e. 100%) of NO to NO₂ is sometimes used for the estimation of the absolute upper limit of the annual mean NO₂. This technique is based on the assumption that all NO emitted is converted to NO₂ before it reaches ground level. However, in reality the conversion is an equilibrium reaction and even at ambient concentrations a proportion of NO_x remains in the form of NO. Total conversion is, therefore, an unrealistic assumption, particularly in the near field (Environment Agency, 2007). While this approach is useful for screening assessments, it is not appropriate for detailed assessments.
- 7.3.36 Historically, the Environment Agency has recommended that for a 'worst case scenario', a 70% conversion of NO to NO₂ should be considered for calculation of annual average concentrations. If a breach of the annual average NO₂ objective/limit value occurs, the Environment Agency requires a more detailed assessment to be carried out with operators asked to justify the use of percentages lower than 70%.
- 7.3.37 Following the withdrawal of the Environment Agency's H1 guidance document, there is no longer an explicit recommendation; however, for the purposes of this detailed assessment, a 70% conversion of NO to NO₂ has been assumed for annual average NO₂ concentrations in line with the Environment Agency's historic recommendations.

Model Outputs – NOx to NO₂ Assumptions for Hourly-Mean Calculations

7.3.38 An assumed conversion of 35% follows the Environment Agency's recommendations (Environment Agency, undated) for the calculation of 'worst case scenario' short-term NO₂ concentrations.

Modelling of Long-term and Short-term Emissions

7.3.39 For pollutants where the objective or limit value is measured over a short averaging period (i.e. less than one year), percentiles have been modelled. For instance, the short-term objective for NO₂ is that the hourly-mean concentration should not exceed 200 µg.m⁻³ more than 18 times per calendar year. As there are 8,760 hours in a non-leap year, the hourly-mean concentration would need to be below 200 µg.m⁻³ in 8,742 hours, i.e. 99.79% of the time. Therefore, the 99.79th percentile of hourly NO₂ has been modelled.

Significance Criteria

7.3.40 The online Environment Agency guidance is for risk assessments and provides details for screening out substances for detailed assessment. In particular, it states that:

"To screen out a PC for any substance so that you don't need to do any further assessment of it, the PC must meet both of the following criteria:

- the short-term PC is less than 10% of the short-term environmental standard
- the long-term PC is less than 1% of the long-term environmental standard

If you meet both of these criteria you don't need to do any further assessment of the substance.

If you don't meet them you need to carry out a second stage of screening to determine the impact of the PEC."

7.3.41 The PEC refers to the Predicted Environmental Concentration calculated as the Process Contribution (PC) added to the ambient concentration. The online Environment Agency guidance continues by stating that:

"You must do detailed modelling for any PECs not screened out as insignificant."

- 7.3.42 It then states that further action may be required where:
 - "your PCs could cause a PEC to exceed an environmental standard (unless the PC is very small compared to other contributors if you think this is the case contact the Environment Agency)
 - the PEC is already exceeding an environmental standard"
- 7.3.43 On that basis:
 - The effects are not considered significant if the short-term PC is less than 10% of the short-term Environmental Assessment Level (EAL);
 - The effects are not considered significant if the long-term PC is less than 1% of the long-term EAL; and
 - The effects are not considered significant if the PEC is below the EAL.

For the purposes of this assessment, effects that are not considered significant are described as negligible.

Plume Visibility

- 7.3.44 Visible plumes can arise when hot, wet exhaust gases are cooled to ambient temperature, resulting in the condensation of water vapour and a white plume. The extent of the plume is dependent on the volumetric flow rate of gases from the source, the amount of water vapour in the cooled gases, the relative humidity of the atmosphere and the extent of plume dispersion in the atmosphere.
- 7.3.45 It is often desirable to recover heat from the exhaust gases for useful energy, rather than rejecting this to the atmosphere. However, issues arise with regard to corrosion once the dew point of the acid gas is reached (at any point in the cooling system) and in resolving a disposal route for the condensed water. There is, therefore, a trade-off between the amount of heat that can be usefully recovered from the exhaust gas stream and the heat required to avoid condensation under all atmospheric conditions.
- 7.3.46 The likely incidence and dimensions of a visible plume emitted from the proposed stack has been predicted using the ADMS 5 plume visibility module, based on an initial mixing ratio of the plume of 0.102 kg.kg⁻¹ (mass of H₂O). Modelling has been undertaken using five years of hourly sequential meteorological data. Resultant data have been used to determine:
 - The amount of time that the length of the plume may exceed the average distance to the site boundary; and
 - The number of plumes that exceed the average distance to the site boundary during daylight hours.
- 7.3.47 The Environment Agency no longer provides guidance to determine the significance of plume visibility effects. The historic Horizontal Guidance Note IPPC H1, Environmental Assessment and Appraisal of BAT (Environment Agency *et al.*, 2003) provided a method of quantifying the impact of a plume. This scale is reproduced in Table 7.12.

Impact	Quantitative Description				
Zero	No visible impacts resulting from operation of process.				
Insignificant	ant Regular small impact from operation of process.				
	Plume length exceeds boundary <5% of daylight hours per year.				
	No local sensitive receptors.				
Low	Regular small impact from operation of process.				
	Plume length exceeds boundary <5% of daylight hours per year.				
	Sensitive local receptors.				
Medium	Regular large impact from operation of process.				
	Plume length exceeds boundary >5% of daylight hours per year.				
	Sensitive local receptors.				
High	Continuous large impact from operation of process.				
-	Plume length exceeds boundary >25% of daylight hours per year with obscuration.				
	Local sensitive receptors.				

Table 7.12: Plume Visibility Impact Descriptors

7.3.48 The plume visibility has been assessed using these impact descriptors. The guidance continues by stating that *"Conditions that result in medium or lower impacts can be considered acceptable"*. On that basis, the effects are not considered significant.

Fugitive Dust Emissions

7.3.49 There is no formal methodology for assessing the risk of dust impacts from the operation of the facility. The risk of dust impacts has been considered qualitatively using a source-pathway-receptor conceptual model.

Odour Emissions

7.3.50 A qualitative predictive assessment of the potential for odour impact has been carried out using the sourcepathway-receptor concept. This approach considers the emission source, the presence of odour controls (both engineering controls and odour management procedures and with the assumption that regulators will properly and effectively enforce these), the prevailing wind direction relative to the locations and distances of the proposed receptors, and their sensitivity to the type of odour in question. This qualitative assessment follows the method in the IAQM (2014b) '*Guidance on the assessment of odour for planning'*. This is described in more detail in Appendix 7.3.

Bioaerosol Emissions

7.3.51 The feedstock is likely to be significantly biologically active only if it contains putrescible material (e.g. rotting food) and exposure is likely to occur only if the material is subject to an activity that creates airborne particles, for example shredding. However, any putrescible material in the feedstock for the facility is unlikely to be in an advanced state of decomposition by the time it reaches the shredding stage. On this basis, bioaerosol emissions are not expected to be significant and are not considered further within this assessment.

7.4 Baseline Conditions

- 7.4.1 The background concentration often represents a large proportion of the total pollution concentration, so it is important that the background concentration selected for the assessment is realistic. National Planning Practice Guidance and EPUK/IAQM guidance highlight public information from the Department for Environment, Food, and Rural Affairs (Defra) and local monitoring studies as potential sources of information on background air quality. LAQM.TG16 (Defra, 2016) recommends that Defra mapped concentration estimates are used to inform background concentrations in air quality modelling and states that: *"Where appropriate these data can be supplemented by and compared with local measurements of background, although care should be exercised to ensure that the monitoring site is representative of background air quality"*.
- 7.4.2 Monitors at urban background locations measure concentrations away from the local influence of emission sources and are therefore broadly representative of residential areas within large conurbations. Monitoring at local urban background locations is considered an appropriate source of data for the purposes of describing baseline air quality for the proposed development site.
- 7.4.3 For this assessment, the background air quality has been characterised by drawing on information from the following public sources:
 - Defra maps, which show estimated pollutant concentrations across the UK in 1 km grid squares;
 - Published results of local authority Review and Assessment studies of air quality and Horsham monitoring; and
 - Results published by national monitoring networks.
- 7.4.4 A detailed description of how the baseline air quality has been derived for the proposed development is provided in Appendix 7.4. The background concentrations used in the assessment are set out in Table 7.13.

Table 7.13: Summary	of Assumed Background Concentrations
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Pollutant	Long-term	Short-term ^(a)	Data Source
Nitrogen dioxide (NO ₂)	11.9 µg.m ⁻³	23.8 µ g.m ⁻³	Defra mapped
Carbon monoxide (CO)	250 µ g.m ⁻³	500 µ g.m ⁻³	Defra mapped
Particulates (PM10)	24.0 µ g.m ⁻³	-	Monitored (Horsham Park Way)
Particulates (PM _{2.5})	11.0 µ g.m ⁻³	-	Defra mapped
Sulphur dioxide (SO ₂)	1.57 µ g.m ⁻³	3.14 µ g.m ⁻³	Monitored (Lullington Heath)
Hydrogen chloride (HCl)	0.39 µ g.m ⁻³	-	Monitored (Barcombe Mills)
Hydrogen fluoride (HF)	2.46 µg.m ^{-3 (b)}	2.46 µ g.m ⁻³	EPAQS 2006
Arsenic (As)	0.99 ng.m ⁻³	-	
Cadmium (Cd)	0.25 ng.m ⁻³	-	
Chromium (Cr)	4.30 ng.m ⁻³	-	
Copper (Cu)	15.53 ng.m ⁻³	-	
Lead (Pb)	11.24 ng.m ⁻³	-	Monitorod (Load and Multi alamonts Natwork
Manganese (Mn)	5.69 ng.m ⁻³	-	Maximum Values)
Mercury (Hg)	2.47 ng.m ⁻³	-	
Nickel (Ni)	0.88 ng.m ⁻³	-	
Vanadium (V)	1.0 ng.m ⁻³	-	
Cobalt (Co)	0.12 ng.m ⁻³		
Antimony (Sb)	-	-	No local monitoring data available
Thallium (TI)	-	-	NU IUCAI MULIIULII IY UALA AVAIIADIE
PAHs	0.23 ng.m ⁻³		Monitored (PAH Network)
PCBs	64.4 pg.m ⁻³		
Dioxins and Furans	26.7 fg.m ⁻³		Monitored (Total Organic Micro-pollutants)

Note: (a) Short-term background data approximately equate to the 90th percentile, which is approximately equivalent to 2 x the annual mean.

(b) The HF concentration adopted applies to the short-term averaging period. For conservatism, the same concentration has been adopted for the annual mean.

Future Baseline Conditions

- 7.4.5 Historically the view has been that background traffic-related NO₂ concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. However, the results of recent monitoring across the UK suggest that background annual-mean NO₂ concentrations have not decreased in line with expectations. To ensure that the assessment presents conservative results, no reduction in the background for any pollutant has been applied for future years.
- 7.4.6 As set out in Section 7.3 above, modelling has been undertaken for a 10 km by 10 km grid of receptors, centred on the facility stack. All future receptors within the study area have therefore been considered within the assessment. In addition, sensitive receptors within the consented Land at North Horsham development have been explicitly included within the model. The receptors selected are provided in Table 7.11.

7.5 Incorporated Enhancement and Mitigation

Construction Phase

7.5.1 With respect to construction related dust impacts, there is no standardised set of good practice measures. The IAQM assessment methodology has been used to establish the risk associated with the construction phase assuming that no mitigation measures are implemented. The IAQM guidance sets out mitigation measures for low, medium and high dust impact risks. Based on the assessment of dust impacts for the construction phase, as detailed in Section 7.6 of this chapter, the highly recommended measures for medium risk sites are listed below. These measures will be implemented through the Construction Environmental Management Plan (CEMP) to be prepared during the pre-construction period once a Principal Contractor has been appointed.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager; and
- Display the head or regional office contact information.

Dust Management Plan

• Develop and implement a Dust Management Plan (DMP) (which may include measures to control other emissions), approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked; and
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary;
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and
- Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. A shorter monitoring period or concurrent upwind and downwind monitoring may be agreed by the local authority.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Use screening intelligently where possible – e.g. locating site offices between potentially dusty activities and the receptors;
- Erect solid screens or barriers around the site boundary;

- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Depending on the duration that stockpiles will be present and their size cover, seed, fence or water to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary no idling vehicles;
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable; and
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible;
- Use enclosed chutes, conveyors and covered skips, where practicable; and
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

• Avoid bonfires and burning of waste materials.

Medium risk measures specific to demolition

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- Bag and remove any biological debris or damp down such material before demolition.

Medium risk measures specific to construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as soon as practicable any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Record all inspections of haul routes and any subsequent action in a site log book; and
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Medium risk measures specific to trackout

- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as practicable;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 metres from receptors where possible.

Operational Phase

7.5.2 For the operational phase, the best way to mitigate against significant adverse effects is to ensure that an appropriate stack height is determined. This assessment includes a stack height determination and results have been presented for the optimum stack height.

7.6 Assessment of Construction Effects

- 7.6.1 The types of activities that could cause fugitive dust emissions are:
 - Demolition;
 - Earthworks;
 - Handling and disposal of spoil;
 - Wind-blown particulate material from stockpiles;
 - Handling of loose construction materials; and
 - Movement of vehicles, both on and off site.
- 7.6.2 The level and distribution of construction dust emissions will vary according to factors such as the type of dust, duration and location of dust-generating activity, weather conditions and the effectiveness of suppression methods.
- 7.6.3 The main effect of any dust emissions, if not mitigated, could be annoyance due to soiling of surfaces, particularly windows, cars and laundry. However, it is normally possible, by implementation of proper control, to ensure that dust deposition does not give rise to significant adverse effects, although short-term events may occur (for example, due to technical failure or exceptional weather conditions). The following assessment, using the IAQM methodology, predicts the risk of dust impacts and the level of mitigation that is required to control the residual effects to a level that is "not significant".

Risk of Dust Impacts

Source

- 7.6.4 The existing Waste Transfer Building on the site would need to be demolished. The volume is estimated to more than 50,000 m³. The dust emission magnitude for the demolition phase is classified, using the IAQM dust guidance, as large.
- 7.6.5 The site area exceeds 10,000 m². As such, the dust emission magnitude for the earthworks phase is classified as large.
- 7.6.6 The total volume of the buildings to be constructed would exceed 100,000 m³. As such, the dust emission magnitude for the construction phase is classified as large.

7.6.7 The maximum number of outwards movements in any one day is expected to be between 10 and 50 HDVs, the dust emission magnitude for trackout would be classified as medium.

Table 7.14: Dust Emission Magnitude for Demolition, Earthworks, Construction and Trackout

Demolition	Earthworks	Construction	Trackout
Large	Large	Large	Medium

Pathway and Receptor - Sensitivity of the Area

7.6.8 All, earthworks and construction activities are assumed to occur within the site boundary. As such, receptors at distances within 20, 50, 100, 200 and 350 metres of the site boundary have been identified. The sensitivity of the area has been classified and the results are provided in Table 7.15 below.

Table 7.15: Sensitivity of the Surrounding Area for Demolition, Earthworks and Construction

Potential Impact Sensitivity of Surrounding Area		Reason for Classification		
Dust Soiling	Medium	1 – 10 high sensitivity receptors located within 20 m of the site entrance (Appendix 7.1, Table 7.1.4)		
Human Health	Medium	1 – 10 high sensitivity receptors located within 20 m of the site entrance and PM ₁₀ concentrations below 24 - 28 μ g.m ⁻³ (Appendix 7.1, Table 7.1.5)		

7.6.9 The Dust Emission Magnitude for trackout is classified as medium and trackout may occur on roads up to 200 metres from the site. The major route within 200 metres of the site is Langhurstwood Road. The sensitivity of the area has been classified and the results are provided in Table 7.16 below.

Table 7.16: Sensitivity of the Surrounding Area for Trackout

Potential Impact	Sensitivity of Surrounding Area	Reason for Classification		
Dust Soiling	Medium	1 – 10 high sensitivity receptors located within 20 m of the roads (Appendix 7.1, Table 7.1.4)		
Human Health	Medium	1 – 10 high sensitivity receptors located within 20 m of the roads and PM ₁₀ concentrations 24 - 28 μg.m ⁻³ (Appendix 7.1, Table 7.1.5)		

Overall Dust Risk

7.6.10 The Dust Emission Magnitude has been considered in the context of the sensitivity of the area to give the Dust Impact Risk. Table 7.17 summarises the Dust Impact Risk for the four activities.

Table 7.17: Dust Impact Risk for Earthworks, Construction and Trackout

Dust Source	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Medium	Medium	Medium	Medium
Risk	Medium	Medium	Medium	Medium

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- 7.6.11 Taking the site as a whole, the overall risk is deemed to be medium. The mitigation measures appropriate to a level of risk for the site as a whole and for each of the phases are committed to as part of the project and are set out in Section 7.5.
- 7.6.12 Provided this package of mitigation measures is implemented, the residual construction dust effects would not be significant. The IAQM dust guidance states that *"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'."* The IAQM dust guidance recommends that significance is only assigned to the effect after the activities are considered with mitigation in place.

Accidents and/or Disasters

- 7.6.13 There are no potential construction accidents/disasters (that could realistically occur) that are relevant to air quality. No significant adverse air quality effects to the environment during the construction phase are anticipated.
- 7.7 Assessment of Operational Effects

Stack Emissions

7.7.1 For each of the five years of meteorological data (2011 to 2015), the maximum predicted ground-level concentration across the modelled domain has been derived for each substance and is reported below. The maximum predicted ground-level concentrations at the selected sensitive receptors have also been predicted and these are summarised in Appendix 7.5.

Scenario 1: Results (short term emission limits)

7.7.2 Table 7.18 summarises the maximum predicted Process Contribution (PC) to ground-level concentrations for those pollutants with short-term emission limits set out in the IED. The resulting Predicted Environmental Concentrations (PECs) have been calculated by adding the PC to the background Ambient Concentration (AC). The maximum PC and PEC for all points over the modelled grid are reported. The PEC for each pollutant has then been compared with the relevant EAL. If the PC is considered potentially significant, the PEC has been considered. Where the PC is insignificant (i.e. less than 10% of the relevant EAL), there is no need to take the assessment any further. Note that operation at the short term emission limit is very unlikely and the coincidence of such operation with the most adverse meteorological conditions (over five years) is extremely unlikely. This assessment is therefore extremely conservative.

Scenario 2: Results (long term emission limits)

- 7.7.3 Table 7.19 summarises the PCs and the resulting PECs for all pollutants assuming that the proposed development is operating at long-term emission limits. This repeats the assessment for those pollutants where short term emission limits apply. It should be noted that operation at the long term emission limit is unlikely and the coincidence of such operation with the most adverse meteorological conditions (over five years) is very unlikely. This assessment is therefore also very conservative for both short term and long term emission limits, the PEC is considered where the PC exceeds the criterion of 1% of the relevant EAL.
- 7.7.4 As Horsham District Council has designated two AQMAs due to high levels of NO₂, contour plots for NO₂ have been provided. A contour plot of the 99.79th percentile of hourly-mean NO₂ PCs is shown in Figure 7.3 and a contour plot of the annual-mean NO₂ PCs is shown in Figure 7.4.

		EAL	Max PC	Max PC as	Criteria	AC	PEC	PC is Potentially	PEC is Potentially
Pollutant	Averaging Period	(µ g.m⁻³)	(µg.m-3)	% of EAL	(%)	(µg.m-3)	(µ g.m ⁻³)	Significant?	Significant?
HCI	1 hour (maximum)	750	7.7	1	10	0.4	8.1	No	-
HF	1 hour (maximum)	160	0.5	0	10	2.5	3.0	No	-
	15 minute (99.90th	266	19.2	7	10	3.1	22.3	No	
SO.	percentile)	200						NU	-
302	1 hour (99.73th percentile)	350	15.1	4	10	3.1	18.2	No	-
	24 hour (99.18th percentile)	125	4.9	4	10	3.1	8.0	No	-
NO ₂	1 hour (99.79th percentile)	200	11.5	6	10	23.8	35.3	No	-

Table 7.18: Predicted Maximum Process Contributions at Short-Term Emission Limits

Table 7.19: Predicted Maximum Process Contributions (µg.m-3) at Long-Term Emission Limits

		EAL	Max PC	Max PC as	Criteria	AC	PEC	PC is Potentially	PEC is Potentially
Pollutant	Averaging Period	(µg.m ⁻³)	(µg.m-3)	% of EAL	(%)	(µg.m-3)	(µg.m ⁻³)	Significant?	Significant?
DMaa	24 hour (90.41st percentile)	50	0.1	0	10	24.0	24.1	No	-
PIVI10	24 hour (annual mean)	40	0.04	0	1	24.0	24.0	No	-
PM _{2.5}	24 hour (annual mean)	25	0.04	0	1	11.0	11.0	No	-
HCI	1 hour (maximum)	750	1.3	0	10	0.4	1.7	No	-
HF	1 hour (maximum)	160	0.1	0	10	2.5	2.6	No	-
	15 minute (99.90th percentile)	266	4.8	2	10	3.1	7.9	No	-
50-	1 hour (99.73th percentile)	350	3.8	1	10	3.1	6.9	No	-
302	24 hour (99.18th percentile)	125	1.2	1	10	3.1	4.4	No	-
	1 hour (annual mean)	50	0.2	0	1	1.6	1.8	No	-
NO	1 hour (99.79th percentile)	200	5.8	3	10	23.8	29.6	No	-
NO2	1 hour (annual mean)	40	0.6	1	1	11.9	12.5	No	-
СО	8 hour (maximum daily running)	10,000	4.6	0	10	500.0	504.6	No	-
Cd	1 hour (annual mean)	0.005	0.0002	4	10	0.00025	0.00045	No	-
ті	1 hour (maximum)	30	0.0064	0	10	-		No	-
11	1 hour (annual mean)	1	0.0002	0	1	-		No	-
Hg	1 hour (maximum)	7.5	0.0064	0	10	0.00247	0.00888	No	-

		EAL	Max PC	Max PC as	Criteria	AC	PEC	PC is Potentially	PEC is Potentially
Pollutant	Averaging Period	(µ g.m ⁻³)	(µg.m ⁻³)	% of EAL	(%)	(µg.m ⁻³)	(µg.m⁻³)	Significant?	Significant?
	1 hour (annual mean)	0.25	0.0002	0	1	0.00247	0.00267	No	-
Sh	1 hour (maximum)	150	0.0641	0	10	-		No	-
SU	1 hour (annual mean)	5	0.0020	0	1	-		No	-
As	1 hour (annual mean)	0.003	0.0020	67	1	0.00099	0.00299	Yes	No
Cr	1 hour (maximum)	150	0.0641	0	10	0.00430	0.06843	No	-
CI	1 hour (annual mean)	5	0.0020	0	1	0.00430	0.00630	No	-
Co	1 hour (maximum)	6	0.0641	1	10	0.00012	0.06425	No	-
CU	1 hour (annual mean)	0.2	0.0020	1	1	0.00012	0.00212	No	-
Cu	1 hour (maximum)	200	0.0641	0	10	0.01553	0.07966	No	-
Cu	1 hour (annual mean)	10	0.0020	0	1	0.01553	0.01753	No	-
Pb	1 hour (annual mean)	0.25	0.0020	1	1	0.01124	0.01324	No	-
Mo	1 hour (maximum)	1500	0.0641	0	10	0.00569	0.06982	No	-
IVILI	1 hour (annual mean)	0.15	0.0020	1	1	0.00569	0.00769	No	-
Ni	1 hour (annual mean)	0.02	0.0020	10	1	0.00088	0.00288	Yes	No
1/	1 hour (maximum)	5	0.0641	1	10	0.00100	0.06513	No	-
V	1 hour (annual mean)	1	0.0020	0	1	0.00100	0.00300	No	-
Dioxins & Furans	1 hour (annual mean)	-	3.99E-10		1	2.67E-08	2.71E-08	-	-
PAHs	1 hour (annual mean)	0.0003	3.99E-05	16.0	1	2.30E-04	2.70E-04	Yes	Yes
PCB	1 hour (annual mean)	0.2	2.00E-05	0.0	1	6.44E-05	8.44E-05	No	-

- 7.7.5 The results presented in Table 7.18 show that the predicted PC is below 10% of the relevant EAL for all pollutants. At short-term emission limits, the effects are therefore not considered significant.
- 7.7.6 The results presented in Table 7.19 show that the predicted PC is below 10% of the relevant short-term EAL for all pollutants except As and Ni; however, in both cases the PEC is below the EAL.
- 7.7.7 The results presented in Table 7.19 show that the predicted PC is below 1% of the relevant long-term EAL for all pollutants with the exception of PAHs. Appendix 7.5 shows that, at the nearest sensitive receptors, the PEC is below the EAL and the long-term PAH effect is not considered to be significant.
- 7.7.8 For hexavalent chromium (Cr^{VI}), the measured concentrations in the Environment Agency document *Releases from waste incinerators – Guidance on assessing group 3 metal stack emissions from incinerators*' version 4 (undated), varies from 0.0005% to 0.03% of the IED emission concentration limit. Table 7.20 shows the predicted PC at these proportions.

Table 7.20: Predicted Maximum Cr^{VI} Process Contributions (µg.m⁻³) at Long-Term Emission Limits

Pollutant	Averaging Period	EAL (µg.m ⁻³)	Max PC (µg.m ⁻³)	Max PC as % of EAL	Percentage of the IED Emission Limit
Cr ^{VI}	1 hour (annual	0.0002	9.98E-09	0	0.0005% (min)
	mean)		5.99E-07	0	0.03% (max)

- 7.7.9 The PC at each end of the range is below 1% of the EAL and the effects are not considered significant.
- 7.7.10 Table 7.21 provides the maximum predicted metal deposition rates.

Table 7.21: Maximum Metal Deposition (mg.m⁻².day⁻¹) at Long-Term Emission Limits

Pollutant	Deposition Rate (mg.m ⁻² .day-1)	Deposition as % of EAL	
	Maximum	Predicted	
Cd	0.009	0.0005	5.7
Hg	0.004	0.0005	12.9
As	0.02	0.0052	25.9
Cr	1.5	0.0052	0.3
Cu	0.25	0.0052	2.1
Pb	1.1	0.0052	0.5
Ni	0.11	0.0052	4.7

7.7.11 The results presented in Table 7.21 show that the predicted metal deposition rate is above 1% of the EAL for Cd, Hg, As, Cu and Ni. Appendix 7.5 shows that, at the nearest sensitive receptors, the long-term effect is not considered to be significant. It should be noted that the preferred method of control for all of the metals listed is to prevent their entry into the waste stream, primarily through product design and then through segregated waste management. The 3Rs Facility would be designed to control emissions from the waste composition expected in typical non-hazardous commercial and industrial waste streams (equivalent to non-hazardous municipal waste).

Plume Visibility

7.7.12 Table 7.22 provides a summary of the results of plume visibility modelling.

Year of Met Data	Number of visible plumes	Percentage of year that a visible plume is predicted	Maximum plume length (m)	Averag e plume length (m)	Number of hours plume visible outside site boundary during daylight hours	Percentage of year visible plumes are outside site boundary during daylight hours
2011	197	2.2	155	1	14	0.4
2012	368	4.2	177	1	15	0.4
2013	533	6.1	376	4	72	1.9
2014	174	2.0	151	1	15	0.4
2015	152	1.7	222	1	12	0.3

Table 7.22: Summary of Plume Visibility Results

7.7.13 Based on modelled results using five years of hourly sequential meteorological data, a plume is predicted to be visible outside the site boundary less than 5% of daylight hours in each of the five years modelled. As there are local sensitive receptors, using the impact descriptors adopted for the assessment, the impact is considered 'low' and can be considered 'acceptable'. An occasional visible plume is quite normal for combustion processes which generate energy by conversion of chemical energy with the main combustion products being water (vapour) and carbon dioxide. Plume visibility is effectively controlled in energy recovery facilities such as the 3Rs Facility being dictated primarily by the temperature at which the reagent reaction (lime or sodium bicarbonate with acid gas) is optimised with the aim of maximising energy efficiency as in conventional domestic boilers). Water vapour plume visibility is considered further in the visual impact assessment, but as can be seen from Table 7.22, visible water vapour plumes cannot be described as frequent, long, or unacceptable. Effects are not therefore considered to be significant.

Dust Emissions

- 7.7.14 The operation of the proposed facility could potentially be associated with dust. Some of the key activities likely to generate dust during the operation of the proposed facility are:
 - Delivery of waste; and
 - Sorting and handling of waste.
- 7.7.15 Upon arrival at the facility, the delivered material would be weighed and recorded. After passing over the weighbridge, the material would be delivered to the reception building where it would be put into buffer storage. It would then be screened and inert materials (rubble and glass), polyvinyl chloride (PVC) and metals would be recovered. The separated recyclable materials would be stored and bulked on the site prior to export for re-use or recovery elsewhere. The residual material would be shredded within the main processing building, prior to thermal treatment.
- 7.7.16 The process would produce residues in the form of bottom ash and boiler ash and air pollution control residue which would be collected and removed from the site for further treatment off-site.
- 7.7.17 The main thermal treatment process would be fully enclosed.
- 7.7.18 There are dedicated areas for the reception and storage of imported material, which together with the processing and materials separation are all contained within a controlled environment.

- 7.7.19 The accepted best practice approach for the primary control of dust releases is containment within the building, which is the technique employed for the 3Rs Facility. Air from within the waste reception hall and waste processing hall would be drawn for use as combustion air and the dust levels inside would be managed so as to comply with health and safety obligations for personal exposure. The only materials stored outside would be inert, comprising ferrous and non-ferrous metals, and PVC plastic with little potential to generate dust. Based on the above, the magnitude of the source of emissions is considered to be small.
- 7.7.20 The wind roses illustrated in Figure 7.1 show that the prevailing wind direction is south westerly. The nearest high sensitive receptors are residential properties on Langhurstwood Road (to the east and north east of the site) and Station Road (to the south). The properties on Station Road are upwind of the site and, at 430 metres, remote from potential sources of emissions. The properties on Langhurstwood Road are downwind of the site; the closest of which is 240 metres to the east. On that basis, the risk of dust impacts from the process is considered to be very low. No significant effects are anticipated.

Odour Emissions

Source Odour Potential

- 7.7.21 The first step in the qualitative assessment of odour impact is to estimate the odour source potential which has been determined based on the guidance set out in Appendix 7.3.
- 7.7.22 Waste delivered to the proposed development would be unloaded within the reception building. Therefore, the potential for odours during the delivery stage and storage stages would be minimal.
- 7.7.23 Defra published a *"Review of Environmental and Health Effects of Waste Management"* (Defra, 2004). This publication included a literature review, which revealed that odour is potentially significant from the waste storage and processing phases of incineration, but that odours are normally controlled via the combustion air. Combustion air for the plant would be drawn from within the buildings creating a slight negative pressure ensuring that airflow and, therefore, odours are likely to be directed into rather than out of the building. The height of the stack and the destruction of odours during the incineration process are sufficient to ensure that it is unlikely that odours from the stack would be detectable at ground level. On that basis, the Source Odour Potential has categorised as 'small'.

Pathway Effectiveness

- 7.7.24 The odour flux from the odour sources is dependent on the effectiveness of odour transport to the receptors, versus the mitigating effect of dilution/dispersion in the atmosphere.
- 7.7.25 The wind roses illustrated in Figure 7.1 show that the prevailing wind direction is south westerly. <u>Risk of Odour Exposure (Impact)</u>
- 7.7.26 When the small Source Odour Potential (ignoring mitigation) is considered in the context of the pathway effectiveness (Appendix 7.3, Table 7.3.3), the risk of odour exposure (impact) is negligible at all receptors. Likely Magnitude of Odour Effect
- 7.7.27 When the above risk of odour exposure impact is considered in the context of the sensitivity of the receptors using the matrix in Appendix 7.3, Table 7.3.4, the likely resulting odour effect is summarised in Table 7.23.

Table 7.23: Likely Odour Effects at the Proposed Development Site

Receptor	Source Odour Potential	Pathway Effectiveness	Risk Odour Exposure	Receptor Sensitivity	Likely Odour Effect
Station Road (430m to the south - upwind)	Small	Ineffective	Negligible Risk	High	Negligible Effect
Langhurstwood Road (240 m to the south east)	Small	Ineffective	Negligible Risk	High	Negligible Effect
Langhurstwood Road (320 m to the north east - downwind)	Small	Moderately Effective	Negligible Risk	High	Negligible Effect

7.7.28 The likely resulting odour effect would be "negligible". Overall, the effect is considered to be "negligible" and would not be significant.

Accidents and/or Disasters

7.7.29 There are no potential operational accidents/disasters (that could realistically occur) that are relevant to air quality. No significant adverse air quality effects on the environment during the operational phase are anticipated.

Potential Changes to the Assessment as a Result of Climate Change

- 7.7.30 The dispersion modelling of operational effects has been undertaken for five years of hourly meteorological conditions. The assessment therefore already takes into account a wide range of ambient temperatures. The assessment has been undertaken using the relevant technical guidance and based on current knowledge, the results of the assessment are not expected to be affected by climate change.
- 7.8 Assessment of Decommissioning Effects
- 7.8.1 The risk of impacts on decommissioning is expected to be the same as those during construction. Therefore, there are not anticipated to be any significant effects during this phase.

7.9 Assessment of Cumulative Effects

- 7.9.1 A review of proposed or possible future third party projects that may have a cumulative impact with the development proposals has been undertaken and used to inform this ES. The projects identified are summarised in Appendix 4.4.
- 7.9.2 In relation to air quality effects, the following developments have been identified as having the potential to interact cumulatively with the proposed 3Rs Facility and have therefore been examined as part of the assessment:
 - Brookhurst Wood Landfill Site;
 - Brookhurst Wood Mechanical Biological Treatment (MBT) Facility;

- Brookhurst Refuse Derived Fuel (RDF) Facility; and
- Land North of Horsham.
- 7.9.3 During the construction phase, cumulative effects are only likely to occur in the area where two or more proposed developments are within 700 metres of each other; and then only for receptors within 350 metres of both developments. Cumulative effects would then only be experienced if construction works on both schemes were to take place simultaneously. The consented North Horsham scheme is such a scheme. Effective implementation of relevant mitigation measures at both sites should ensure the risk of cumulative dust effects is minimal and as a result no significant effects are anticipated during the construction phase. Cumulative effects are assessed as 'negligible' and "not significant".
- 7.9.4 For the operational phase, background concentrations have been derived following a comparison of data from available sources, including Defra maps. For each pollutant, a conservative but representative concentration has been selected. For NO₂, CO and PM_{2.5}, data from the Defra maps has been used. No sources have been deducted from the Defra mapped concentrations. For PM₁₀, the nearest monitor measured higher concentrations than the Defra maps and the highest monitored concentration has been used instead.

Brookhurst Wood Landfill Site

7.9.5 The National Atmospheric Emissions Inventory (NAEI) provides a list of the operators and sites with point source emissions included within the data that underpins the Defra maps. The Brookhurst Wood operators are listed as Biffa Waste Services Limited and UK Waste Management Limited. The data reported by the NAEI includes emissions of NOx, PM₁₀ and PM_{2.5}. Emissions from road vehicles using the site are also included within the Defra mapped concentrations. Emissions from operations at the Brookhurst Wood Landfill Site are therefore already taken into account to the extent that associated concentrations are included within the background concentrations adopted for the assessment.

Brookhurst Wood RDF

- 7.9.6 No air quality assessment was submitted in support of the refuse derived fuel compacting and baling facility at Brookhurst Wood, indicating that the air quality effects are not expected to be significant. The 2013 Design and Access Statement (Crowther Associates, 2013) submitted to accompany the planning application considers odour and dust impacts.
- 7.9.7 An odour assessment was not undertaken; however, no food waste would be accepted at the facility and unacceptable odours are not anticipated. A dust assessment was also not undertaken; however, the applicant advises that odour and dust mitigation measures would be agreed by the successful waste operator as part of the licence.

Brookhurst Wood MBT Facility and Land at North Horsham

- 7.9.8 The Brookhurst Wood MBT facility commenced accepting waste in July 2014. The engines combusting gas produced by the anaerobic digestion process, emit 0.46 g/s of NOx and 0.29 g/s of SO₂ from a 15 m stack (Jacobs, 2008). Using dispersion factors for a 15 metre stack available at the Environment Agency (2016) document, the maximum process contribution has been estimated.
- 7.9.9 The Air Quality chapter in the Environmental Statement (Liberty Property Trust, 2016)) for the Land at North Horsham development identified the key air quality concerns during the operational phase as traffic-related emissions. The chapter presents the predicted change in NO₂, PM₁₀ and PM_{2.5} concentrations at a number of representative sensitive receptors in 2031, the year in which the development is expected to be fully operational.
- 7.9.10 The contribution from each of the developments has been combined with the relevant PC for the 3Rs Facility to determine the likely cumulative PEC. The results are summarised in Table 7.24.

Table 7.04. Cuman	a a mu a f Cuma ula	thus leave a sta
Table 7.24: Sumi	nary of Cumula	alive impacts

		Concentrations in µg.m ⁻³					
Pollutant	Averaging Period	EAL	Maximum PC - Proposed Wealden Facility	Maximum PC – Land at North Horsham	Maximum PC – Brookhurst Wood MBT	AC	PEC
PM ₁₀	24 hour (annual mean)	40	0.04	0.3	-	24	24.34
PM _{2.5}	24 hour (annual mean)	25	0.04	0.2	-	11	11.2
NO ₂	1 hour (annual mean)	40	0.6	1.6	5.9	11.9	20.0
SO ₂	1 hour (annual mean)	50	0.2	-	5.3	1.57	7.1

- 7.9.11 The Environment Agency dispersion factors used to estimate the PC for the Brookhurst Wood gas engines are deliberately conservative. Furthermore, the analysis assumes that the location of the maximum impacts from the proposed development coincide with the location of the maximum impact from the Brookhurst Wood gas engines, which is highly unlikely to be the case.
- 7.9.12 The results show that the cumulative PEC remains well below the relevant EAL. Even with highly conservative assumptions, the cumulative effects are not considered significant. The impacts calculated for the proposed 3Rs Facility are much lower than those predicted for Land North of Horsham or Brookhurst Wood MBT (noting that the latter uses the conservative Environment Agency dispersion factors).

7.10 Inter-relationships

7.10.1 Arrivals at and departures from the project site may change the number, type and speed of vehicles using the local road network. Changes in road vehicle emissions can affect air quality; however, in this case the effects are not considered significant. Chapter 6: Traffic and Transport provides the detailed analysis of vehicle movements generated by the construction and operation of the development.

7.11 Limitations of the Assessment

- 7.11.1 The assessment has limitations and uncertainties in a number of areas including:
 - Overall limitations of the model algorithms No dispersion model is wholly accurate and all models will produce variations in results under certain conditions. However, the model used in the assessment has been extensively validated and the full set of model validation documents is available on CERC's web site. Dispersion models typically have an accepted uncertainty of up to +/-25% and this is taken into account when devising the criteria for establishing significance.
 - Estimates of background concentrations The background concentrations have been derived from a number of available sources. Where appropriate, the highest concentration has been used in the assessment. The conservative assumptions adopted ensure that the background concentration used within the model is towards the top of the uncertainty range, rather than a central estimate;

- Meteorological data uncertainties Five years of hourly sequential meteorological data have been used in the assessment ensuring that a wide range of potential meteorological conditions have been accounted for in the assessment; and
- Stack emissions The modelling has been undertaken assuming that the stack emissions are released at the IED emissions concentrations limit. In reality, emissions concentrations are likely to be lower.
- 7.11.2 On the basis of the above, the results of the assessment should be considered conservative.
- 7.12 Further Mitigation Measures

Construction and Demolition

- 7.12.1 As set out in Sections 7.5 and 7.6, the proposed development includes a commitment to implement dust control measures based on those identified in the IAQM guidance (IAQM, 2014a) for medium risk sites. These would be implemented through the Construction Environmental Management Plan.
- 7.12.2 The IAQM dust guidance states that with the recommended dust mitigation measures in place the residual effect will normally be "not significant", and recommends the mitigation is secured by for example planning conditions, a legal obligation, or by legislation. No further mitigation measures are therefore required.

Operation

- 7.12.3 The effects during operation are not considered to be significant. As such, no further mitigation has been identified.
- 7.13 Monitoring and Management Strategies

Construction

- 7.13.1 Regular site inspections to monitor compliance with the DMP would be carried out with inspection results recorded in a log that would be made available to the local authority on request.
- 7.13.2 The frequency of site inspections by the person accountable for air quality and dust issues on site would need to be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- 7.13.3 The requirement for dust deposition, dust flux and/or real-time PM₁₀ continuous monitoring would be agreed with the Local Authority prior to the commencement of construction works.

Operation

- 7.13.4 Stack emissions monitoring will be required to demonstrate compliance with the terms of the Environmental Permit. The permit will set out details of the type of monitoring and the frequency of data collection and reporting.
- 7.14 Residual Effects
- 7.14.1 Table 7.25 summarises the significance of effects for the construction and the operational phase for the project taking into account the mitigation measures incorporated into the development proposals.

Parameter	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
A range of receptors within 350 m of the site boundary	Receptors considered range from low to high sensitivity	Suspended particulate matter and deposited dust.	Medium- term	Risk - Medium	Guidance does not allow significance of effect to be determined before mitigation.	Suite of measures set out in the IAQM dust guidance	Guidance does not allow the magnitude of the impact risk to be determined after mitigation, specifying only that the resultant effect will not be significant.	Negligible	No
Grid of receptors 10 km by 10 km with 100 m spacing and 3 km by 3 km with 30 m spacing	Assumed to be high.	Increased atmospheric pollutant concentrations and metal deposition.	Long- term	Small	Negligible	None	Negligible	Negligible	No
Representative receptors	High	Dust	Long- term	Small	Negligible	None	Negligible	Negligible	No
Representative receptors	High	Odour	Long- term	Small	Negligible	None	Negligible	Negligible	No
Grid of receptors 10 km by 10 km with 100 m spacing	Assumed to be high.	Visible plume	Long- term	Small	Negligible	None	Negligible	Negligible	No

Table 7.25: Summary of Likely Environmental Effects on Air Quality and Odour

7.15 Conclusions

- 7.15.1 A detailed air quality assessment predicting the potential effects of emissions generated during the construction and operation of the facility has been undertaken.
- 7.15.2 Impacts during the construction, such as dust generation and plant vehicle emissions, are predicted to be of short duration and only relevant during the construction phase. The results of the risk assessment of construction dust impacts undertaken using the IAQM dust guidance, indicate that before the implementation of mitigation and controls, the risk of dust impacts will be medium. Implementation of the highly-recommended mitigation measures described in the IAQM construction dust guidance is likely to reduce the residual dust effects to a level categorised as "not significant".
- 7.15.3 The number of vehicle movements generated by construction activities is below the threshold criteria for requiring an assessment. The effects due to emissions from construction-related vehicle emissions are therefore considered to be "not significant". Emissions from the thermal treatment of waste have been assessed through detailed dispersion modelling using best practice approaches. The assessment has been undertaken based on a number of conservative assumptions. This is likely to result in an over-estimate of the contributions that will arise in practice from the facility. The results of dispersion modelling reported in this assessment indicate that predicted contributions and resultant environmental concentrations of all pollutants considered would be of 'negligible' significance.
- 7.15.4 A visible plume extending beyond the site boundary is predicted for less than 5% of daylight hours in each of the five years modelled. Using the impact descriptors adopted for the assessment, the impact is considered 'low' and the plume visibility is considered to be 'acceptable'.
- 7.15.5 There would be no change in HGV movements during the operational phase over and above the site's extant consent. On that basis, vehicle-related emissions have not been assessed and the effects from operational-vehicle emissions are not considered to be significant.
- 7.15.6 The main dust mitigation measure is containment. Taking into account the fact that the process would be largely contained and the relative distance to sensitive receptors, the risk of dust impacts during operation is predicted to be insignificant based on professional judgement.
- 7.15.7 The risk of odour impacts has been assessed qualitatively using a source-pathway-receptor conceptual model. The likely odour effect is negligible.
- 7.15.8 Overall the effects of the facility are not considered to be significant.

7.16 References

Legislation

Council Directive 2006/12/EC European Parliament and of the Council of 5 April 2006 on Waste

Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe.

Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

Directive 2010/75/EC of The European Parliament And Of The Council of 24 November 2010 on industrial emissions

Directive 1996/61/EC of 24 September 1996 concerning Integrated Pollution Prevention and Control

The Environmental Permitting (England and Wales) Regulations 2016

The Air Quality Standards (England) Regulations.

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Horsham District Council (2015) Horsham District Planning Framework (excluding South Downs National Park).

IAQM (2014a) Guidance on the Assessment of Dust from Demolition and Construction.

IAQM (2014b) Guidance on the Assessment of Odour for Planning.

Jacobs (2008) Atmospheric Dispersion Modelling of Potential Anaerobic Digestion and Energy from Waste Plants

Liberty Property Trust (July 2016) Land North of Horsham Environmental Statement

WHO (2005) Air Quality Guidelines: Global Update 2005.

West Sussex County Council and South Downs National Park Authority (2014) West Sussex Waste Local Plan. April 2014.

8 Noise and Vibration

8.1 Introduction

8.1.1 This chapter provides a summary of the noise and vibration assessment undertaken for the proposed 3Rs Facility proposed at the site located at Langhurstwood Road, Horsham, West Sussex.

Scope of Study

- 8.1.2 This chapter sets out the approach to the assessment; provides a description of the baseline noise environment; identifies those aspects of the proposed development that may result in significant noise and/or vibration effects; provides predictions of noise and/or vibration immissions at the nearest noise and/or vibration sensitive receptors (NVSRs); and provides an assessment of the significance of noise and/or vibration effects. Mitigation measures are identified where necessary. Cumulative noise and/or vibration effects with other proposed developments that may also affect the same NVSRs as the project are also considered, as are the limitations of the assessment.
- 8.1.3 Significant noise exposure can cause annoyance and sleep disturbance, both of which can impact on the quality of life. Significant groundborne vibration can reduce the quality of life and working efficiency of building occupants and, for very high levels, has the potential to cause cosmetic or structural damage to buildings and structures.
- 8.1.4 This assessment considers noise and vibration effects during the construction phase, together with noise arising from operation of the proposed facility. Noise effects from construction and operational traffic are assessed. The plant and equipment associated with the facility would not produce high levels of vibration. In addition, vibration levels drop off rapidly with distance and the closest receptors are over 200 metres away. Therefore, vibration effects from operation of the proposed facility have been scoped out of the assessment.

Study Area

- 8.1.5 The study area for this assessment includes the nearest existing and proposed noise sensitive receptors (NVSRs) to each boundary of the site that lie within 500 metres. The following are the sensitive receptors/areas which have been identified and considered within this assessment:
 - Langhurst Moat Cottage and Wealden, Langhurstwood Road, located approximately 210 metres south east of the site;
 - Grayland's Lodge, on Langhurstwood Road, located approximately 330 metres to the north east of the site;
 - Several residential properties on Langhurstwood Road, located approximately 370 metres south east of the site;
 - Residential properties on Station Road, located approximately 330 metres south of site;
 - Cox Farm, located approximately 420 metres north west of site; and
 - The proposed residential development Land North of Horsham (subject to a resolution to grant outline consent) located approximately 450 metres south east of the site.
- 8.1.6 A plan indicating the locations of the above NVSRs is provided in Figure 8.1.

8.2 Legislation and Policy Context

8.2.1 This section summarises relevant legislation and policies that are directly relevant to noise and vibration issues.

Legislation

Control of Pollution Act, 1974

- 8.2.2 Part III of the Control of Pollution Act 1974 (CoPA) is specifically concerned with pollution. With regards to noise it covers construction sites; noise in the street; noise abatement zones; codes of practice and best practicable means (BPM).
- 8.2.3 Section 60, Part III of the CoPA refers to the control of noise on construction sites. It provides legislation by which local authorities can control noise from construction sites to prevent noise disturbance occurring. The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 approved British Standard (BS) 5228 Part 1 (BSI, 2014a) and Part 2 (BSI, 2014b) for the purpose of giving guidance on appropriate methods for minimising noise from construction and open sites in exercise of the powers conferred on the Secretary of State by sections 71(1)(b), (2) and (3) of the CoPA.
- 8.2.4 The CoPA enables the local authority, in whose area work is going to be undertaken, or is being undertaken, the power to serve a notice imposing requirements as to the way in which construction works are to be carried out. This notice can specify the plant or machinery that is or is not to be used, the hours during which the construction work can be carried out, the level of noise and vibration that can be emitted from the premises in question or at any specified point on these premises or that can be emitted during specified hours, or for any change of circumstances.
- 8.2.5 Section 61, Part III of the CoPA refers to prior consent for work on construction sites. It provides a method by which a contractor can apply for consent to undertake construction works in advance. If consent is given, and the stated method and hours of work are complied with, then the local authority cannot take action under Section 60.
- 8.2.6 Section 71, Part III of the CoPA refers to the preparation and approval of codes of practice for minimising noise.
- 8.2.7 Section 72, Part III of the CoPA refers to Best Practicable Means, which is defined as:

"reasonably practicable, having regards among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications'. Whilst 'Means' includes 'the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures".

- 8.2.8 If Best Practicable Means is applied, it can provide a defence in the event of legal action by a complainant.
 National Policy and Guidance
 <u>National Planning Policy Framework (2012)</u>
- 8.2.9 The National Planning Policy Framework (NPPF) (DCLG, 2012), published in March 2012, sets out the government's planning policies for England.
- 8.2.10 The document does not contain any specific noise policy or noise limits, but it provides a framework for local people and local authorities to produce their own local and neighbourhood plans, which reflect the needs and priorities of their communities.

8.2.11 In Section 11, 'Conserving and enhancing the natural environment', paragraph 123 relates to noise and states that:

'123. Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts²⁷ on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impact²⁸ on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;²⁸ and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'

27 See Explanatory Note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs). 28 Subject to the provisions of the Environmental Protection Act 1990 and other relevant law.'

National Planning Policy for Waste (2014)

8.2.12 Appendix B of the National Planning Policy for Waste (DCLG, 2014a) provides a list of factors that are to be considered in determining planning applications including:

"j. noise, light and vibration Considerations will include the proximity of sensitive receptors. The operation of large waste management facilities in particular can produce noise affecting both the inside and outside of buildings, including noise and vibration from goods vehicle traffic movements to and from a site. Intermittent and sustained operating noise may be a problem if not properly managed particularly if night-time working is involved. Potential light pollution aspects will also need to be considered."

Noise Policy Statement for England (2010)

- 8.2.13 The Noise Policy Statement for England (NPSE) (Defra, 2010) aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.
- 8.2.14 Paragraph 1.6 of the NPSE sets out the long-term vision and aims of government noise policy:

"Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

"Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life."
- 8.2.15 The aims require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

8.2.16 With regard to the terms 'significant adverse' and 'adverse' included in the 'Noise Policy Aims', these are explained further in the 'Explanatory Note' as relating to established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation which are:

'NOEL – No Observed Effect Level'

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on human health and quality of life due to noise.

'LOAEL – Lowest Observed Adverse Effect Level'

This is the level above which adverse effects on health and quality of life can be detected.

8.2.17 Defra has then extended these concepts for the purpose of the NPSE to introduce the concept of:

'SOAEL – Significant Observed Adverse Effect Level'

8.2.18 This is the level above which significant adverse effects on health and quality of life occur. The accompanying explanation states that:

'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available'.

8.2.19 With regard to 'further evidence', Defra has commissioned research to try and identify the levels at which the above effects occur but this is not yet in the public domain. However, early indications are that this research has been largely inconclusive. On this basis, and until further guidance becomes available, and given that there is no specific guidance in the NPPF on noise, there is no justification to vary assessment methods and criteria from those previously adopted from British Standards and good practice guidance.

Planning Practice Guidance

- 8.2.20 In addition to the NPPF and the Noise Policy Statement for England (NPSE) described below, the Department for Communities and Local Government released National Planning Practice Guidance (NPPG) (DCLG, 2014b) on noise in March 2014. The NPPG provides guidance on determining the significance of noise effects to support the requirements of the NPPF.
- 8.2.21 The guidance provides advice on how to deliver its policies. The NPPG reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards and contains examples of acoustic environments commensurate with various effect levels (paragraph Reference ID: 30-001-20140306).
- 8.2.22 The NPPG describes noise that is not noticeable to be at levels below the NOEL. It describes a range of noise exposure that is noticeable but not to the extent there is a perceived change in quality of life. Noise exposures in this range are below the LOAEL and need no mitigation. On this basis, the audibility of noise from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.
- 8.2.23 The NPPG suggests that noise exposures above the LOAEL cause small changes in behaviour. An example of noise exposures above the LOAEL provided in the PPG is having to turn up the volume on the television; needing to speak more loudly to be heard; or, where there is no alternative ventilation, closing windows for some of the time because of the noise. In line with the NPPF and NPSE, the NPPG states that consideration

needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise.

8.2.24 The NPPG suggests that noise exposures above the SOAEL cause material changes in behaviour. An example of noise exposures above the SOAEL provided in the NPPG are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. In line with the NPPF and NPSE, the NPPG states that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

Development Plan Policy

West Sussex Waste Local Plan (2014)

- 8.2.25 The following policies of the West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2010) are relevant to noise and vibration.
- 8.2.26 Policy W18: Transport

" Proposals for waste development will be permitted provided that:

- (b) ...transport links are adequate to serve the development or can be improved to an appropriate standard without an unacceptable impact on amenity, character, or the environment;"
- 8.2.27 Policy W19: Public Health and Amenity

" Proposals for waste development will be permitted provided that:

(a) lighting, noise, dust, odours and other emissions, including those arising from traffic, are controlled to the extent that there will not be an unacceptable impact on public health and amenity;"

Horsham District Planning Framework

8.2.28 Strategic Policy 24, Environmental Protection, of the Horsham District Local Plan (Horsham District Council, 2015) is relevant to noise and vibration. The policy seeks to protect the high quality of the District's environment, requiring new development to minimise emission of pollutants including noise, odour, air and light pollution.

8.3 Assessment Methodology

Relevant Guidance

- 8.3.1 The assessment methodology has been informed by guidance contained within the following documents:
 - BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites Part 1: Noise (BSI, 2014a);
 - BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites Part 2: Vibration (BSI, 2014b);
 - BS 4142:2014. Methods for rating and assessing industrial and commercial sound (BSI, 2014c);
 - BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (BSI, 2014d);
 - ISO 9613-2:1996. Acoustics Attenuation of sound during propagation outdoors Part 2: General method of calculation (International Organization for Standardization, 1996);
 - Department of Transport (1988) Calculation of Road Traffic Noise; and

• Highways Agency *et al.* (2011) Design Manual for Roads and Bridges. Volume 11. Section 3 - Part 7: Noise and Vibration.

Consultation

- 8.3.2 In carrying out the noise and vibration assessment, consultation has included:
 - A formal scoping request;
 - Informal scoping, including consultation with an Environmental Health Officer at Horsham District Council regarding the methodology for the operational noise assessment and baseline noise monitoring locations; and
 - Comments received in relation to the previous application at the site (issued by WSCC in relation to application 062/16/NH.)
- 8.3.3 The issues raised through the consultation outlined above that are relevant to noise and vibration are summarised in Table 8.1 below.
- 8.3.4 A full copy of the Scoping Opinion is contained in Appendix 4.2.

Date/Source October 2015/ Scoping Opinion October 2015/ Scoping Opinion	Consultee and Issues Raised Jane Mosely, Case Officer – Main Report Agreed to approach set out in Scoping Report. Stated that the cumulative impact of vehicle noise/vibration with the North Horsham allocation should be taken into account. Gerry Benham – Clerk to Warnham Parish Council Quantitative assessment of the changes in noise levels on the highways due to road traffic should be	How/ Where Addressed The North Horsham traffic has been included in the cumulative assessment provided in Section 8.10 of this ES chapter. The North Horsham traffic has been included in the cumulative assessment provided in Section
	included. Cumulative traffic noise effects with the North of Horsham development to be included. Effects on the North of Horsham development should be assessed. The basis for the statement that significant operational vibrations are unlikely should be explained.	8.10 of this ES chapter. Effects on residents of the new development are included within the assessment. The plant and equipment associated with the facility will not produce high levels of vibration. In addition, vibration levels drop off rapidly with distance and the closest receptors are over 200 m away. Therefore, vibration effects from operation of the development have been scoped out.
July 2016/ Informal Consultation	Adam Dracott – Environmental Health Officer at Horsham District Council Agreed to methodology set out in Scoping Request and responses as above. Agreed baseline noise monitoring locations.	Baseline noise monitoring locations are provided in Figure 8.3.
January 2018 Regulation 22 Request	West Sussex County Council Provide further evidence to demonstrate how noise impacts from plant, machinery and activities at the site will be minimised.	Mitigation for the operational aspects of the site is provided in Section 8.6 of this ES chapter.

Table 8.1: Consultation Relevant to Noise and Vibration

Date/Source	Consultee and Issues Raised	How/ Where Addressed
January 2018 Regulation 22 Request	West Sussex County Council Provide further justification to demonstrate that no correction for tonality or impulsivity is appropriate in the assessment, with reference to the conclusions in the previous ES and the issues raised by the Environmental Health Officer.	Paragraph 8.8.3 of this ES chapter. The applicant is also prepared to accept a planning condition to control the rating level of the plant with respect to BS 4142:2014, and hence take into consideration any tonality and impulsivity. This would be agreed with West Sussex County Council prior to the commencement of the operation. See Section 8.6.
January 2018 Regulation 22 Request	West Sussex County Council Clarify what mitigation measures would be provided to off-set the night-time noise impacts at three receptor locations (two of them significant).	Section 8.6 of this ES chapter. The applicant is also prepared to accept a planning condition that requires mitigation to be applied to reduce the significance of effects. See Section 8.13.

Baseline Surveys

- 8.3.5 Three long term baseline sound level surveys were carried out at nearby residential dwellings between 14:30 hours on Wednesday 27th July 2016 until 10:15 hours on Thursday 4th August 2016. The surveys were carried out to determine the existing levels of environmental sound affecting the nearest noise sensitive receptors. A plan showing the approximate location of the measurement positions and site boundary is provided in Figure 8.3.
- 8.3.6 The first long term survey (LT1) was located at 11 Station Road to the south of the site. The microphone was mounted on a pole secured to the garden fence at a height of approximately 2.5 metres above local ground level and placed approximately 20 metres north of the rear façade of the property. The microphone was secured to a height of 2.5 metres to ensure that it was under free field conditions (at least 3.5 metres from any reflecting surfaces, excluding the ground). During the time spent on site setting up the long term survey, the following sound sources were noted affecting the site: road traffic on the A24, passing trains, industrial noise (whirring and reversing alarms), geese and aircraft passing overhead.
- 8.3.7 The second long term survey (LT2) was located at Cox Farm to the north west of the site. The microphone was mounted on a pole 1.2 metres above ground level, approximately 10 metres west of the rear façade of the house and under free-field conditions. During the time spent on site setting up the long term survey, the following sound sources were noted affecting the site: aircraft passing overhead, distant road traffic and wind through trees.
- 8.3.8 The third long term survey (LT3) was set-up in the rear garden of Haybarn Cottage to the south east of the site. The microphone was mounted on a pole 1.2 metres above ground level, approximately 3.5 metres east of the rear façade of the house and under free-field conditions. During the time spent on site setting up the long term survey, the following sound sources were noted affecting the site: distant road traffic from the A264, HGVs and other vehicles on Langhurstwood Road, birdsong and wind rustling through trees.
- 8.3.9 All sound level measurements were made using 'Class 1' Rion NL-52 sound level meters (SLMs) in accordance with BS 7445-2:1991 (BSI, 1991). Both SLMs were calibrated before and checked after use with a Rion NC-74 calibrator with no significant drift occurring.
- 8.3.10 Meteorological data have been taken from the Met Office Weather Observations Website for the Horsham site. During the survey, period wind speeds were low, not exceeding 2.8 m/s. Rainfall accumulation (over 15 minutes) was generally low with the exception of 2nd August 2016 when up to 12 mm was measured. Analysis of the data has not indicated that noise levels were affected by wind or rainfall and, therefore, no data have been excluded due to meteorological conditions.

Assessment Criteria and Assignment of Significance

Sensitivity of Receptors

8.3.11 Table 8.2 below provides the thresholds used within this assessment for determining the sensitivity of noise and vibration receptors.

Table 8.2: Definitions of Sensitivity

Sensitivity	Descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

8.3.12 The NVSRs considered within this assessment are all residential receptors including private gardens and, therefore, considering the descriptors above, are considered to be of medium sensitivity.

Assessment of Construction Effects

On-Site Construction Works

8.3.13 A qualitative assessment of noise and vibration effects has been undertaken based on the typical construction equipment and plant that would be required for this type of development. It is anticipated that the activity likely to generate the greatest levels of noise and vibration would be piling for foundations if required. The significance of effects have been determined on the basis of professional judgement, baseline sound levels determined from surveys and the semantic scale described in Table 8.3, which refers to guidance contained within the NPPG. Table 8.3 provides the corresponding impact levels in the terminology of the NPPG.

Table 8.3: Methodology for Determining Magnitude of Impact for Construction (and Industrial) Noise and Vibration at Residential NVSRs

Magnitude of Impact	Threshold Effect Level for Residential NVSRs (NPPG)	Examples of Outcomes
High	UAEL ¹	The noise/vibration causes a material change in behaviour and/or attitude. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.
Medium	SOAEL	Noise/vibration can be heard/felt and causes small changes in behaviour and/or attitude. Affects the acoustic character of the area such that there is a perceived change in the quality of life.
Low	LOAEL	A minor shift away from baseline conditions. Noise/vibration can be heard/felt, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.
Negligible	NOEL	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

Note 1: The NPPG indicates that an unacceptable adverse effect (level) occurs above SOAEL; the term UAEL (Upper Adverse Effect Level) has therefore been used to describe effects at this level although it is not a term referred to in the NPSE or elsewhere in the NPPG except in the table of effects.

Construction Traffic

- 8.3.14 The assessment of changes in road traffic noise levels on local roads as a result of the construction of the proposed development is based on the methods contained within Calculation of Road Traffic Noise (CRTN) and the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7: Noise and Vibration (HD 213/11), which is a method designed for the assessment of new construction, improvements and maintenance of trunk roads. Therefore, the method described in the DMRB is considered as informative but not definitive for the assessment of the traffic noise effects arising from traffic generation associated with the proposed development.
- 8.3.15 Further details of the traffic noise assessment are provided within the methodology set out below for assessment of operational off-site road traffic noise, with thresholds of impact magnitude provided in Table 8.4. For a temporary change, such as may arise from construction traffic servicing a construction site, as the noise change is not permanent, and in order to allow the project to proceed at a reasonable rate without undue constraint, it is considered justifiable, following accepted precedent, that the threshold can be raised to a level that is higher than for permanent operational traffic. Therefore, for the purposes of this assessment, the impact thresholds for noise change for each stated operational noise level have been doubled from that of the operational noise assessment.

Assessment of Operational Effects

Operation of the Proposed Facility

8.3.16 Noise effects due to the operation of the proposed facility have been assessed according to the guidance and methodology contained in BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' and the NPPG as presented in Table 8.3 above. The foreword to BS 4142:2014 provides the following introduction for the assessment of human response to sound:

"Response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood."

- 8.3.17 BS 4142:2014 primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e. the 'specific sound' from the proposed development) at residential NVSRs. The specific sound level may then be corrected for the character of the sound (e.g. perceptibility of tones and/or impulses), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
- 8.3.18 The specific sound levels have been determined separately in terms of the $L_{Aeq,T}$ index over a period of T = 1hour during the daytime and T = 15-minutes during the night-time. For the purposes of the Standard, daytime is typically considered to be the period between 07:00 and 23:00 hours and night-time is typically between 23:00 and 07:00 hours. It is also common practice to separate the daytime period into two periods comprising day 07:00 to 19:00 hours and the evening from 19:00 to 23:00 hours, as described in ISO 1996-2:2015 (ISO<,1966). This approach has been adopted for this assessment.
- 8.3.19 The majority of the plant on site would operate continuously over 24 hours/7 days. However, deliveries and exports would only take place during the standard working hours of 07:00 to 18:00 Monday to Saturday, and waste sorting activities would normally also only take place within these hours. For the purposes of this assessment in accordance with BS 4142:2014, it has been assumed that full site operations including HGVs and other external mobile plant would take place during the daytime assessment period, i.e. between 07:00 and 19:00 hrs, and that all operations excluding HGV movements and other external mobile plant would be fully operational during the evening and night-time assessment periods, i.e. between 19:00 and 07:00 hours.

- 8.3.20 Specific sound immissions from the site have been predicted at the NVSRs defined in the study area using SoundPLAN Version 7.2 sound modelling software utilising the propagation method contained in ISO 9613-2:1996 (ISO, 1996). Indicative source data for the plant have been supplied by the technology providers for the site and from measurements undertaken by RPS of similar operations on other sites. Specifications for the sound insulation of the facades of the turbine hall have been provided by one of the potential technology suppliers for the site. All other buildings have been modelled as clad using a standard Kingspan panel. Details of the source data used for the assessment are provided in Appendix 8.1 and a plan indicating the location of the plant is provided in Figure 8.2.
- 8.3.21 For the sound model, standard meteorological conditions have been used with a ground factor of 0 (hard ground) for the site and other industrial premises, and 1 (soft ground) for agricultural land. For each group of NVSRs, a single location has been modelled, which is representative of the closest NVSRs to the site within that group. Predictions have been made at ground floor level for the daytime and evening periods (07:00 to 23:00 hrs) and first floor level for the night-time period (23:00 to 07:00 hrs).
- 8.3.22 At each NVSR, the rating level has been determined from the predicted specific sound level. Where RPS has considered it to be appropriate, a rating penalty has been applied for tonality, impulsivity and/or intermittency of sound as described in the commentary to paragraph 9.2 of BS 4142:2014. This has been applied with consideration of the main sound sources from site that contribute to the level of specific sound at the NVSR location, i.e. in accordance with BS 4142:2014, the character of the sound is only of concern and hence requires consideration at the NVSRs, not at source.
- 8.3.23 Background sound levels have been determined for the daytime, 07:00 to 19:00 hours; evening, 19:00 hours to 23:00 hours and night-time, 23:00 to 07:00 hours periods. BS 4142:2014 requires that the background sound levels adopted for the assessment be representative for the period being assessed. The Standard recommends that the background sound level should be derived from continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night-time period is because it can be subject to a wide variation in background sound level between the shoulder night periods. The accompanying note to paragraph 8.1.4 states that:

"A representative level ought to account for the range of background sounds levels and ought not automatically to be assumed to be either the minimum or modal value."

- 8.3.24 The approach that has been adopted for this project has been to determine the background sound levels for each full daytime, evening and night-time and provide a linear average of the levels calculated for each period. Further information regarding the determination of background sound levels is provided within Section 8.4 'Baseline Conditions'.
- 8.3.25 An initial estimate of the impact of the specific sound has been obtained by subtracting the measured background sound level from the rating level of the specific sound. In the context of the Standard, adverse impacts include, but are not limited to, annoyance and sleep disturbance. Typically, the greater this difference, the greater is the magnitude of the impact defined in the Standard as follows:
 - A difference of around +10 dB or more is likely to be an indication of a material adverse impact, depending on the context.
 - A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
 - 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 material 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.

- 8.3.26 Whilst there is a relationship between the level of impacts determined by the method contained within BS 4142:2014 and the impacts described in the NPPG, there is not a direct link. It is not appropriate to ascribe numerical rating / background level differences to LOAEL and SOAEL because this fails to consider the context of the sound, which is a key requirement of the Standard.
- 8.3.27 The magnitude of impact of the noise in question (i.e. whether above or below SOAEL and LOAEL) has been determined on the basis of the initial estimate from the BS 4142:2014 assessment with reference to the examples of outcomes described within the NPPG and after having considered the context of the sound. It is necessary to consider all pertinent factors, including:
 - The absolute level of the sound;
 - The character and level of the residual sound compared to the character and level of the specific sound; and
 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.
- 8.3.28 In addition to the above, the number of affected NVSRs is considered within the overall significance of effects due to the proposed development.

Off-Site Road Traffic Noise

- 8.3.29 The assessment of changes in road traffic noise levels on local roads as a result of the operation of the proposed development has been based on the methods contained within Calculation of Road Traffic Noise (CRTN) and the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7: Noise and Vibration, which is a method designed for the assessment of new construction, improvements and maintenance of trunk roads. Therefore, the method described in DMRB is considered as informative but not definitive for the assessment of the traffic effects of the proposed development.
- 8.3.30 The calculations are based on traffic flow data contained with Chapter 6: Traffic and Transport, and consider the difference in flows, comparing 'with' and 'without' the proposed development. Both scenarios 'with' and 'without' the proposals include measured 2013 baseline traffic flows and anticipated traffic growth to 2018. In order to assess cumulative effects, a comparison has also been made between the scenario 'with and without other committed developments for the following links:
 - Link 1 Langhurstwood Road Between Mercer Road and A264;
 - Link 2 Langhurstwood Road Between Site Access and Mercer Road;
 - Link 3 A264 East; and
 - Link 4 A264 West.
- 8.3.31 Paragraph 3.5 of DMRB HD 213/11 states that:

"The threshold criteria used for traffic noise assessment during the day is a permanent change in magnitude of 1 dB $L_{A10,18h}$ in the short term (i.e. on opening) or a 3 dB $L_{A10,18h}$ change in the long term (typically 15 years after project opening). For night time noise impacts, the threshold criterion of a 3 dB $L_{night,outside}$ noise change in the long term should also apply but only where the $L_{night,outside}$ is predicted to be greater than 55 dB for any scenario."

8.3.32 Furthermore, (paragraph 3.37):

"A change in road traffic noise of 1 dB $L_{A10,18h}$ in the short term (e.g. when a project is opened) is the smallest that is considered perceptible. In the long term (typically 15 years after project opening), a 3 dB $L_{A10,18h}$ change is considered perceptible."

- 8.3.33 On the basis of the above, changes in road traffic sound emissions will only have the potential to cause or contribute to some harmful or otherwise unwanted effect, like annoyance or sleep disturbance, (i.e. for the change to be an impact) if they are 1 dB L_{A10,18h} or more. Changes in road traffic sound emissions that are less than 1 dB L_{A10,18h} do not give rise to an impact. Consequently, no adverse effect, significant or otherwise, can occur from such changes.
- 8.3.34 The magnitude of impact is also dependent upon the absolute level of the sound. If the levels are low such they do not have the potential to cause or contribute to some harmful or otherwise unwanted effect, like annoyance or sleep disturbance, then the impact would be low regardless of the increase in level. Consequently, where an impact is predicted to occur, the absolute levels of road traffic sound immission are considered in terms of guidance contained within BS 8233:2014, Noise Insulation Regulations and DMRB HD 213/11.
- 8.3.35 BS 8233:2014 provides guideline values for desirable internal ambient noise levels in rooms used for resting, dining and sleeping when they are unoccupied. Impacts are increasingly likely to give rise to adverse effects the greater the road traffic noise immission exceeds the guideline levels contained within BS 8233:2014.
- 8.3.36 On this basis, the guideline internal noise levels contained within BS 8233:2014 have been converted to equivalent external noise levels on the basis that windows are sufficiently open (partially) to provide background ventilation. An external to internal sound level difference of 15 dB has been adopted based on the guidance contained within the report 'Open/Closed Window Research Sound Insulation through Ventilated Domestic Open Windows' (Building Performance Centre, 2007). The Noise Insulation Regulations provide L_{A10,18h} levels above which insulation would be offered, assuming other factors are satisfied. The magnitude of impact is increased if the road traffic noise immission exceeds the threshold levels contained within Noise Insulation Regulations.
- 8.3.37 The methodology described above has been summarised in Table 8.4 below. However, the table has not been used prescriptively; the ultimate determination has been based on professional judgment with consideration for the context of the site and NVSRs being assessed albeit informed by quantitative assessment.

Magnitude of	Absolute Level of Traffic Noise (baseline	Change in Traffic Noise Level
Impact	+ proposed) L _{A10,18hr} dB	L _{A10,18hr} dB
High	≥ 68	≥ 5.0
	≥ 52	≥ 10.0
Medium	≥ 68	3.0 to 4.9
	≥ 52 & < 68	5.0 to 9.9
	< 52	≥ 10.0
Low	≥ 68	1.0 to 2.9
	≥ 52 & < 68	3.0 to 4.9
	< 52	5.0 to 9.9
Negligible	≥ 52 & < 68	1.0 to 2.9
	< 52	1.0 to 4.9
	Any	0.1 to 0.9
No Change	Any	<0.1

Table 8.4: Magnitude of Impact for Road Traffic Noise

Assignment of Significance

8.3.38 The assessment of significance for each aspect of the development has been determined from the NVSR sensitivity and magnitude of impact based on the following matrix.

Sensitivity of	Magnitude of	Impact			
Receptor	No Change	Negligible	Low	Medium	High
Negligible	None	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	None	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	None	Negligible or Minor	Minor	Moderate	Moderate or Major
High	None	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	None	Minor	Moderate or Major	Major or Substantial	Substantial

Table 8.5: Assessment Matrix for the Determination of the Significance of Effect

- 8.3.39 Where the matrix offers more than one significance option, professional judgement has been used to decide which option is most appropriate.
- 8.3.40 The broad definitions of the terms above are as follows:
 - Substantial: These effects represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
 - Major: These effects are considered to be very important considerations and are likely to be material in the decision-making process.
 - Moderate: These effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
 - Minor: These effects may be raised as local factors. They are unlikely to be critical in the decisionmaking process, but are important in enhancing the subsequent design of the project.
 - Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
- 8.3.41 In general, only effects that are moderate and above are considered to be significant in terms of the EIA Regulations in this assessment.

8.4 Limitations of the Assessment

- 8.4.1 In all assessments, it is good practice to consider uncertainty, which can arise from a number of different aspects of an assessment. There is a degree of uncertainty associated with: the instrumentation itself; the use of instrumentation, i.e. the measurements; the source terms used; the sound propagation model; and the subjective response of residents to the sound sources.
- 8.4.2 With regard to subjective response, the acoustics standards and guidance adopted for the assessments within this chapter are based on the subjective response of the majority of the population. This is considered to be the best that can be achieved in a population of varying subjective responses, which are dependent upon a wide range of factors.

8.4.3 On the basis of the above, whilst the magnitude of uncertainty has not been quantitatively defined, measures have been taken to minimise this aspect in accordance with best practice.

Baseline Characterisation

- 8.4.4 Uncertainty due to instrumentation error has been significantly reduced with the introduction of modern instrumentation and is reduced further by ensuring that all instrumentation is calibrated before and after each measurement period and is within accepted calibration intervals.
- 8.4.5 Uncertainty in the baseline data has been reduced significantly by carrying out baseline sound monitoring over a period of seven days in some locations, allowing analysis of how representative the baseline data are given the naturally varying sound level at NVSRs within the vicinity of the site.

Operation of the Proposed Facility

- 8.4.6 Operational sound emissions have been determined from sound power data provided by the technology providers and from data within the RPS Source Term Library of similar plant and facilities. Therefore, these data are estimates of realistically achievable sound levels although the final plant servicing the facility may vary from that which has been modelled. However, any plant included in the facility would need to comply with the Environmental Permitting Regulations (EPR), and therefore demonstrate that the techniques used represent Best Available Techniques (BAT), which would include minimising noise immissions at NVSRs, among other requirements.
- 8.4.7 Sound immissions at NVSRs have been calculated using the prediction methodology in ISO 9613-2:1996 (ISO, 1996). For source heights up to 30 metres and prediction distances between 100 and 1000 metres, ISO 9613-2:1996 claims accuracy of +/-3 dB. ISO 9613-2 is widely used for the prediction of industrial noise and is recommended in paragraph 1.5.3.2 of the Horizontal Guidance H3 Part 2 Noise Assessment and Control (Environment Agency *et al*, 2004) and referred to in BS 4142:2014 (BSI, 2014c).
- 8.4.8 On the basis of the above, it is considered that limitations to the assessment have been minimised and that the results provide a robust estimate of the likely noise effects of the development.

Road Traffic Noise Assessment

- 8.4.9 The assessment of noise from road traffic is limited to the traffic data provided. Further details of the assumptions used in deriving the traffic data are provided in Chapter 6: Traffic and Transport.
- 8.4.10 The CRTN prediction method is based on free-flowing traffic on main roads and typical noise levels from cars and HGVs. Vehicles have changed since the time that the guidance was drafted and typically it is expected that HGVs in particular will be quieter. Therefore, the predictions of absolute noise levels produced by road traffic are potentially higher than road traffic noise levels will be in practice. Predictions of changes in noise levels are likely to be robust.

8.5 Baseline Conditions

Existing Baseline Conditions

8.5.1 The results of the baseline sound level surveys are presented in Table 8.6 below. The ambient and background noise levels are given for each monitoring location during the daytime, evening and night-time periods. Further details are provided in Appendix 8.2.

Period	Parameter	11 Station Road	Cox Farm	Langhurst Moat Cottage
Daytime	Baseline ambient noise level, dB LAeq	49	47	44
(07:00 - 19:00)	Background noise level, dB L_{A90}	43	40	43
Evening (19:00 - 23:00)	Baseline ambient noise level, dB LAeq	50	45	43
	Background noise level, dB LA90	42	39	42
Night-time (23:00-07:00)	Baseline ambient noise level, dB LAeq	55	49	48
	Background noise level, dB LA90	36	34	35

Table 8.6: Baseline Sound Level Survey Results

Future Baseline Conditions

- 8.5.2 Since the time of the previous application for the proposed development, the Land North of Horsham development has been subject to a resolution to grant outline planning consent for residential development. This development has the potential to increase the level of noise from road traffic at receptors that are in close proximity to Langhurst Wood Road, including Langhurst Moat Cottage and Grayland's Lodge, in addition to properties within the Land North of Horsham development itself. As the scheme is residential, these increases are mainly expected to occur during the daytime i.e. between 07:00 and 23:00 hrs.
- 8.5.3 The assessment of noise from the site is primarily based on the background sound levels L_{A90,T} dB, which are the baseline levels that are exceeded for 90% of the relevant period, in accordance with the BS 4142:2014 methodology. Reference is also made to the residual sound levels, which are based on the average energy within the baseline sound. It is unlikely that any increase to the baseline traffic would cause a notable increase in the background sound levels, particularly at night, which is the most sensitive period. Although residual sound levels may increase as a result of the Land North of Horsham development, this again is unlikely to affect night-time levels. Therefore, future baseline conditions are not likely to significantly alter the sound climate during the most sensitive period. If there is any change, the noise levels would likely increase and, therefore, the assessment based on existing sound levels has been considered as a worst-case.
- 8.5.4 In order to ensure that effects from the 3Rs Facility on the future residents of the land North of Horsham scheme are considered, these future residential properties have been included as sensitive receptors within this assessment.
- 8.5.5 Cumulative noise effects due to road going traffic have been considered with the Land North of Horsham development within Section 8.10 on Cumulative Effects.

8.6 Incorporated Enhancement and Mitigation

8.6.1 The mitigation measures proposed as part of the 3Rs Facility design in relation to noise and vibration include the following.

Construction Phase

8.6.2 Construction works would follow Best Practicable Means (BPM) outlined in Section 72 of the Control of Pollution Act 1974 (as amended) to minimise noise and vibration effects. Such details will be required by the Construction Environmental Management Plan (CEMP) to be submitted to and agreed in writing with West Sussex County Council prior to commencement of construction activities and following the appointment of a

contractor. The following mitigation measures for noise and vibration will be provided within the CEMP. These are based upon the guidance contained in BS 5228:2009 (BSI, 2014a, 2014b):

- Communication: The existing Local Liaison Committee arrangements or the site would be continued for the new development, and occupiers of residential and business properties that are likely to be affected by the works would be notified in advance of the works. A named individual would be appointed to take primary responsibility for the day-to-day implementation of the CEMP during the construction phase and to act as the first point of contact on environmental matters for with West Sussex County Council, other external bodies and the general public. Information regarding the nature and duration of the works, and named contact details for key members of staff would be displayed on a noticeboard near to the site.
- Standard construction hours: Core working hours would be 07:30 to 19:00 hours Monday to Friday, 08:00 to 16:00 hours on Saturday and at no time on Sundays or on public or bank holidays, with some non-intrusive and internal activities such as fit out and commissioning to be undertaken outside these hours. In the event that noise generating works are required outside of core working hours, this would be agreed with West Sussex County Council prior to commencement of the activity. In such instances the contractor would apply to with West Sussex County Council for written consent prior to work commencing by submitting either a Section 61 consent application or an agreed method statement in line with the Control of Pollution Act.
- Access routes: The sole access point to the site would be from the A264 and then directly north on Langhurstwood Road. Construction traffic routes on the public highway would be controlled through a Construction Traffic Management Plan.
- Equipment: Quieter alternative methods, plant and equipment would be used, where reasonably practicable, as required by the CEMP.
- Worksite: Plant, equipment, site offices, storage areas and worksites would be positioned away from existing NVSRs, where reasonably practicable.
- Screening: Portable acoustic enclosures/screens would be used, as required.
- Maintenance: All vehicles, plant and equipment would be maintained and operated in an appropriate manner, to ensure that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum.

Operational Phase

- 8.6.3 In order to comply with Environmental Permitting Regulations (EPR), the plant would be designed to present Best Available Techniques (BAT), which will include limiting noise generation by the plant where practicable. Of the plant within the facility, the air cooled condensers are likely to result in the most significant effects at NVSRs as they are located externally and require 24/7 operation. The air cooled condensers would be selected such that they would not exceed a sound power level of 97 dB(A), which is the lowest practical level identified by the technology suppliers for the plant. Furthermore, acoustic screening would be installed around the perimeter of the air cooled condensers. Other significant items of plant would be located within buildings or enclosures which would be designed to reduce noise levels, as required. Specifically, the turbine hall, which contains the highest noise generating plant would be designed with a high specification façade and roof to reduce the noise levels emitted from these buildings. Furthermore, the plant would be designed such that it would not be tonal in character at the nearest NVSRs.
- 8.6.4 The proposed development would not result in any increase in vehicles coming to the site above those already permitted. There would, therefore, be no requirement for any additional waste related HGV movements to transport waste to the site over and above the sites extant consent. HGVs would follow the approved access routes to and from site.

8.7 Assessment of Construction Effects

On-Site Construction Works

- 8.7.1 Noise emissions are likely to be highest at the early stages of works i.e. during site preparation and civils works, and would decrease during the plant erection and fit-out stages. Noise emissions during the fit-out as buildings are completed would be very low, as work would be undertaken mostly with hand-tools within the completed structures.
- 8.7.2 For the majority of the construction period, plant on-site would comprise various diesel mechanised construction plant including excavators (with various tool attachments depending upon the task being undertaken), dump trucks, fork-lift trucks, concrete wagons and pumps, mobile cranes and delivery lorries.
- 8.7.3 It is anticipated that the most noise generating activity on site would be piling of foundations. Building foundation loadings are only likely to be high for the main building. Therefore, the need for driven piling is expected to be limited and alternative methods would be employed where possible, i.e. bored.
- 8.7.4 As construction works are likely to be short to medium term, only existing NVSRs need to be considered within the construction assessment. As identified in Section 8.1 of this ES, there are two residential properties (Langford Moat Cottage and Wealden) on Langhurstwood Road approximately 210 metres south east of the site, and several residential properties on Langhurstwood Road, approximately 370 metres south east of the site; residential properties on Station Road, approximately 330 metres south of site; and Cox Farm, approximate 420 metres north-west of site. From the baseline surveys existing ambient sound levels in the area are around 48 to 55 dB L_{Aeq,12hr} during the daytime between 07:00 and 19:00 hours when construction works would take place. On this basis noise from construction activities is likely to be noticeable and may exceed existing ambient sound levels at the closest NVSRs at times, but is unlikely to cause a perceived change in the quality of life.
- 8.7.5 Depending upon the method used, piling has the potential to cause vibration that would be noticeable on-site. However, the propagation of groundborne vibration is subject to significant losses due to the distances between the site and NVSRs and the varying densities of the subsurface geology. Therefore, vibration effects are unlikely to be noticeable at the closest NVSRs, which are more than 200 metres from the site construction activity.
- 8.7.6 In summary, it is unlikely that construction works would generate noise levels at NVSRs that are disturbing or that would affect activities commonly occurring in residential areas. Noise levels may be noticeable for limited and short durations when significant works such as piling are being undertaken during site establishment and foundation construction. Vibration is likely to be imperceptible at the closest NVSRs to the site. Construction activities would take place according to a predetermined schedule following the BPM measures stated within Section 8.6 above. There would be very little change to the evening, night-time and weekend baseline noise conditions as most construction activities would be outside of these more sensitive periods.
- 8.7.7 With reference to Table 8.3, the magnitude of noise impacts would be low and the sensitivity of the receptors is medium. Therefore, there is likely to be a direct, temporary, medium term noise effect on NVSRs of minor adverse significance prior to the implementation of mitigation measures. There would be no change due to vibration and the significance of effects in terms of vibration would therefore be negligible. With reference to the NPPG, construction noise effects are likely to be above the LOAEL but below the SOAEL and vibration effects would be below the NOEL.

Construction Traffic

8.7.8 The magnitude of impacts during the daytime is determined from the absolute traffic noise levels and predicted change in road traffic noise levels at NVSRs comparing the flows for the year 2018 'with' and 'without' construction traffic for the development using the methodology described in Section 8.3 of this

chapter. The predicted road traffic noise levels and magnitude of impacts are summarised in Table 8.7 below. Full traffic calculations are provided in Appendix 8.3.

NVSR	Road Traffic No L _{A10,18h} (dB)	bise Level	Change in Road Traffic Noise Level L _{A10,18h} (dB)	Magnitude of Impact
	Baseline 2018	2018 With Development		
Link 1: Langhurstwood Rd between A264 and Mercer Rd	66.2	66.5	0.3	Negligible
Link 2: Langhurstwood Rd between Site Access and Mercer Rd	65.2	65.6	0.3	Negligible
Link 3: A264 East	79.4	79.4	0.0	Negligible
Link 4: A264 West	79.4	79.4	0.0	Negligible

Table 8.7: Magnitude of Road Traffic Noise Impacts in the Construction Phase

8.7.9 From Table 8.7, the magnitude of impact from construction traffic noise would be negligible. The sensitivity of the receptors is medium. Therefore, the significance of effects from construction traffic noise is negligible.

8.8 Assessment of Operational Effects

Operation of the Proposed Facility

- 8.8.1 The predicted specific sound levels from the facility and the results of the BS 4142:2014 assessment are provided in Table 8.8. Noise contour plots for the daytime, evening and night-time periods are provided in Figures 8.4, 8.5 and 8.6. The change in the ambient sound levels at NVSRs has also been determined by adding the level of residual and specific sound levels.
- 8.8.2 BS 4142:2014 states that acoustic features including tonality, impulsivity, intermittency and features that are otherwise readily distinctive can increase the level of impact over that expected from a basic comparison between the specific sound level and the background sound level. For planning purposes, a subjective assessment of the prominence of the character of a specific sound at the noise sensitive locations should be applied based on the expected characteristics of a similar source.
- 8.8.3 In the experience of RPS, noise emissions from modern well designed plant used in industrial facilities are generally broadband and not dissimilar in character to the sound from a domestic central heating system. Therefore, noise emissions from the proposed facility would generally not be tonal or impulsive by design. It is widely acknowledged that tonal and/or impulsive acoustic features can increase the likelihood of complaint. It is considered commensurate with BAT that these features would therefore be controlled. Although there are some exceptions to this, where processes are difficult to control and may, at times, produce sound that contains impulsive or other specific features, the predictions indicate that the main sound sources are the air cooled condensers; and emissions from the buildings; both of which are unlikely to contain discrete tones or impulsive noise. Therefore, on the basis of the subjective analysis above no character correction has been applied to derive the rating level at any of the NVSRs considered within this assessment. Notwithstanding the consideration that no character corrections are necessary, this aspect can be controlled by condition based upon the acceptable rating level from the facility.

Table 8.8: BS 4142 and Noise Change Assessment of Noise Immissions from the Operation of the Proposed Facility

Location	Background Sound level, dB L _{A90}	Residual Sound Level dB L _{Aeq,T}	Specific Sound Level, dB L _{Aeq,T}	Rating Level, dB Lar,Tr	Rating Level minus Background Sound Level	Total Ambient Sound Level (Specific plus Residual) dB LAeq.T	Change in Ambient Sound Level dB
Day (07:00 to	19:00)						
11 Station Road	43	49	37	37	-6	49	+0
Cox Farm	40	50	32	32	-8	50	+0
Graylands Lodge	43	55	38	38	-5	55	+0
Haybarn Cottage	43	55	39	39	-5	55	+0
Langhurst Moat Cottage	43	55	45	45	+2	56 ¹	+0
North Horsham Scheme	43	55	36	36	-7	55	+0
Evening (19:0	00 to 23:00)	•	•	•		•	
11 Station Road	42	47	35	35	-8	47	+0
Cox Farm	39	45	31	31	-7	46 ¹	+0
Graylands Lodge	42	49	38	38	-4	49	+0
Haybarn Cottage	42	49	34	34	-8	49	+0
Langhurst Moat Cottage	42	49	37	37	-5	49	+0
North Horsham Scheme	42	49	31	31	-11	49	+0
Night (23:00 i	to 07:00)				•	•	•
11 Station Road	36	44	37	37	0	45	+1
Cox Farm	34	43	32	32	-2	43	+0
Graylands Lodge	35	48	39	39	+4	49 ¹	+0
Haybarn Cottage	35	48	35	35	0	48	+0
Langhurst Moat Cottage	35	48	38	38	+3	491	+0
North Horsham Scheme	35	48	32	32	-3	48	+0
1) Noise change is less than 0.5 dB although rounded noise levels vary.							

8.8.4 From Table 8.8, during the daytime period, the difference between the rating and the background sound level would range between -8 dB and +2 dB, with the highest level difference occurring at Langhurst Moat Cottage. During the evening period, the difference between the rating and the background sound level ranges between -11 dB and -4 dB, with the highest level difference occurring at Graylands Lodge. During the night-time period, the difference between the rating and background sound level ranges between -3 dB and +4 dB, with the highest level difference occurring at Graylands Lodge. In the majority of locations for the

majority of the time, the rating level is predicted to be below the background sound level which is an indication of a low impact depending on the context. From BS 4142:2014, a difference of around 5 dB is likely to be an indication of an adverse impact, depending on the context. The rating level would only exceed the background sound level at Graylands Lodge (+ 4 dB), and Langhurst Moat Cottage (+3 dB) (i.e. a total of two residential receptors) during the night-time.

- 8.8.5 Section 8.3 of this chapter states the factors that BS 4142:2014 requires to be taken into consideration when assessing the context of the sound, including the absolute level of sound, including any potential for sleep disturbance, the character and level of the residual sound, and any mitigation that is incorporated into the NVSRs. The absolute levels of specific sound are predicted to be between 32 and 45 dB L_{Aeq,T} during the daytime, 31 and 37 dB L_{Aeq,T} during the evening and between 32 and 39 dB L_{Aeq,T} during the night-time.
- 8.8.6 Table 4 of BS 8233:2014 (BSI, 2014d) contains guidance values for indoor ambient noise levels within dwellings for resting during the daytime and sleeping during the night-time. The guidance levels are 35 dB L_{Aeq,16hour} for daytime (07:00 to 23:00 hrs) resting and 30 dB L_{Aeq,8hr} for night-time (23:00 to 07:00 hrs) sleeping. BS 8233:2014 also recommends that '*for traditional areas that are used for amenity space, such as gardens and patios, it is desirable that the daytime external noise level does not exceed 50 dB L_{Aeq,16hr} with an upper guideline value of 55 dB L_{Aeq,1hr} which would be acceptable in noisier environments'.*
- 8.8.7 Based on the guidance contained within the Report NANR 116 (Building performance Centre, 2007), a standard residential partially open window will provide a sound attenuation of around 15 dB. Based on this guidance, the specific sound from the site, not accounting for other existing sources of sound, would be within the guidance of BS 8233:2014 for indoor ambient noise levels. The specific sound levels are also within the guidance levels for quiet enjoyment of gardens during the daytime and evening.
- 8.8.8 The specific sound levels are predicted to be at least 8 dB below existing residual levels during the daytime, evening and night-time periods at all locations. The noise change assessment indicates that there would be no increase to the ambient sound level at the majority of locations for the majority of times, with the only exception being and at 11 Station Road where it is estimated that there would be an increase in the ambient sound level of 1 dB during the night-time from 44 dB L_{Aeq,8hr} to 45 dB L_{Aeq,8hr}, and, therefore, assuming a sound attenuation of 15 dB for a partially open window, the internal level would still just lie within the guideline level of 30 dB L_{Aeq,8hr} within BS 8233:2014 for internal noise levels within bedrooms. Although the character of the sound may be different from that of road traffic, and therefore may be audible, it is likely to be a broadband sound that is neither tonal nor impulsive and therefore would not be a prominent noise source at any of the NVSR locations.
- 8.8.9 The above assessment indicates that, with the development, at the closest NVSRs, there would be a small change to baseline conditions during the daytime and night-time period and no or a negligible change during the evening period. In the event that noise from the site is audible, it is unlikely to cause any changes in behaviour or attitude or a perceived change in quality of life. Therefore, with respect to national planning guidance in the NPPF, NPSE and NPPG (Table 8.3), noise from operations on site would be at or below the LOAEL.
- 8.8.10 Therefore, with consideration for the context, the impact of noise from activities on site is expected to be low. The sensitivity of receptors is medium so there would be a direct, permanent minor adverse effect due to noise from the operation of the facility.

Off-Site Road Traffic Noise

8.8.11 The magnitude of impacts during the daytime is determined from the absolute traffic noise levels and predicted change in road traffic noise levels at NVSRs comparing the flows for the year 2018 'with' and 'without' the development using the methodology described in Section 8.3 of this chapter. The predicted road traffic noise levels and magnitude of impacts are summarised in Table 8.9 below. Full operational traffic calculations are provided in Appendix 8.4.
NVSR	Road Traffic Sound Level, LA10,18h (dB)		Road Traffic Sound Level, La10,18h (dB)	Magnitude of Impact
	2018Baseline	2018 with Development		
Link 1: Langhurstwood Rd between A264 and Mercer Rd	66.2	67.5	1.3	Negligible
Link 2: Langhurstwood Rd between Site Access and Mercer Rd	65.2	66.8	1.6	Negligible
Link 3: A264 East	79.4	79.5	0.1	Negligible
Link 4: A264 West	79.4	79.4	0.0	Negligible

Table 8.9: Magnitude of Road Traffic Noise Impacts During the Operational Phase

8.8.12 From Table 8.9, the magnitude of impact from road traffic noise would be negligible. The sensitivity of the receptors is medium. Therefore, the significance of effects from road traffic noise would be negligible. It should also be noted that although an assessment of noise from operational traffic has been provided, the traffic numbers are within those agreed within the existing planning permission.

8.9 Assessment of Decommissioning Effects

8.9.1 The activities associated with the future decommissioning of the facility would be similar to those for construction. It is therefore unlikely that this activity would lead to any greater disruption, and it is possible that noise and vibration levels at NVSRs from decommissioning would be quieter than for the construction phase due to improvements in plant technology in future years.

8.10 Assessment of Cumulative Effects

- 8.10.1 A review of proposed projects that may have a cumulative impact with the 3Rs Facility has been undertaken and used to inform this Environmental Statement. The proposed developments considered identified are summarised in Appendix 4.4.
- 8.10.2 In relation to noise and vibration impacts, the following developments have been identified has having the potential to impact cumulatively with the proposed 3Rs Facility and have therefore been examined as part of the assessment:
 - Brookhurst Wood landfill site (development of a materials recycling facility, anaerobic digestion plant and extension to existing landfill site);
 - Land south of Brookhurst Wood landfill site (mechanical biological treatment);
 - Land west of Brookhurst Wood landfill site (proposed facility for compaction and baling of Refuse Derived Fuel);
 - Green's Accident Repair Centre, Horsham (parking and storage of vehicles, plant and equipment); and
 - Land north of Horsham (proposed mixed use strategic development, including up to 2,750 dwellings, business park, retail, community centre, leisure facilities, education facilities and public open space).

Construction Phase

8.10.3 During the construction phase, significant cumulative effects are only likely to occur in the area where the developments have common NVSRs within close proximity (circa 300 metres) of both developments. Cumulative effects would then only be experienced if construction works on both developments were to take place simultaneously. The Land North of Horsham development is such a development. Effective implementation of relevant mitigation measures at both sites should ensure the risk of cumulative noise and vibration effects is minimal. Construction effects from the 3Rs Facility would be controlled through the CEMP. Therefore, cumulative impacts are anticipated to be negligible or low during the construction phase. The sensitivity of residential NVSRs is medium. Therefore, there is likely to be a direct, temporary, medium-term noise effect on NVSRs of negligible or minor adverse significance during the construction phase.

Operational Phase

Operation of the Proposed Facility

- 8.10.4 The Brookhurst Wood Landfill Site and Green's Accident Repair Centre both include industrial processes and therefore have potential to result in cumulative noise effects at existing NVSRs. There are several applications for the Brockhurst Wood Landfill site some of which relate to activities that are currently being carried out on the site. The only notable change with respect to noise is the construction of a new Refuse Derived Fuel (RDF) facility. As these sites are currently operational, it can be assumed that any noise from these sites would contribute to existing baseline ambient sound levels, although the contribution from each site at each NVSR location and has therefore been considered within the primary assessment.
- 8.10.5 It is also noted that for the Brookhurst RDF facility and Green's Accident Repair Centre noise assessments were not submitted as part of the respective planning applications, which is an indication that significant noise effects were not anticipated from these sites.
- 8.10.6 The operational noise assessment indicated that adverse noise effects are only likely to occur from the proposed development during the night-time period at NVSRs to the north east and south east of the site on Langhurstwood Road. Therefore the contribution of the proposed 3Rs Facility to any cumulative noise effects during the daytime would be negligible. Green's Accident Repair Centre is unlikely to operate during the night-time works at the Brookhurst RDF Plant are likely to be minimal. It is therefore anticipated that any cumulative noise effects would be of no greater significance than predicted operational noise effects. Therefore, the cumulative noise impacted is expected to be negligible or low. The sensitivity of receptors is medium so there would be a direct, permanent negligible to minor adverse effect due to cumulative noise from the site and other NVSRs.

Road Traffic Noise

- 8.10.7 The Brookhurst Wood Landfill Site and MBT facility and Green's Accident Repair Centre are currently operational. The Brookhurst RDF plant is likely to contribute a very minor increase in the overall quanta of vehicles accessing the sites. Therefore, the only site that has potential to produce cumulative traffic noise effects is the Land North of Horsham development.
- 8.10.8 Traffic data were provided for the baseline scenario and with development scenario in 2031 for the Land North of Horsham development. Therefore, the 2031 traffic has been used as a baseline for the cumulative traffic noise assessment. Of the links assessed in the Land North of Horsham ES, the only common road links at which cumulative noise effects with the development may occur are:
 - Link 1 Langhurstwood Road Between Mercer Road and A264
 - Link 2 Langhurstwood Road Between Site Access and Mercer Road
- 8.10.9 A cumulative road traffic noise assessment has been carried out for the above road links following the same methodology as used for the operational traffic noise assessment. The magnitude of the road traffic noise impacts is provided in Table 8.10. Full cumulative traffic calculations are provided in Appendix 8.5.

Table 8.10: Magnitude of Cumulative Road Traffic Noise Impacts

NIVED	Road Tr	affic Sound Level, LA10,18h (dB)	Change in Road	Magnitude of Impact	
INVSK	2031 Baseline	2031 with Development + Cumulative Development	Level La10,18h (dB)		
Link 1: Langhurstwood Rd between A264 and Mercer Rd	67.4	69.3	1.9	Low	
Link 2: Langhurstwood Rd between Site Access and Mercer Rd	67.4	68.4	1.0	Negligible	

8.10.10 From Table 8.10, the magnitude of impact from road traffic noise is predicted to be low. The sensitivity of the receptors is medium. Therefore, there would be a direct, permanent cumulative noise effect of minor adverse significance.

8.11 Inter-relationships

8.11.1 Inter-relationships with road traffic have been considered as part of this assessment. Traffic effects are considered in more detail in Chapter 6 of this ES. There are no other inter-relationships with noise and vibration from other aspects that are likely to occur.

8.12 Further Mitigation Measures

Construction Phase

8.12.1 Reasonable mitigation for noise and vibration from construction activities has been provided by applying BPM as outlined within Section 8.6 of this chapter 'Incorporated Mitigation and Enhancement'. With this mitigation in place, construction noise and vibration effects are expected to be minor adverse at worst, and of a temporary nature. On this basis, it is not expected that there will be a need for further mitigation measures to be employed.

Operational Phase

8.12.2 Reasonable mitigation for noise from the operation of the facility has been provided as outlined within Section 8.6 of this chapter 'Incorporated Mitigation and Enhancement'. With this mitigation in place, noise effects from the operation of the facility are expected to be minor adverse at worst. However, as there is potential for change to the final selection of plant, the following condition is proposed to control operational noise immissions:

"The plant will be designed such that the rating level $L_{Ar,Tr}$ of the noise emitted from it shall not exceed the existing representative background sound levels $L_{A90,T}$ (as provided in the Environmental Statement), by more than 3 dB during the appropriate time period at the nearest noise sensitive receptors. The assessment shall be carried out in accordance with BS4142:2014 'Methods for rating and assessing industrial and commercial sound'. Noise monitoring will be carried out post completion to ensure that the operational plant complies with the design requirement presented in this condition. The monitoring procedure will be discussed and agreed with the case officer at WSCC (and/or their consultee on noise) in advance."

8.12.3 Compliance with the above condition will be included in the plant specification.

8.13 Monitoring and Management Strategies

Construction

8.13.1 A CEMP would be in place to ensure that environmental effects, including noise and vibration from the site, are adequately controlled. This will include any requirements for monitoring and management. The CEMP will be agreed in writing with West Susses County Council prior to the commencement of construction works.

Operation

8.13.2 Noise monitoring would be carried out to demonstrate compliance as identified in the planning condition proposed above. It is also noted that that monitoring would be required as part of the Environmental Permit which would set out details of the type of monitoring and the frequency of data collection and reporting. Any monitoring requirements for planning are likely to be similar to those for permitting, so it may be possible to co-ordinate these.

8.14 Residual Effects

8.14.1 Table 8.11 summarises the significance of effects for the construction and the operational phase for the project taking into account the mitigation measures incorporated into the development proposals.

Parameter (e.g. Receptor No 1)	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Construction Phase									
Residential NVSRs on Langhurstwood Road, Station Road and Cox Farm	Medium	Noise from construction works	Short to medium term	Low	Minor Adverse	Noise Measures to be included in the CEMP ref Section 8.6	Low	Minor adverse	Not significant
Residential NVSRs on Langhurstwood Road, Station Road and Cox Farm	Medium	Vibration from construction works	Short to medium term	Negligible	Negligible	No mitigation required	Negligible	Negligible	Not significant
Residential NVSRs on Langhurstwood Road	Medium	Noise from construction traffic	Short to medium term	Negligible	Negligible	No mitigation required	Negligible	Negligible	Not significant
Operational Phase	Madium	Noice from	Longtorm	Low	Minor Advoros	Cite will need	Low	Minor odvoroo	Not cignificant
Road, Station Road and Cox Farm	neulum	operational plant on site	Long term	LUW	winder Auverse	to comply Best Available Techniques as part of the Environmental Permitting Regulations.	LOW	IVIII IOF auverse	not significant
Residential NVSRs on Langhurstwood Road	Medium	Noise from operational traffic	Long term	Negligible	Negligible	No mitigation required	Negligible	Negligible	Not significant

Table 8.11: Summary of Likely Environmental Effects on Noise and Vibration

8.15 Summary and Conclusions

- 8.15.1 A detailed noise and vibration assessment considering the potential effects of emissions generated during the construction and operation of the facility has been undertaken.
- 8.15.2 Mitigation for noise and vibration from construction activities would be provided within the Construction Environmental Management Plan (CEMP) for the site based upon the guidance in 5228:2009 (BSI, 2014a, 2014b). Construction works would follow Best Practicable Means (BPM) outlined in Section 72 of the Control of Pollution Act 1974 (as amended) to minimise noise and vibration effects.
- 8.15.3 A qualitative assessment of construction noise and vibration effects has been carried out with reference to National Planning Practice Guidance for noise (NPPG). The assessment indicates that, with suitable mitigation measures, there is likely to be a direct, temporary, medium term noise effect on noise sensitive receptors (NVSRs) of minor adverse significance. Vibration impacts would be negligible and the significance of effects would therefore be negligible. With reference to the NPPG, construction noise effects might be above the Lowest Observed Adverse Effect Level (LOAEL) but would be below the Significant Observed Adverse Effect Level (SOAEL) and vibration effects would be below the No Observed Effect Level (NOEL).
- 8.15.4 The effects of change in noise levels due to road traffic on the local road network during the construction period have also been considered with reference to the guidance in the DMRB. The assessment indicates that the significance of effects due to operational road traffic noise would be negligible.
- 8.15.5 In order to comply with the Environmental Permitting Regulations, the development would incorporate Best Available Techniques to minimise noise emissions. The air cooled condensers would be selected such that they would not exceed a sound power level of 90 dB(A) as identified within this assessment. HGVs would follow the approved access routes to and from site. Other external plant would be located within buildings or enclosures which would be designed to reduce noise levels, if required.
- 8.15.6 An assessment of the operational noise effects, with the above measures in place has been carried out in accordance with the NPPG and BS 4142:2014. The assessment indicates that at the majority of locations the rating level would not exceed the background sound level, though the background sound level would be exceeded by up to 6 dB during the night-time period at three locations. With consideration for the context, it is possible that noise from site activities would be noticeable on occasions at the closest NVSRs to the site but it would not cause any changes in behaviour or attitude or a perceived change in quality of life. Therefore, with respect to national planning guidance in the NPPG, the level of noise would be at or below the LOAEL. The impact of noise from activities on site is expected to be low. The sensitivity of receptors is medium so there would be a direct, minor adverse effect due to noise from the operation of the facility.
- 8.15.7 The effects of change in noise levels due to road traffic on the local road network during the operational phase have also been considered with reference to the guidance in the DMRB. The assessment indicates that the significance of effects due to operational road traffic noise would be negligible. The traffic numbers associated with the development are also within those agreed within the existing planning permission.
- 8.15.8 Cumulative operational noise effects with other consented developments that have the potential to generate cumulative operational noise effects at receptors within the vicinity of the site have been considered. Although there is potential for cumulative effects to occur, these are likely to be negligible to minor. On this basis, the significance of cumulative effects would be, in the worst case, of minor adverse significance.
- 8.15.9 Cumulative effects of change in noise levels due to road traffic on the local road network have also been considered with reference to the guidance on noise contained in the DMRB. The assessment indicates that the cumulative impact due to operational road traffic noise from this development and other developments would be minor adverse, and the significance of effects would also therefore be minor adverse.

8.15.10 In conclusion, there is the potential for effects of up to minor adverse significance to occur due to noise during the construction of the development and during the operation of the development, and cumulatively with road traffic from other developments. Construction noise would be controlled using best practicable means and operational noise would be controlled using best available technology. The effects due to construction vibration are predicted to be negligible. None of the identified effects would be significant.

8.16 References

British Standards Institution (1991) British Standard 7445-2:1991. Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use.

British Standards Institution (2014a) British Standard 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites - Part 1: Noise.

British Standards Institution (2014b) British Standard 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration.

British Standards Institution (2014c) British Standard 4142:2014. Methods for rating and assessing industrial and commercial sound.

British Standards Institution (2014d) British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings.

Building Performance Centre School of the Built Environment, Napier University (2007) Report NANR116. Open/Closed Window Research – Sound Insulation through Ventilated Domestic open Windows. Edinburgh, Napier University

Department for Communities and Local Government (2012) National Planning Policy Framework: HMSO. March 2012.

Department for Communities and Local Government (2014a) National Planning Policy for Waste: HMSO. October 2014.

Department for Communities and Local Government (2014b) National Planning Practice Guidance

Department for Environment, Food and Rural Affairs (2010) Noise Policy Statement for England. Defra. 2010.

Department of Transport (1988) Calculation of Road Traffic Noise. HMSO. 1988.

Environment Agency, Environment and Heritage Service Northern Ireland and Scottish Environment Protection Agency (2004) Horizontal Guidance for Noise Part 2 – Noise Assessment and Control.

Highways Agency, Transport Scotland, Welsh Government and The Department for Regional Development Northern Ireland (2011) Design Manual for Roads and Bridges. Volume 11. Section 3 - Part 7: Noise and Vibration. November 2011.

Horsham District Council (2015) Horsham District Planning Framework. November 2015.

International Organization for Standardization (1996) ISO 9613-2:1996. Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation.

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West Sussex County Council and South Downs National Park Authority (2010) West Sussex Waste Local Plan. April 2010.

9 Archaeology and Cultural Heritage

9.1 Introduction

- 9.1.1 This chapter assesses the likely effects of the implementation of the proposed Recycling Recovery and Renewable Energy (3Rs) Facility at Langhurstwood Road, Horsham, West Sussex on cultural heritage in terms of archaeology, built heritage and the historic landscape. The likely effects are assessed during the construction and operational phases of the proposed development. Details of the proposed development are presented in Chapter 2 and accompanying figures, which set the basis against which this assessment has been conducted.
- 9.1.2 An Environmental Statement (ES) was produced in support of the application for the consented Waste Transfer Facility at the site. This contained a chapter (Chapter 12) on archaeology, which has been reviewed and taken into consideration in connection with the proposed 3Rs Facility.
- 9.1.3 A report on building recording within the site was produced by SLR Consulting in 2015 (SLR, 2015) as required under condition 13 of the Waste Transfer Station permission. This has also been taken into account in this assessment.

Scope of Study

- 9.1.4 This chapter:
 - Presents the existing environmental baseline established from desk studies, dedicated surveys and consultation undertaken;
 - Identifies and assesses the relative importance of heritage assets likely to be affected by the proposed 3Rs Facility;
 - Identifies any assumptions and limitations encountered in compiling the environmental information;
 - Presents the likely environmental effects on the historic environment, based on the information gathered and the analysis and assessments undertaken to date; and
 - Identifies any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified.
- 9.1.5 The effect, if any, of the proposed development on below ground archaeological remains within and immediately surrounding the site has been considered. In addition, consideration has been given to information on scheduled monuments, registered parks and gardens and registered battlefields, conservation areas, listed buildings and historic landscapes from a wider area so that the effect, if any, of the proposed development on their setting could be considered.

Study Area

- 9.1.6 The study area for the assessment has been based upon recent experience of similar developments, the site visit and consideration of the landscape assessment, including the zone of theoretical visibility (ZTV) that has been defined in Chapter 5. The assessment set out in this chapter, for the purpose of the settings of heritage assets, has focused on the following study area:
 - Designated heritage assets of the highest significance (World Heritage Sites, scheduled monuments, Grade I and II* listed buildings, Grade I and II* registered parks and gardens) – a circle of 5 km radius centred on the proposed site. These radii may be subdivided into distances of 1.5 km, 1.5 to 3 km and 3 to 5 km from the site for greater clarity; and

- Other designated heritage assets (e.g. Grade II listed buildings, conservation areas, locally listed buildings) a circle of 3 km radius centred on the site.
- 9.1.7 With respect to the settings of heritage assets, only those assets which lie within the ZTV are assessed, using that the guidance prepared by Historic England in their document "Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets" (Historic England 2017) along with "Conservation Principles" (Historic England, 2008).
- 9.1.8 For buried archaeological remains that are recorded on the Historic Environment Record but not designated, the study area comprised a circle of 1 km radius centred on the site. Whilst there is no potential for direct effects on heritage assets outside the site, it is considered that information from this study area may inform the evaluation of the sensitivity of the site and the archaeological resources within it.

9.2 Legislation and Policy Context

9.2.1 This section summarises relevant legislation and policies that are relevant to archaeology and cultural heritage issues.

Legislation

Planning (Listed Buildings and Conservation Areas) Act (1990)

9.2.2 Listed buildings are protected under the provisions of 54(i) of the Town and Country Planning Act (1971), as amended by the Planning (Listed Buildings and Conservation Areas) Act (1990), which empowers the Secretary of State for the Department of Culture, Media and Sport (DCMS) to maintain a list of built structures of historic or architectural significance.

Ancient Monuments and Archaeological Areas Act (1979)

9.2.3 Scheduled monuments are protected through the Ancient Monuments and Archaeological Areas Act (1979), which has been updated by the National Heritage Act (1983). Scheduled monuments are maintained on a list held by the Secretary of State for DCMS. Any alterations or works to a scheduled monument (including archaeological investigation) require scheduled monument consent (SMC).

Historic Buildings and Ancient Monuments Act 1953 (as amended)

9.2.4 Historic Battlefields have received recognition under the Historic Buildings and Ancient Monuments Act 1953 (as amended). Such sites are described on a register maintained by Historic England for DCMS, but such designation does not afford statutory protection.

National Policy and Guidance

National Planning Policy Framework (2012)

- 9.2.5 The National Planning Policy Framework (NPPF) (DCLG, 2012) sets out the governments planning policies for England regarding the protection of heritage assets and indicates how these policies should be applied. The NPPF takes an integrated approach to the historic environment and 'heritage assets', including buildings, landscapes and archaeological remains.
- 9.2.6 Section 12, entitled Conserving and Enhancing the Historic Environment provides policy on the conservation and investigation of heritage assets. The objectives of Section 12 can be summarised as seeking the:
 - Delivery of sustainable development;
 - Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
 - Conservation of England's heritage assets in a manner appropriate to their significance; and

- Recognition of the contribution that heritage assets make to our understanding of the past.
- 9.2.7 The NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. Paragraph 128 notes that in determining applications, local planning authorities 'should require an applicant to provide a description of the significance of any heritage assets affected and the contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance'.
- 9.2.8 A heritage asset is defined in the NPPF at page 52 as 'a building, monument, site, place, area or landscape positively identified as having a degree of significance meriting consideration in planning decisions because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).'
- 9.2.9 Setting is defined in the NPPF at page 56 as *'the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.'*
- 9.2.10 Paragraph 131 of the NPPF notes that in determining planning applications, local planning authorities should take account of the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation; the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and the desirability of new development making a positive contribution to local character and distinctiveness.
- 9.2.11 Paragraph 132 notes that when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be.
- 9.2.12 Paragraph 135 notes that 'the effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non designated heritage assets, a balanced judgement will be required, having regard to the scale of any harm or loss and the significance of the heritage asset'.

Planning Practice Guidance

- 9.2.13 The NPPF is supported by the web-based National Planning Practice Guidance (NPPG) (DCLG, 2014). With regard to the section that deals with conserving and enhancing the historic environment, this was last updated on 10th April 2014. The NPPG provides advice on specific issues such as 'What is 'significance'' (paragraph 008) and 'What is the setting of a heritage asset and how should it be taken into account'? (paragraph 013).
- 9.2.14 On the 25th March 2015 Historic England (formerly English Heritage) withdrew the PPS5 Practice Guide. The document was replaced by three Good Practice Advice in Planning Notes (GPAs), 'GPA1: Local Plan Making' (Historic England, 2015a), 'GPA2: Managing significance in Decision-Taking in the historic Environment' (Historic England, 2015b) and 'GPA3: The Setting of Heritage Assets (Historic England, 2017).
- 9.2.15 The GPAs provide supporting guidance relating to good conservation practice. The documents particularly focus on the how good practice can be achieved through the principles included within national policy and guidance. As such, the GPAs provide information on good practice to assist local planning authorities, planning and other consultants, owners, applicants and other interested parties when implementing policy found within the NPPF and Planning Practice Guidance relating to the historic environment.

Conservation Principles, Policies and Guidance (English Heritage, 2008)

- 9.2.16 'Conservation Principles' outlines Historic England's approach to the sustainable management of the historic environment. While primarily intended to ensure consistency in English Heritage's own advice and guidance through the planning process, the document is commended to local authorities to ensure that all decisions about change affecting the historic environment are informed and sustainable.
- 9.2.17 This document remains relevant to the current policy regime in the emphasis placed upon the importance of understanding significance as a means to properly assess the effects of change to heritage assets. The guidance describes a range of heritage values that enable the significance of assets to be established systematically, with the four main 'heritage values' being: evidential, historical, aesthetic and communal. The document emphasises that 'considered change offers the potential to enhance and add value to places...it is the means by which each generation aspires to enrich the historic environment' (paragraph 25).

Development Plan Policy

9.2.18 The development plan for the site comprises the West Sussex Waste Local Plan, developed in partnership with the South Downs National Park Authority, and formally adopted by both authorities in April 2014 and the Horsham District Planning Framework (Horsham District Council, 2015). The site is allocated in the West Sussex Waste Local Plan, shown in Policy Map 4, for waste management development.

West Sussex Waste Local Plan (2014)

9.2.19 The relevant policy from the West Sussex Waste Local Plan is as follows:

Policy W15, Historic Environment

Proposals for waste development will be permitted provided that:

(a) known features of historic or archaeological importance are conserved and, where possible, enhanced unless there are no alternative solutions and there are overriding reasons which outweigh the need to safeguard the value of sites or features;

(b) it would not adversely affect currently unknown heritage assets with significant archaeological interest; and

(c) where appropriate, the further investigation and recording of any heritage assets to be lost (in whole or in part) is undertaken and the results made publicly available. '

Horsham District Planning Framework (2015)

9.2.20 The relevant policy from the Horsham District Planning Framework is as follows:

Policy 34: Cultural and Heritage Assets

'The Council recognises that heritage assets are an irreplaceable resource, and as such the Council will sustain and enhance its historic environment through positive management of development affecting heritage assets. Applications for such development will be required to:

1. Make reference to the significance of the asset, including drawing from research and documentation such as the West Sussex Historic Environment Record;

2. Reflect the current best practice guidance produced by English Heritage and Conservation Area Character Statements;

3. Reinforce the special character of the district's historic environment through appropriate siting, scale, form and design; including the use of traditional materials and techniques;

4. Make a positive contribution to the character and distinctiveness of the area, and ensuring that development in conservation areas is consistent with the special character of those areas;

5. Preserve, and ensure clear legibility of, locally distinctive vernacular building forms and their settings, features, fabric and materials;

6. Secure the viable and sustainable future of heritage assets through continued preservation by uses that are consistent with the significance of the heritage asset;

7. Retain and improves the setting of heritage assets, including views, public rights of way, trees and landscape features, including historic public realm features; and

8. Ensure appropriate archaeological research, investigation, recording and reporting of both above and below-ground archaeology, and retention where required, with any assessment provided as appropriate.'

9.3 Assessment Methodology

- 9.3.1 A draft desk assessment was produced in 2016 and updated in 2018 (Appendix 9.1). The study area was as indicated in paragraph 9.1.6 *et seq*, above. The desk assessment comprised, in the first instance, consultation with the West Sussex Archaeology Advisory Service and their Historic Environment Record (HER). Data on World Heritage Sites, scheduled monuments, listed buildings, registered parks and gardens and registered were was obtained from Historic England. Data on conservation areas and locally listed buildings were obtained from the local planning authority and/or the HER as appropriate. A review of relevant documentary and archival material held in libraries and archives was undertaken. An iterative approach was adopted during this process to determine the scope of the above consultations/searches.
- 9.3.2 A site visit was undertaken in June 2016 to establish the presence of above ground archaeology, whether or not previously recorded. The site visit also provided an indication of the suitability of any further survey techniques and an indication of the settings of nearby designated assets. Given that there has been no significant change in the footprint of the proposed 3Rs Facility since that time, no further site visit has been considered necessary.
- 9.3.3 Further details of the baseline methodology are included in Appendix 9.1.

Relevant Guidance

- 9.3.4 The assessment methodology has been informed by guidance contained within the following documents:
 - Good Practice Guidance (Historic England 2015a, 2015b and 2017); and
 - Conservation Principles, Policies and Guidance (English Heritage, 2008)

Consultation

- 9.3.5 In carrying out the archaeology and cultural heritage assessment consultation has included:
 - A formal request for a Scoping Opinion;
 - Informal scoping including:

- o Initial consultation with the West Sussex Historic Environment Record.
- Post application advice from heritage consultees; and
- Consultation on the revised scheme.
- 9.3.6 The issues raised through the consultation outlined above that are relevant to archaeology and cultural heritage are summarised in Table 9.1 below.
- 9.3.7 A full copy of the Scoping Opinion is contained in Appendix 4.2.

Table 9.1: Consultation Responses Relevant to Archaeology and Cultural Heritage

Date/Source	Consultee and Issues Raised	How/ Where Addressed
October 2015/Formal Scoping Opinion for previous application	 The County Archaeologist raised the following issue: Consideration should be given of the visual impact of the development on heritage assets. The approach set out is considered acceptable. 	The effect, if any, of the development on the settings of heritage assets is considered throughout the chapter and in particular in Section 9.7 Assessment of Construction Effects
	 Recordings have been made of the existing buildings on the site in response to conditions attached to the 2014 permission. The approved documents should be included in the submission and referred to in this ES chapter in relation to mitigation on existing buildings 	The approved documents are included as Appendix 9.2 and are referred to as appropriate within the text.
	 With the erection of new built development on the site, ground excavation is likely to be undertaken so consideration should be given to impacts on buried archaeology including former brickworks structures. The need for proportionate further assessment and mitigation works should be identified in the ES chapter. This may include the need for intrusive archaeological surveys. 	The effect, if any, of the development on the buried heritage assets is considered throughout the chapter and in particular in Section 9.7 Assessment of Construction Effects.
	 Given the potential height of the stack, the impact on the setting of the Graylands Copse Moated Site' scheduled monument (set within a historic parkscape) should be considered. 	The effect, if any, of the development on the setting of Graylands Copse Moated Site' scheduled monument is considered in Section 9.7 Assessment of Construction Effects and in particular at paragraph 9.7.12 <i>et seg.</i>
Consultee responses to previous application January 2017	 The County Archaeologist raised the following issue: Further information is required, in the form of visual evidence (existing and proposed views), to show how the applicant has concluded that the impact of development upon the setting of the nearby Scheduled Ancient Monument would be minor (referring to the medieval moat west of Graylands Copse). Refer NPPF Policies 128, 129, 132, 133; West Sussex Waste Local Plan Policy W15 (b) (Historic Environment); Horsham District Planning Framework, Policy 34(7) (Cultural and Heritage Assets). 	A series of photographs and visualisations has been provided as part of this chapter.
	 Referring to the cited paragraphs of the NPPF above, in order to be able to grant planning permission, the County Planning Authority must first be satisfied, from the evidence supplied, that the proposals will not cause substantial harm to the significance of the scheduled moat (including 	A detailed assessment of the effect of the proposed development on designated assets, including the scheduled monument, has been included as part of the chapter. This has concluded that harm would be

Date/Source	Consultee and Issues Raised	How/ Where Addressed
	 its setting). If there would be substantial harm, there must also be clear evidence that such harm would be outweighed by the public benefits of the proposals. Therefore, clear visual evidence of the expected impact of the proposals upon the setting of the scheduled moat is essential. This should take the form of existing views towards the application area from the moat itself, with photomontages showing the proposed views, in the same form as the 	very limited. The assessment and conclusion is supported by a series of photographs and visualisations also provided as part of this chapter.
	 submitted existing views and proposed views, submitted in the Landscape and Visual Impact Assessment. Without such evidence, the County Planning Authority cannot make a reliable assessment of the visual impact of the proposals upon the setting of the moat, which both the applicant and the County Planning Authority have agreed is a heritage asset of the highest significance. 	
	 A site visit was made on 18th January 2017 by this Council's Senior Archaeologist and Principal Landscape Architect. The taller trees along the edges of Langburstwood. 	The proposed development has been subject to significant redesign to reduce visibility from designated assets
	 The tailet frees along the edges of Langhuistwood Road, between the moat and application area, are mostly deciduous. Using existing and proposed levels information, our preliminary assessment is that the upper parts of the buildings would be clearly visible through the bare branches at this time of year, and the tall stack would be prominently visible, well above the above the tree tops. A thin screen of trees along the western edge of the moat would not prevent a viewer at three of the moat's corners from seeing the new buildings and stack as a marked visual intrusion into the monument's still rural setting. 	
	 The applicant should make the strongest endeavours to provide: Required: photomontages of existing and proposed views of the application area, taken from a minimum of three viewpoints around the moat, just outside its north-west, north-east and south-west corners. Recommended: photomontage of existing and proposed views of the moat and the application area from the locally high ground at the north-eastern corner of the field immediately to the moat's north (understood to be farmed by the same landowner), adjoining the driveway of Graylands House. From visual media from these viewpoints, and with existing and proposed views, it is expected that sufficient information should be available to provide the absent but necessary evidence of visual impact upon the scheduled moat. 	The effect of the proposed development on designated assets, including the scheduled monument, is assessed in this chapter. The assessment and conclusion is supported by a series of photographs and visualisations also provided as part of this chapter.
	Historic England raised the following issues:	The proposed development has been
	 Our comments concern the Graylands Copse Moated Site, which is a scheduled monument very 	subject to significant redesign to reduce visibility from designated

I	Data/Cauraa	Canaultas and Jacuas Dalaad	
	Date/Source	close to the proposed development site. Many	HOW/ Where Addressed
		other heritage assets have been assessed in the Cultural Heritage Chapter of the Environmental	A detailed assessment of the effect of
		Impact Assessment but, with respect to these, we will defer to your local conservation advisors.We have concerns that the effect of the proposed	the proposed development on designated assets, including the scheduled monument, has been
		development on the heritage significance of the Graylands Copse Moat scheduled monument has not been assessed adequately. We also think that the development is likely to cause harm to this scheduled monument by creating a very large and incongruous industrial building within its rural setting. It also seems likely that the proposed development will cause cumulative harm in combination with the proposed "Land North of Horsham" development to the east of the scheduled monument.	included as part of the chapter. This has concluded that harm would be very limited. The assessment and conclusion is supported by a series of photographs and visualisations also provided as part of this chapter.
		 We recommend that further assessment is undertaken of the effect of the proposed development on the setting of the Graylands Copse scheduled monument before planning permission is determined and action should be taken to reduce the harmful effects of the development on this heritage asset. 	
		 We think that the development is likely to cause harm to the Graylands Copse Moat scheduled monument by creating a very large and incongruous industrial building within its rural setting, which is an important aspect of its heritage significance. It also seems likely that the proposed development will cause cumulative harm in combination with the proposed "Land North of Horsham" development to the east of the Graylands Moat scheduled monument. 	The proposed development has been subject to significant redesign to reduce visibility from designated assets.
	W/B 24th July 2017: Meeting between Keith Riley, Cris Foss, Jane Moseley and Tim Dyer	 Suggestions for the colour palette of the new building were made by West Sussex County Council. 	The design of the revised facility has used the 'Western High Weald Woodland and Heath Sub Palette', set out in the High Weald Area of Outstanding Natural Beauty (AONB) <i>Guidance on the selection and use of</i> <i>colour in development</i> (High Weald AONB, 2017) document.
	10th January 2018: Meeting between Jane Moseley, Tim Dyer, Keith Riley Cris Foss, Richard Foss, Dan Smyth, Mark Hilton and Corinna Demmar	 The roof height of the proposed building has been reduced through working with different suppliers and going sub ground level. Two options, a curvilinear form and rectilinear form, were presented, both of which are designed to break up the building mass. Both options are the same height, which has been reduced to 35.92 m above ordnance datum, at the highest point of the roof. Dan Smyth noted the input of the whole team in the evolution of the design, including technical advisers and specialists, the architectural team and the landscape team to achieve this outcome. It was acknowledged that both designs were valid approaches. Tim Dyer expressed a preference for the curvilinear option. 	A new ZTV has been generated using the new, reduced height.

Assessment Criteria and Assignment of Significance

- 9.3.8 In order to reach an understanding of the likely effect that a project may have on a heritage asset, it is necessary to understand the significance and importance of that asset. Establishing the importance of a heritage asset is principally a means of identifying the extent to which the asset should be valued, for example, whether an asset is important on a national or local level.
- 9.3.9 Significance can primarily be understood through examination of why a structure, site or area should be considered as a heritage asset. In the NPPF the significance of an asset is defined as '*The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.* (DCLG 2012, Annex 2)
- 9.3.10 These levels of interest broadly tie in with previous guidance from English Heritage expressed in the document Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage, 2008). This provides guidance on understanding heritage values and also includes a section (Section 6) advising on how to assess heritage significance.
- 9.3.11 According to the guidance published by English Heritage (2008), heritage values fall into the following four inter-related groups.
 - Evidential value the potential of a place to yield evidence about past human activity.
 - Historical value this derives from the ways in which past people, events and aspects of life can be connected through a place to the present. This value tends to be illustrative (providing insights into past communities and their activities) or associative (association with a notable family, person, event or movement).
 - Aesthetic value this derives from the ways in which people draw sensory and intellectual stimulation from a place.
 - Communal value this derives from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory.

Assessment of Asset Importance – Archaeological Assets

- 9.3.12 There are no national government guidelines for evaluating the importance of heritage assets. For archaeological assets, the Department of Culture, Media and Sport (DCMS) has adopted a series of recommended (i.e. non-statutory) criteria for use in the determination of national importance when scheduling ancient monuments. These are expressed in the document Scheduled Monuments (DCMS, 2013). The criteria include period, rarity, documentation, group value, survival/condition, fragility/vulnerability, diversity and potential, and can be used as a basis for the assessment of the importance of historic remains and archaeological sites. However, the document also states that these criteria '*should not be regarded as definitive; but as indicators which contribute to a wider judgement based on the individual circumstances of a case*.'
- 9.3.13 The criteria described above may also be used as a basis for the assessment of the importance of archaeological assets of less than national importance. However, the categories of regional and district/local importance are less clearly established than those for national importance and implicitly relate to local, district and regional priorities, which themselves vary within and between regions. Where available, local, district and regional research agenda, and local or structure plans may assist in this process.
- 9.3.14 It is noted that a high degree of professional judgement is required in the identification of importance for archaeological assets and that approach has been applied to this assessment, guided by acknowledged standards, designations and priorities. It is also important to recognise that buried archaeological remains may not always be well-understood at the time of assessment and can therefore be of uncertain importance.

- 9.3.15 The most recent guidance from any national agency regarding cultural heritage and Environmental Impact Assessment (EIA) is from the Highways Agency and is expressed in Guidance Note 208/07 (August 2007) that now forms part of the Design Manual for Roads and Bridges, Volume 11, Section 3, Part 2 (HA 208/7) (Highways Agency *et al.*, 2007).
- 9.3.16 The following table is primarily based on HA 208/07 and has been used to inform the assessment.

 Table 9.2: Assessing the Importance of Archaeological Assets

Sensitivity	Typical descriptors
Assets of the	World Heritage Sites.
highest	Assets of acknowledged international importance.
significance	Assets that can contribute significantly to acknowledged international research objectives.
	Scheduled monuments.
	Undesignated assets of schedulable quality and importance.
High	Assets that can contribute significantly to acknowledged national research objectives.
Medium	Designated or undesignated heritage assets that contribute to regional research objectives.
Low	Undesignated heritage assets of local importance.
	Assets compromised by poor preservation and/or poor survival of contextual associations.
	Assets of limited value, but with potential to contribute to local research objectives.
Negligible	Assets with very little or no surviving archaeological interest.
Unknown	The importance of the resource cannot be ascertained.

Assessment of Asset Importance – Historic Buildings

- 9.3.17 For historic buildings, assessment of importance is usually based on the designations used in the Listed Building process. Where historic buildings are not listed or where the listing grade may be in need of updating, professional judgement has been used.
- 9.3.18 The criteria used in establishing the importance of historic buildings within the listed building process include architectural interest, historic interest, close historic association (with nationally important people or events) and group value. Age and rarity are also taken into account. In general (where surviving in original or near-original condition), all buildings of pre-1700 date are listed, most of 1700 to 1840 date are listed, those of 1840 to 1914 date are more selectively listed, and thereafter even more selectively. Specific criteria have been developed for buildings of 20th century date. At a local level, buildings may be valued for their association with local events and people or for their role in the community.
- 9.3.19 HA 208/07 provides a basis for the following table as a guide for establishing the importance of historic buildings. This has been used to inform the current assessment.

Table 9.3: Definition of Terms for Establishing the Importance of Historic Buildings

Sensitivity	Typical descriptors
Assets of the	Standing buildings inscribed as of universal importance as World Heritage Sites.
highest	Other buildings of recognised international importance.
significance	Scheduled monuments with standing remains.
-	Grade I and II* listed buildings.
	Other listed buildings that can be shown to have exceptional qualities in their fabric or historical
	association not adequately reflected in the listing grade.
	Conservation areas containing very important buildings.
	Undesignated structures of clear national importance.
High	Grade II listed buildings.
-	Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or
	historical association.
	Conservation areas containing important buildings.
Medium	Historic townscape or built-up areas with historic integrity in their buildings, or built settings (e.g.
	including street furniture and other structures).

Sensitivity	Typical descriptors	
Low	'Locally listed' buildings.	
	Historic (unlisted) buildings of modest quality in their fabric or historical association.	
	Historic townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g.	
	including street furniture and other structures).	
Negligible	Buildings of no architectural or historic note; buildings of an intrusive character.	
Assessment of Asset Importance — Historic Landssanos		

Assessment of Asset Importance – Historic Landscapes

- 9.3.20 The sub-topic of Historic Landscape is recognised as having significant overlaps with other topics, such as landscape and townscape and therefore a multi-disciplinary approach to assessment has been adopted. This is to avoid double counting and duplication of effort. Impacts and effects on landscape and townscape character are reported in Chapter 5 of the ES.
- 9.3.21 There are also significant overlaps with the other cultural heritage sub-topics of archaeological remains and historic buildings. The elements that are considered within those two sub-topics can make significant contributions to the historic landscape. This latter sub-topic has therefore concentrated on the overall Historic Landscape Character (HLC) and its value, rather than the individual elements within it.
- 9.3.22 All landscapes have some level of historic significance, as all of the present appearance of the urban and rural parts of England is the result of human or human-influenced activities overlain on the physical parameters of climate, geography and geology.
- 9.3.23 A number of designations can apply to historic landscapes, including World Heritage Sites (inscribed for their historic landscape value), registered parks and gardens, registered battlefields and conservation areas. Some local plans include locally designated historic landscape areas and historic parks and gardens (or similar). Those in Horsham district are within the town.
- 9.3.24 A model has been produced by the Council for British Archaeology (Rippon, 2004), whereby the historic landscape can be divided up into units that are scaled from smallest to largest, as follows:
 - Elements individual features such as earthworks, structures, hedges, woods etc.;
 - Parcels elements combined to produce, for example farmsteads or fields;
 - Components larger agglomerations of parcels, such as dispersed settlements or straight-sided field systems;
 - Types distinctive and repeated combinations of components defining generic historic landscapes such as ancient woodlands or parliamentary enclosure;
 - Zones characteristic combinations of types, such as Anciently Enclosed Land or Moorland and Rough Grazing;
 - Sub-regions distinguished on the basis of their unique combination of interrelated components, types and zones; and
 - Regions areas sharing an overall consistency over large geographical tracts.
- 9.3.25 The model described above can be used as the principal part of the overall assessment usually known as Historic Landscape Characterisation. However, although characterisation has been undertaken for much of England, there is no specific guidance or advice regarding the attribution of importance or significance to identified character types.
- 9.3.26 The following table is based on the guidance provided in HA 208/07 with regard to evaluating the importance of historic landscape character units and has been used to inform the current assessment.

Sensitivity	Typical descriptors
Assets of the	World Heritage Sites inscribed for their historic landscape qualities.
highest	Historic landscape of international sensitivity, whether designated or not.
significance	Extremely well-preserved historic landscapes with exceptional coherence, time-depth, or other
	critical factor(s).
High	Designated historic landscapes of outstanding interest.
	Undesignated landscapes of outstanding interest.
	Undesignated landscapes of high quality and importance, and of demonstrable national sensitivity.
	Well-preserved historic landscapes exhibiting exceptional coherence, time-depth, or other critical
	factor(s).
Medium	Designated special historic landscapes.
	Undesignated historic landscapes that would justify special historic landscape designation,
	landscapes of regional sensitivity.
	Averagely well preserved historic landscapes with reasonable coherence, time-depth, or other
	critical factor(s).
Low	Robust undesignated historic landscapes.
	Historic landscapes with specific and substantial importance to local interest groups, but with
	limited sensitivity.
	Historic landscapes whose sensitivity is limited by poor preservation and/or poor survival of
	contextual associations.
Negligible	Landscapes with little or no significant historical interest.

Table 9.4: Definition of Terms for Evaluating Historic Landscape Character Units

Assessment of Impact Magnitude – Archaeological Assets

- 9.3.27 The magnitude of an impact is assessed without regard to the value of the heritage asset. In considering the magnitude of impact, the principle established in section 12 of the NPPF that preservation of the asset is preferred, and that total physical loss of the asset is least preferred, has been taken into account.
- 9.3.28 It is not always possible to assess the physical impact in terms of percentage loss and therefore it can be important in such cases to try to assess the capacity of the heritage asset to retain its character and significance following any impact. Similarly, impacts resulting from changes within the settings of buried archaeological assets may also be more difficult to assess as they do not involve physical loss of the resource and may be reversible.
- 9.3.29 The magnitude of the predicted impact is assessed using the criteria expressed in the table below. These are primarily based on the guidance provided in HA 208/07.

Table 9.5: Definition of Terms for Assessment of Magnitude of Impact on Archaeological Assets

Magnitude	Typical criteria descriptors
High	Change to most or all key archaeological elements, such that the asset is totally altered and much of its significance is lost. Substantial change within the setting leading to considerable loss of significance of the asset.
Medium	Changes to many key archaeological elements, such that the asset is clearly modified and there is some loss of significance. Change within the setting leading to some loss of significance of the asset.
Low	Changes to key archaeological elements, such that the asset is slightly altered and there is a slight loss of significance. Slight change within the setting leading to a slight loss of significance of the asset.
Negligible	Very minor changes to key archaeological elements or within the setting that hardly affect the significance of the asset.
None	No substantive change to key archaeological elements or within the setting.

Assessment of Impact Magnitude – Historic Buildings

- 9.3.30 As for archaeological assets, the magnitude of impact in relation to historic buildings is assessed without regard to the importance of the asset, so the total destruction of an insignificant historic building has the same degree of magnitude of impact as the total loss of a high value historic building. Determination of the magnitude of impact is based on the principle that preservation of the asset and its setting is preferred and that total physical loss of the asset and/or its setting is the least preferred.
- 9.3.31 Changes within the settings of historic buildings may result from vibration, noise and lighting issues as well as visual impacts, and may be reversible. Additional methodology regarding the assessment of effects resulting from changes within settings is provided below.
- 9.3.32 The magnitude of the predicted impact is assessed using the criteria expressed in the table below. These are primarily based on the guidance provided in HA 208/07.

Magnitude	Typical criteria descriptors
High	Change to key historic building elements, such that the asset is totally altered and much of its significance is lost. Substantial change within the setting of an historic building leading to considerable loss of significance of the asset.
Medium	Change to many key historic building elements, such that the asset is clearly modified and there is some loss of significance. Change within the setting of an historic building leading to some loss of significance of the asset.
Low	Changes to key historic building elements, such that the asset is slightly altered and there is some loss of significance. Change within the setting of an historic building leading to a slight loss of significance of the asset.
Negligible	Slight changes to historic building elements or within its setting that hardly affect the significance of the asset.
None	No substantive change to fabric or within the setting.

Table 9.6: Definition of Terms for Assessment of Magnitude of Impact on Historic Buildings

Assessment of Impact Magnitude – Historic Landscapes

- 9.3.33 Historic landscapes cannot be destroyed or damaged but impacts on them can change their character. Impacts are assessed using evaluated HLC units, not the elements/parcels/components that contribute towards the character. There may be impacts resulting from changes within the settings of identified units, especially with regard to designated historic landscapes. Additional methodology regarding the assessment of effects resulting from changes within settings is provided at paragraph 9.3.42 et seq below.
- 9.3.34 The magnitude of the predicted impact is assessed using the criteria expressed in the table below. These are primarily based on the guidance provided in HA 208/07.

Table 9.7: Definition of Terms for Assessment of Magnitude of Impact on Historic Landscapes

Magnitude	Typical criteria descriptors
High	Change to most or all key historic landscape elements, parcels or components; extreme visual
	effects; gross change of noise or change to sound quality; fundamental changes to use or access;
	resulting in total change to HLC unit and complete loss of significance.
Medium	Changes to many key historic landscape elements, parcels or components; visual change to many
	key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable
	changes to use or access; resulting in moderate changes to HLC and some loss of significance.
Low	Changes to few key historic landscape elements, parcels or components; slight visual changes to
	few key aspects of historic landscape; limited changes to noise levels or sound quality; slight
	changes to use or access; resulting in limited changes to HLC and slight loss of significance.
Negligible	Very minor changes to key historic landscape elements, parcels or components; virtually
	unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes
	to use or access; resulting in a very small change to HLC and very little loss of significance.

Significance of Effects

- 9.3.35 The significance of an effect is a combination of the importance of the heritage asset and the magnitude of impact on that asset.
- 9.3.36 Effects can be adverse or beneficial. Beneficial effects are those that mitigate existing impacts and help to restore or enhance heritage assets, therefore allowing for greater understanding and appreciation. Based on the approach in HA 208/07, the following matrix has been used for the assessment of archaeological remains, historic buildings and historic landscapes.

Sensitivity	Magnitude of Impact					
	None	Negligible	Low	Medium	High	
Negligible	Neutral	Negligible	Negligible or minor	Negligible or minor	Minor	
Low	Neutral	Negligible or minor	Negligible or minor	Minor	Minor or moderate	
Medium	Neutral	Negligible or minor	Minor	Moderate	Moderate or major	
High	Neutral	Minor	Minor or moderate	Moderate or major	Major or substantial	
Very high	Neutral	Minor	Moderate or major	Major or substantial	Substantial	

Table 9.8: Significance of Effect Assessment Matrix

- 9.3.37 Effects can be either favourable or adverse; however, to avoid confusion; the default position of any effect recorded in this chapter is understood to be adverse unless stated otherwise.
- 9.3.38 Where the matrix provides a split in the level of effects, e.g. moderate/minor, the assessor has exercised professional judgement in determining which of the levels is more appropriate.
- 9.3.39 For the purposes of this assessment, any effect that is moderate, major or substantial is considered to be significant in terms of the EIA Regulations.
- 9.3.40 The duration of the effect is indicated where known using the following terminology.
 - Short term: a period of months, up to one year;
 - Medium term: a period of between one and five years; and
 - Long term: a period of five years or more.

9.3.41 The significance of any effect on a heritage asset is clearly different from the significance of the asset itself.

Settings

- 9.3.42 In 2017, Historic England published the second edition of 'Historic Environment Good Practice Advice' in 'Planning Note 3: The Setting of Heritage Assets' (Historic England, 2017). This guidance provides further advice on the definition of setting and the general principles of setting in the context of strategic planning and development control.
- 9.3.43 Paragraph 2 of the advice document in particular deals with the issue of setting and development control. It advises applicants that the information required in support of applications for planning permission and listed building consents should be no more than is necessary to reach an informed decision, and that activities to conserve or invest need to be proportionate to the significance of the heritage assets affected and the impact on the significance of those heritage assets.
- 9.3.44 Paragraph 19 of the advice document provides the following broad approach to assessment, undertaken as a series of steps that apply proportionately to complex or more straightforward cases.
 - Step 1: identify which heritage assets and their settings are affected.
 - Step 2: assess the degree to which these settings make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated.
 - Step 3: assess the effects of the proposed development, whether beneficial or harmful, on that significance or the ability to appreciate it.
 - Step 4: explore the way to maximise enhancement and avoid or minimise harm.
 - Step 5: make and document the decision and monitor outcomes.
- 9.3.45 To this end the ZTV is a useful tool in assessing in general terms the assets which are likely to be impacted by the proposed development (Historic England, 2017: paragraph 21).
- 9.3.46 An assessment of visual impacts on the heritage assets and their settings needs to take into account a wide variety of factors. These include the location of the asset within the physical landscape, its relationship with contemporary and non-contemporary features within that landscape and the location, size and character of the project in relation to these factors. The assessment then needs to balance the impact of these various considerations on the basis of informed professional judgment.
- 9.3.47 Assessment of the visual effects of the project has been undertaken in accordance with the procedures expressed in the Guidelines for Landscape and Visual Impact Assessment (The Landscape Institute and the Institute of Environmental Management and Assessment, 2013). The findings of the landscape and visual assessment are presented in Chapter 5 of this ES. These findings have been taken into account in considering the impact on settings in this chapter. Where there is the potential for changes within the setting of heritage assets due to noise or other impacts, these have been considered within this chapter using appropriate procedures.
- 9.3.48 Paragraph 17 of the Historic England advice document indicates that there should also be consideration of the sensitivity to change of the setting of a heritage asset. In practice this requires examination of the current setting with regard to identifying elements that contribute to the significance of the asset, elements that make a neutral contribution to the significance of the asset and elements that make a negative contribution (i.e. detract from) the significance of the asset.
- 9.3.49 Once the impact on the heritage asset has been examined, this has been related to the impact scales defined above for each type of heritage asset. The level of impact has been considered against the importance of the heritage asset in the matrix provided in Table 9.8 to reach a conclusion regarding the overall significance of effect. The effects on heritage assets resulting from change within their settings may be adverse or beneficial.

9.4 Limitations of the Assessment

9.4.1 A comprehensive desk assessment has been undertaken using all available relevant sources. On this basis there are no major data limitations.

9.5 Baseline Conditions

- 9.5.1 Figure 9.1 shows heritage assets located within 1 km of the site, while Figure 9.2 shows the designated assets within 1.5 km of the site. Figure 9.3 shows designated assets between 1.5 km and 3 km of the site, Figure 9.4 shows designated assets of the highest significance between 3 km and 5 km of the site and Figure 9.5 shows historic landscape characterisation.
- 9.5.2 Recorded archaeological remains in the wider area range in date from the Roman to the post medieval period.

Prehistoric and Roman

- 9.5.3 While there is relatively little evidence for prehistoric activity in the wider area, the Roman period is reasonably well represented.
- 9.5.4 Evidence for Roman activity in the wider area includes tile kilns at Itchingfield (Porteous & Henderson, 2009: 3), while iron working has been recorded at Broadfield, in Crawley, some 9 km east of the site (Pine, 2013).
- 9.5.5 Stane Street Roman road passes some 4 km west of the site at its nearest point. A section of Stane Street, some 275 metres in length located in Roman Woods, some 4.9 km west of the site is a scheduled monument (list entry number 1005837). At Alfoldean, some 5.3 km west of the site, a bridge carried the road over the River Arun. A roadside settlement was established to the south of the bridge. This included a *mansio*, a substantial building providing facilities, including accommodation and stabling, for travellers associated with the provincial postal service of Roman Britain. The *mansio* is a scheduled monument (list entry number 1005838).
- 9.5.6 There are no recorded remains of confirmed prehistoric or Roman date within or in the immediate vicinity of the site.

Medieval

- 9.5.7 There is little material evidence for Anglo Saxon activity in the area and few of the local place names, are recorded in the Domesday Book of 1086 (Williams and Martin, 1992). Horsham is first mentioned in documents in 947 (Baggs *et al.*, 1986a: 131). Horsham was called a borough in 1235 (Baggs *et al.*, 1986a: 131).
- 9.5.8 Baggs *et al.* (1986b: 204) notes that 'medieval settlement in Warnham evidently originated, as in neighbouring parishes, in outlying swine pastures or denns of manors elsewhere.....A tithing of Warnham was mentioned in 1166, but despite evidence for a 12th century church probably on the site of the present one there is no certainty that a nucleated village existed in the Middle Ages.'
- 9.5.9 Much of the parish of Warnham was wooded during the medieval period. (Baggs *et al,* 1986b: 203). The medieval parish church of St Margaret, Warnham, is located some 1.25 km south west of the site. The building is listed at Grade I (list entry number 1026877).
- 9.5.10 Several further medieval buildings and sites are recorded in the wider area. Cox Farmhouse is located in fields on the east side of the A24 road, some 400 metres north west of the site. The farmhouse is a listed building, listed at Grade II (HER number MWS9936, list entry number 1026892). Lower Chickens

Farmhouse, located on the west side of the A24, some 750 metres west of the site, is also listed at Grade II (HER number MWS12214, list entry number 1181419), as is Weston Place, located some 680 metres south west of the site (list entry number 1026885).

- 9.5.11 A medieval moated site is located some 60 metres east of Langhurstwood Road at the access point to the proposal site and some 100 metres north of Graylands Farm. The list entry notes that 'all four arms of the moat are water-filled....No indication of buildings survive on the island although brick foundations were visible until recently on the western side. These are likely to be associated with the re-use of the monument as a landscape feature, adapted as part of the grounds of Graylands, probably in the mid-19th century when the island was planted with exotic species of trees and shrubs. A bridge was also constructed in this period, the brick foundations of which are situated on either side of the northern part of the east arm of the moat.' The moated site is a scheduled monument (list entry number 1010500, HER number MWS3534).
- 9.5.12 The evidence of later mapping indicates that the site and wider area was probably formed into fields from woodland and used for pasture during the later medieval period. There is no evidence for medieval settlement activity within the site.

Post-medieval and Modern

- 9.5.13 The picture of settlement and activity in the wider area during the early post medieval period was presumably similar to that of the later medieval period.
- 9.5.14 Baggs *et al.* (1986b: 204) notes that '*Warnham village grew up as a roadside settlement on a valley site presumably chosen for access to water'.*
- 9.5.15 There is a number of surviving post medieval buildings in the wider area. Durfold Manor is located west of the A24 road some 870 metres north west of the site. The building is listed at Grade II (list entry number 1181432). Geerings, located some 900 metres north west of the site, is similarly listed at Grade II (list entry number 1354260), as is Little Daux, (list entry number 1026886), Great Daux (list entry number 1181304, HER number MWS10949) and Weston Cottages (list entry number 1354254), the latter three all located along the A24 road, between 700 and 900 metres south west of the site.
- 9.5.16 Warnham Court and its surrounding parkland, located some 1.1 km south west of the site forms a registered park and garden (list entry number 1001413).
- 9.5.17 Early maps of the wider area show it as being largely rural in nature, with enclosed fields. Warnham, approximately a kilometre to the south west of the site, is shown as a linear settlement along the main road leading towards Dorking to the north. The Horsham tithe map of 1844 shows the site and surrounding area in use as arable land.
- 9.5.18 The railway from Horsham to Dorking, which passes immediately west of the proposal site was opened in 1867. (Baggs *et al.*, 1986a: 204). The first edition Ordnance Survey (OS) 6 inch to the mile map of 1874 shows the railway having been constructed and severing the fields immediately west of the site. Fields shown within or adjacent to the site on the tithe map of 30 years previously had been amalgamated by this time.
- 9.5.19 Parkland is shown on the first edition OS 6 inch to the mile map of 1874 at Holbrook Park, some 300 metres east of the site. An ice house has been recorded within the parkland (HER number MWS3957). The house, Holbrook Park, located approximately a kilometre from the nearest part of the proposal site is a mid-19th century two storey building, cement faced with a balustraded parapet and a projecting Italianate tower at north-east corner with wide eaves cornice on console brackets. The building is listed at Grade II (list entry number 1193406).
- 9.5.20 A number of 19th century farmsteads recorded on the HER, including Andrews Farm (HER number MWS9285) and Graylands Farm (HER number MWS10841), are broadly extant. Several others, including

the site of Gun Barn, (HER number MWS11046), the site of Haybarn, Billingshurst, (HER number MWS11203) and the site of an Outfarm, (HER number MWS12823) are now all totally demolished/lost.

- 9.5.21 Graylands, located some 540 metres north east of the site, is a 19th century regular courtyard farmstead with a detached farmhouse attached to the agricultural range. It is apparently extant with no apparent alteration (HER number MWS10840). The second edition OS of 1897 shows parkland around Graylands, extending as far as the eastern side of Langhurstwood Road (HER number MWS61). The parkland is shown as incorporating the moated site described above at paragraph 9.5.11.
- 9.5.22 The OS edition of 1897 indicates that a brick works had been established on the west side of the railway and north of Station Road, to the south of the site by this time. The brickworks were developed during the late 19th century by the Peter's family (HER numbers MWS5146, MWS5335 and MWS10177).
- 9.5.23 The ES produced as part of the application for a waste transfer and materials recycling facility on the site (WSCC/018/14/NH) in 1024 (SLR, 2014 chapter 12: 11-12) notes that:

"clay extraction and brick manufacture commenced within the application site at the turn of the 20th century, appearing between the publication of the 1897 and 1912 OS maps. The operation included clay extraction across the northern half of the site, with a tramway connecting the working clay pit to the processing buildings and kilns in the northwest. A water tank and engine shed were present towards the centre of the site on rough ground, and a site access was gained by the creation of tracks in the south west corner of the site to cross the railway line and also eastward onto Langhurstwood Road. The site was initially developed by the Peters' family, following which it successively merged with the Sussex Brick Co. Ltd, Sussex and Dorking United Brick Companies and the Redland Group.

The brick works complex had expanded to encompass the full extent of the application site, with an extensive clay pit to the north east and buildings complex extending northwards along the line of the adjacent railway. The expansion correlates with the installation of automatic moulding machinery in the early 1960s which would have facilitated a rapid increase in production capacity.

In the latter part of the 20th century the brick works complex continued to expand. Within the application site these changes were primarily associated with alterations to the building stock. In 1974-76 this included the creation of a large open-sided shed in the centre of the site, a complex of smaller buildings to the east and a kiln in the south east corner. By 1980 the south-westernmost kiln had been removed, and by 1991 the kilns had all been removed, to be replaced by the existing large shed covering the western side of the site. The single-storey brick building which is still present to the east had been retained, and a small building in the south west corner also. Brick production at the site ceased in the 1990s. "

- *9.5.24* The site apparently contains the remains of one of the last surviving Hoffman-type kilns still extant in Sussex (HER numbers MWS5146, MWS5335, MWS10177).
- 9.5.25 The 1912 edition of the OS marks three kilns adjacent to the railway line, apparently Hoffman type kilns, with further processing buildings to their east and north. Of these buildings, the southernmost of the kilns lies within the site, the northern two outside it.
- 9.5.26 The site visit has indicated that the site has largely been cleared of buildings associated with the brickworks. The site is largely covered in concrete hardstanding. The waste transfer/materials recycling facility building is partly of recent construction, but incorporates elements of an earlier steel portal type building (built after 1980, according to cartographic evidence) associated with the brickworks. A small brick built gatehouse or similar survives in the south western part of the site, first shown on the OS in 1962 and a single storey brick structure, formerly an office, survives in the centre of the proposal site. This is rectangular in plan, approximately 20 metres in length and dates from between 1962 and 1974 according to the OS.
- 9.5.27 No other archaeological features were observed or finds made during the site visit.

- 9.5.28 There is limited evidence for prehistoric and Roman activity in the area. The site itself seems to have been woodland and then agricultural land from antiquity onwards. There is no recorded evidence for activity, other than use as agricultural land over the site until the development of the brickworks.
- 9.5.29 Most of the structures associated with the brickworks have been cleared. Those remaining within the site are part of the waste transfer station/materials recycling facility building, which incorporates elements of an earlier steel portal type building associated with the brickworks, small brick built gatehouse or similar surviving in the southwestern part of the site and a single storey brick structure surviving in the centre of the site.
- 9.5.30 The historic landscape characterisation indicates that the proposed development area lies within the *Industrial Processing* character type (HWS5104).

Designated Assets

9.5.31 The site itself does not contain any designated assets.

Designated Assets within 1.5 km of the Site

- 9.5.32 There is one scheduled monument located within 1.5 km of the site. This is the moated site 200 metres west of Graylands Copse (list entry number 1010500). The designated asset itself lies partly within the ZTV.
- 9.5.33 There is one registered park and garden located within 1 km of the site. This is Warnham Court, registered at Grade II (list entry number 1001413). Most of this designated asset lies between 1 and 2 km from the site. The designated asset lies partly within the ZTV.
- 9.5.34 There are 36 listed buildings within 1.5 km of the site. Of these, 35 are listed at Grade II and one, the Parish Church of St Margaret (list entry number 1026877), is listed at Grade I. Of the Grade II listed buildings, three (list entry numbers 1027065, 1027066 and 1193397) are located within the built development of Horsham and 13 (list entry numbers 1026878, 1026879, 1026880, 1026881, 1026882, 1026895, 1026896, 1181495, 1181501, 1284967, 1285086, 1354222 and 1354232), as well as the Grade I listed Parish Church of St Margaret, are located within the built development of Warnham and outside the ZTV.
- 9.5.35 The Warnham Conservation Area lies within 1.5 km of the site at its nearest point. Most of the designated asset lies outside the stack and building ZTV, with only the field in the north at the junction of Church Street and Threestile Road being largely within it.

Designated Assets between 1.5 and 3 km of the Site

- 9.5.36 There are two scheduled monuments located between 1.5 and 3km of the site. These are The 'Castle' moated site, 500 metres east south east of Hawkesbourne Farm (list entry number 1008050) and Motte and bailey castle north of Chennells Brook Farm (list entry number 1014389). Although both assets are nominally located within both the stack and building ZTV, the former is located in woodland which forms its setting and provides screening and the latter is located within the built development of Horsham, which comprises its setting.
- 9.5.37 There are 57 listed buildings located between 1.5 and 3 km of the site. Of these, two are listed at Grade II* and the remainder at Grade II. Of the latter 14 (list entry numbers 1026883, 1026887, 1026888, 1026889, 1026918, 1181334, 1181352, 1181357, 1181361, 1181374, 1354223, 1354253, 1354256 and 1354257) are located within or immediately adjacent to the built development of Warnham and lie outside the ZTV.
- 9.5.38 A further 18 listed buildings (list entry numbers 1026890, 1026891, 1026941, 1026942, 1026943, 1026945, 1027072, 1181160, 1181262, 1181378, 1181536, 1193597, 1354187, 1354234, 1354258, 1354258, 1026955 and 1027071) lie outside the ZTV.

- 9.5.39 In addition, a total of 17 listed buildings (list entry numbers 1027485, 1027486, 1027490, 1027496, 1027512, 1027523, 1027549, 1192066, 1192076, 1286755, 1286787, 1353931, 1353937, 1353940, 1353959, 1354150 and 1354275) are located within the built development of Horsham.
- 9.5.40 There are eight listed buildings located between 1.5 and 3 km of the proposed development area and within of immediately adjacent to the registered park and garden at Warnham Court. Of these, one (list entry number 1354221) is listed at Grade II* and the remainder (list entry numbers 1026894, 1026914, 1026915, 1181160, 1181178, 1285140, and 1354231) at Grade II.

Designated Assets between 3 and 5 km of the Site

- 9.5.41 There are three scheduled monuments located between 3 and 5 km of the site. Stane Street Roman Road (list entry number 1005837) is located some 5 km west of the site.
- 9.5.42 In addition, there are two medieval sites located between 3 and 5 km of the site. These are the medieval moated site, north of Oakdale Farm (list entry number 1012782) and moated site and fishponds 15m south of Chesworth House (list entry number 1021446). The former scheduled monument lies partly within the stack ZTV, but is tree covered.
- 9.5.43 The latter scheduled monument is located to the south of Horsham, lies partly within the ZTV and is largely surrounded by trees. The adjacent Chesworth House comprises the remaining part of a mansion which then became a farmhouse. The north east range dates from the late 15th century, while the south east range was probably built between 1514 and 1524. The building is listed at Grade II* (list entry number 1027063).
- 9.5.44 There are 13 Grade I and Grade II* listed buildings located between 3 and 5 km of the site. Of these, three are listed at Grade I and the remainder at Grade II*. Of the above listed buildings, seven, list entry number 1353908, listed at Grade I and list entry numbers 1027542, 1027571, 1192026, 1286838, 1286966 and 1353938, listed at Grade II* are located within the built development of Horsham.
- 9.5.45 Of the remaining six listed buildings, list entry number 1026916, listed at Grade I lies outside the ZTV. List entry number 1027063, listed at Grade II* is Chesworth House, is associated with the adjacent moated site (a scheduled monument, list entry number 1021446, see paragraph 9.5.41, above).
- 9.5.46 Bonnetts, located some 3.35 km just west of north of the site is listed at Grade II* (list entry number1378124 II*). Taylors, located some 4.4 km just east of north of the site is listed at Grade II* (list entry number 1378127). The parish church of St Mary Magdalene is located some 4.45 km north east of the site and is listed at Grade I (list entry number 1026946). Leonards, located some 4.3 km south east of the site is listed at Grade II* (list entry number 13254200).

9.6 Incorporated Enhancement and Mitigation

- 9.6.1 Chapter 2 of this ES details the mitigation measures proposed as part of the 3Rs Facility design. In relation to archaeology and cultural heritage these include:
 - The location (on previously developed land), nature and design (i.e. an industrial development of appropriate scale and massing) of the proposed development seeks to minimise or remove effects on the settings of designated assets; and
 - The remaining boundary alignments around the proposed development site would be preserved in *situ* and the landscape pattern would remain unchanged.

9.7 Assessment of Construction Effects

On Site Assets

- 9.7.1 The site apparently contains the remains of one of the last surviving Hoffman-type kilns still extant in Sussex (HER numbers MWS5146, MWS5335, MWS10177).
- 9.7.2 Although no above ground remains are visible, there may be below ground remains of the southernmost of three Hoffman kilns formerly standing in the brickworks, the northern two being located outside the boundary of the site. Although there are several examples of Hoffman kilns which have received statutory protection, these are, apparently without exception, standing structures.
- 9.7.3 The heritage values of the heritage asset are as follows:
 - Evidential and Historical The value derives primarily from the buried remains of the kiln. Given that the kiln has been demolished, remains are likely to represent foundations and buried deposits and the evidential value is now low. The historical value is largely illustrative, although there are associations with documented organisations and individuals;
 - Aesthetic Given that the kiln has been demolished and that any remains are buried, any aesthetic value is now very low; and
 - Communal The value of the kiln derives from its symbolic and economic value as part of the local community. Given that the kiln has been demolished and that any remains are buried, any communal value is now very low.
- 9.7.4 The kiln and many of the structures of the brickworks have been demolished and setting makes a contribution to the significance of the kiln mainly in the deterministic sense that the kiln is located at a convenient point in relation to the clay resource. The significance of the kiln is compromised by both poor preservation and poor survival of contextual associations, and is now of limited value, but with the potential to contribute to local research objectives. The kiln is of low significance.
- 9.7.5 The development would result in major changes and the asset would be largely or totally removed, with much of its significance lost and the magnitude of impact is assessed as being high. The effect of the proposed development on the kiln is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.6 The other remaining buildings within the site are part of the waste transfer/materials recycling facility building, which incorporates elements of an earlier steel portal type building associated with the brickworks, a small brick built gatehouse or similar surviving in the southwestern part of the site and a single storey brick structure surviving in the centre of the site. Cartographic and architectural evidence indicates that all these structures are of post-war origin, with none dating to before 1962.
- 9.7.7 The heritage values of these heritage assets are as follows:
 - Evidential and Historical The value derives primarily from the standing remains of the buildings. The largest of these, the steel portal type building has been extensively rebuilt and contains no internal features of archaeological interest. The others are of at most minor significance in the brick making process and the evidential value is now low. The historical value is largely illustrative, although there are associations with documented organisations and individuals;
 - Aesthetic The value derives from the architectural expression of structures of the post war brick making industry; and
 - Communal The value of the buildings derives from their symbolic and economic value as part of the local community.

- 9.7.8 Many of the structures of the brickworks have been demolished and setting makes a contribution to the significance of these surviving assets mainly in the deterministic sense that they are located at a convenient point in relation to the clay resource. The significance of the buildings is compromised by both poor preservation and poor survival of contextual associations, and there is now very little or no surviving archaeological interest. The remaining buildings within the site are of negligible significance.
- 9.7.9 The development would result in major changes and the assets would be largely or totally removed, with much of their significance lost and the magnitude of impact is assessed as being high. The effect of the proposed development on these buildings is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.10 The historic landscape characterisation indicates that the proposed development lies within the *Industrial Processing* character type, (HWS5104). The character type is of low significance and would have a high ability to withstand change. The proposed development would be constructed within existing boundaries and the landscape pattern would remain unchanged. The impact of the proposed development on the historic landscape is assessed as being low. The effect of the proposed development on the asset is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.

On Site Designated Assets

9.7.11 The proposal site does not contain any designated assets.

Designated Assets within 1.5 km of the Site

- 9.7.12 There is one scheduled monument located within 1.5 km of the site. This is moated site 200 metres west of Graylands Copse (list entry number 1010500). The designated asset itself lies partly within the ZTV, mostly that of the stack. The list entry notes that 'all four arms of the moat are water-filled....No indication of buildings survive on the island although brick foundations were visible until recently on the western side. These are likely to be associated with the re-use of the monument as a landscape feature, adapted as part of the grounds of Graylands, probably in the mid-19th century when the island was planted with exotic species of trees and shrubs. A bridge was also constructed in this period, the brick foundations of which are situated on either side of the northern part of the east arm of the moat.' The moated site is a scheduled monument (list entry number 1010500, HER number MWS3534).
- 9.7.13 The heritage values of the scheduled monument are as follows:
 - Evidential and Historical The value derives from the fabric and upstanding remains of the scheduled monument itself and from the likelihood of the survival of buried remains relating to the monument. The historical value is largely illustrative;
 - Aesthetic The value derives from the earthwork remains of the scheduled monument; and
 - Communal This value derives from its symbolic value as part of the local community.
- 9.7.14 There would be no physical impact on the scheduled monument. Any impact would be on its setting. On the basis of consultation during the previous application, a number of visualisations and viewpoint photographs have been provided, to further illustrate the visual impact of the proposal development on the scheduled monument. These are considered below

Viewpoint Location 1 North West Corner of Moated Site 200 Metres West of Graylands Copse

- 9.7.15 This view looks west from the north west corner of the scheduled monument. No part of the Graylands Copse Moated Site is visible, it being behind the photographer. The view is of the field gate to Langhurstwood Road and the trees forming the sinuous woodland between the field and the road.
- 9.7.16 Neither the proposed 3Rs building nor the associated stack would be visible from this viewpoint in summer. Winter views would be filtered by trees and the proposed view indicates that it would be very difficult to see

the proposed 3Rs even at this time of year. The design of the structure, in particular the curved roof and muted colours would further reduce the visibility of the building.

Viewpoint Location 2: North East Corner of Moated Site 200 Metres West of Graylands Copse

- 9.7.17 This view looks slightly north west from the north east corner of the scheduled monument. The northern boundary of the moated site 200 metres west of Graylands Copse is visible as a group of trees in the far left of the photograph. Numerous further trees, both singles and in hedgerows are visible. The scheduled monument forms part of this larger group, making it difficult to discern.
- 9.7.18 The stack associated with the proposed 3Rs Facility would be visible as a skyline feature. It would not compete with the scheduled monument, which is represented by a mature hedgerow and is not prominent in the view. The proposed 3Rs building would not be visible from this viewpoint in summer.
- 9.7.19 It would not be possible to fully mitigate for the effects of the stack in views, although existing mature trees obscure the building in summer and assist in filtering the view in winter.

Viewpoint Location 3: South East Corner of Moated Site 200 Metres West of Graylands Copse

- 9.7.20 This view looks north west from the south west corner of the scheduled monument. The moat of the Graylands Copse Moated Site is visible to the right of the photograph. The view is of the trees forming the sinuous woodland between the field and Langhurstwood Road.
- 9.7.21 Neither the 3Rs building nor the associated stack would be visible from this viewpoint in summer. Winter views, if any, would be filtered by trees. The design of the structure, in particular the curved roof and muted colours would further reduce the visibility of the building.

Viewpoint Location 4: Field South of Graylands

- 9.7.22 This view looks south west from the field to the south of Graylands. The moated site 200 metres west of Graylands Copse is visible as a group of trees below the skyline in the far left of the photograph. Numerous further trees are visible and the scheduled monument forms part of this larger group, making it difficult to discern.
- 9.7.23 The proposed view indicates that the stack associated with the proposed 3Rs facility would be visible as a skyline feature. It would not compete with the scheduled monument, which is not prominent in the view.
- 9.7.24 It would not be possible to fully mitigate for the effects of the stack in views, although existing mature trees assist in filtering the view.
- 9.7.25 The proposed 3Rs building would not be visible from this viewpoint. It is noted that in practice the design of the structure, in particular the curved roof and muted colours would further reduce the visibility of the building from the surrounding area.

Effect on Moated Site

- 9.7.26 There is no public access to the scheduled monument itself, although it is visible from the field gate on Langhurstwood Road from the road some 50 metres north west off the scheduled monument's north westernmost point. The original main function of the scheduled monument as a moated site would have been as a high status domestic dwelling and/or an administrative centre. It is noteworthy that the scheduled monument is located towards the bottom of the slope below the later Graylands, above the stream. This is likely to be to prevent flooding rather than to create views to or from the scheduled monument. Generally, moated sites are not intended to be seen from a distance.
- 9.7.27 The scheduled monument is of highest significance. The setting of the scheduled monument largely comprises the surrounding fields and parkland. Setting makes a significant contribution to the significance of the scheduled monument in that it retains its rural location and forms a parkland feature. It is noted that there

are no designed views to or from the scheduled monument. Within the field containing the scheduled monument as one gets further away to the east the scheduled monument begins to merge with the general landscape (see Viewpoint 1).

- 9.7.28 The impact of the proposed development on the scheduled monument would be entirely visual. Other elements which may affect the settings of heritage assets, such as noise dust etc. are not considered to impact on the setting of the scheduled monument in this instance.
- 9.7.29 In practice, surrounding vegetation would limit or remove views from the designated asset towards the proposed development.
- 9.7.30 Although the proposed 3Rs stack (and in some cases a small part of the building) would be visible in combination with the scheduled monument in the views available, the proposed development would not dominate views. Neither would it draw the eye way from the scheduled monument, which blends into the landscape and which is not visually prominent.
- 9.7.31 There would be no direct impacts on the scheduled monument. Any impacts would be to the setting of the scheduled monument. There would be very minor changes to the setting of scheduled monument. The rural parkland setting of the scheduled monument would be able to be understood in the same way as the baseline position and the magnitude of impact is assessed as being negligible.
- 9.7.32 The scheduled monument is a designated heritage asset of the highest significance. There would be very minor changes to the setting of the scheduled monument and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the SM is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.

Other Assets

- 9.7.33 There is one registered park and garden located within 1 km of the site. This is Warnham Court, registered at Grade II (list entry number 1001413). Most of this designated asset lies between 1 and 2 km from the site.
- 9.7.34 The registered park and garden comprises a mostly 19th century park, laid out from the early 1830s around a country house (Warnham Court, part of which listed at Grade II, list entry number 1181160). There are several other designated assets within and adjacent to the registered park and garden.
- 9.7.35 The heritage values of the registered park and garden are as follows:
 - Evidential and Historical The value derives from the fabric of the designed landscape. The historical value is partly illustrative, but there are associations with architects and garden designers as well as patrons;
 - Aesthetic The value derives from the layout of the designed landscape, largely planned; and
 - Communal This value derives from its symbolic value as part of the local community.
- 9.7.36 The registered park and garden is of high significance. Setting makes a significant contribution to the significance of the registered park and garden. The designated asset lies partly within both the stack and building ZTV, with views towards the site from some parts of it, but with screening provided by trees in many areas.
- 9.7.37 The list entry notes that there are views from the western park boundary southwards over the park and to the distant South Downs National Park. The principal building faces south and the park seems to have been designed so that there are formal views to the lake to the south west of the main house. These views are in the opposite direction of the proposed 3Rs site. To the north of the principal building, woodland provides screening to the north of the registered park and garden. Landscape Viewpoint 7 (Figure 5.15) provides an indication of the existing and proposed view from the north eastern part of the registered park and garden.

While the stack would be visible form this viewpoint, it would form a small part of the view when looking in this direction.

- 9.7.38 There would be minor changes to the setting of the registered park and garden and the magnitude of impact is assessed as being low. The effect of the proposed development on the registered landscape is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.39 There are 36 listed buildings within 1.5 km of the site. Of these, 35 are listed at Grade II and one, the Parish Church of St Margaret (list entry number 1026877), is listed at Grade I.
- 9.7.40 Of the Grade II listed buildings, three (list entry numbers 1027065, 1027066 and 1193397) are located within the built development of Horsham, which forms their setting and on this basis are not considered further.
- 9.7.41 A total of 13 Grade II listed buildings (list entry numbers 1026878, 1026879, 1026880, 1026881, 1026882, 1026895, 1026896, 1181495, 1181501, 1284967, 1285086, 1354222 and 1354232) are located within the built development of Warnham, outside the ZTV and are not considered further.
- 9.7.42 The Warnham Conservation Area lies within 1.5 km of the site at its nearest point. Most of the designated asset lies outside the ZTV, with only the field in the north at the junction of Church Street and Threestile Road being largely within it. The Grade I listed Parish Church of St Margaret (list entry number 1026877), is located at the edge of the conservation area. No conservation area appraisal has been undertaken. The conservation area largely comprises the historic core of the settlement.
- 9.7.43 The heritage values of the conservation area are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the buildings, listed and otherwise, structures and streetscape within the conservation area and the potential for below ground remains. The historical value is largely illustrative;
 - Aesthetic The value derives from the design value of the conservation area in terms of its expression of settlement architecture; and
 - Communal The value of the conservation area derives from its symbolic value as part of the local community, primarily in Warnham and Horsham.
- 9.7.44 The conservation area is of high significance. Setting makes a significant contribution to the significance of the conservation area.
- 9.7.45 The setting of the conservation area primarily comprises the surrounding fields. A visualisation (Viewpoint Location 5) has been produced from a viewpoint within the churchyard of the Parish Church of St Margaret (list entry number 1026877). This shows the existing and proposed views looking towards the proposed development.
- 9.7.46 The stack associated with the proposed 3Rs Facility would be visible as a skyline feature. The proposed 3Rs building would not be visible from this viewpoint. It would not be possible to fully mitigate for the effects of the stack in views although existing mature trees assist in filtering the view. Views to or from the proposed 3Rs Facility would be difficult to obtain in relation to most if not all of the conservation area.
- 9.7.47 There would be slight changes to the setting of the conservation area and the listed buildings therein that would hardly affect it and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the conservation area is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.48 A group of listed buildings is clustered to the south west of the site. Weston Place and the timber framed outbuilding to its north (list entry numbers 1026884 and 1026885, Little Daux (list entry number 1026886), Great Daux (list entry number 1181304, HER number MWS10949) and Weston Cottages (list entry number 1354254) are all located along the A264 road, between 65 and 900 metres south west of the site. The

buildings are each listed at Grade II. They represent a group of houses, of the medieval and post medieval period.

- 9.7.49 The heritage values of the listed buildings are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed buildings and the potential for associated buried archaeological remains. The historical value is largely illustrative;
 - Aesthetic The value derives from the design value of the listed buildings in terms of their expression of the local vernacular and more polite forms of architecture; and
 - Communal The value of the listed buildings derives from their symbolic value as part of the local village and farming community.
- 9.7.50 The listed buildings are of high significance. Setting makes a significant contribution to the significance of the listed buildings.
- 9.7.51 The setting of the listed buildings is primarily each other and the road along which they are located. The A264 road, along which the listed buildings are arranged, runs roughly south east to north west and views towards the proposed development to the north east of the listed buildings would be screened by development and would be difficult to obtain. In any event, the proposed development would form a small part of the view from the listed buildings when looking in its direction.
- 9.7.52 There would be slight changes to the setting of the listed buildings that would hardly affect them and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed buildings is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.53 A small cluster of listed buildings including The Old Manor House (list entry number 1285037), Barn to North east of the Old Manor House (list entry number 1181415) and Cider Mill Farm Cottages (list entry number 1354259) are all located to the west of Knob Hill road, between 1.1 and 1.4 km west of the site. The buildings are each listed at Grade II. They represent a group of houses, of the medieval and post medieval periods.
- 9.7.54 The heritage values of the listed buildings are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed buildings and the potential for associated buried archaeological remains. The historical value is largely illustrative;
 - Aesthetic The value derives from the design value of the listed buildings in terms of their expression of the local vernacular and more polite forms of architecture; and
 - Communal The value of the listed buildings derives from their symbolic value as part of the local village and farming community.
- 9.7.55 The listed buildings are of high significance. Setting makes a significant contribution to the significance of the listed buildings.
- 9.7.56 The setting of the listed buildings is primarily each other and the road along which they are located. The A264 road, along which the listed buildings are arranged, runs roughly north to south and views towards the proposed development to the north east of the listed buildings would be screened by development and would be difficult to obtain. In any event, the proposed development would form a small part of the view from the listed buildings when looking in its direction.
- 9.7.57 There would be slight changes to the setting of the listed buildings that would hardly affect them and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed buildings is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.

- 9.7.58 A group of medieval and post medieval buildings are located along the A24 road between 400 and 900 metres to the west and north west of the site. These include Cox's Farmhouse, a 16th century timber framed building located in fields on the east side of the A24 road (HER number MWS9936, list entry number 1026892), Lower Chickens Farmhouse, a 17th century or earlier timber framed (but mostly refaced) building located on the west side of the A24 (HER number MWS12214, list entry number 1181419), Durfold Manor, a 16th century timber framed house which has been altered and enlarged, located west of the A24 road (and some 400 metres north of the location given by Historic England, list entry number 1181432), Geerings, a 16th century restored timber framed building located some 250 metres west of the A24 road (list entry number 1285015) and Geerings Cottages, a 16th century timber framed cottage located on the west side of the A24 road).
- 9.7.59 The buildings are each listed at Grade II. They represent a group of vernacular houses of the end of the medieval and or early post medieval period.
- 9.7.60 The heritage values of the listed buildings are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed buildings and the potential for associated buried archaeological remains. The historical value is largely illustrative;
 - Aesthetic The value derives from the design value of the listed buildings primarily in terms of their expression of the local vernacular architecture; and
 - Communal The value of the listed buildings derives from their symbolic value as part of the local village and farming community.
- 9.7.61 The listed buildings are of high significance. Setting makes a significant contribution to the significance of the listed buildings. Cox's Farmhouse and Durfold Manor are located within the ZTV, while Lower Chickens Farmhouse, Geerings and Geerings Cottages are located at the edge of the ZTV.
- 9.7.62 The setting of the listed buildings is primarily each other, the road along which they are located and the fields in which the farmhouses stand. The A264 road, along which the listed buildings are arranged, runs roughly north to south and views from here towards the site to the east of the listed buildings would be partly or entirely screened by development and difficult to obtain. Cox's Farmhouse, Lower Chickens Farmhouse, Durfold Manor, Geerings and Geerings Cottages are largely or entirely screened by vegetation.
- 9.7.63 There would be slight changes to the setting of the listed buildings that would hardly affect them and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed buildings is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.64 Burcombe Cottage (list entry number 1026893) is located some 1.05 km north west of the site. The building is listed at Grade II and comprises a restored 17th century timber-framed cottage with plaster infilling.
- 9.7.65 The heritage values of the listed building are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed building and the potential for associated buried archaeological remains. The historical value is largely illustrative;
 - Aesthetic The value derives from the design value of the listed building in terms of its expression of the local vernacular; and
 - Communal The value of the listed building derives from its symbolic value as part of the local community.
- 9.7.66 The listed building is of high significance. Setting makes a significant contribution to the significance of the listed building in the sense of its roadside location.

- 9.7.67 The setting of the listed building is primarily the nearby dwellings and the road along which they are located. The A264 road, along which the listed building lies, runs roughly north to south and views towards the proposal to the north east of the listed buildings would be screened by hedgerows and difficult to obtain.
- 9.7.68 There would be at most slight changes to the setting of the listed building that would hardly affect it and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed building is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.69 Northlands Farmhouse (list entry number 1193425) is located on the west side of Northlands Road, some 1.48 km north east of the site. The building is listed at Grade II and comprises a house, probably of the 17th century, refaced with roughcast, with a tiled roof. There is a 19th century gabled red brick porch.
- 9.7.70 The heritage values of the listed building are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed building and the potential for associated buried archaeological remains. The historical value is largely illustrative;
 - Aesthetic The value derives from the design value of the listed building in terms of its expression of the local vernacular; and
 - Communal The value of the listed building derives from its symbolic value as part of the local community.
- 9.7.71 The listed building is of high significance. Setting makes a significant contribution to the significance of the listed building in the sense that the farmhouse retains its rural, agricultural location. The listed building lies at the edge of the ZTV.
- 9.7.72 The setting of the listed building is primarily the yard and gardens in which it is located, the adjacent farm buildings, the road along which they are located and the surrounding fields. The listed building faces east, away from the proposed development. The proposed development would form a small part of the view from the vicinity of the listed building when looking in its direction.
- 9.7.73 There would be slight changes to the setting of the listed building that would hardly affect it and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed building is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.74 A group of listed buildings is clustered around the minor Northlands Road, approximately 1.1 km east of the nearest part of the site including Hollywick Farmhouse (list entry number 1027067), Holbrook Park (list entry number 1193406), The Moated House (list entry number 1286109) and Holbrook House (list entry number 1354147).
- 9.7.75 The buildings are each listed at Grade II. They represent a group of houses, of the post medieval period (although in the case of the Moated House with earlier origins at least in terms of its site), into the mid-19th century.
- 9.7.76 The heritage values of the listed buildings are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed buildings and the potential for associated buried archaeological remains. The historical value is largely illustrative;
 - Aesthetic The value derives from the design value of the listed buildings in terms of their expression of the local vernacular and more polite forms of architecture; and
 - Communal The value of the listed buildings derives from their symbolic value as part of the local village and farming community.

- 9.7.77 The listed buildings are of high significance. Setting makes a significant contribution to the significance of the listed buildings. The listed buildings lie at the edge of the ZTV.
- 9.7.78 The setting of the listed buildings is primarily each other and the road along which they are located. Northlands Road, along which the listed buildings are arranged, runs roughly north to south and views towards the proposed 3Rs Facility to the north east of the listed buildings would be screened by hedgerows and planting and would be difficult to obtain.
- 9.7.79 There would be slight changes to the setting of the listed buildings that would hardly affect them and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed buildings is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.

Designated Assets between 1.5 and 3 km of the Site

- 9.7.80 There are two scheduled monuments located between 1.5 and 3 km of the site. These are The 'Castle' moated site, 500 metres east south east of Hawkesbourne Farm (list entry number 1008050) and the Motte and bailey castle north of Chennells Brook Farm (list entry number 1014389). Although both assets are nominally located within both the stack and building ZTV, the former is located in woodland which forms its setting and provides screening and the latter is located within the built development of Horsham, which comprises its setting. On this basis no further assessment is made of either asset.
- 9.7.81 There are 57 listed buildings located between 1.5 and 3 km of the site. Of these, two are listed at Grade II* and the remainder at Grade II. Of the latter 14 (list entry numbers 1026883, 1026887, 1026888, 1026889, 1026918, 1181334, 1181352, 1181357, 1181361, 1181374, 1354223, 1354253, 1354256 and 1354257) are located within or immediately adjacent to the built development of Warnham, lie outside the ZTV and are not considered further.
- 9.7.82 A further 18 listed buildings (list entry numbers 1026890, 1026891, 1026941, 1026942, 1026943, 1026945, 1027072, 1181160, 1181262, 1181378, 1181536, 1193597, 1354187, 1354234, 1354258, 1354258, 1026955 and 1027071) lie outside the ZTV and are not considered further here.
- 9.7.83 In addition, a total of 17 listed buildings (list entry numbers 1027485, 1027486, 1027490, 1027496, 1027512, 1027523, 1027549, 1192066, 1192076, 1286755, 1286787, 1353931, 1353937, 1353940, 1353959, 1354150 and 1354275) are located within the built development of Horsham. The settings of these listed buildings comprise the built development of the town and they are not considered further here.
- 9.7.84 There are eight listed buildings located between 1.5 and 3 km of the site and within or immediately adjacent to the registered park and garden at Warnham Court. Of these, one (list entry number 1354221) is listed at Grade II* and the remainder (list entry numbers 1026894, 1026914, 1026915, 1181160, 1181178, 1285140, and 1354231) at Grade II. These listed buildings are considered with the registered park and garden and are not considered further here.
- 9.7.85 On the basis of the above, no further assessment of the effect of the proposed development on those designated assets located between 1.5 and 3 km of the site is necessary.

Designated Assets between 3 and 5 km of the Site

- 9.7.86 There are three scheduled monuments located between 3 and 5 km of the site. Stane Street Roman Road (list entry number 1005837) is located some 5 km west of the site. Although nominally within the ZTV, the scheduled monument is tree covered and the scheduled monument itself is unlikely to have views to the proposed development. On this basis the effect, if any, of the proposed development on the scheduled monument is not considered further here.
- 9.7.87 In addition, there are two medieval sites located within 3 and 5 km of the site. These are the medieval moated site, north of Oakdale Farm (list entry number 1012782) and moated site and fishponds 15 metres
south of Chesworth House (list entry number 1021446). The former scheduled monument lies partly within the stack ZTV, but is tree covered and the scheduled monument itself is unlikely to have views to the proposed development. On this basis the effect, if any, of the proposed development on the scheduled monument is not considered further here.

- 9.7.88 The latter scheduled monument is located to the south of Horsham, lies partly within the ZTV and is largely surrounded by trees. The scheduled monument itself is unlikely to have views to the proposed development. The adjacent Chesworth House comprises the remaining part of a mansion which then became a farmhouse. The north east range dates from the late 15th century, while the south east range was probably built between 1514 and 1524. The list entry notes that the earlier medieval manor house would have occupied the moated site to the south of the current house. The building was altered at the end of the 1920s and is listed at Grade II* (list entry number 1027063).
- 9.7.89 The heritage values of the listed building are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed building and the potential for associated buried archaeological remains. The historical value is partly illustrative, but there are associations with a number of significant families, including the Dukes of Norfolk and the Earls of Arundel;
 - Aesthetic The value derives from the design value of the listed building in terms of its expression of polite architecture from the end of the medieval period onwards; and
 - Communal The value of the listed building derives from its symbolic value as part of the local community.
- 9.7.90 The listed building is of the highest significance. Setting makes a significant contribution to the significance of the listed building in the sense that it retains a semi-rural location in fields on the southern edge of Horsham as well as its spatial association with the adjacent moated site. The listed building lies at the edge of the stack ZTV.
- 9.7.91 The setting of the listed building primarily comprises the gardens and grounds in which it is located, the adjacent moated site and ponds to the south and the farm and other buildings to the north with which it is associated. The surrounding fields form a significant part of the setting of the designated asset. Views towards the site to the north of the listed building would be screened by existing buildings and vegetation and difficult to obtain.
- 9.7.92 There would be at most slight changes to the setting of the listed building that would hardly affect it and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed building is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.93 There are 13 Grade I and Grade II* listed buildings located between 3 and 5 km of the site. Of these, three are listed at grade I and the remainder at Grade II*. Of the above listed buildings seven, list entry number 1353908, listed at Grade I and list entry numbers 1027542, 1027571, 1192026, 1286838, 1286966 and 1353938, listed at Grade II* are located within the built development of Horsham. The settings of these listed buildings comprise the built development of the town and they are not considered further here.
- 9.7.94 Of the remaining six listed buildings, list entry number 1026916, listed at Grade I, lies outside the ZTV. List entry number 1027063, listed at Grade II* is Chesworth House, is associated with the adjacent moated site (a scheduled monument, list entry number 1021446, see paragraphs 9.5.41 and 9.7.88 *et seq*, above).
- 9.7.95 Bonnetts, located some 3.35 km just west of north of the site is listed at Grade II* (list entry number 1378124 II*). The building comprises a house of the late 16th to early 17th century, which had its roofed raised and extended during the 17th century. The building is timber framed on a sandstone rubble plinth.
- 9.7.96 The heritage values of the listed building are as follows:

- Evidential and Historical The evidential value derives primarily from the fabric of the listed building and the potential for associated buried archaeological remains. The historical value is largely illustrative;
- Aesthetic The value derives from the design value of the listed building in terms of its expression of the local vernacular architecture of the early post medieval period; and
- Communal The value of the listed building derives primarily from its symbolic value as part of the local farming community.
- 9.7.97 The listed building is of the highest significance. Setting makes a significant contribution to the significance of the listed building in that it retains its rural, agricultural setting. The listed building lies at the edge of the stack ZTV.
- 9.7.98 The setting of the listed building is primarily the gardens and grounds, the adjacent farm buildings, most of which are shown on the OS first edition map of the area of 1874 and the surrounding fields. Views towards the site to the south of the listed building would be screened by hedgerows and planting and would be difficult to obtain and, in any event, the stack would form a small part of the view when looking in this direction.
- 9.7.99 There would be slight changes to the setting of the listed building that would hardly affect it and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed building is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.100 Taylors, located some 4.4 km just east of north of the site is listed at Grade II* (list entry number 1378127). The building comprises a hall house of the 14th century, which was developed into larger hall during the 15th century and floored during the 16th century. The building was altered during the 17th and 19th centuries.
- 9.7.101 The heritage values of the listed building are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed building and the potential for associated buried archaeological remains. The historical value is largely illustrative;
 - Aesthetic The value derives from the design value of the listed building in terms of its expression of the vernacular architecture of the medieval period and later; and
 - Communal The value of the listed building derives primarily from its symbolic value as part of the local farming community.
- 9.7.102 The listed building is of the highest significance. Setting makes a significant contribution to the significance of the listed building in the sense that it remains in a rural locality with associated, if later, ancillary buildings. The listed building lies at the edge of the ZTV.
- 9.7.103 The setting of the listed building is primarily its gardens and grounds, the adjacent farm buildings, most of which are shown along with the pond and orchard to the north and north west on the OS first edition map of the area of 1874 and the surrounding fields. Views towards the site would be screened by adjacent buildings and planting and would be difficult to obtain and, in any event, the site would form a small part of the view when looking in this direction.
- 9.7.104 There would be slight changes to the setting of the listed building that would hardly affect it and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed building is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.105 The parish church of St Mary Magdalene is located on the west side of Rusper High Street, some 4.45 km north east of the site and is listed at Grade I (list entry number 1026946). The building comprises a west tower of the 15th century. The remainder of the church originally dated from the 14th century and was rebuilt in 1855.

9.7.106 The heritage values of the listed building are as follows:

- Evidential and Historical The evidential value derives primarily from the fabric of the listed building and the potential for associated buried archaeological remains. The historical value is largely illustrative, although there are associations with known individuals through the survival of monumental brasses of the medieval period within the church;
- Aesthetic The value derives from the design value of the listed building in terms of its expression of the ecclesiastical architecture of the late medieval period; and
- Communal The value of the listed building derives primarily from its symbolic value as part of the local village community.
- 9.7.107 The listed building is of the highest significance. Setting makes a significant contribution to the significance of the listed building in that it is located at the heart of the village. The listed building lies at the edge of the ZTV.
- 9.7.108 The setting of the listed building comprises primarily the surrounding churchyard and built development of the village of Rusper, including a number of historic buildings. Views towards the site to the south west of the listed building would be screened by vegetation and difficult to obtain and in any event, the proposed development would form a small part of the view when looking in this direction.
- 9.7.109 There would be slight changes to the setting of the listed building that would hardly affect it and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed building is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.
- 9.7.110 St Leonards, located in countryside on the south east side of Horsham, some 4.3 km south east of the site is listed at Grade II* (list entry number 1354200). The building comprises an early 19th century mansion with elements of the classical style, including a pediment. Pevsner notes that the house dates from c. 1840 with an earlier 18th century centre. This may have been designed by John Johnson.
- 9.7.111 The heritage values of the listed building are as follows:
 - Evidential and Historical The evidential value derives primarily from the fabric of the listed building and the potential for associated buried archaeological remains, particularly within the parkland. The historical value is largely illustrative, although there are associations with known individuals including architects, patrons, landowners etc.
 - Aesthetic The value derives from the design value of the listed building in terms of its expression of the formal architecture of the enlightenment.
 - Communal The value of the listed building derives primarily from its symbolic value as part of the local community.
- 9.7.112 The listed building is of the highest significance. Setting makes a significant contribution to the significance of the listed building in that it retains at least some of its parkland setting, although this has been subdivided. The listed building lies at the edge of the ZTV.
- 9.7.113 The setting of the listed building comprises primarily the surrounding parkland, which is shown on the first edition OS six-inch map of 1879. The parkland is now subdivided and a there has been a degree of built development. Designed views from the listed building are slightly north of the east/ west axis and not towards the proposal site. Views in this direction would be screened by vegetation and difficult to obtain. The proposed development would form a small part of the view when looking in this direction.
- 9.7.114 There would be slight changes to the setting of the listed building that would hardly affect it and the magnitude of impact is assessed as being negligible. The effect of the proposed development on the listed building is assessed as being minor adverse, which is not significant in terms of the EIA Regulations.

9.8 Assessment of Operational Effects

9.8.1 All effects would be at their maximum at the end of the construction phase and no additional operational effects on heritage assets beyond those assessed in Section 9.6 above are likely.

9.9 Assessment of Decommissioning Effects

- 9.9.1 It is assumed that, in the event of decommissioning, all below ground archaeological assets within the site would be removed in their entirety.
- 9.9.2 Effects during the decommissioning phase would be limited to those resulting from changes to the settings of heritage assets during the decommissioning process. Such effects would be short-term and fully reversible. On this basis no significant decommissioning effects on these assets are predicted.

9.10 Further Mitigation Measures

- 9.10.1 The site of the Hoffman kiln, within the north west corner of the site comprises demolished underground remains only. These are currently underneath the existing building. On this basis, no work on the remains can safely or reasonably take place until the superstructure of the building is removed.
- 9.10.2 Following an appropriate level of demolition of the existing building, mitigation of the effect of the development on the Hoffman kiln is proposed through a programme of excavation and recording of the asset prior to construction of the proposed development.
- 9.10.3 Following the works on the site of the Hoffman kiln described above, no further mitigation would be required.
- 9.11 Monitoring and Management Strategies
- 9.11.1 Mitigation would be complete following the construction phase and no future monitoring would be required.
- 9.12 Residual Effects
- 9.12.1 Table 9.9 summarises the significance of effects for the construction and the operational phase for the project taking into account the mitigation measures. It is noted that at the end of the construction phase effects would reach their maximum extent and that there would be no additional effects on below ground archaeology during the operational phase.

Parameter	Sensitivity	Likely	Duration	Magnitude	Significance	Mitigation	Magnitude	Significance	Significant
(e.g. Receptor	of	impact		of impact	of effect		of	of Residual	
No 1)	receptor						Residual	Effect	
,	•						Impact		
Construction Phase	•								
Below ground	Low	Removal of	Long Term	High	Minor adverse	Recording of	Low	Minor adverse	No
archaeology within		archaeological				remains			
the site		remains							
Historic	Low	Damage to	Long Term	Low	Minor adverse	Designed in	Low	Minor adverse	No
Landscape		elements of				-			
		historic							
		landscape							
Designated assets	High to Very	Effect on	Long Term	Low	Minor adverse	Designed in	Low	Minor adverse	No
	High	setting				-			
Operational Phase									
Historic	Low	Damage to	Long Term	Low	Minor adverse	Designed in	Low	Minor adverse	No
Landscape		elements of	-			-			
		historic							
		landscape							
Designated assets	High to Very	Effect on	Long Term	Low	Minor adverse	Designed in	Low	Minor adverse	No
-	High	setting	-			-			

Table 9.9: Summary of Likely Environmental Effects on Archaeology and Cultural Heritage

9.13 Assessment of Cumulative Effects

- 9.13.1 A review of proposed or possible future third party projects that may have a cumulative impact with the proposed 3Rs Facility has been undertaken and used to inform this ES. The projects identified are summarised in Appendix 4.4.
- 9.13.2 In relation to archaeology and cultural heritage impacts, the following developments have been identified has having the potential to impact cumulatively with the proposal and have therefore been examined as part of the assessment:
 - Brookhurst Wood Landfill Site and adjacent land, Langhurstwood Road, Horsham (Construction and operation of a materials recycling facility (Application Ref: DC/2919/06/NH) and Erection of 2 no. carbon vessel systems and associated infrastructure (Planning Ref NC/16/0026).
- 9.13.3 The above are located within a group of existing structures to the north of the site, would have no cumulative impact with the proposed development and are not considered further here.
- 9.13.4 The Land North of Horsham Scheme comprises an outline planning application for a mixed use strategic development. (Application ref: DC/16/1677). The cumulative development site lies immediately to the east of Langhurstwood Road.
- 9.13.5 The cumulative development site includes the moated site 200 metres west of Graylands Copse (a scheduled monument, list entry number 1010500). Effects on the scheduled monument from the proposed development are considered at paragraph 9.7.12 *et seq*, above. The scheduled monument is shown on the illustrative masterplan for the cumulative development as being located within an area reserved for Green Infrastructure. The ES for the cumulative scheme assesses the effect of the cumulative development with the proposed development on the scheduled monument as being negligible and not significant.

9.14 Inter-relationships

9.14.1 The chief inter-relationship with heritage is landscape. This has been considered during the assessment. Further details of the findings of the landscape assessment are provided in Chapter 5 of this ES.

9.15 Conclusions

- 9.15.1 The assessment has found that there are no designated sites (e.g. scheduled monuments, listed buildings) within the proposed development site.
- 9.15.2 There are a number of designated assets in the wider area. A comparison of these against the ZTV has been undertaken and a detailed assessment has been carried out to assess the effects, if any, on these assets as a consequence of the proposed development.
- 9.15.3 There is one scheduled monument located within 1.5 km of the site. This is moated site 200 metres west of Graylands Copse. There is one registered park and garden located within 1 km of the site. This is Warnham Court, registered at Grade II. Most of this designated asset lies between 1 and 2 km from the site.
- 9.15.4 There are 36 listed buildings within 1.5 km of the site. Of these, 35 are listed at Grade III and one, the Parish Church of St Margaret, is listed at Grade I. Of the Grade II listed buildings, three are located within the built development of Horsham and 13, as well as the Grade I listed Parish Church of St Margaret, are located within the built development of Warnham. The Warnham Conservation Area lies within 1.5 km of the site at its nearest point.

- 9.15.5 There are two scheduled monuments located between 1 and 2 km of the site. These are the 'Castle' moated site, 500 metres east south east of Hawkesbourne Farm and the Motte and bailey castle north of Chennells Brook Farm.
- 9.15.6 There are 57 listed buildings located between 1.5 and 3 km of the site. Of these, two are listed at Grade II* and the remainder at Grade II.
- 9.15.7 There are three scheduled monuments located between 3 and 5 km of the site. These are Stane Street Roman Road, the medieval moated site, north of Oakdale Farm and moated site and fishponds 15 metres south of Chesworth House.
- 9.15.8 There are 13 Grade I and Grade II* listed buildings located between 3 and 5 km of the site. Of these, three are listed at grade I and the remainder at Grade II*.
- 9.15.9 There is limited evidence for prehistoric and Roman activity in the area. The site itself seems to have been woodland and then agricultural land from antiquity onwards. There is no recorded evidence for activity, other than use as agricultural land over the proposal site until the development of the brickworks.
- 9.15.10 Most of the structures associated with the brickworks have been cleared. Those remaining within the site are part of the waste transfer station/materials recycling facility building, which incorporates elements of an earlier steel portal type building associated with the brickworks, small brick built gatehouse or similar surviving in the southwestern part of the proposal site and a single storey brick structure surviving in the centre of the proposal site. Cartographic and architectural evidence indicates that all these structures are of post-war origin. Although no above ground remains are visible, there may be below ground remains of the southernmost Hoffman kiln formerly standing in the brickworks in the north western part of the site. Although there are several examples of Hoffman kilns which have received statutory protection, these are, apparently without exception, standing structures. Below ground remains of the on in this location are likely to be of local significance.
- 9.15.11 There is no evidence for the site to contain below ground remains of the highest significance, or of sufficient significance to warrant preservation *in situ*. Appropriate mitigation measures for the proposed development have been incorporated into the assessment of residual effects. They comprise mitigation of the effect of the development on the Hoffman kiln within the site through a programme of excavation and recording of the asset prior to construction of proposed development.
- 9.15.12 No mitigation measures for effects on the settings of designated assets, other than those built into the design of the proposed development, are considered necessary.
- 9.15.13 There are predicted to be no significant effects on buried archaeological remains, the historic landscape, or any designated heritage assets.

9.16 References

Legislation

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Town and Country Planning Act (1971 SI No 78),

Ancient Monuments and Archaeological Areas Act (1979 Si No 46)

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10 Hydrology and Flood Risk

10.1 Introduction

- 10.1.1 This chapter summarises the assessment of hydrology and flood risk associated with the proposed Resource Recovery and Renewable Energy (3Rs) Facility at Langhurstwood Road, Horsham, West Sussex.
- 10.1.2 This chapter describes the policy context, input data and methods used to assess the proposed facility. It reviews the baseline hydrology, flood risk and water quality at the site and assesses the likely effects of the facility taking into account the measures which have been adopted to prevent, reduce, mitigate or offset the identified effects.

Scope of Study

10.1.3 The overall aim of this assessment is to determine whether the proposed facility may affect the hydrology, surface water drainage, flooding or water quality of the site and surrounds, or whether these factors may affect the facility and surrounds.

Study Area

- 10.1.4 The site is located within the former Wealdon Brickworks Site, Langhurstwood Road, West Sussex, occupying a relatively flat lying parcel of land approximately 3.8 hectares in area.
- 10.1.5 A 500 metre search radius for data collection was selected primarily to identify any existing assets or infrastructure that might affect or be affected by the proposed facility (see Figure 10.1 Study Area). A 500 metre radius is considered appropriate for data collection taking into account the nature of the development and likely zone of influence on hydrological receptors. Given the landscape surrounding the development, other ongoing anthropogenic activities are likely to have a greater effect than the proposed facility at a distance beyond 500 metres.

10.2 Legislation and Policy Context

Introduction

10.2.1 This section summarises legislation and policies that are directly relevant to hydrology and flood risk.

Legislation

The European Water Framework Directive 2000

10.2.2 The European Water Framework Directive (WFD) came into force in December 2000 and became part of UK law in December 2003. It aims to protect and enhance the quality of surface water, groundwater, groundwater dependent ecosystems, estuaries and coastal waters. Member States must aim to reach good chemical and ecological status for inland and coastal waters subject to certain limited exceptions. The WFD establishes a strategic framework for managing the water environment and requires a management plan for each river basin to be developed every six years.

Flood Directive 2007

10.2.3 The European Floods Directive came into force in 2007 and aims to engage statutory bodies to draw up flood risk assessments and prepare flood maps and management plans.

Drinking Water Directive (2015)

10.2.4 The Drinking Water Directive concerns the quality of water intended for human consumption. Its objective is to protect human health from adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean.

Environmental Protection Act 1990

10.2.5 The Environmental Protection Act is an Act of the Parliament of the United Kingdom that as of 2008 defines, within England and Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment.

The Environment Act 1995

10.2.6 The Environment Act 1995 (Section 57) amends the Environmental Protection Act 1990 and makes provisions for a risk based framework for the identification, assessment and management of contaminated land within the UK. It includes measures for protection of the environment, including powers to prevent water pollution.

Water Resources Act 1991

- 10.2.7 The Water Resources Act (1991), as amended in 2009, principally relates to the protection of controlled water (i.e. rivers, lakes, canals and groundwater) from pollution. It sets out the responsibilities of the Environment Agency in relation to water pollution, resource management, flood defence, fisheries, and in some areas, navigation.
- 10.2.8 The Water Resources Act regulates discharges to controlled water and groundwater and provides legislation on the definition of controlled waters. The Act enforces the offences of polluting controlled water and places the financial costs of the results of a water pollution incident on the polluter.

Land Drainage Act 1991

10.2.9 The Land Drainage Act 1991 (as amended in 1994) sets out the responsibilities of the Environment Agency, Internal Drainage Boards, local authorities, navigation authorities and riparian owners in the mitigation of flooding.

Water Act 2003

10.2.10 The Water Act 2003 amends the Water Resources Act 1991 to improve the management of long term water resources, primarily through significant changes to the way in which abstraction and impoundment of water is regulated. The Water Act aims for the sustainable use of water resources; strengthening the voice of consumers; a measured increase in competition; and the promotion of water conservation.

Groundwater Regulations (2009)

10.2.11 The Groundwater (England and Wales) Regulations 2009 supplement existing regulations to protect groundwater in England and Wales. These regulations control groundwater pollution from contaminated land. The regulations provide a more flexible, risk-based approach than previous legislation and cover a wider range of substances.

Flood Risk Regulations 2009

10.2.12 These regulations transpose Directive 2007/60/EC on the assessment and management of flood risks for England and Wales. The regulations impose duties on the Environment Agency and local authorities to

prepare preliminary assessment reports about past floods in each river basin district, and the possible harmful consequences of future floods. The Environment Agency is also under a duty to prepare a preliminary assessment map of each river basin district. Following these assessments, the authorities must identify areas which are at significant risk of flooding.

Flood and Water Management Act 2010

10.2.13 The Flood and Water Management Act (2010) implements the recommendations from Sir Michael Pitt's review of the floods in 2007 and aims to improve flood risk management. It designates Lead Local Flood Authorities, whose responsibilities include reviewing all proposed sustainable drainage systems for new planning applications.

Water Act 2014

10.2.14 The Water Act 2014 amends the Water Industry Act 1991 and improves regulation of the water industry through licensing, as well as increasing competition within the water and sewerage industries for the benefit of customers. It also details that the long term resilience of water supply and sewerage systems should be secured. In place of the existing multiple permitting/consent schemes, a single environmental permitting regime for the regulation of the water environment is set out, in addition to the mechanisms through which households can obtain flood insurance.

Environmental Permitting (England and Wales) 2016

10.2.15 The Environmental Permitting (England and Wales) Regulations 2016 regulate discharges to controlled waters.

Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

10.2.16 These regulations implement the Water Framework Directive and set out details of the river basin districts, protected areas and environmental objectives for water bodies (including groundwater).

National Planning Policy

National Policy Statement for Energy (NPS) EN-1, EN-3 and EN-5 (2011)

- 10.2.17 Whilst the National Policy Statements (NPSs) are at the heart of the planning regime for Nationally Significant Infrastructure Projects, they are also recognised as a material consideration in decisions on planning applications. Therefore, where relevant, the policy set out within the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a), the NPS for Renewable Energy Infrastructure EN-3 (DECC, 2011b) and the NPS for Electricity Networks Infrastructure EN-5 (DECC, 2011c) in relation to hydrology and flood risk has been considered.
- 10.2.18 Paragraph 4.8.6 (NPS EN-1) specifically identifies that applicants should have regard to climate change and should assess the resilience of their project to climate change. Paragraph 2.4.1 of NPS EN-5 specifically identifies the potential issues applicants should consider in terms of resilience to climate change.

National Planning Policy Framework (2012)

- 10.2.19 The National Planning Policy Framework (NPPF) published on 27 March 2012 sets out the Government's planning policies in England and how these are expected to be applied (DCLG, 2012).
- 10.2.20 Paragraphs 99 to 108 of the NPPF outline the development requirements in terms of flood risk, water quality and resources and the impact of climate change. The accompanying online Planning Practice Guidance: ID7 provides additional guidance in the implementation of the NPPF in relation to development in flood risk areas.

Planning Practice Guidance- Flood Risk and Coastal Change

10.2.21 Section ID7 Flood Risk and Coastal Change of the Planning Practice Guidance (DCLG, 2014a) provides guidance to ensure the effective implementation of the NPPF for development in areas at risk of flooding.

- 10.2.22 PPG ID7 states that a site-specific Flood Risk Assessment (FRA) is required for all proposals for new development in Flood Zones 2 and 3 and for any proposal of 1 hectare or greater in Flood Zone 1. An FRA should consider vulnerability to flooding from other sources as well as from river and sea flooding, and also the potential for any increased risk of flooding elsewhere resulting from a development.
- 10.2.23 The purpose of an FRA is to provide sufficient information to demonstrate that future users of the development would remain safe throughout its lifetime, that the development would not increase flood risk elsewhere and, where practicable, that the development would reduce flood risk overall.

National Planning Policy for Waste (2014)

- 10.2.24 The Waste Management Plan for England (DCLG, 2014b) sets out the Government's ambition to work towards a more sustainable and efficient approach to resource use and management. The specific responsibilities put onto planning authorities relevant to hydrology, flood risk and the environment are presented below:
 - Ensure that the need for waste management facilities is considered alongside other spatial planning concerns, recognising the positive contribution that waste management can bring to the development of sustainable communities; and
 - Give priority to the re-use of previously-developed land, sites identified for employment uses, and redundant agricultural and forestry buildings and their curtilages.
- 10.2.25 Waste planning authorities should assess the suitability of sites and/or areas for new or enhanced waste management facilities against each of the following criteria:
 - The extent to which the site or area will support the other policies set out in the document;
 - Physical and environmental constraints on development, including existing and proposed neighbouring land uses, and having regard to the appropriate level of detail needed to prepare the Local Plan; and
 - The cumulative impact of existing and proposed waste disposal facilities on the well-being of the local community, including any significant adverse impacts on environmental quality, social cohesion and inclusion or economic potential.
- 10.2.26 The suitability of locations subject to flooding, with consequent issues relating to the management of potential risk posed to water quality from waste contamination, will also need particular care.

West Sussex Waste Local Plan (2014)

- 10.2.27 The West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2014) provides the basis for making consistent land-use planning decisions about planning applications for water management facilities.
- 10.2.28 The specific policies relevant to hydrology and flood risk are presented below.

Policy W16: Air, Soil and Water

- 10.2.29 Proposals for waste development will be permitted provided that:
 - There are no unacceptable impacts on the intrinsic quality of, and where appropriate the quantity of, air, soil, and water resources (including ground, surface, transitional and coastal waters);
 - There are no unacceptable impacts on the management and protection of such resources, including any adverse impacts on air quality management areas and source protection zones;
 - The quality of rivers and other watercourses is protected and, where possible, enhanced (including within built-up areas); and

• They are not located in areas subject to land instability, unless problems can be satisfactorily resolved.

Policy W17: Flooding

- 10.2.30 Proposals for waste development will be permitted provided that:
 - Mitigation measures are provided to an appropriate standard so that there would not be an increased risk of flooding on the site or elsewhere;
 - They are compatible with Shoreline Management Plans and / or Catchment Flood Management Plans and the integrity of functional floodplains is maintained;
 - Appropriate measures are used to manage surface water run-off including, where appropriate, the use of sustainable drainage systems (SuDS); and
 - They would not have an unacceptable impact on the integrity of sea, tidal, or fluvial flood defences, or impede access for future maintenance and improvements of such defences.
- 10.2.31 Proposals for waste development in 'areas at risk of flooding' will not be permitted unless they pass the sequential test and, where applicable, the exception test set out in national policy.

Horsham District Planning Framework (HDPF) (2015)

- 10.2.32 The HDPF (Horsham District Council, 2015) is the overarching planning document for Horsham district outside the South Downs National Park, and replaces the core strategy and general development control policy documents, which were adopted in 2007.
- 10.2.33 The specific policies relevant to hydrology and flood risk are presented below.

Strategic Policy 35: Climate Change

- 10.2.34 Development will be supported where it makes a clear contribution to mitigating and adapting to the impacts of climate change and to meeting the district's carbon reduction targets as set out in the Council's Acting Together on Climate Change Strategy, 2009.
- 10.2.35 Development must be designed so that it can adapt to the impacts of climate change, reducing vulnerability, particularly in terms of flood risk, water supply and changes to the district's landscape.

Strategic Policy 38: Flooding

- 10.2.36 Development proposals will follow a sequential approach to flood risk management, giving priority to development sites with the lowest risk of flooding and making required development safe without increasing flood risk elsewhere.
- 10.2.37 The development must comply with the tests and recommendations set out in the Horsham District Strategic Flood Risk Assessment (SFRA).
- 10.2.38 Where there is the potential to increase flood risk, proposals must incorporate the use of SuDS where technically feasible, or incorporate water management measures which reduce the risk of flooding and ensure flood risk is not increased elsewhere.

West Sussex County Council Local Flood Risk Management Strategy (2013 – 2018)

10.2.39 The strategy (West Sussex County Council, 2014) sets out how West Sussex County Council as a Lead Local Flood Authority will work alongside other risk management authorities to deliver improvements. It represents a positive step forward for West Sussex County Council, enabling the County Council to prioritise and invest money in flood risk for local benefit.

10.2.40 The report has been prepared so West Sussex County Council meets its duties to manage local flood risk and deliver the requirements of the Flood Risk Regulations (2009). West Sussex County Council is defined as a Lead Local Flood Authority (LLFA) under the regulations. The strategy and supporting annexes represent the first stage of the Preliminary Flood Risk Assessment (PFRA) requirements of the regulations.

Horsham District Strategic Flood Risk Assessment (April 2010)

10.2.41 Policy and legislation requires Local Planning Authorities to undertake SFRAs, which are to be used as the evidence base for planning decisions and to supply a key component of the Sustainability Assessment process that should be used in the review of Local Development Documents or in their production.

10.3 Assessment Methodology

- 10.3.1 The assessment methodology is based on guidance provided within the Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment (2004), the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 10 (Highways Agency *et al.*, 2009) and DMRB Volume 11, Section 2, Part 5 (Highways Agency *et al.*, 2008). Although developed for linear schemes, the DMRB sets out a structured framework for assessment that can logically be applied to other types of development.
- 10.3.2 The assessment of likely effects on water resources has taken account of the impacts from the proposed facility on the prevailing hydrological, surface water drainage, flooding and water quality environments.

Assessment Criteria and Assignment of Significance

- 10.3.3 The assessment considers the likely effects on environmental receptors and the pathways by which the receptors may be affected. The following terms have the following meanings in this section:
 - Source: potential contaminant sources, ground/channel disturbance;
 - Pathway: the mechanism by which the source may affect a receptor; and
 - Receptor: identified features that may be affected, based on the sensitivity of the site.
- 10.3.4 The assessment includes consideration of the probability of harm occurring, taking into account potential sources of contamination and receptors that may be affected by such contamination.
- 10.3.5 The significance of the likely effects has been determined by consideration of the sensitivity of the key hydrology and flood risk receptors that may be affected and the magnitude of the predicted impact.
 Determining the Sensitivity of the Receptor
- 10.3.6 The sensitivity or value of a hydrological receptor or attribute is largely determined by its quality, rarity and scale.
- 10.3.7 The determination of value or sensitivity takes into account the scale at which the attribute is important. This can be defined as being at a local level (site), district level (within Horsham District), County level (West Sussex), regional level (South East of England), national level (United Kingdom) or international level (Europe).
- 10.3.8 The definitions set out in Table 10.1 below have been followed in the consideration of sensitivity for this project. This table takes into account guidance provided in Table 2.1 A4.3 of the Design Manual for Roads and Bridges (DMRB) (Highways Agency *et al.*, 2009).

Table	10.1:	Definitions	of Sensitivity	or Value
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Sensitivity	Definition
Very High	Receptor is high value or critical importance to local, regional or national economy. Receptor is highly vulnerable to impacts that may arise from the project and
	Surface water: Water Framework Directive (WED) Current Overall Status of High
	Flood risk: Flood plain or defence protecting more than one hundred residential
lliab	properties from nooding.
пуп	national economy.
	Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly.
	Surface water: WED Current Overall Status of Good
	Flood risk: Flood plain or defence protecting between one and one hundred
	residential properties or industrial premises from flooding.
Medium	Receptor is of minor value with small levels of contribution to local, regional or
	national economy.
	Receptor is somewhat vulnerable to impacts that may arise from the project and
	has moderate to high levels of recoverability.
	Surface water: WFD Current Overall Status of Moderate.
	Flood risk: Flood plain with limited constraints and a low probability of flooding of residential and industrial properties.
Low	Receptor is of low value with little contribution to local, regional or national
	ECUTION. Decenter is not generally yulgerable to impacts that may arise from the project
	and/or has high recoverability.
	Surface water: WFD Current Overall Status of Poor.
	Flood risk: Flood plain with limited constraints and a low probability of flooding of
	residential and industrial properties.
Negligible	Receptor is of negligible value with no contribution to local, regional or national
	economy.
	Receptor is not vulnerable to impacts that may arise from the project and/or has
	nign recoverability.
	Surrace water: wFD Current Overall Status of Bad.
	Flood lisk: Area outside flood plain of flood plain with very low probability of flooding industrial proporties
	ווטטעווואַ ווועעגנוומן אוטאפרנופג.

Magnitude of Impacts

10.3.9 The magnitude of any predicted impact is dependent on its size, duration, timing (e.g. seasonality) and frequency (permanent, seasonal etc.). A qualitative appraisal of the likely magnitude of the predicted impact is provided within this assessment, taking into account the measures proposed to be adopted as part of the development to control such impacts. The magnitude of the predicted impact has been described using the criteria outlined in Table 10.2. This table takes into account guidance provided in Table 2.1, A4.4 of DMRB (Highways Agency *et al.*, 2009).

Magnitude	Definition
High	Total loss of ability to carry on activities. Impact is of extended temporal or physical extent and of long term duration (i.e., approximately 50 years duration) (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Loss or alteration to significant portions of key components of current activity. Impact is of moderate temporal or physical extent and of medium term duration (i.e., less than 20 years) (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Low	Minor shift away from baseline, leading to a reduction in level of activity that may be undertaken. Impact is of limited temporal or physical extent and of short term duration (i.e., less than 2 years) (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very slight change from baseline condition. Physical extent of impact is negligible and of short term duration (i.e., less than 2 years) (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	No change from baseline conditions.

Table 10.2: Definitions of Magnitude

Significance of Effects

10.3.10 The significance of predicted effects has been determined using publicly available environmental data to take into account the sensitivity of the receptor and the magnitude of each impact. Table 10.3 below has been used to inform the evaluation of the significance of effects. The table is based on guidance provided within the DMRB (Highways Agency *et al.*, 2008).

Table 10.3: Matrix for Determining Significance of Effect

Sensitivity	Magnitude of Impact						
	No Change	Negligible	Low	Medium	High		
Negligible	None	Negligible	Negligible or Minor	Negligible or Minor	Minor		
Low	None	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate		
Medium	None	Negligible or Minor	Minor	Moderate	Moderate or Major		
High	None	Minor	Minor or Moderate	Moderate or Major	Major or Substantial		
Very high	None	Minor	Moderate or Major	Major or Substantial	Substantial		

10.3.11 The effect of relevant aspects of the project on hydrology and flood risk has been described and evaluated against the following criteria, defined as:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity;
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process;

- Moderate: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor;
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
- 10.3.12 For the purposes of this assessment any effect that is moderate, major or substantial is considered to be significant in terms of the EIA Regulations.

Relevant Guidance

- 10.3.13 The assessment methodology has been informed by guidance contained within the following documents:
 - NPPF Chapter 10: Meeting the challenge of climate change, flooding and coastal change (DCLG, 2012);
 - Planning Practice Guidance ID 7: Flood Risk and Coastal Change (DCLG, 2014a);
 - Non-statutory technical standards for sustainable drainage systems, March 2015 (Defra, 2015);
 - Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance (Local Authority SuDS Officer Organisation, 2016);
 - CIRIA 753 The SUDS Manual (CIRIA, 2015a);
 - CIRIA 741 (CIRIA, 2015b) Environmental Good Practice on Site;
 - CIRIA 532 (2001) Control of Water Pollution from Construction Sites;
 - Surface Water Environmental Quality Standards (EQS), UK Drinking Water Standards; and
 - Environment Agency Pollution Prevention Guidelines (see below).

Non-statutory Technical Standards for Sustainable Drainage Systems (Defra, 2015)

- 10.3.14 This document sets out non-statutory technical standards for sustainable drainage systems. They should be used in conjunction with the NPSs, NPPF and Pollution Prevention Guidelines. The SUDS Manual (CIRIA 2015a)
- 10.3.15 The guidance covers the planning, design, construction and maintenance of SuDS to assist with their effective implementation within both new and existing developments. The guidance looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality.
- 10.3.16 The guidance is a compendium of good practice, based on existing guidance and research in the UK and internationally and the practical experience of the authors, the project steering group and industry. <u>CIRIA Environmental Good Practice on Site (CIRIA, 2015b) and CIRIA Control of Water Pollution from</u> <u>Construction Sites (CIRIA, 2001)</u>
- 10.3.17 These documents provide useful best practice information on hydrology and water quality. Furthermore, C502 provides guidance on how to avoid causing environmental damage during construction.

Pollution Prevention Guidelines

- 10.3.18 Produced by the Environment Agency, PPGs have been withdrawn from use as guidance, but still provide a useful framework upon which good environmental practice philosophies can be produced. Each PPG addresses a specific industrial sector or activity. Those of relevance to this assessment are listed below:
 - PPG1 General guide to the prevention of water pollution (Environment Agency, 2001a);
 - PPG2 Above ground oil storage tanks (Environment Agency, 2011a);
 - PPG3 Use and Design of Oil Separators in Surface Water Drainage Systems (Environment Agency, 2006);
 - PPG5 Works in, near or liable to affect watercourses (Environment Agency, 2007a);
 - PPG6 Working at construction and demolition sites (Environment Agency, 2010);
 - PPG7 Pollution prevention guidelines refuelling facilities (Environment Agency, 2011b);
 - PPG8 Storage and disposal of used oils (Environment Agency, 2004);
 - PPG13 High pressure water and steam cleaners (Environment Agency, 2007b);
 - PPG18 Control of spillages and firefighting run-off (Environment Agency, 2000);
 - PPG21 Pollution incident response planning (Environment Agency, 2009a);
 - PPG22 Dealing with Spills (Environment Agency, 2011c);
 - PPG26 Storage and handling of drums and intermediate bulk containers (Environment Agency, 2011d); and
 - PPG27 Installation, decommissioning and removal of underground storage tanks (Environment Agency, 2011e).

Consultation

- 10.3.19 In carrying out the hydrology and flood risk assessment consultation has included:
 - A formal request for a Scoping Opinion;
 - Informal scoping including:
 - Consultation with the Environment Agency;
 - Consultation with Horsham District Council; and
 - Consultation with West Sussex County Council.
- 10.3.20 The issues raised during consultation with appropriate authorities which are relevant to hydrology and flood risk are summarised in Table 10.4.
- 10.3.21 A full copy of the formal Scoping Opinion is provided in Appendix 4.2.

Date/Source	Consultee and Issues Raised	How/ Where Addressed
October 2015/Formal Scoping Opinion	 West Sussex County Council: The approach to hydrology and flood risk set out in the Scoping Report is considered acceptable and appropriate. The Lead Local Flood Authority and Environment Agency should be consulted to define the information required in the ES, and confirm any design requirements. 	EA Scoping Response received December 2015. Salient points for hydrology and flood risk detailed in table.
October 2015/Formal Scoping Opinion	 West Sussex County Council: Measures to protect ground and surface water should be set out, whilst taking into account the impact this may have on drainage and flood risk. The Flood Risk Assessment should feed into this chapter, and drainage should be based on sustainable principles (SuDs). 	A development specific FRA (Appendix 10.2) has been undertaken. The FRA takes into account any potential alterations in existing site run-off characteristics. A proposed drainage strategy will take account of the alteration in surface low permeability covering and look to mimic the pre-development run-off rates, in line with the NPPF and SuDS Manual.
October 2015/Formal Scoping Opinion	 West Sussex County Council: The proposal should be discussed with the Environment Agency at the earliest stage so that their requirements can be defined, and the implications this may have for the site layout and design taken into account. The Environmental Permitting requirements in relation to the water environment should be identified to feed in to the final site layout. 	EA Scoping Response received December 2015 and summarised below.
December 2015/ Formal Scoping Opinion	 Environment Agency We have reviewed the EIA Scoping Report and agree with the issues scoped in. Your development may require an Environmental Permit for certain activities. The Environmental Permitting Regulations (England and Wales) 2010, cover water discharge activities, groundwater activities, radioactive substances, waste, mining waste and installations. 	An Environmental Permit application is to be progressed for the development.
January 2017/Consultee comments	 Environment Agency Drainage Strategy We recommend that the drainage proposals are clarified before the application is determined. Detailed comments provided on drainage strategy. 	Associated reports have been updated, taking into account comments provided, and presented in Appendix 10.2: Flood Risk Assessment and Appendix 10.4: Drainage Strategy.
June 2017/ Consultee comments	 West Sussex County Council Flood Risk The site is located within Flood Zone 1 as defined on The Environment Agency mapping. The proposals are for Recycling, Recovery and Renewable Energy Facility and Ancillary Infrastructure. The post development classification is compatible to flood zone 1. WSCC is not aware of any historic flooding and/or drainage problems at the site. 	Associated reports have been updated, taking into account comments provided, and presented in Appendix 10.2: Flood Risk Assessment and Appendix 10.4: Drainage Strategy.

Table 10.4: Consultation Responses Relevant to Hydrology and Flood Risk

Date/Source	Consultee and Issues Raised	How/ Where Addressed
	 The LPA is not aware of any historic flooding and/or drainage problems at the site. A review of all sources of flooding concludes that there are some areas of the site with a low to medium risk of surface water flooding, however given the historic and post development use this is considered to be an overall low risk. Surface Water An updated drainage strategy (Revision P03) has been supplied – detailed comments provided. Foul Water All outstanding concerns in relation to the proposed foul drainage strategy have been 	

10.4 Limitations of the Assessment

- 10.4.1 The assessment is primarily based on publicly available data obtained from the Environment Agency, local authorities and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.
- 10.4.2 The limitations of this chapter and how they were overcome are presented below:
- 10.4.3 No site / watercourse specific WFD assessment was available. This was overcome by reviewing and assessing the upstream and downstream WFD information obtained for the EA (http://environment.data.gov.uk/catchment-planning/). This provides the most up to date WFD Current Overall Status classifications for the Environment Agency designated main water courses within 1 km search radius of the proposed development.
- 10.4.4 Overall a moderate to high level of certainty has been applied to the study. Where available catchment data regarding water quality / WFD classification, a detailed site survey and engineering site has been used to inform the assessment. The information accessible in order to complete the assessment is considered sufficient to establish the baseline. Therefore, there are no data limitation that would affect the conclusions of this assessment.

10.5 Baseline Conditions

- 10.5.1 Baseline data have been collated to inform the assessment of the likely significant effects for the proposed development. Current site conditions were ascertained through a desk based assessment utilising publicly available data, including OS mapping, aerial photography and utility plans, described below. This provided an insight into surface water features and the existing land use within the immediate area.
- 10.5.2 Baseline conditions at the site have been established through a review of:
 - Environment Agency flood maps;
 - British Geological Survey, Geology of Britain Online Viewer;
 - Horsham District Council (2007) Horsham District Strategic Flood Risk Assessment;
 - Horsham District Council (2010) Horsham District Strategic Flood Risk Assessment;

- SLR Environmental Ltd (undated) Wealden Brickworks Environmental Statement Technical Chapter (Reference Water Environment 11); and
- SLR Environmental Ltd (2013) Flood Risk Assessment (Reference: 416.01258.00002).
- 10.5.3 The proposed development site lies within the district of Horsham. The majority of the district is characterised by a rural agricultural land with small settlements and villages.
- 10.5.4 The site is currently brownfield, containing the former brickwork development. The site surface is a mixture of low permeability concrete surfacing and permeable grassed areas.

Topography

10.5.5 The site falls from approximately 51.30 metres above ordnance datum (AOD) within the north east corner to 47.50 metres AOD within the south west corner of the site.

Hydrological Environment

- 10.5.6 The site is situated within the Boldings Brook hydrological catchment, which is classified as a main river maintained by the Environment Agency. The brook feeds into the River Arun where the responsibility for these watercourses falls under the jurisdiction of West Sussex County Council (WSCC) acting as the Lead Local Flood Authority under the Water and Flood Management Act 2010 and Land Drainage Act 1991.
- 10.5.7 The Arun and Western Streams Catchment Flood Management Plan (CFMP) (Environment Agency, 2009b) indicates that the Environment Agency has a rolling programme of flood defence reviews with a policy to protect properties, acknowledging that there would still be a risk from more extreme events, driven by climate change as land use and management changes.
- 10.5.8 Further descriptions of the key hydrological and flood risk characteristics within the study area are presented below.

Flood Risk and Flood Defences

10.5.9 Potential sources of flooding for the proposed development have been assessed within the FRA (Appendix 10.2) and are summarised below.

Fluvial and Tidal Flooding

- 10.5.10 The Environment Agency food map for planning (accessed February 2018) indicates that the site is situated within Flood Zone 1 (FZ1) defined as land at low risk of flooding (land at risk of flooding from fluvial or tidal flood events with less than 0.1% (1:1,000 year) annual probability of occurrence).
- 10.5.11 The Horsham Council SFRA also indicates that the site is situated within FZ1.

Flood Defences

10.5.12 The Environment Agency flood map for planning indicates that no flood defences are present within the vicinity of the site.

Overland Flow Flooding

10.5.13 The site is situated within an area of relatively flat topography. The Environment Agency surface water flood map indicates that the majority of the site is at low risk of surface water flooding. Areas within the site are defined as being of low to high risk of surface water flooding, associated with localised areas of low lying land.

10.5.14 Due to the presence of significant drainage systems within the site and the relatively flat lying land, it has been assessed that the risk of overland flooding is low.

Flooding from Rising / High Groundwater

- 10.5.15 British Geological Survey (BGS) online mapping indicates that the site is directly underlain by Weald Clay Formation Mudstone (Dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone (e.g. Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones).
- 10.5.16 The bedrock is classified by the Environment Agency under the WFD as an unproductive stratum, defined as "...rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow."
- 10.5.17 Based on the information outlined above, the potential for groundwater flooding is considered to be low.

Flooding from Artificial Drainage Systems

- 10.5.18 A detailed drainage survey was commissioned and completed in April 2017. The survey indicates that existing surface run-off is directed into the underground system by a series of hardstanding gullies and roof rainwater pipes.
- 10.5.19 Site run-off is directed to the south west corner of the site and discharged into Boldings Brook via 'Culvert A', which passes beneath the rail embankment. There is no evidence of any flow control to limit discharge from site.
- 10.5.20 It is assumed that local sewer systems will have been designed to industry standards (e.g. Sewers for Adoption). However, the most common causes of flooding from sewers are inadequate flow capacity, blockages, pumping station failures, burst water mains, water inflow from rivers or the sea, tide locking, siltation, fats/greases, and sewer collapse. Should any of these events occur there is a risk of flooding by surcharge where the flood is in excess of the sewer capacity (usually 1 in 30 year event or greater).
- 10.5.21 The Horsham SFRA confirms that the majority of the sewers within the district are designed to accommodate a storm event with a 3.3% annual probability. The SFRA indicates that the site area has not been flooded due to drainage system failure.
- 10.5.22 Taking into account the above and the absence of any historical sewer flooding the overall risk of flooding via artificial drainage system to the site has been assessed to be low.

Flooding from Infrastructure Failure

- 10.5.23 Environment Agency data and the Horsham SFRA indicate that the site is not reliant on flood defence infrastructure.
- 10.5.24 The site has therefore been assessed as being at no risk of flooding due to infrastructure failure. <u>Historic Flood Events</u>
- 10.5.25 The Horsham SFRA indicates that no historic flood events have occurred within the site area. <u>Current Flood Risk</u>
- 10.5.26 The site has been assessed as being at low risk of flooding from all sources.

Surface Watercourses

10.5.27 Boldings Brook, an Environment Agency designated main river, flows in a southerly direction, located approximately 125 metres west of the site beyond the London to Horsham Railway Line. The Brook flows

into Warnham Mill pond (part of Warnham Mill nature reserve). Further downstream, the Brook discharges into the River Arun (an Environment Agency main river).

10.5.28 OS mapping and aerial photography indicate that there are a number of ponds and unnamed streams within close proximity to the site. The 2017 drainage survey indicates that the existing site discharges to Boldings Brook via a drainage network at an uncontrolled rate.

Surface Water Quality

10.5.29 The Environment Agency catchment data explorer (accessed February 2018) provides the most current Water Framework Directive (WFD) Overall Status classifications for a number of watercourses within the study area. Table 10.5 below lists the water body and associated WFD classification grade.

Table 10.5: WFD Water Quality Data

Waterbody Name	Current Overall Status (2016)	Objective Status (2027)
Boldings Brook	Poor	Good

10.5.30 In summary, the WFD records show that the watercourse within close proximity to the site has a WFD status of Poor, but the WFD requires all watercourses to aim for Good status. A full description of the WFD classification process and associated definitions is provided in Appendix 10.3.

Surface Water Abstraction

10.5.31 The Environment Agency 'what's in your backyard' database indicates that there is one active licenced surface water abstraction within the 500 metre study area (Table 10.6Table 10.6).

Name of Holder	Licence Number	Grid Reference	Distance From Site (m)	Purpose	Permitted Annual Yield (m³/year)
Wienerberger Limited	25/088 (SSD 10/41/428101)	TQ 173 342	39.0	General use / industrial	18,000 from surface water pond

Discharge Consents

10.5.32 The Environment Agency detailed public register indicates that there are three water discharges within 500 metres of the Site (Table 10.7).

Table 10.7: Water Discharges within 500 m

Name of Holder	Licence Number	Site Postcode	Distance From Site (m)	Purpose	Start Date
Redland Technology	SO/P03886/001	RH12 4QG	150	Undefined or Other	22/10/1991
Verve Investments Limited	SO/P00008/001	GRAYLANDS, HORSHAM	260	Undefined or Other	02/05/1985
Verve Investments Limited	SO/P01670/001	GRAYLANDS, HORSHAM	290	Construction of Buildings	28/07/1988

Pollution Incidents

10.5.33 The Environment Agency 'what's in your backyard' database indicates that there have been six pollution incidents and two industrial pollution incidents within a 500 m radius of the site summarised in Table 10.8 and Table 10.9 respectively.

Table 10.8: Pollution Incidents

Date	Incident number	Local Authority	Pollutant	Impact to Land	Impact to water
08/06/2001	8196	Horsham	Atmospheric Pollutants and Effects	No Impact	No Impact
16/06/2001	9708	Horsham	Atmospheric Pollutants and Effects	No Impact	No Impact
17/06/2001	9785	Horsham	Atmospheric Pollutants and Effects	No Impact	No Impact
18/06/2001	10016	Horsham	Atmospheric Pollutants and Effects	No Impact	No Impact

Table 10.9: Industrial Pollution Incidents

Name of Holder		Licence	Site	Distance From		Process	Start
		Number	Postcode	Site (m)			Date
Biffa V	Waste	BV9896IY	RH14 4QD	320		Waste Processes /	2005 -
Services Ltd						Landfilling	2012
Waste		WAS002/19678	N/a	50 Wa		Waste Processes /	2002 -
Management Ltd						Landfilling	2004

Designated Environmentally Sensitive Areas

10.5.34 The site is located within a Nitrate Vulnerability Zone and nitrate sensitive area.

Future Baseline Conditions

10.5.35 The likely future baseline conditions in the absence of the proposed facility are considered below.

Proposed Development

10.5.36 In the absence of the proposed development, the site would remain as present. As a consequence, it is unlikely that there would be any change in the amount of permeable surfacing and/or additional built development at the site. A number of other developments are proposed in the surrounding area, as set out in Appendix 4.4 of the ES. However, none of these would affect the site directly and it is assumed that each of these would need to comply with relevant planning policy and legislative standards so that the overall flood risk in the area would not increase.

Climate Change

10.5.37 The site lies within Flood Zone 1, and is therefore considered to be at low risk of flooding from all sources. No detailed hydrological modelling including the revised Environment Agency Climate Change Allowances (February 2016) have been made available. An allowance for future climate change and increased flood risk has been made within this assessment and the FRA.

10.6 Incorporated Enhancement and Mitigation

10.6.1 Chapter 2 (Site Description and Description of Development) of this ES summarises the mitigation measures that form part of the design of the 3Rs Facility. In relation to hydrology and flood risk, a number of designed-in mitigation measures have been proposed to reduce the potential for impacts of the development. These

measures are considered standard industry practice for this type of development and are summarised in Table 10.10 below.

Table 10.10: Designed-in Mitigation Measures Adopted with Respect to Hydrology and Flood Risk

Designed in mitigation measures adopted as part of the project	Justification
Construction	
Surface water management strategy The proposed development would result in the construction of low permeability surfacing, increasing the rate of surface water run-off from the site. A surface water management plan is required to ensure the existing run-off rates to the surrounding water environment are maintained at pre-development rates. Measures to mitigate against water pollution would also apply and would include measures as set below. A development specific drainage strategy has been generated presented in Appendix 10.4.	To address NPS-EN1, the NPPF, Environment Agency and WSCC surface water run-off requirements.
Best practice measures	To accord with guidance and
 All construction work would be undertaken in accordance with the Construction Environmental Management Plan and good practice documentation including: CIRIA – SuDS Manual; Prevent surface water being affected during earthwork operations. No discharge to surface watercourses will occur without permission from the Environment Agency; Environment Agency, Pollution Prevention Guidance Note 6 (PPG6): Pollution Prevention Guidelines – Working at Construction and Demolition Sites; Environment Agency, Pollution Prevention Guidance Note 5 (PPG5)– Working in, near or liable to affect watercourses; Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532); Prevent surface water being affected during earthwork operations. No discharge to surface watercourses will occur without permission from the Environment Agency; Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants; Regular cleaning of roads of any construction waste and dirt to be carried out; and A construction method statement to be submitted for approval by the responsible authority. 	best practice guidelines for construction works.
Pollution provention measures	To prevent pollution of water
 Refuelling of machinery would be undertaken within designated areas where spillages can be easily contained. Machinery would be routinely checked to ensure it is in good working condition. Any tanks and associated pipe work containing substances included in List 1 of the Groundwater Directive would be double skinned and be provided with intermediate leak detection equipment. The following specific mitigation measures for the protection of surface water during construction activities would be implemented: Management of construction works to comply with the necessary standards and consent conditions as identified by the Environment Agency; A briefing highlighting the importance of water quality, the location of watercourses and pollution prevention included within the site induction; Areas with prevalent run-off to be identified and drainage actively managed, e.g. through bunding and/or temporary drainage; Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) to be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or the local watercourses. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. Bunds used to store fuel, oil etc. to have a 110% capacity; Disturbance to areas close to watercourses reduced to the minimum necessary for the work; Excavated material to be placed in such a way as to avoid any disturbance of 	courses and address stakeholder concerns for the construction of the 3Rs Facility.

Designed in mitigation measures adopted as part of the project	Justification					
 areas near to the banks of watercourses and any spillage into the watercourses; Construction materials to be managed in such a way as to effectively minimise the risk posed to the aquatic environment; All plant machinery and vehicles to be maintained in a good condition to reduce the risk of fuel leaks; Drainage works to be constructed to relevant statutory guidance and approved via the Lead Local Flood Authority prior to the commencement of construction; and Consultation with the Environment Agency to be ongoing throughout the construction period to promote best practice and to implement proposed mitigation measures. 						
Operation	•					
Operational practices to incorporate measures to prevent pollution and increased flood risk, to include emergency spill response procedures, clean up and remediation of contaminated water run-off.	To reduce the risk of surface water pollution based on guidance in e.g. Environment Agency, Planning Policy Guidance Note 22 (PPG22): Pollution Prevention Guidelines – Dealing with Spills.					
Decommissioning						
Decommissioning practices to incorporate measures to prevent pollution and increased flood risk, to include emergency spill response procedures, and clean up and remediation of contaminated soils.	To protect surface water based on guidance that will be appropriate at the time of decommissioning.					

10.7 Assessment of Construction Effects

10.7.1 The effects of construction of the proposed development have been assessed in relation to hydrology and flood risk. A description of the significance of effects upon hydrology and flood risk receptors caused by each identified impact is given below.

Flood Risk

10.7.2 For the purpose of this ES, flood risk is defined as the increase in low permeability surfacing leading to an alteration in pre-development surface water run-off rates or a derogation of floodplain storage. 'Temporary' flood risk is the temporary removal or alteration in permeable surfacing leading to a temporary increase in surface water run-off or derogation of floodplain storage (for example, during construction).

Sensitivity of Receptor

10.7.3 The site has been identified as not directly at risk of flooding. The land adjoining the site is of low vulnerability, high recoverability and low value. The sensitivity of the receptor is, therefore, considered to be low.

Magnitude of Impact

- 10.7.4 During the construction phase, a temporary increase in the low permeable area may occur due to the presence of the construction compound and the construction of the hardstanding required for the development, potentially increasing the risk of flooding to the surrounding area. The proposed engineering methods have been agreed in principle with the regulators. Together with the use of the Construction Environmental Management Plan, this would ensure that the risk of flooding during construction is not increased during construction.
- 10.7.5 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will not affect surrounding local receptor directly. The magnitude is, therefore, considered to be negligible.

Significance of Effect

10.7.6 The overall significance of the effect on flood risk is assessed as negligible, which is not significant in terms of the EIA Regulations.

Further Mitigation

10.7.7 No additional mitigation measures are foreseen at this time.

Future monitoring

10.7.8 No future monitoring is considered to be required.

Accidents and/or Disasters

10.7.9 In the event that construction drainage channels or similar become blocked, surface water by virtue of the site layout would be directed to the next available channel, from where water would be discharged back into the drainage system. Alternatively, water would be conveyed directly to temporary construction settlement ponds/features for treatment, where required, prior to being discharged from site in accordance with the permit.

Effects on Surface Water Resources

Sensitivity of Receptor

10.7.10 The sensitivity of watercourses is dependent on the nature of the specific watercourse. WFD classification information obtained from the Environment Agency website and mapping for water quality indicates that the closest watercourse is of low sensitivity (poor WFD status). However, the assessment also takes into account the objective WFD status (good). Therefore, based on the criteria set out in Table 10.1, surface water resources are considered to be moderately vulnerable, of slow recoverability and medium value. The sensitivity of the receptor is, therefore, considered to be high.

Magnitude of Impact

- 10.7.11 Activities on site during construction could lead to an increase in turbid run-off and spillages/leaks of fuel, oil etc. that could affect nearby watercourses. However, the construction process would include measures to intercept run-off and ensure that discharges from the site are controlled in quality and volume. This would include the use of filter drains and ponds to remove sediment, temporary interceptors and a hydraulic brake. These would be implemented through the Construction Environmental Management Plan.
- 10.7.12 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. The magnitude is therefore, considered to be low (adverse).

Significance of Effect

10.7.13 Effects in relation to run-off from construction sites and spillages which includes the integration of measures adopted in Table 10.10 would be of minor adverse significance, which is not significant in terms of the EIA Regulations.

Further Mitigation

10.7.14 No additional mitigation measures are foreseen at this time.

Future monitoring

10.7.15 No future monitoring is considered to be required.

Accidents and/or Disasters

10.7.16 In the event of a catastrophic/large scale spillage strategies outlined in the Construction Environmental Management Plan would be actioned. A member of staff trained in the use of a 'spill kit' or similar would attend to the event. Should material become mobilised via site surface water this would be directed by virtue of the site layout and drainage system to an interceptor for treatment and/or removal from site as appropriate.

Effects on the On-Site Drainage Network

Sensitivity of Receptor

10.7.17 On-site drains are considered to be of moderate vulnerability, moderate to high recoverability and minor value. The sensitivity of the receptor is, therefore, considered to be medium.

Magnitude of Impact

10.7.18 The impact of construction works effecting on-site drainage is predicted to be of local spatial extent, short term duration and intermittent occurrence. It is predicted that the impact would affect the receptor directly. The magnitude is therefore, considered to be negligible.

Significance of Effect

10.7.19 The significance of effects on on-site drainage networks which includes the integration of measures adopted in Table 10.10 is considered to be minor adverse significance, which is not significant in terms of the EIA Regulations.

Further Mitigation

10.7.20 No additional mitigation measures are foreseen at this time.

Future monitoring

10.7.21 No future monitoring is considered to be required.

Accidents and/or Disasters

- 10.7.22 In the event of an accident or disaster, the effect would be similar to those outlined in paragraphs 10.7.9 and 10.7.16.
- 10.8 Assessment of Operational Effects
- 10.8.1 The effects of the operation and maintenance of the proposed development have been assessed in relation to hydrology and flood risk area. A description of the significance of effects upon hydrology and flood risk receptors caused by each identified impact is given below.

Flood Risk

- 10.8.2 An FRA has been undertaken for the proposed development in accordance with NPS EN-1, the NPPF and associated Planning Practice Guidance. The proposed development type is defined as 'Less Vulnerable' in Table 2 of the Technical Guidance to the NPPF and is therefore suitable for the location within Flood Zone 1.
- 10.8.3 The proposed development would increase the amount of low permeability cover on the site and, as a consequence surface run-off, from the site to local watercourses. There would be an approximately 15% increase in the low permeable area within the site.
- 10.8.4 The proposed surface water drainage scheme is presented in the drainage strategy (Appendix 10.4).

10.8.5 The drainage strategy demonstrates that surface water run-off can be practicably managed, mimicking existing flows rates and, where possible, providing a betterment. Attenuation would comprise a mix of techniques including permeable paving and underground storage in line with SuDS guidance (Appendix 10.1). The type of underground structure would be agreed during the construction contract and is likely to be cellular, plastic arch or large diameter pipes, although other system suitability may be explored. The FRA is presented in Appendix 10.2 of the ES.

Sensitivity of Receptor

10.8.6 The site is located within Flood Zone 1 ('low probability'), defined by the Environment Agency as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%). Therefore, the site has been assessed as of low sensitivity to flooding.

Magnitude of Impact

10.8.7 The proposed development has been subject to a FRA in order to meet the requirements of planning policy and best practice. The development would be designed to ensure no increase in the rate of run-off. The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. The magnitude is, therefore, considered to be no change.

Significance of Effect

10.8.8 As the proposed development has been assessed as having a 'no change' within an area at low risk of flooding and therefore low sensitivity, the overall significance of effect is considered to be 'None' which is not significant in terms of the EIA Regulations.

Further Mitigation

10.8.9 No additional mitigation measures are foreseen at this time.

Future monitoring

10.8.10 Monitoring would be undertaken in accordance with the permit.

Accidents and/or Disasters

10.8.11 In the event that a drainage gully or similar becomes blocked, surface water by virtue of the site layout would be directed to the next available gully/chamber, from where water would be discharged back into the drainage system. Alternatively, water would be retained onsite by virtue of kerbed features or similar prior to being discharged from site in accordance with the permit.

Effects on Surface Water Resources

Sensitivity of Receptor

10.8.12 The watercourses are considered to be of low to moderate vulnerability, slow recoverability and moderate value. The sensitivity of the receptor is, therefore, considered to be high.

Magnitude of impact

10.8.13 The impact of potentially contaminated run-off entering local watercourses is predicted to be of local spatial extent, short term duration, intermittent and reversible. It is predicted that the impact would affect the receptor directly. The magnitude is therefore considered to be low (adverse).

Significance of Effect

10.8.14 Taking into account the measures integrated as part of the project outlined in Table 10.10, the effects are considered to be of minor adverse significance which would not be significant in terms of the EIA Regulations.

Further Mitigation

10.8.15 No additional mitigation measures are foreseen at this time.

Future monitoring

10.8.16 Monitoring to be undertaken in accordance with the permit.

Accidents and/or Disasters

10.8.17 In the event of a catastrophic/large scale spillage, operational procedures would be actioned. A member of staff trained in the use of a 'spill kit' or similar would attend to the event. Should material become mobilised via site surface water this would be directed by virtue of proposed drainage system to interceptor for treatment and/or removal from site as appropriate.

Effects on the On-site Drainage Network

10.8.18 Following the construction of the proposed development no impact on the on-site drainage network as a consequence of site operations is anticipated.

10.9 Assessment of Decommissioning Effects

- 10.9.1 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. With effective control measures in place, no significant effects are likely to arise.
- 10.10 Inter-relationships
- 10.10.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposed development on the same receptor. These are considered to be:
 - Contamination of surface water impacting upon groundwater quality; and
 - Contamination of surface water impacting upon aquatic ecology.
- 10.10.2 The incorporation of appropriate and agreed upon mitigation measures (Table 10.10) within the construction and operational phase of the development would reduce the risk of contamination of surface water. Therefore, no significant effects on surface water contamination impacting upon groundwater quality and aquatic ecology are considered to be likely.
- 10.11 Further Mitigation Measures
- 10.11.1 No further mitigation measures are needed in relation to hydrology and flood risk. The mitigation measures presented within Table 10.10Table 10.10 are sufficient that no significant effects are predicted to arise from the proposed development.
- 10.12 Monitoring and Management Strategies
- 10.12.1 A drainage strategy has been developed to manage on site surface water and foul water flows (Appendix 10.4).

10.13 Assessment of Cumulative Effects

- 10.13.1 This section considers the cumulative effects of the proposed development on hydrology and flood risk in conjunction with other developments.
- 10.13.2 A review of approved and proposed developments within a 500 m search area from the proposed development has been undertaken.
- 10.13.3 A 500 m search area is considered appropriate for data collection, taking into account the nature of the development and likely zone of influence on hydrological receptors.
- 10.13.4 The review of approved and proposed development established that there are seven cumulative developments within the defined 500 m study area of the proposed development outlined below.
 - Brockhurst Wood Landfill Site: Construction and operation of a materials recycling facility including offices and visitor centre, an anaerobic digestion plant and extension to an existing landfill site and ancillary infrastructure.
 - Brockhurst Wood Landfill Site: Amendment of conditions.
 - Land south of Brookhurst Wood landfill site (erection of carbon vessel systems and associated infrastructure).
 - Land south of Brookhurst Wood landfill site (mechanical biological treatment).
 - Land west of Brookjurst Wood landfill site (proposed facility for compaction and baling of Refuse Derived Fuel);
 - Land north of Horsham (proposed mixed use strategic development, including up to 2,750 dwellings, business park, retail, community centre, leisure facilities, education facilities and public open space); and
 - Graylands House: Prior approval for change of use of ground and first floor from use class B1(A) office to use class C3 residential for eleven dwellings.
- 10.13.5 It is assumed, where relevant, in accordance with the NPS and/or NPPF and Planning Practice Guidance, any new development is required to attenuate surface water run-off, where practicable, to the greenfield run-off rate and provide appropriate management techniques to treat potentially contaminated run-off prior to discharge into the local drainage network.
- 10.13.6 Any works undertaken within 8 m of a watercourse and / or flood defence will require consent. For the consent to be provided the developer is required to demonstrate that the risk of flooding during the lifetime of the development could be mitigated to a level acceptable to the Environment Agency, LLFA and / or Internal Drainage Boards. Therefore, cumulative effects on hydrology and flood risk are not predicted to be significant.

10.14 Residual Effects

- 10.14.1 Table 10.11 summarises the significance of effects for the construction and the operational phase for the project taking into account the mitigation measures incorporated into the development proposals.
- 10.14.2 The summary confirms that the development will have no significant residual effect on hydrology and flood risk following the implementation of appropriate and agreed upon mitigation measures.

Parameter	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Construction Phase									
Flood risk	Low	+Increase in Flood Risk on adjoining land	Short term	Negligible	Negligible	 + Surface Water Management Strategy + Detailed drainage design philosophy. 	Low	None	No
Surface water resources	High	+ Increase in turbid run-off +Spillages +Decreasing the WFD classification of nearby watercourses	Short term	Low	Minor	+ Interceptor trenches for run-off during construction. +Best construction practices.	Low	None	No
On-site drainage network.	Medium	+Disruption of on-site drainage network due to heavy vehicles and construction.	Short term	Negligible	Minor	 + on-site drainage network will be disrupted as little as possible. + Drainage will be returned to pre development state post construction. 	Low	None	No
Operational Phase									
Flood risk	Low	+Increase in Flood Risk within the Site and to adjacent land.	Long Term	No Change	None	Detailed drainage design to include: filter drain and pond storage.	Low	None	No

Table 10.11: Summary of Likely Environmental Effects on Hydrology and Flood Risk

Parameter	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Surface water resources	High	+ Decrease in surface water quality in close proximity to the Site.	Long Term	Low	Minor	 + Best operational practices including: 1) Correct storage of hazardous chemical and oils. 2) Fuel storage and filling area. 3) Hazardous spillage procedure 	Low	None	No

10.15 Conclusions

- 10.15.1 The effects on hydrology and flood risk for the proposed development have been assessed in line with the relevant the NPPF, Planning Practice Guidance and other relevant legislation, guidance, planning policy and technical documentation.
- 10.15.2 The assessment has indicated that no significant effects are likely to arise from the proposed development following the implementation of the proposed mitigation measures.
- 10.15.3 There will be a c.15% increase in the low permeable area of the site due to the development. However, any increase in flood risk during the construction or operational phase due to disturbance of on-site drainage systems would be managed through the drainage strategy, restricting off-site surface water flows and incorporating best practice construction techniques.

10.16 References

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11 Hydrogeology and Ground Conditions

11.1 Introduction

11.1.1 This chapter summarises the assessment of hydrogeology and ground conditions associated with the proposed Recycling, Recovery and Renewable Energy (3Rs) Facility at Langhurstwood Road, Horsham, West Sussex.

Scope of Study

11.1.2 This chapter of the ES assesses the effects that may arise due to the current ground conditions, geology, hydrogeology and land contamination and as a result of the construction and operation of the 3Rs Facility. The chapter describes the assessment methodology; the baseline conditions currently existing at the site and surroundings; and the likely significant environmental effects, taking into account the mitigation measures adopted to prevent, reduce or offset any significant adverse effects.

11.2 Legislation and Policy Context

11.2.1 This section summarises relevant legislation and policies that are directly relevant to hydrogeology and ground conditions.

Legislation

- 11.2.2 In general terms the legislation advocates the use of a risk assessment approach to assessing contamination and remedial requirements. Relevant legislation includes:
 - Part 2A of the Environmental Protection Act (1990);
 - The Environment Act (1995);
 - The Water Resources Act 1991 (as amended);
 - Contaminated Land (England) Regulations (2006);
 - The Groundwater (England and Wales) Regulations 2009;
 - The Environmental Damage (Prevention and Remediation) Regulations (2015);
 - Environmental Permitting (England and Wales) Regulations (2016, as amended); and
 - The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.
- 11.2.3 The Building Act 1984 and the Building Regulations are the two key legislative drivers when considering structural and design aspects of a development in terms of geotechnical properties of the ground and the presence of ground gas.

National Policy and Guidance

National Planning Policy Framework (2012)

11.2.4 The National Planning Policy Framework (NPPF) (DCLG, 2012) sets out the Government's planning policies for England and how these are expected to be applied. With respect to pollution and contamination, paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by:

- 'preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and
- remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'
- 11.2.5 Paragraph 111 states that planning policies and decisions should encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.
- 11.2.6 Paragraph 120 states that:

'To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.'

11.2.7 Paragraph 121 states that:

Planning policies and decisions should also ensure that:

- the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;
- after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and
- adequate site investigation information, prepared by a competent person, is presented.

National Planning Practice Guidance

- 11.2.8 The contaminated land regime under Part 2A of the Environmental Protection Act 1990 provides a risk-based approach to the identification and remediation of land where contamination poses an unacceptable risk to human health or the environment.
- 11.2.9 National Planning Practice Guidance has been produced to accompany the NPPF (DCLG, 2014) and includes guidance on how land affected by contamination is dealt with through the planning regime.

Development Plan Policy

West Sussex Waste Local Plan (2014)

- 11.2.10 The West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2014) reinforces the County's aspiration to become a zero waste to landfill authority and provides guidance on land use planning policy for waste. It provides the basis for making consistent land use planning decisions about planning applications for waste management facilities, making the document important in consideration for the proposed facility.
- 11.2.11 The Plan includes an assessment of the former brickworks site (referred to as Brookhurst Wood within the document) as a potential waste processing site. Policy W10 outlines a series of conditions that are required

to be fulfilled to allow development. The following condition is considered to be relevant to the consideration of hydrogeology and ground conditions:

- Assessment of impacts on the water environment and possible mitigation required.
- 11.2.12 The West Sussex Waste Local Plan identifies a number of policies that are relevant to the consideration of hydrogeology and ground conditions.
- 11.2.13 Policy W16: Air, Soil and Water states that:

"Proposals for waste development will be permitted provided that:

(a) there are no unacceptable impacts on the intrinsic quality of, and where appropriate the quantity of, air, soil, and water resources (including ground, surface, transitional, and coastal waters);

(b) there are no unacceptable impacts on the management and protection of such resources, including any adverse impacts on Air Quality Management Areas and Source Protection Zones;

(c) the quality of rivers and other watercourses is protected and, where possible, enhanced (including within built-up areas); and

(d) they are not located in areas subject to land instability, unless problems can be satisfactorily resolved."

Horsham District Planning Framework (2015)

- 11.2.14 The Horsham District Planning Framework (Horsham District Council, 2015) is described as the overarching planning document for Horsham district, which has been produced to be used alongside national guidance such as the NPPF. The framework sets out the development visions of Horsham Council until 2031, however the vast majority of the document relates to residential or town centre redevelopment and prosperity without a specific development environmental focus.
- 11.2.15 Policy 24 (Environmental Protection) of the Horsham District Planning Framework is relevant to consideration of hydrogeology and ground conditions and states that:

"The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution and ensure that they:

1. Address land contamination by promoting the appropriate re-use of sites and requiring the delivery of appropriate remediation;

2. Are appropriate to their location, taking account of ground conditions and land instability;

3. Maintain or improve the environmental quality of any watercourses, groundwater and drinking water supplies, and prevents contaminated run-off to surface water sewers;

4. Minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment;

5. Contribute to the implementation of local Air Quality Action Plans and do not conflict with its objectives;

6. Maintain or reduce the number of people exposed to poor air quality including odour. Consideration should be given to development that will result in new public exposure, particularly where vulnerable people (e.g. the elderly, care homes or schools) would be exposed to the areas of poor air quality; and

7. Ensure that the cumulative impact of all relevant committed developments is appropriately assessed."

11.3 Assessment Methodology

- 11.3.1 Determination of the baseline conditions at the site has been established through a review of the available assessments previously undertaken for the site, presented in the form of a Ground Conditions Desk Study (Appendix 11.1). The assessments considered within the desk study were:
 - Risk Management Ltd (2015) Site Investigation, undertaken in February 2015, an intrusive investigation at the site comprising boreholes, trial pits and the production of a human health risk assessment using a commercial end use scenario;
 - SLR Consulting (2014) Desk Study, undertaken in September 2014, which included a site reconnaissance visit and the production of a Preliminary Land Quality Risk Assessment (PLQRA) on completion;
 - SLR (undated) Environmental Statement Technical Chapter 13: Land Quality. The environmental statement also included a reconnaissance visit and the production of a Preliminary Land Quality Risk Assessment (PLQRA) upon completion;
 - Scott Wilson Ltd (2009) Desk Study, undertaken in December 2009, included a site reconnaissance visit and the production of a Conceptual Site Model and Preliminary Risk Assessment for the proposed development of an industrial building within the site boundary; and
 - Capita Symonds (2005), Ground Investigation, which included the advancement of an unconfirmed volume of investigative positions (boreholes and trial pits) and the collection of 18 soil samples.
- 11.3.2 Further details of these assessments and reports are summarised within the desk study (Appendix 11.1).
- 11.3.3 In addition to a review of the above documents, the desk study was based on the following:
 - A review of historic maps and GroundSure data for the site;
 - A review of geology, hydrogeology and groundwater vulnerability maps and designated groundwater source protection zones (SPZs);
 - A review of statutory designations such as Sites of Special Scientific Interest (SSSI);
 - A site walkover to identify potentially contaminating land uses, and any evidence of contamination;
 - A review of Environment Agency records relating to the permitted activities at the site; and
 - The development of a Conceptual Site Model (CSM) and Preliminary Risk Assessment (PRA).
- 11.3.4 The study area in a number of the historical reports varies from that currently under consideration within this ES. For clarity, the current site boundary is detailed on Figure 1.2 of this ES.

Relevant Guidance

- 11.3.5 The assessment methodology has been informed by guidance contained within the following documents:
 - BS10175:2011 + A1:2013 Code of Practice for Investigation of Potentially Contaminated Sites (BSI, 2013);
 - BS1377:1990 Methods of Test for Soils for Civil Engineering Purposes (BSI, 1990);
 - BS5930:2015 Code of Practice for Site Investigations (BSI, 2015);

- Model Procedures for the Management of Contaminated Land, Contaminated Land Report 11, Environment Agency (Environment Agency and Defra, 2004);
- The Generic Assessment Criteria for Human Health Risk Assessment (LQM/CIEH, 2015);
- Assessing Risks Posed by Hazardous Ground Gases to Buildings, CIRIA Report C665 (CIRIA, 2007);
- Contaminated Land Exposure Assessment (CLEA) guidance; and
- Surface Water Environmental Quality Standards (EQS) and UK Drinking Water Standards.

Consultation

- 11.3.6 In carrying out the hydrogeological and ground conditions assessment consultation has included:
 - Request for a scoping opinion; and
 - Informal scoping comprising initial consultation with the Adam Dracott, the Principal Environmental Health Officer at Horsham District Council in June 2016.
- 11.3.7 Through this consultation, the desk based approach to establishing the baseline conditions at the site was agreed. The issues raised through the consultation outlined above that are relevant to hydrogeology and ground conditions are summarised in Table 11.1 below.
- 11.3.8 A full copy of the Scoping Opinion is contained in Appendix 4.2 and details of the informal scoping relevant to this chapter are contained in Appendix 11.2.

Table 11.1: Consultation Responses Relevant to Hydrogeology and Ground Conditions

Date/Source	Consultee and Issues Raised	How/ Where Addressed
October 2015/ Scoping Opinion	Horsham District Council – No issues	Assessment undertaken in accordance with agreed approach
Scoping Opinion	agreed.	

Assessment Criteria and Assignment of Significance

- 11.3.9 Following establishing the baseline conditions, the likely significant effects of the facility due to hydrogeology and ground conditions were considered based on:
 - Evaluation of the potential impacts of the facility and the effect these could have on the baseline conditions;
 - Evaluation of the significance of these effects through consideration of the sensitivity of receptors, and determination of the magnitude of the impacts (adverse and beneficial);
 - Identification of measures to mitigate against any potential adverse impacts resulting from the facility; and
 - Identification of significance of the effects, taking into account the mitigation measures that form part of the project.
- 11.3.10 The sensitivity or value (High, Medium or Low) of existing features and attributes (known as receptors) has been described using the criteria and examples with respect to land contamination as outlined in Table 11.2.

Sensitivity	Criteria	Example of Attribute
High (England/UK/International)	Highly sensitive receptor or attribute of significant value	Principal Aquifer within source protection zone for potable use. High value surface water course. Residential properties.
Medium (County/Regional)	Moderately sensitive receptor or attribute of moderate value	Secondary Aquifer with resource value or contribution to surface water flow. Water course with low value. Landscape use and construction workers
Low (Local/District)	Low sensitivity receptor or attribute of low value	Unproductive Strata Industrial use.

Table 11.2: Criteria for Determining the Importance or Sensitivity of Receptors

11.3.11 The magnitude (High, Medium or Low) of the predicted impact has been described using the criteria and examples with respect to land contamination in Table 11.3.

Magnitude	Criteria	Example
High	Results in loss of attribute and likely to cause exceedances of statutory objectives and/or breeches of legislation	Contamination of a potable source of water abstraction, or gross and widespread contamination of the site requiring significant remediation.
Medium	Results in effect on integrity of attribute or loss of part of attribute, possibly with or without exceedances of statutory objectives or with or without breaches of legislation	Reduction in land value due to contamination. Contaminant pollutant linkages in specific areas identified requiring remediation
Low	Results in minor effect	Slight impact upon a water feature not resulting in a breach of a water quality standard

Table 11.3: Definitions of Magnitude

11.3.12 The identification of significant effects has taken into account the sensitivity of the receptor and the predicted magnitude of impact, as shown in Table 11.4, and uses the terms beneficial (for an advantageous or positive effect on an environmental resource and receptor) or adverse (for a detrimental or negative effect on an environmental resource or receptor).

Table 11.4: Assessment Matrix

Sensitivity / Value of Pecentor	Magnitude of Impact				
Sensitivity/ value of Receptor	High	Medium	Low		
High	Major	Major/ Moderate	Moderate		
Medium	Major/ Moderate	Moderate	Moderate/ Minor		
Low	Moderate	Moderate/ Minor	Minor		

11.3.13 For the purposes of this assessment, effects of moderate or greater significance are considered to be significant in terms of the EIA Regulations.

11.4 Limitations of the Assessment

11.4.1 The assessment is based on the available reports. Whilst only partial information is available in relation to some of the previous assessments, it is considered that the previous investigations, together with the desk study research undertaken for this assessment, ensures that the available information is sufficiently robust to support the assessment.

11.5 Baseline Conditions

- 11.5.4 The baseline conditions at the site have been assessed using information collated in the desk study provided at Appendix 11.1. The main findings of the desk study are summarised below:
 - An area of Made Ground (worked ground (undivided)) is shown in the north east corner of the site.
 - Superficial Drift Geology Superficial deposits are not recorded beneath the site. Although an area of Alluvium is shown to the west and Arun Terrace Deposits are shown to the south.
 - Solid Geology The solid geology beneath the whole site is recorded as the Weald Clay Formation. Beneath the Weald Clay is the Tunbridge Wells Sand.
 - The Weald Clay beneath the site is classified as an unproductive stratum (proven to a depth of 5 m), with the underlying Tunbridge Wells formation classified as a Secondary A Aquifer. Groundwater is estimated to be at a depth of approximately 10 m below ground level (m bgl).
 - Radon Gas The site is classified as being in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level, but no radon protective measures are considered necessary.
 - Mining, and Ground Stability Hazards The whole of the site is indicated as Historic Surface Ground Workings associated with the brickworks between 1914 and 1956. Abstraction within the site is not recorded on the available records or indicated by the available ground investigation reports.
 - No historical underground workings are recorded on or close to the site. Non-coal mining related activities (Iron Ore) are indicated as being highly unlikely on site.
 - The GroundSure report states that there are low to negligible ground stability hazards from shrinking / swelling clay, landslides, soluble rocks, collapsible rocks and running sands. There is moderate potential for compressible ground.
 - Hydrology, Surface Water and River Network Two small ponds associated with the former brickworks are located immediately off-site to the north. An additional pond is located to the east of the site, directly south of the Biffa-operated MBT plant. The nearest river is indicated as a tertiary river to the west of the site. Boldings Brook is also located to the west of the site.
 - Surface Water Abstractions There is one surface water abstraction within 1 km of the site. This is located 39 m south for general use relating to secondary category (medium loss).
 - As a result of previous activities at the site there is considered to be potential for the presence of contamination, although the previous investigation works suggest that any contamination is likely to be localised.
 - The preliminary conceptual site model developed within the desk study to inform the preliminary risk assessment assessed the potential risks posed from the identified potential contamination sources to controlled waters, human health and the risk from ground gas. The conceptual site model concluded that there was a low or negligible risk to human health and controlled waters from soil contamination and ground gases.

Future Baseline Conditions

11.5.5 It is not anticipated that the baseline conditions identified would be likely to change significantly during the lifetime of the project. It is not considered likely that future climate change would affect the hydrogeology or ground conditions at the site.

11.6 Incorporated Enhancement and Mitigation

11.6.1 As set out in Chapter 2 of this ES, construction would be undertaken in accordance with a Construction Environmental Management Plan (CEMP). This would include the following measires in relation to ground conditions and hydrogeology.

Exposure of Construction Workers

Chemical Contamination of Soil and Groundwater

- Appropriate use of standard Personal Protective Equipment (PPE);
- Appropriate segregation of 'dirty' and 'clean' working areas and the establishment of appropriate washing facilities for construction workers;
- Appropriate briefing of site staff; and
- Implementation of personal hygiene protocols.

Ground Gases

- Recognition of confined space, and use of safe entry procedures;
- Appropriate use of standard PPE; and
- Appropriate training and briefing of site staff.

<u>Asbestos</u>

- Asbestos strip from buildings prior to site clearance and demolition;
- Airborne asbestos monitoring and personal asbestos monitoring;
- Appropriate use of PPE, to include but not restricted to masks (P3 rated), coveralls, boot covers and gloves;
- Appropriate segregation of the asbestos effected area (considered a 'dirty' area) from the remainder of the site and the implementation of appropriate decontamination measures;
- Appropriate training and briefing of site staff; and
- Implementation of personal hygiene protocols.
- 11.6.2 Additionally, airborne particles would be controlled through dust suppression measures such as damping. Removal of asbestos or asbestos contaminated materials would be undertaken by suitably experienced specialist contractors.

Mobilisation of Existing Contamination

Contaminated Dusts and Airborne Asbestos

- Damping down of exposed formations and stockpiles during dry conditions;
- Covering of contaminated stockpiles arising during remediation;

- Appropriate location of stockpile away from sensitive receptors;
- Restriction of works which are likely to generate dusts during windy conditions;
- Wheel washing of vehicles leaving site; and
- Creation of temporary haul roads away from sensitive receptors.

Contaminated Soils and Groundwaters

- Controlled excavation of known localised contaminated soils prior to bulk excavation works;
- The control of waters entering any excavation;
- The periodic inspection of excavations to identify significant water build up and the implementation of measures to prevent water flow from excavations;
- Periodic inspection of excavations to identify residual contamination if required, and allow its removal prior to deepening of excavations;
- Stockpiling of contaminated materials away from water courses/drains; and
- Covering of stockpiles to prevent leaching of contaminants.
- 11.6.3 It is considered that the potential for impact to controlled waters can be mitigated through the completion of a piling risk assessment in advance of construction. The piling risk assessment should identify the most appropriate piling method to minimise the generation of vertical contaminant migration pathways.

Creation of New Areas of Contamination

- 11.6.4 It is considered that the potential for accidental spillage of site process materials can be mitigated through appropriate storage and handling of materials in designated areas, with appropriate infrastructure and drainage systems in place. Any chemical and material storage on the site would be undertaken in accordance with the Environment Agency guidance in order to avoid pollution.
- 11.6.5 The following measures would be adopted:
 - Regular servicing and inspection of vehicles used on-site;
 - The restriction of refuelling of vehicles to bunded areas underlain by hard standing, or other impermeable materials; and
 - Deployment of spill kits to immediately control any spills that do occur.

11.7 Assessment of Construction Effects

- 11.7.1 An assessment of the likely significance of effects has been undertaken based on the identified baseline conditions. The assessment considers the impact of the construction of the facility on the sensitive receptors on the site and off-site receptors.
- 11.7.2 Construction works have the potential to generate the following potential impacts relevant to this assessment:
 - Exposure of construction workers to contamination;
 - Mobilisation of any existing contaminants into ground, groundwater, surface water and off-site;
 - Creation of new areas of contamination e.g. through spillage; and
 - Alteration of groundwater flow regime.

Exposure of Construction Workers

Soil and Groundwater Contamination

- 11.7.3 During construction and demolition works, workers at the site may be exposed to contaminants in soils and groundwater (where present) through ingestion, dermal contact or inhalation of volatile or dust particles.
- 11.7.4 As is always the case in the development of brownfield sites there is potential for areas of previously unidentified contamination to be present. Therefore, there are potential health risks to construction workers if mitigation measures are not in place. Exposure to the identified and any previously unidentified areas of contamination that may be present will be short-term exposure rather than long-term. With the proposed mitigation measures in place, the magnitude of the impact is considered to be low and the sensitivity of the receptor medium. Therefore, with appropriate mitigation, the likely significance of effect is considered to be minor adverse, short term and local.

Ground Gases

11.7.5 During construction of the proposed development, workers may be exposed to ground gases that may accumulate in confined spaces and, in exceptional circumstances, lead to a risk of explosion (methane) or asphyxiation (carbon dioxide). The magnitude of the impact is considered to be low with suitable mitigation in place and the sensitivity of the receptor medium. Therefore, with mitigation, the likely significance of effect is considered to be minor adverse, short term and local.

Asbestos

- 11.7.6 During demolition works there is the potential that workers may be exposed to asbestos fibres unless mitigation and controls are put in place. Asbestos containing materials have been observed in building fabric of the existing buildings.
- 11.7.7 Where airborne fibres are generated during demolition these may be inhaled or ingested by workers unless controls are in place. The magnitude of the impact is considered to be low and the sensitivity of the receptor medium. Therefore, with mitigation, the likely significance of effect is considered to be minor adverse, short term and local.

Mobilisation of Existing Contamination

- 11.7.8 Construction activities at the site may lead to the generation of dust that could be inhaled or ingested by construction workers and people in adjacent areas, if the dust were to migrate off the site. Due to the low levels and localised nature of chemical contaminants identified during the ground investigations undertaken on the site, dust generated from ground disturbance during construction is unlikely to be contaminated. The exception to this relates to the existing structures which were recorded to contain asbestos. The magnitude of the impact with suitable mitigation in place is considered to be low and the sensitivity of the receptor high. Therefore, the likely significance of the effect is considered minor adverse, short term and local.
- 11.7.9 Construction activities can result in the mobilisation of contaminants within the soil and the creation of a pathway for contaminants to migrate to underlying groundwater. The Weald Clay underlying the site is classified as an unproductive stratum and is of a low permeability and is present to depths of greater than 5 m. This stratum is underlain by the Tunbridge Wells formation that is classified as a Secondary A Aquifer and is considered a relatively sensitive receptor. Therefore, where the construction works fully penetrate the Weald Clay this may to lead to generation of a vertical pathway. It should, however, be noted that such a thickness of clay is likely to retard migration of contaminants and will be naturally annealing limiting the potential for migration. Additionally, ground investigation has identified that ground contamination at the site is limited in extent and severity. The magnitude of the impact is considered to be low and the sensitivity of the receptor medium. Therefore, the likely significance of this effect is considered minor adverse, short term and local with mitigation.

Creation of New Areas of Contamination

11.7.10 During construction works there is the potential for accidental spillage that may contaminate soils, surface waters or groundwater at the site. The Weald Clay underlying the site is classified as an unproductive stratum and the surface water features surrounding the site are unnamed small scale streams. The main source of potential spillages is considered to be from construction plant (relating to refuelling, maintenance, breakdowns etc.) and the storage of potentially hazardous construction materials on the site. The magnitude of change for the soils, surface waters, and groundwater due to accidental spillage of contaminated materials would be dependent on the nature, frequency and size of the spillage. Given the nature of the development it is considered that there is the potential for large volumes of potentially hazardous material (ready mix concrete etc.) to be stored on the site for short periods, and therefore there is the potential for a significant contamination event if appropriate measures are not in place. The magnitude of the impact is considered to be high and the sensitivity of the receptor low. Therefore, the likely significance of this effect is considered minor adverse, short term and local with mitigation.

Alteration of Groundwater Flow Regime

11.7.11 During construction at the site it is unlikely that the groundwater regime would be altered in such a way as to affect groundwater flows and surrounding surface water features. The investigation has identified that the only shallow ground water is perched water pockets in the made ground above the Weald Clay. A consistent groundwater table is estimated to be present at a depth of approximately 10 m bgl. Construction works to this depth are limited and unlikely to alter the groundwater regime beneath the site. The magnitude of the impact is considered to be low and the sensitivity of the receptor low. Therefore, the likely significance of this effect is considered minor adverse, short term and local with mitigation.

11.8 Assessment of Operational Effects

- 11.8.1 Potential likely during operation are outlined below:
 - Exposure of worker and site visitors to any contamination;
 - Impact to controlled waters from contamination; and
 - Alteration of groundwater flow regime.

Exposure of Workers and Site Visitors to Contamination

11.8.2 There is a potential for end users to be exposed to contamination that may be present at the site through incidental soil ingestion, dermal contact, inhalation of volatiles and dust particles or landfill gas. The proposed development comprises a commercial development that would lead to capping of the majority of the site with hardstanding. Additionally, the structures at the site would be highly ventilated, consistent with the proposed waste management processes. This would limit exposure to any residual contamination. The current investigation information indicates that contamination at the site is localised and of limited severity. There is, however, the potential for unidentified contamination to be present. The magnitude of the impact is considered to be low and the sensitivity of the receptor medium. Therefore, the likely significance of effect is considered to be minor adverse, long term and local.

Impact to Controlled Waters from Contamination

11.8.1 Completion of the proposed development is unlikely to increase the potential for persistent pathways to be introduced that may allow contamination to effect controlled water receptors. The Weald Clay underlying the site would create a natural barrier to vertical migration of contaminants to the underlying Tunbridge Wells formation which is classified as a Secondary A Aquifer and is therefore considered a sensitive receptor. Where this layer is fully penetrated by structures, such as piles and the proposed bunker, this would create a pathway for contamination. Such a pathway is, however, likely to be limited as a result of the Weald Clay

which would act to retard migration of contamination and is likely to be naturally annealing around structures. Additionally, ground investigation has identified that ground contamination at the site is limited in extent and severity. The magnitude of the impact is considered to be low and the sensitivity of the receptor medium. Therefore, the likely significance of effect is considered to be of minor adverse, long term and local.

Alteration of Groundwater Flow Regime

11.8.2 The presence of substantial below ground structures following redevelopment has the potential to alter groundwater flow. The potential significance of this effect would relate to the conditions pre-construction and the groundwater flows beneath the site. As previously stated, the Weald Clay formation beneath the site is classified as an unproductive stratum and, therefore, groundwater flows through this unit would be negligible. A consistent groundwater table is, however, estimated to be present at a depth of approximately 10 m bgl within the Tunbridge Wells formation. Where permanent structures extend into this formation to a depth greater than 10 m bgl they have the potential to impact groundwater flows. Significant structures are not proposed beyond this depth. Whilst parts of the bunker structural slab would extend beyond the finished floor level, significant structures would not extend significantly below the water table. The magnitude of the impact is considered to be low and the sensitivity of the receptor low. Therefore, the likely significance of this effect is considered minor adverse, long term and local.

11.9 Assessment of Decommissioning Effects

- 11.9.1 Where complete removal of structures is undertaken as part of decommissioning it is considered that the decommissioning effects at the plant would be broadly similar to the construction effects with regards to plant, equipment, materials and personnel required to return the site to a vacant, clear condition. In the event that the hardstanding remains in place post decommissioning, the significance of the effects would be less than reported for construction.
- 11.9.2 In this respect, similar mitigation measures should be adopted to prevent pollution. It should be possible to exclude asbestos mitigation measures from any future decommissioning plans, as it is anticipated that asbestos containing materials would not be utilised in the construction of the facility.

11.10 Assessment of Cumulative Effects

11.10.1 As set out above, it is anticipated that the proposed development would have only low level and localised effects that would not affect other sites. As other schemes come forward for development, the land involved in those developments and any potential contamination within those sites will need to undergo assessment to evaluate the risks and the significance of effects posed by those developments. Following that assessment, any identified requirement for remediation should be completed prior to the start of, or as a justified part of, the construction phase. Accepting that other proposed developments in the area around the site are adequately assessed, remediated and mitigated, they should themselves result in no significant adverse effects, and it is therefore not anticipated that there would be measurable cumulative effects.

11.11 Inter-relationships

- 11.11.1 There is potential for contamination to be identified during construction and the need for it to be managed and removed from site to a licensed waste management facility. In the unlikely event that this requirement arises additional vehicle movements would be required. It is anticipated that volumes of material would be limited and therefore any increase in vehicle movement would be negligible above those required for the general construction activities.
- 11.11.2 Effects on surface water receptors are considered in Chapter 10 of this ES.

11.12 Further Mitigation Measures

- 11.12.1 As set out above, the CEMP would include a range of good practice measures to control the potential for contamination and for effects on workers and receptors in the surrounding area. No further mitigation is considered necessary.
- 11.13 Monitoring and Management Strategies
- 11.13.1 Implementation of specific monitoring or management strategies is not considered necessary.
- 11.14 Residual Effects
- 11.14.1 Table 11.9 summarises the significance of effects for the construction and the operational phase for the project taking into account the mitigation measures incorporated into the facility.

		ry Environmenta		ng constructio					
Parameter (e.g. Receptor No 1)	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Demolition and	Construction								
Exposure of construction workers to any existing contamination present within soils and groundwater	Medium	Human health impacts through construction workers being exposed to contaminated materials.	Short	High	Moderate adverse, short term and local	Adherence of standard construction protocols for potentially contaminated sites, appropriate use of PPE, segregation of 'dirty' and 'clean' working areas and the establishment of decontamination facilities, appropriate briefing of site staff, Implementation of personal hygiene protocols.	Low	Minor, short term and local.	Not significant
Exposure of Construction Worker: Ground gases	Medium	Inhalation of ground gasses, causing nausea or asphyxiation. Risk of explosion.	Short	High	Major adverse, short term and local.	Use of PPE Identify and risk assess confined spaces and use confined space entry procedures with trained staff.	Low	Minor, short term and local.	Not significant
Exposure of Construction Worker: Asbestos	Medium	Inhalation of asbestos fibres	Short	High	Major adverse, short term and local	Soft asbestos strip from buildings and removal of asbestos contaminated soil prior to demolition, appropriate use of PPE, appropriate segregation of the asbestos effected area (considered a 'dirty' area) from the remainder of the site, appropriate briefing of site staff and implementation of personal hygiene protocols	Low	Minor, short term and local.	Not significant

Table 11.9. Summary of Likely Environmental Effects During Construction and Operation of 3Rs Facility

Parameter (e.g. Receptor No 1)	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Mobilisation of any existing contaminants through the generation of dust and inhalation by humans.	High	Inhalation of dusts.	Short	High	Major adverse, short term and local.	Damping down, covering of contaminated stockpiles, wheel washing of vehicles leaving site, creation of temporary haul roads.	Low	Minor, adverse short term and local.	Not significant
Mobilisation of any existing contaminants into ground and groundwater.	Medium	Contamination of controlled waters.	Short	Low	Minor / moderate adverse, short term and local.	inspection of excavations and removal of contaminated groundwater.	Low	Minor, adverse short term and local.	Not significant
Creation of new areas of contamination e.g. through spillage	Low	Contamination of soils and controlled waters.	Short	High	Moderate adverse, short term and local	Regular servicing and inspection of vehicles used onsite, restriction of refuelling of vehicles to bunded areas, and deployment of spill kits.	Low	Minor, adverse short term and local.	Not significant
Alteration of groundwater flow regime beneath the site.	Low	Alteration of groundwater flows beneath the site.	Short	Low	Minor adverse, short term and local	N/A	N/A	N/A	Not significant
Exposure of future users to any existing contamination present within soils and groundwater	ase Medium	Human health impacts through site occupation being exposed to contaminated materials.	Long term	Low	Minor adverse, long term and local	N/A	Low	Minor adverse, long term and local	Not significant

Parameter (e.g. Receptor No 1)	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Impact on controlled waters	Medium	There is not anticipated to be a sensitive controlled waters body.	Long	Low	Minor/moderate, long term and local	Piling risk assessment	Low	Minor, long term and local.	Not significant
Alteration of groundwater flow regime beneath the site.	Low	Groundwater beneath the site is not deemed at risk.	Long	Low	Minor adverse, long term and local	N/A	Low	Minor adverse, long term and local	Not significant

11.15 Conclusions

11.15.1 With appropriate mitigation, the impacts associated with redevelopment and operation of the site relating to hydrogeology and ground conditions is assessed as low and the significance of effect as no greater than minor adverse. It is considered that the proposed facility would not generate an unacceptable effect.

11.16 References

Published Documents

BSI (2013) BS10175:2011 + A1:2013 Code of Practice for Investigation of Potentially Contaminated sites.

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SLR Consulting (undated) Environmental Statement Technical Chapter, based on 2014 desk top study.

West Sussex County Council and South Downs National Park Authority (2014) West Sussex Waste Local Plan. April 2014.

Web Resources

BritishGeologicalSurveyGeologyofBritainViewerhttp://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html?src=topNavContaminatedLandExposureAssessment(CLEA)https://www.gov.uk/government/publications/contaminated-land-exposure-assessment-clea-toolEnvironment Agency, What's in your backyard? www.environment-agency.gov.uk/mapsContaminated

12 Ecology and Nature Conservation

12.1 Introduction

- 12.1.1 This chapter details the findings of the ecological assessment undertaken for the proposed 3Rs Facility. The existing baseline ecological conditions at the site are described with reference to the surrounding area. The effects arising from the proposed development are described, taking into account the measures that have been incorporated into the design and identifying any additional measures required to avoid, reduce, mitigate or compensate for adverse effects. The predicted significance of the effects is set out.
- 12.1.2 Ecological function has been considered in relation to other environmental factors (including landscape and hydrology) and operational requirements (lighting and construction). The ecological assessment draws on the findings of the other discipline areas where relevant, and aims to provide an objective understanding of the effect of this project on the ecology of the site and surrounding area, with reference to legislation, planning policy and biodiversity obligations.

12.2 Legislation and Policy Context

12.2.1 This section summarises relevant legislation and policy that is directly relevant to ecology and nature conservation issues.

National Policy and Guidance

National Policy Statement for Energy (NPS) EN-1, EN-3 and EN-5

- 12.2.2 Whilst the National Policy Statements (NPSs) are at the heart of the planning regime for Nationally Significant Infrastructure Projects, they are also recognised as a material consideration in decisions on planning applications. Therefore, where relevant, the policy set out within the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a), the NPS for Renewable Energy Infrastructure EN-3 (DECC, 2011b) and the NPS for Electricity Networks Infrastructure EN-5 (DECC, 2011c) in relation to ecology and nature conservation has been considered.
- 12.2.3 Paragraph 2.4.2 (NPS EN-3) specifically identifies that applicants should demonstrate good design in respect of landscape and visual amenity and in the design of the project to mitigate impacts such as noise and effects on ecology.

National Planning Policy Framework

- 12.2.4 The National Planning Policy Framework (NPPF) published on 27 March 2012 sets out the Government's planning policies in England and how these are expected to be applied (DCLG, 2012).
- 12.2.5 The principle of sustainable development enshrined in the NPPF acknowledges the environmental role of planning in protecting and enhancing the natural environment, and helping to improve biodiversity. The NPPF recognises that achieving sustainable development involves pursuing positive improvements in the natural environment including: '...*moving from a net-loss of biodiversity to achieving net gains for nature*'.
- 12.2.6 Chapter 11 of the NPPF 'Conserving and enhancing the natural environment' contains provisions for ensuring that planning can be sustainable from an environmental perspective. Specifically, Chapter 11 states that: '...*the planning system should contribute to and enhance the natural and local environment by:*
 - Protecting and enhancing valued landscapes, geological conservation interests and soils;

- Recognising the wider benefits of ecosystem services; minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressure;
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and,
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'
- 12.2.7 The NPPF encourages planning authorities to develop criteria based policies for development affecting protected sites, taking into consideration the geographical hierarchy of nature conservation designations. Such policies should aim to conserve and enhance biodiversity when considering planning applications, and to encourage opportunities to incorporate biodiversity in and around developments.
- 12.2.8 Further guidance is provided in the National Planning Practice Guidance (NPPG) (DCLG, 2014a). Paragraph 016 of the NPPG sets out guidance in relation to taking biodiversity into account in planning applications. This states that 'Local planning authorities should only require ecological surveys where clearly justified, for example if they consider there is a reasonable likelihood of a protected species being present and affected by development. Assessments should be proportionate to the nature and scale of development proposed and the likely impact on biodiversity.'
- 12.2.9 Paragraph 018 relates to mitigation, with reference to the preference for avoidance of impacts before mitigation. Where significant effects cannot be avoided, paragraph 019 states that mitigation or compensation measures can be secured through planning conditions or obligations.
- 12.2.10 The NPPF is also supported by the Government Circular: Biodiversity and Geological Conservation Statutory Obligations and their Effect within the Planning System, jointly issued by the Office of the Deputy Prime Minister and the Department of Food and Rural Affairs (ODPM & DEFRA, 2005). This joint circular aims to provide 'guidance on the application of the law in relation to planning and nature conservation as it applies in England'.
- 12.2.11 The Government Circular makes reference to the UK Biodiversity Action Plan (BAP), England Biodiversity Strategy and Local Biodiversity Partnerships.

National Planning Policy for Waste

- 12.2.12 The National Planning Policy for Waste (DCLG, 2014b) was published in October 2014 and provides a simplified and streamlined single document to work towards a more sustainable and efficient approach to resource use and management. It is aimed at local waste planning authorities, providing guidance and information on how to deliver the country's waste ambitions, through several main objectives:
 - Delivery of sustainable development and resource efficiency, including provision of modern infrastructure, local employment opportunities and wider climate change benefits, by driving waste management up the waste hierarchy;
 - Ensuring that waste management is considered alongside other spatial planning concerns, such as housing and transport, recognising the positive contribution that waste management can make to the development of sustainable communities;
 - Providing a framework in which communities and businesses are engaged with and take more responsibility for their own waste, including by enabling waste to be disposed of or, in the case of mixed municipal waste from households;
 - Helping to secure the re-use, recovery or disposal of waste without endangering human health and without harming the environment; and

- Ensuring the design and layout of new residential and commercial development and other infrastructure (such as safe and reliable transport links) complements sustainable waste management, including the provision of appropriate storage and segregation facilities to facilitate high quality collections of waste.
- 12.2.13 In testing the suitability of sites and areas in the preparation of Local Plans and in determining planning applications, waste planning authorities should consider (in reference to ecology and nature conservation) (Appendix B) any adverse effect on a site of international importance for nature conservation (Special Protection Areas, Special Areas of Conservation and Ramsar Sites), a site with a nationally recognised designation (Sites of Special Scientific Interest, National Nature Reserves), Nature Improvement Areas and ecological networks and protected species.

Local Planning Policy

West Sussex Waste Local Plan

- 12.2.14 The West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2014) was adopted in 2014 and covers the period up until 2031. The Plan provides strategies on waste planning and, within this, specific policies in order to achieve such strategies. Broadly, the plan is based upon promoting sustainable development, following the principles of the NPPF and the National Planning Policy for Waste.
- 12.2.15 The plan addresses the need for an increase in waste management facilities, in line with an expected population growth of 60,000 residents by 2026. Further to this, in order to achieve the objectives of 'net self-sufficiency' and 'zero waste to landfill' by 2031 (Policy W1), non-inert landfill options will need to be explored, and to that end, several new sites have been allocated for development; and the re-development of older sites is also encouraged. To this end, the Wealden site has been allocated within the Waste Local Plan (Policy W10) as a strategic site for waste management, which is potentially rail linked. This is the only available site in the north of West Sussex.

Horsham District Planning Framework (2015)

12.2.16 The Horsham District Planning Framework (Horsham District Council, 2015)) was adopted in 2015 and sets out the planning policies up to 2031. The HDPF contains several policies relating to ecology and biodiversity:

Policy 25 – The Natural Environment and Landscape Character:

"Maintains and enhances the existing network of geological sites and biodiversity, including safeguarding existing designated sites and species, and ensures no net loss of wider biodiversity and provides net gains in biodiversity where possible."

Policy 31 – Green Infrastructure and Biodiversity:

Policy 31 (1)

" Development will be supported where it can demonstrate that it maintains or enhances the existing network of green infrastructure. Proposals that would result in the loss of existing green infrastructure will be resisted unless it can be demonstrated that new opportunities will be provided that mitigates or compensates for this loss, and ensures that the ecosystem services of the area are retained."

Policy 31 (2)

" Development proposals will be required to contribute to the enhancement of existing biodiversity, and should create and manage new habitats where appropriate. The Council will support new development which retains and /or enhances significant features of nature conservation on development sites. The Council will

also support development which makes a positive contribution to biodiversity through the creation of green spaces, and linkages between habitats to create local and regional ecological networks."

12.2.17 Policy 31 (4)

"a) Particular consideration will be given to the hierarchy of sites and habitats in the district as follows:

- Special Protection Area (SPA) and Special Areas of Conservation (SAC);
- Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs);

• Sites of Nature Conservation Importance (SNCIs), Local Nature Reserves (LNRs) and any areas of Ancient woodland, local geodiversity or other irreplaceable habitats not already identified in i & ii above.

b) Where development is anticipated to have a direct or indirect adverse impact on sites or features for biodiversity, development will be refused unless it can be demonstrated that:

- The reason for the development clearly outweighs the need to protect the value of the site; and,
- That appropriate mitigation and compensation measures are provided."

Wildlife Legislation

Wildlife and Countryside Act 1981 (as amended)

12.2.18 The Wildlife and Countryside Act (WCA) 1981 (as amended) consolidated and amended earlier national legislation to implement the European Directive 2009/147/EC on the conservation of wild birds (The Birds Directive) in the UK. Individual species receive different levels of protection under the act. Special Protection Areas (SPAs) were designated under the WCA 1981 where sites support significant numbers of wild birds and their habitats.

Conservation of Habitats and Species Regulations 2017

- 12.2.19 The WCA 1981 is complemented by the Conservation of Habitats and Species Regulations 2017 (hereafter referred to as The Habitat Regulations). This is the most recent legislation to implement in law the European Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (Habitats Directive) adopted in 1992.
- 12.2.20 Individual species (such as otter *Lutra lutra* and dormouse *Muscardinus avellanarius*) and species groups (all native UK bat *Chiroptera* species) receive a high level of protection under the Habitat Regulations.
- 12.2.21 The regulations require the potential effects on European Protected Habitats to be a key consideration in planning decisions. If it is likely that the designated features have the potential to be impacted then an appropriate assessment is required under Article 6(3) of the Habitats Directive with consideration of mitigation options to avoid adverse effects. If uncertainty remains over a potentially significant effect, then alternative solutions need to be considered.

Countryside and Rights of Way Act 2000

- 12.2.22 The WCA 1981 has been amended and reinforced in England and Wales by the Countryside and Rights of Way Act (CRoW) Act 2000 (as amended). The CRoW Act increases protection for Sites of Special Scientific Interest (SSSIs) as well as strengthening wildlife enforcement legislation.
- 12.2.23 The CRoW Act places a duty on the Government to have regard for the conservation of biodiversity and to maintain lists of species and habitats for which conservation action should be taken or promoted, in accordance with the Convention on Biological Diversity. Schedule 9 of the CRoW Act amends the WCA 1981 by altering the notification procedures for SSSIs and providing increased powers for their protection and management.

Natural Environment and Rural Communities Act 2006

- 12.2.24 The Natural Environment and Rural Communities (NERC) Act 2006 places a duty on all public authorities to have regard to the purpose of conserving biodiversity.
- 12.2.25 Section 40 of the NERC Act 2006 imposes a duty on all public bodies including local and national government to have regard to biodiversity in the exercise of all of their functions, with particular regard to the species of conservation priority and is often referred to as 'the biodiversity duty'.
- 12.2.26 In England, Section 41 (S41) of the Act lists the species and habitats of highest importance for conserving biodiversity (derived from the original UK BAP priorities). The S41 list is a definitive reference for all public bodies in England (statutory and non-statutory) and is a guide for decision-makers when implementing their statutory duties to have regard to the conservation of biodiversity. This 'biodiversity duty' includes taking steps to promote the restoration and enhancement of the populations of S41 species.
- 12.2.27 Section 41 species include a number of native bat species (including greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, and brown long-eared bat *Plecotus auritus*), dormouse, hedgehog *Erinaceus europaeus*, brown hare *Lepus europaeus*, a number of bird species associated with grassland and woodland habitats, and slow-worm *Anguis fragilis*, and great crested newt amongst others. All these species are of conservation concern and have suffered long-term population declines.

The Hedgerows Regulations 1997

- 12.2.28 The Hedgerows Regulations 1997 provided a framework against which hedgerows can be assessed to determine whether they qualify as "important". A hedgerow is defined as important if it has existed for 30 years or more and satisfies at least one of the criteria listed in Part II of Schedule 1 of the act. Part II of schedule 1 contains criteria in the categories of "Archaeology and history" and "Wildlife and landscape". The Wildlife and landscape criteria relate to the diversity of woody and herbaceous species within the hedgerow, the size and structure of the hedgerow and its' association with other landscape features that can contribute to ecological function.
- 12.2.29 For the purpose of ecological assessment, hedgerows are only considered in relation to the wildlife and landscape criteria of the regulations.

Biodiversity Action Plans

- 12.2.30 The UK Biodiversity Action Plan (BAP) was published in 1994 in response to the 1992 Convention on Biological Diversity. Within the UKBAP, habitats and species were identified that should be the target of conservation action and, as such, were made the focus of Habitat Action Plans (HAPs) and Species Action Plans (SAPs) respectively.
- 12.2.31 The NERC Act Section 41 (S41) lists of species and habitats of highest importance for conserving biodiversity are based on the UKBAP species and habitats and now supersede the UKBAP priorities.
- 12.2.32 The Sussex BAP was adopted in 2010 and lists species and habitat that are identified as priorities for action within Sussex. The following species and habitats covered in this assessment are listed as priorities in the Sussex BAP:
 - Great crested newt.

Local Nature Partnerships

12.2.33 Following the Nagoya UN Biodiversity Summit in October 2010 the UK Government published the white paper 'The Natural Choice: Securing the Value of Nature' (HM Government, 2011) which introduced the institutional framework for the enhancement of the benefits of nature through Local Nature Partnerships

(LNPs). The Governments strategy for the delivery of Biodiversity in England 'Biodiversity 2020' including specific actions and targets was subsequently published in 2011 (Defra, 2011).

- 12.2.34 Following the publication of the white paper in 2011 the Sussex LNP was established and officially recognised by Defra in July 2012. The LNP covers East Sussex, West Sussex, Brighton and Hove.
- 12.2.35 The LNP has two high-level objectives:
 - Conserve, enhance and expand Sussex's Natural Capital; and
 - Ensure that Sussex residents have access to and share in the benefits provided by healthy, well-functioning ecosystems.

Species Legal Protection and Conservation Status

Bats

- 12.2.36 All bats, their breeding and nesting sites (roosts) are protected under the Habitats Regulations 2017 and Section 9(4)(b), (c) and (5) of the Wildlife and Countryside Act 1981 with an amendment in the Countryside and Rights of Way Act 2000 to include both intentional and reckless disturbance.
- 12.2.37 In summary, these pieces of legislation make it an offence if: a bat is deliberately captured, injured or killed; a bat is intentionally or recklessly disturbed in its roost or a group of bats is deliberately disturbed; a bat roosting place is damaged or destroyed (even if bats are not occupying the roost at the time); or access to a bat roost is intentionally or recklessly obstructed.
- 12.2.38 Any disturbance of a roost due to development must be licensed. The legislation protects roost sites and consideration needs to be given to circumstances where loss of foraging habitat could indirectly result in the loss of the roost.

<u>Badger</u>

12.2.39 Under the Protection of Badgers Act 1992, badgers (*Meles meles*) are protected from being killed, injured or disturbed, while occupying a sett, and their setts are protected from obstruction, damage or destruction.

Nesting Birds

12.2.40 Nesting birds are protected under the Wildlife and Countryside Act 1981, which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition to this, for some rarer species (listed on Schedule 1 of the Act), it is an offence to intentionally or recklessly disturb them while they are nest building or at or near a nest with eggs or young, or to disturb the dependent young of such a bird.

<u>Reptiles</u>

12.2.41 All native British reptiles are protected under the Wildlife and Countryside Act 1981 (as amended). The four most widespread reptile species (grass snake *Natrix natrix*, slow worm *Anguis fragilis*, common lizard *Zootoca vivipara* and adder *Vipera berus*) are protected from intentional killing or injury.

Great Crested Newt

12.2.42 The great crested newt *Triturus cristatus* is a European Protected Species (EPS) and as such is afforded full protection under the Conservation of Habitats and Species Regulations 2017. It is also fully protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally kill, injure or take great crested newts and to damage, destroy or obstruct access to any structure or place used for shelter or protection. In addition to this, it is an offence to intentionally or recklessly disturb them while they are occupying a structure or place used for that purpose.

12.3 Assessment Methodology

Baseline Survey Methodology

12.3.1 The baseline ecological surveys that underpin this assessment have, as matter of best practice, been undertaken following published guidance from the relevant body. Full details of the survey methods are provided in the Ecological Appraisal Report and Ecology Survey Report in Appendices 12.1 and 12.2. A brief summary is given below.

Ecological Appraisal (Preliminary)

- 12.3.2 The Ecology Appraisal was undertaken following the Guidelines for Preliminary Ecological Appraisal (CIEEM 2012) and guidance on Phase 1 habitat survey from the Joint Nature Conservation Committee (JNCC, 2003). It is noted that the CIEEM guidelines were updated in December 2017, after the preliminary appraisal was completed. However, application of the updated guidelines would not affect the conclusions of the appraisal.
- 12.3.3 Information was collated on local and national nature conservation designations within 2 km, and international designations within 10 km. The local biological record centre supplied records of protected species and other species of conservation interest within 2 km of the site, and records of bat species form up to 4 km from the site boundary.
- 12.3.4 The site walkover was undertaken on 7th March 2016, including an extended Phase 1 habitat survey, during which all habitats within the site were classified, mapped and described. The habitats within the site were also assessed for their potential to support legally protected or otherwise notable flora. No changes have occurred at the site since the site walkover that would affect the results of this appraisal.
- 12.3.5 Targeted searches were also made in areas of suitable habitat and where appropriate for evidence of legally protected fauna or faunas of conservation interest.
- 12.3.6 The findings of the Preliminary Ecological Appraisal are set out in Appendix 12.1.

eDNA Survey for Great Crested Newt

12.3.7 Water samples from ponds within 500 m were collected on the 17th May 2016 and 2nd June 2016 for eDNA analysis, as per the methodology set out in Biggs *et al.* (2014). Twenty water samples were collected from around the perimeter of the pond. All samples were then pooled into a single bag, which was then shaken for 15 seconds to thoroughly mix. Six aliquots were then pipetted into separate test tubes and sent off for final analysis by SureScreen Scientifics. Appendix 12.2 sets out further details of the methodology and results of this survey.

Bat Daytime Inspection and Emergence Surveys

- 12.3.8 A daytime inspection of one of the buildings was undertaken on the 26th October 2016 with respect to its potential to support a bat roost. The building had been previously highlighted as having a low potential to support roosting bats due to substantial cracking along one corner. This followed the methods set out in Collins (2016) and involved the use of an endoscope to check the crack for evidence of bat usage by a licensed bat ecologist.
- 12.3.9 One follow-up dusk emergence survey was carried out on the 26th October 2016. Two surveyors observed the building from where it was considered bats might emerge. The dusk survey commenced 15 minutes before sunset, and finished up to two hours after sunset. Full details and results can be found in Appendix 12.2.

12.3.10 Time-expansion bat detectors (Pettersson D 240x, and Elkon Batlogger) and frequency division bat detectors (Batbox Duet) were used to record bat echolocation calls of any emerging bats and identify species, where possible. Recordings were made using Edirol recording devices (R-09HR and R-05) and built in recorders within the detectors, which were later analysed using the computer software 'BatSound'.

Assessment Methodology

- 12.3.11 The chapter follows the most recent published guidance from The Chartered Institute of Ecology and Environmental Management (CIEEM, 2017). The updated guidance aims to promote good practice in the assessment of ecological impacts in terrestrial, freshwater and marine environments in the UK.
- 12.3.12 The stages in the assessment process are:
 - Identifying the baseline conditions and ecological features through desk study and site surveys, taking into account potential changes in condition between the time of the assessment and the commencement of the development;
 - Identifying the ecological features likely to be affected by the development, including sites designated for their nature conservation or biodiversity value;
 - Evaluating the ecological/biodiversity importance of ecological features at the geographical scale;
 - Identifying the impacts on important ecological features as a result of the construction or operational phases of the development;
 - Assessing the anticipated effect of the identified impacts of the development on important ecological features;
 - Identifying appropriate mitigation to avoid, mitigate, compensate or off-set anticipated effects; and
 - Evaluating anticipated effects as a result of the development after appropriate avoidance, mitigation, compensation and offsetting measures have been implemented.

Assessing the Value of Ecological Features

- 12.3.13 Several factors are taken into consideration when assessing the value of an ecological feature and whether it is considered important and therefore requires detailed assessment.
- 12.3.14 In assessing the value of habitats or species populations, a subjective assessment is made, based on a range of factors that influence overall ecological value. Amongst other factors, a series of criteria are considered for habitats and populations of species (Ratcliffe, 1977), including: fragility, rarity, extent, diversity, position in the landscape, naturalness, and recorded history.
- 12.3.15 Other resources that are used to inform the assessment of value and importance include but are not limited to:
 - EU Directives;
 - Habitats and Species of Principal Importance (Section 41);
 - Birds of Conservation Concern (BoCC) Red and Amber lists (RSPB, 2015); and
 - National and County Red Data Book species.
- 12.3.16 The resources used to assess the value and importance of features also helps to define the importance in the context of geographical scale. The CIEEM guidelines state that significance of effects of ecological features should be qualified with reference to the appropriate geographic scale. Therefore, to provide a framework that is consistent for both assessing the importance of ecological features and determining the significance of effects, the importance of ecological features is described at one of the following geographic scales.

- National (high);
- Regional (medium);
- County (medium);
- Local (low);
- Site (and immediate surroundings) (negligible).
- 12.3.17 Where ecological features are considered important, then potential impacts on such features will be considered in the impact assessment. This process is described in more detailed below.

Characterising Ecological Impacts

- 12.3.18 Impacts may be described in terms of changes to the structure or function of ecological resource and are characterised according to a number of parameters where these are relevant to understanding ecological effect. These parameters include:
 - Beneficial or adverse impacts may be either, depending on the nature of the impact.
 - Extent- the geographical range over which the impact occurs.
 - Magnitude the size of the impact in terms of amount of a feature affected.
 - Duration and timing when the effect will occur and how long it will last.
 - Frequency whether the effect will be a single event or multiple events.
 - Reversibility the effect may be permanent, or may naturally reverse without mitigation, or may be reversible with appropriate mitigation.

Cumulative Impacts

12.3.19 Other proposed developments that could result in cumulative impacts have been identified (Appendix 4.4). Cumulative impacts have been addressed through consideration of the potential for other proposed developments to result in impacts on ecological features identified in the assessment, and which could contribute to the impacts likely to arise from the 3Rs Facility.

Assessing Significance of Ecological Effects

- 12.3.20 Significance is considered taking into account the importance of the ecological feature (at the geographical scale) and the characterisation of the impact (such as magnitude, extent, reversibility etc).
- 12.3.21 Broadly, effects are considered significant where they affect the structure of sites, habitats and ecosystems or the conservation status of habitats and species.
- 12.3.22 Several impacts of varying magnitudes could act on a receptor simultaneously. Therefore, for each receptor, a single overall level of significance of effect is presented for the construction, operation and decommissioning phases based on the most significant effect identified for that receptor.
- 12.3.23 For consistency between disciplines the overall significance of an effect is expressed as Negligible, Minor, Moderate, Major or substantial, based on the definitions below.
 - Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.

- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
- Moderate: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
- 12.3.24 Effects of moderate significance or above are considered to be significant in terms of the EIA Regulations.
- 12.3.25 In addition, the geographical scale at which the effect would be significant is described, using the same framework as is used in determining the ecological value of features.

Consultation

12.3.26 Table 12.1 sets out the results of consultation undertaken in relation to ecology and nature conservation. A full copy of the scoping opinion is contained in Appendix 4.2.

Table 12.1: Consultation Responses Relevant to Ecology and Nature Conservation.

Date/Source	Consultee and Issues Raised	How/ Where Addressed
November 2015	West Sussex County Council. Agreed with	Proposed approach adopted
Scoping	proposed approach with respect to	throughout chapter.
Opinion	ecology.	
Response to	WSCC Ecology: No objection. A bat	N/A.
previous	sensitive lighting scheme is required via	
application at	condition.	
the site		

12.4 Limitations of the Assessment

- 12.4.1 The Preliminary Ecological Appraisal was carried out at an appropriate time of year, and by an experienced ecologist, and therefore, there are no perceived limitations to this survey.
- 12.4.2 The bat emergence surveys were undertaken at a time of year, that, if bats were present, they would have been observed by the surveyors. Therefore, there are no perceived limitations to this survey.
- 12.4.3 The eDNA surveys were carried out at an appropriate time of year, and following the correct guidelines (Biggs, 2014, Appendix 12.2). However, the discrepancies between the results of Pond 5 (eDNA reporting a negative result, but great crested newt eggs being present), point to there being some limitations of the eDNA work. Biggs (2014) discusses these in more depth, Table 12.2 summarises the potential causes of false negative results.

Risk Factor	Mitigation
Field -Based	
Low numbers of newts	This risk is minimised by following good field protocol. Note that at present the minimum number of newts that can be detected in different waterbodies is not known. However, ponds with torch counts of zero animals in the breeding season, where newts were known to be present, have provided positive eDNA results in the breeding season.
Very wide, shallow draw down zones may increase the likelihood of collecting water samples in areas where there has been no newt activity even though the pond is currently occupied.	To access deeper water areas it is possible that the water sampler could be added to a long pole. It is important not to enter the water as sediments will be disturbed which may contain historical great crested newt DNA. Further research data on sediment DNA is likely to be available within 6-12 months to refine understanding of this issue. In all water depths it is necessary to gently stir the water throughout its depth, without disturbing sediments, as eDNA is believed to sink. It is advisable to avoid sampling very shallow water (less than 5-10 cm deep) as it may be difficult to avoid stirring up sediment in these areas.
There is evidence that DNA is less likely to be detected in water taken from densely packed mats of vegetation; either because of a lack of newt activity or because of the difficulty of sample collection in these areas.	Avoid sampling in these areas: sample from water in areas where vegetation is suitable for egg-laying and open water areas suitable for displaying.
There is evidence that eDNA is less likely to be detected if the whole pond perimeter is not sampled.	Every effort should be made to access 20 sites around the pond for sampling. Sites where 80-90% of pond margins were accessed achieved 99.3% detection rates. Attaching the sampling ladle to an extension pole may be an option for reaching a wider range of areas. Effective cleaning of the extension pole between sites is essential. The pole must be kept separate from any equipment that is in contact with newts.
Laboratory-based	
Very low eDNA concentrations.	Samples with DNA amounts below the Limit of Detection will generate false negatives. It is not currently possible to mitigate this risk.

Table 12.2: eDNA, Explanations for False Negative Results

12.4.4 Given this, it is possible that Pond 5 has very low numbers of GCN present, and therefore, the potential lack of DNA within the pond meant that the water samples did not pick up enough DNA to return a positive result from the analysis.

12.5 Baseline Conditions

12.5.1 The findings of the Preliminary Ecological Appraisal, including extended Phase 1 Habitat Survey, and desk study results are provided in Appendix 12.1.

Nature Conservation Designations

12.5.2 There are two statutory designated sites (Local Nature Reserve (LNR) and Site of Special Scientific Interest (SSSI) within 10km of the site boundary, and four non-statutory sites, including sites of nature conservation interest (SNCI). These are described briefly below in Table 12.3 and shown on Figure 12.1. For records of protected species and more in depth descriptions of the designated sites refer to Appendix 12.1.

Table 12.3: Statutory	and Non-statutory	/ Designated Sites	within 2 km of the Site
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Designated Site	Designation Development Site		Description
Warnham Mill Pond	Local Nature Reserve	0.9km south	A 40ha site comprising freshwater marsh and broadleaved plantation. The reserve is of ornithological interest and supports breeding great crested grebes <i>Podiceps cristatus</i> .
Warnham	Site of Special Scientific Interest	0.7km north east	Designated for geological reasons and therefore not considered further in this assessment.
-	Ancient Semi Natural Woodland	0.2km to the south and east of the site	Woodland composed of native trees and shrubs that do not obviously originate from planting.
Brookhurst Wood & Gill & Morris's Wood	Site of Nature Conservation Importance (SNCI)	0.4km north-east	30ha of semi-natural woodland dominated by hornbeam <i>Carpinus betulus</i> . It is situated on and around stream valley sides, with a sparse but occasionally species-rich ground flora.
Two sections of road verge	Notable Road Verges	1.1km and 1.6km north-east of the site	Road verges designated for their wildlife interest, often supporting diverse, protected, uncommon or declining habitat or flora.
-	Wood Pasture and Parkland	1.2km south-west	Typically veteran trees in a matrix of grazed grassland or heathland, often providing habitat for roosting bats, birds and invertebrates.

Habitats

<u>Buildings</u>

12.5.3 Eight buildings were present on site, of differing ages and constructions. Refer to the full Preliminary Ecological Appraisal (Appendix 12.1) for detailed individual descriptions.

Tall Ruderal and Ephemeral / Short Perennial Mosaic

- 12.5.4 A tall ruderal and ephemeral / short perennial mosaic had colonised open areas within the site. This was most extensive to the north-east of the site where ruderal vegetation had established on a large bank.
- 12.5.5 Mosses dominated the ground cover in these areas, interspersed with herbs such as colt's-foot *Tussilago farfara*, barren strawberry *Potentilla sterilis* and creeping buttercup *Ranunculus repens*. Frequent strands of dead tall ruderal vegetation were present, including teasel *Dipsacus fullonum*, common ragwort *Jacobaea vulgaris* and dock *Rumex* species.
- 12.5.6 This ruderal vegetation on site was small in extent, and comprised species common within the wider landscape. However, given this habitat's proximity to the off-site ponds that have been identified as supporting great crested newt, it will form part of this species' core terrestrial habitat and is therefore considered to be of value at the local level.

Scrub and Trees

- 12.5.7 Butterfly bush *Buddleja davidii*, bramble *Rubus fruticosus sp.*, grey willow *Salix cinerea* and silver birch *Betula pendula* scrub have self-seeded in places, forming denser stands to the north and north-east of the site. Rose *Rosa sp.*, hawthorn *Crataegus mongyna* and pedunculate oak *Quercus robur* saplings were additionally present along the eastern bank.
- 12.5.8 Along the access road to the site were lines of mature Lombardy poplar *Populus nigra Italica*, hawthorn hedge and large-leaved lime trees *Tilia platyphyllos*.
- 12.5.9 There are several large blocks of mature broad-leaved woodland and mature hedgerows with trees in the wider local area. In this context, the on-site trees/scrub are a negligible proportion of the local tree resource. However, they will form part of the terrestrial habitat for the population of great crested newts identified using the off-site ponds. As such, they are considered to be of value at the local level.

Amenity Grassland

- 12.5.10 A narrow bank of close-mown amenity grassland bordered the main recycling area to the south-east of the site. Perennial rye-grass *Lolium perenne* was the dominant species in the grassland, with common grassland species such as ribwort plantain *Plantago lanceolata*, common daisy *Bellis perennis* and yarrow *Achillea millefolium* occasionally present. Patches of bramble occurred across the grassland.
- 12.5.11 This grassland was small in extent and close-mown. Therefore, it is not considered of ecological value and not considered further in this assessment.

Off-site Ponds

- 12.5.12 Two ponds were located within dense scrub to the immediate north of the site, surrounded by grey willow, hawthorn and blackthorn *Prunus spinosa*. While they lack the structure associated with high-quality ponds (no emergent vegetation, very little aquatic), all ponds form part of the NERC Act 2006 Section 41 Habitat 'Ponds' as being essential to the conservation of biodiversity in England.
- 12.5.13 Therefore, the ponds are considered to be of value at the local level.

Fauna

<u>Bat Roosts</u>

- 12.5.14 A single building on site was noted as having low potential to support roosting bats, and, therefore, in line with guidance, a detailed daytime bat inspection was completed along with a single, follow-up emergence survey (Appendix 12.2).
- 12.5.15 These surveys found no evidence of bats roosting within the building. Therefore, impacts on bat roosts are not considered further in this assessment.

Bat Activity

12.5.16 The site provides limited foraging/commuting habitat for bats, comprising mainly hard standing and industrial buildings. The wider landscape is rural in nature with plentiful high-quality bat foraging/commuting habitat; the railway to the immediate east of the site may also provide a more substantial, unlit corridor for bat movement. Therefore, given the rural site context, it is possible that bats periodically forage across the site (this was confirmed by the bat emergence survey (Appendix 12.2) that found that the limited bat activity that did occur was focused along the railway boundary). Consequently, given the low availability of foraging habitat on site and the abundance of such habitat in the surrounding landscape, the site is considered only of site level importance for foraging/commuting for common species of bat (common and soprano pipistrelle) due to the presence of the railway adjacent to the western site boundary.

Nesting Birds

12.5.17 The ruderal vegetation/scrub mosaic and some buildings provide dense cover and would have the potential to support nesting bird species. Based on the small size of the site and limited extent of such habitat within it, the number of potential nests within the site would be expected to be low. With extensive suitable habitat present locally, the site is considered to be of value at the level of the site only with respect to nesting birds.

<u>Reptiles</u>

12.5.18 Grass snake *Natrix natrix* and slow-worm *Anguis fragilis* have previously been recorded in the woodland adjoining the site to the north and east respectively. However, at present, the sparse vegetation cover within the site provides very poor quality terrestrial habitat for reptiles and therefore, it is unlikely that reptiles will be using the site. Subsequently, they are not considered any further within this assessment.

Great Crested Newt

- 12.5.19 A small breeding population of great crested newt was identified in two ponds (Ponds 5 and 6) approximately 220 m to the north of the site in 2013. Great crested newts were not found to be present in the remaining five ponds within 500 m (in 2013). Ponds 1 and 2 were recorded as having common toads and smooth newts present in 2013.
- 12.5.20 The 2013 surveys were updated in 2016, using eDNA techniques rather than conventional night-time surveys (Figure 12.2 & 12.3) due to a blanket ban on night-time access to the site for health and safety reasons by Britanniacrest Recycling Ltd. The results of the eDNA analysis returned positive great crested newt results for Ponds 1 and 2 (located immediately north of the site boundary) and negative results for the remaining ponds (Refer to Appendix 12.2 for pond locations, Appendix 12.3 for full eDNA results). Notwithstanding this negative result, Pond 5 was found to have great crested newt eggs present on vegetation surrounding the pond during water sample collection and, therefore, it is considered that great crested newts, as in 2013, are present in this pond also. It is unclear why the eDNA analysis did not return a positive result from this pond (this is considered further below). However, all recommended methods to limit false negative results occurring were observed (collecting samples from around a pond and pooling, not taking samples from areas contaminated by mud etc.). The presence of eggs confirms a breeding population of this species although not the population size.
- 12.5.21 The habitat between Pond 5 and the site is primarily close-mown grass over a capped landfill, with hardstanding and the occasional patch of ruderal vegetation also present. Therefore, the connectivity between the site and Pond 5 is very limited as these are all considered to be habitats of sub-optimal value for great crested newts. Further, Pond 5 is separated from the site (and Ponds 1 and 2) by amphibian-proof fencing erected for other development. Also, directly east and adjacent to Pond 5, there is abundant suitable great crested newt terrestrial habitat. On this basis, it is considered highly unlikely that great crested newts are moving between Pond 5 and the site; i.e. the populations of this species in the two ponds to the immediate north of the site are unlikely to form a meta population. Therefore, given the distance of Pond 5 from the site and the barriers to newt dispersal from it to the application site, impacts to Pond 5 are not considered further in this assessment.
- 12.5.22 Ponds 1 and 2 have not previously been found to support great crested newts (2013). However, they both returned a positive eDNA result for this species in 2016 (Appendix 12.2), suggesting this species has recently established themselves in these ponds. The immediate surrounds of the ponds (dense scrub/small trees, ephemeral/short perennial and tall ruderal) provide limited, but suitable terrestrial habitat.
- 12.5.23 The ponds west of the railway have never been surveyed for GCN in relation to the either the current application or that to the north, as the existing industrial buildings/processes and railway line act as barriers to dispersal in this direction.
- 12.5.24 Given this, the only terrestrial habitat available to the newts is that immediately surrounding the ponds (a small proportion of which is on the current site, the remainder to the north within the neighbouring site). The

population is likely to be rather isolated within the wider landscape, given the barriers to dispersal surrounding it (industrial facilities, railway to the west/south and the unsuitability of habitat between the ponds and Pond 5 to the east). Therefore, any impacts to this suitable terrestrial habitat (namely small amounts of vegetation removal) would have a correspondingly larger effect on the population present, even if that population is only very small. Therefore, the population of great crested newt is considered to be of local value.

12.6 Future Baseline Conditions

- 12.6.1 In the absence of the proposed development, it would be expected that the features of the existing site would remain largely unchanged (consisting of hardstanding, several derelict buildings, scrub and a waterbody). The man-made habitats that would remain unvegetated and, in the absence of management, any increase in the extent of scrub would be minor.
- 12.6.2 Climate change over the proposed development's operational lifetime could influence the ecological baseline at the site in the longer term. For example, an increase in temperatures may place increased stress on nearby ecosystems within designated sites in the local area, and potentially reduce their resilience to indirect environment effects from the development (e.g. nitrogen deposition). However, ecological change associated with climate will be gradual and long term. Consequently, within the operational lifetime of the proposed development any changes to ecosystems are predicted to be extremely small.
- 12.6.3 Changes in rainfall could potentially impact the amount of water in great crested newt breeding ponds. Modelling undertaken by UK Climate Projections (UKCP09) (which is a joint project between a number bodies lead by Defra) calculated the change in precipitation on a 25 km by 25 km grid cell basis. Between 2020 and 2049, the average rainfall in the grid cell which includes the site, there is a predicted reduction of 0.44%, with this rising to -0.80% between 2030 and 2059. These changes are extremely small, they are unlikely to have any negative impact on the water levels in the ponds or lead to frequent drying out. The terrestrial habitats around the pond would remain unaffected. Therefore, climate change should not negatively impact upon the breeding habitat or status of the great crested newt population.

12.7 Incorporated Enhancement and Mitigation

- 12.7.1 This section describes the enhancement and mitigation features that have been incorporated into the proposed development. Identification of the key ecological features of the site, and potential presence of protected species, were considered early in the design process. Provision for the following measures has been incorporated into the design and layout to help avoid or reduce impacts on biodiversity (shown on Figure 12.4) and would be secured as part of the through the landscape strategy for the site:
 - Provision for retention and enhancement of some scrub/trees toward the north of the site and planting of new trees/scrub;
 - Creation of tussocky/wildflower grassland areas; and
 - Planting of aquatic/marginal species within the areas of the ponds in applicant's ownership.

Habitats

Tree and Scrub Retention

12.7.2 Native trees and scrub/shrubs would be retained where possible (mainly along the northern boundary). Along with rough grassland planting along the northern boundary, this would help to ensure that at least a 20 m vegetated buffer would be present between the proposed development and the off-site ponds.

12.7.3 New tree planting along the eastern boundary and towards the south of the site would provide suitable foraging and nesting habitat for birds and bats.

Woodland Planting

- 12.7.4 New woodland planting is proposed along the northern site boundary, to enhance the buffer that is currently present between the development and the off-site ponds. The woodland planting would encourage birds, mammals and invertebrates onto the site and to provide new habitat for great crested newts during their terrestrial phase. The grassland would be cut annually in late summer to avoid impacts to newts.
- 12.7.5 The woodland to be created along the northern site boundary would form a link between the existing ponds and the linear corridor along the railway to the west of the site. This is an important enhancement since it would allow the population of great crested newts present in the ponds to the north of the site to disperse into the surrounding landscape along a vegetated corridor; the population is currently isolated by existing industrial development within the vegetation immediately surrounding the ponds.

Grassland Creation

- 12.7.6 The landscape strategy based on the illustrative masterplan would incorporate new meadow grassland, which would be present to the north and west of the facility.
- 12.7.7 Grassland areas would be planted with a wildflower seed mix, to encourage birds, mammals and invertebrates onto the site and to provide new habitat for great crested newts during their terrestrial phase. The grassland would be cut annually in late summer to avoid impacts to newts. A 5 m margin of uncut grassland would be maintained around the ponds. Fertilisers would not be used.

Ground Cover Planting

- 12.7.8 The landscape strategy based on the illustrative masterplan would incorporate new areas of groundcover planting, particularly along the eastern boundary of the development.
- 12.7.9 This planting along the eastern site boundary would encourage birds, mammals and invertebrates onto the site and to provide new habitat for great crested newts during their terrestrial phase.

Fauna

Nesting Birds

- 12.7.10 The scrub, ruderal vegetation and a small number of the buildings currently present on site offer suitable habitat for nesting birds. To comply with wildlife legislation, any vegetation clearance would be carried out outside of the breeding bird season (March-September inclusive), where practicable. If this is not possible, any vegetation to be removed would be checked for nesting birds by a suitably qualified ecologist immediately prior to their removal. If any nests are found, they would be left undisturbed until the chicks have fledged (usually around six weeks).
- 12.7.11 The new tree and grassland planting would provide opportunities for both foraging and nesting birds.

Great Crested Newts

- 12.7.12 The southern boundary of Pond 1 is within the ownership of Britaniacrest Recycling. Therefore, a range of aquatic/marginal species would be planted along this area to enhance its suitability for this species. In addition to this, the large amount of additional wildflower grass, groundcover planting and native woodland planting along the northern, eastern and western site boundaries would ensure that there is an overall gain both in the quantum and quality of great crested newt habitat on site.
- 12.7.13 It would be necessary to undertake a programme of trapping from within the site to move animals out of the dense scrub into areas of retained habitat. The trapping would be done via fencing the site with amphibian-proof fencing and the use of pitfall traps and artificial refugia. Full details can be found in Appendix 12.2.

Foraging Bats

- 12.7.14 Normal hours of working during construction would be:
 - Monday to Friday 07.30 to 19.00 hours; and
 - Saturday 08.00 to 16.00 hours.
- 12.7.15 No construction works would take place on Sundays or Public Holidays. In the unlikely event that construction would be required outside of these hours consent would be agreed in advance with the local planning authority. However, it is envisaged that non-intrusive activities (such as electrical installations and commissioning operations etc) would be undertaken outside of these hours in order to minimise overall construction time.
- 12.7.16 Lighting outside the standard construction working hours would be restricted to that necessary for individual tasks and would be directional to avoid light spill onto areas where lighting is not required. Construction lighting would be designed to ensure there would be minimal artificial light spill to the railway corridor during the period when bats would be foraging / commuting.
- 12.7.17 An ecologically sensitive artificial lighting scheme has been designed for the site during its operational phase to minimise impacts on retained ecological features (including the adjacent railway corridor). Artificial light spill onto retained features and new grassland has been kept (where possible) to a maximum of 1 lux. Appropriate use of lighting technologies, such as direction lighting, would assist this. Where possible, the use of white LED lamps with a 'cool' colour temperature would be selected as this has lower attractiveness to insects and would be less likely to attract bats away from darker areas where they will more routinely forage (Fure, 2012).
- 12.7.18 Grassland creation along with tree/scrub planting would enhance the value of the on-site habitats as bat flight lines and foraging areas.
- 12.8 Assessment of Construction Effects
- 12.8.1 Effects on biodiversity would arise during construction through the disturbance and loss of habitats. Potential effects during the construction phase are listed below:
 - Permanent habitat loss (adverse);
 - Temporary habitat loss (adverse);
 - Loss of connectivity (adverse);
 - Effects on retained habitats during construction (adverse); and
 - Effects on fauna during the construction through removal of habitat (adverse).

Designated Sites

- 12.8.2 There is one statutory designated site within 2 km of the application boundary, Warnham Mill Pond Local Nature Reserve (LNR), located 0.9 km south of the site (Warnham SSSI, 0.7 km north east of the site, is designated for geological reasons and therefore not considered here). The LNR is not ecologically linked to the site, and given the distances between the designated site and site boundary, there is no likelihood of direct impacts on the nature conservation designated site and the 3Rs Facility site and, therefore, no scope for any indirect impacts to occur.
- 12.8.3 The nearest non-statutory site is located 0.2 km from the site, comprising an area of ancient semi-natural woodland. There is no woodland within the 3Rs Facility site and the areas of ancient semi-natural woodland
are separated from the site by Langhurstwood Road and existing development to the east, and a railway line to the west. As such, given the distance, no impact pathways between the development and the non-statutory sites are anticipated. It is therefore anticipated that there would be no impact or effect on designated sites.

Habitats

Tall Ruderal and Ephemeral / Short Perennial Mosaic

- 12.8.4 The majority of the existing ruderal and ephemeral/mosaic habitat would be removed in order to facilitate the construction of the facility. The ecological value of this habitat is related to the use of it by great crested newt in their terrestrial phase, given the relatively limited quantity of such habitat immediately surrounding the ponds where this species has been found. Of the total resource of this habitat lost, only part is considered to be suitable newt habitat, given its proximity to the ponds to the north of the site and the lack of significant hard standing barriers. The remaining areas of this habitat are to the south west of the existing buildings and hardstanding, which would prevent colonisation by newts.
- 12.8.5 The significance of the effect on great crested newts arising from the permanent loss of this habitat is considered in the section relating to great crested newts below.

Scrub and Trees

- 12.8.6 Whilst some areas of existing dense scrub/trees would be removed during construction, approximately half, particularly around the pond/along the northern boundary, would be retained. Given that these areas are relatively species poor, that new additional scrub/woodland planting is proposed, and that there are a number of larger woodland copses within the wider area, it is considered that the removal of such habitat would not be detrimental to the immediate surrounding area.
- 12.8.7 The ecological value of this habitat is related to the use of it by great crested newt in their terrestrial phase, given the relatively limited quantity of such habitat immediately surrounding the ponds where this species has been found. Therefore, the significance of the effect on great crested newts arising from the permanent loss of this habitat is considered in the section relating to great crested newts below.

Off-site Ponds

- 12.8.8 The off-site ponds to the immediate north of the site would be retained with a buffer of at least 20 m retained/newly-planted dense scrub and woodland habitat. Site surface water drainage is currently discharged into the ponds. This would continue through construction with appropriate silt/hydrocarbon traps in line to ensure no accidental pollution events occur.
- 12.8.9 Good-practice dust suppression methods would be implemented during both demolition and construction to prevent dust generated during works impacting the ponds. Details of such measures will be set out in the suitable Construction Environment Management Plan.
- 12.8.10 Overall, therefore, direct impacts (i.e. habitat loss) and impacts arising from dust to the ponds are considered unlikely. The resulting effects would be negligible.
- 12.8.11 A number of other ponds are present within 500 m of the site, but these are not ecologically linked to the site and, therefore, no impacts or effects on these are anticipated.

Fauna

Nesting Birds

12.8.12 Removal of only small areas of dense scrub/small trees means that some potential nesting habitat would largely be retained. Removal of such small areas of these resources, coupled with the new tree planting, would not significantly reduce the carrying capacity of the on-site habitats. Removal of dense scrub/ruderal

vegetation/select buildings could potentially disturb or destroy active bird nests if it is carried out during the bird nesting season.

- 12.8.13 Construction activity would be spread across the site during the initial phase of site preparation works (including vegetation removal), but construction would likely then be localised within the existing hardstanding on site. Disturbance would therefore be restricted to a small proportion of the available habitats during site preparation, with the remaining habitat remaining sufficiently undisturbed not to deter nesting birds.
- 12.8.14 Taking this into account, the impact on nesting birds during construction would be low, leading to a negligible significance of effect (an effect at the level of the site and its immediate surrounds).

Foraging/Commuting Bats

- 12.8.1 The vegetation on site is not considered to be of significance for foraging bats other than the (off-site) railway corridor to the west which would continue to be protected through construction by site boundary fencing.
- 12.8.2 Given the sub-optimal nature of the remainder of the site for foraging / commuting bats, and the retention, protection and enhancement of vegetation on site, the impact on bats during construction would be low, leading to an effect of negligible significance, which would not be significant beyond the level of the site and its immediate surrounds.

Great Crested Newts

- 12.8.3 Retention of the much of the dense scrub in the design of the facility means that potential great crested newt terrestrial habitat would largely be retained. However, removal during site preparation works of some newt terrestrial habitat (in the form of dense scrub, tall ruderal and ephemeral/short perennial habitats) would be necessary to facilitate the development.
- 12.8.4 Given that part of the habitat is within 50 m of the ponds known to support great crested newts, it is considered to be 'core' terrestrial habitat, the loss of which is likely to have the biggest impact on the species (English Nature, 2001). This species and its habitat has strict legal protection and, therefore, such works would need to be completed under an appropriate European Protected Species (EPS) licence. The areas of tall ruderal and ephemeral/short perennial habitat to the south west of the site are not considered suitable newt terrestrial habitat due to the circa 100 m of hardstanding/buildings between these areas and the nearest suitable habitat creating a significant barrier to dispersal into these areas.
- 12.8.5 On a temporary basis during construction, the loss of the terrestrial habitat is likely to be of medium magnitude, leading to a minor to moderate significance of effect (at the local to County level).

12.9 Assessment of Operational Effects

- 12.9.1 Effects following construction of the facility could occur via:
 - Effects on habitats during the operational phase, through site drainage, for example (adverse);
 - Effects on faunal activity during operation (adverse); and
 - Availability of new habitats created through the landscape strategy (beneficial).

Designated Sites

12.9.2 There is one statutory designated site within 2 km of the site, Warnham Mill Pond LNR, located 0.9 km south of the site. This is not ecologically linked to the 3Rs Facility site, and given the distance between the two, there is no likelihood of impacts on the nature conservation designation. Further to this, there is no material ground or surface water connectivity between the statutory designated site and the 3Rs Facility site.

- 12.9.3 Operational emissions from the facility (oxides of nitrogen - NO_{x_1} ammonia – NH_3 and sulphur dioxide – SO_{2_1} plus associated deposition of acid/nutrient nitrogen) have the potential to impact natural ecosystems both through direct phytotoxicity and through changes to soil conditions (pH and nutrient status) that can influence botanical composition. The nearest statutory designated site is 0.9 km south of the site (Warnham Mill Pond LNR). Given this is down wind of the proposed facility (i.e. the emission plume would travel north east, not south), it is highly unlikely that impacts from operational emissions would increase aerial concentrations/surface deposition within the LNR sufficiently to result in significant effects. Figure 7.4 shows that the process contribution at the LNR to the south is going to be 0.1 μ g.m⁻³ or less. A conservative estimate would be that 70% of the predicted NO_X concentration is NO₂. So, if it is assumed that the process contribution across the LNR is 0.1 μ g.m⁻³ NO₂, then it can be estimated that the process contribution of NO_x at the LNR is $0.1/0.7 = 0.14 \mu q.m^{-3}$. The Environment Agency's guideline is that the impacts at an LNR (or any non-statutory site such as ancient woodland) can be screened out as insignificant if the process contribution from the facility is less than 100% of the accepted critical level for NO_x of 30 μ g.m⁻³. On that basis, any effects from the proposed development on nearby designated sites as a result of emissions to air are not considered significant and as such any impacts are considered to be negligible, leading to a negligible significance of effect (site level).
- 12.9.4 The nearest non-statutory site is located 0.2 km from the site, comprising an ancient semi-natural woodland. There is no woodland within the 3Rs Facility site and the woodland is separated from the site by Langhurstwood Road to the east and by a railway line to the west. As such, no impact pathways between the development and the non-statutory sites are anticipated. It is therefore anticipated that there would be no impact or effect on non-statutory designated sites.

Habitats

- 12.9.5 The areas of dense scrub to the north/north-east would largely be retained within the design, and would form a landscape buffer around the north/east/west.
- 12.9.6 The use of artificial lighting without control would not significantly affect the areas of dense scrub, especially given that the site is already well lit. Native tree, shrub and grassland planting is undertaken widely in landscape schemes, and schemes subject to artificial lighting with the planting suffer no ill effects.
- 12.9.7 The new facility would receive and process waste and would generate emissions to air. However, the stack would operate to legislative standards and effects arising from emissions on scrub and tree planting are not considered likely. Given that the nature of the site (waste facility) is not going to change, it is expected that there would be a very limited (if any) increase in other forms of pollution, such as dust deposition or litter. Some reduction in dust deposition is possible, compared to the existing situation (with some activities unenclosed) on site.
- 12.9.8 In the longer term, the planting scheme for the facility would become established and mature, resulting in some potential for low beneficial impacts in terms of new habitat provision. With effective management of the habitats in the long term, this could lead to a minor beneficial effect (site-local level).

Fauna

Nesting Birds

- 12.9.9 Retention of the majority of the dense scrub within the design means that potential nesting habitat would largely be retained.
- 12.9.10 Disturbance from human activity associated with operation of the facility is likely to be no more than the current levels of activity at the site and the surrounds. Therefore, the impact on nesting birds would be negligible, leading to an effect of negligible significance (site level).

Foraging/Commuting Bats

- 12.9.11 The majority of the bat foraging / commuting habitat within the site would be retained as part of the design.
- 12.9.12 New grassland planting between the new buildings and existing vegetation would provide a green buffer within which bats would be able to commute. The dense scrub would still be expected to support flying insects and continue to provide prey for bats. Furthermore, the railway line and associated tree lines would not be lit any more than currently.
- 12.9.13 Therefore, there is high confidence that impacts to foraging and commuting bats on the site and its immediate surrounds during operation would be negligible, leading to an effect of negligible significance (site level).

Great Crested Newts

- 12.9.14 The ponds supporting the population of great crested newt are to remain *in situ* during operation and the design would deliver a substantial increase in the quality and connectivity of newt terrestrial habitat, albeit with a slight overall loss in total area, with dense scrub retained to the north/north-east, and new grassland planting around the site, providing additional grassy foraging and sheltering areas. The link created to the north of the site with the nearby railway is particularly important in providing a corridor to facilitate newt dispersal into the wider landscape to the north and south of the site.
- 12.9.15 There is already a high level of human activity surrounding the site which would not increase with the new facility. The ponds would continue to be fenced off from the site to prevent staff access and a new, permanent newt fence would be installed around the terrestrial habitat along the site's northern boundary to prevent any newts accidentally moving onto the hard standing of the development thereby avoiding killing/injury by vehicle movement or from becoming trapped in gully pots.
- 12.9.16 The operational surface water drainage scheme would continue to discharge into the ponds at a very similar rate similar to that occurring currently as the total roof area from which rain water would be collected is almost identical. All necessary in-line traps for silt/hydrocarbons would also be in place to prevent accidental discharge into the ponds during operation and as drainage will be pumped (due to level changes on site), in the unlikely event of an accidental pollution event, all surface water discharge could be prevented by stopping the pumps to allow sufficient time for the event to be dealt with. Therefore, there would be no change in the hydrological regime of the pond to that currently experienced by the newts.
- 12.9.17 Given this, it is anticipated that operational impacts on great crested newts from the new facility would be negligible, leading to effects of negligible significance (site level).

12.10 Assessment of Cumulative Effects

- 12.10.1 A review of proposed or possible future third party projects that may have a cumulative impact with the 3Rs Facility has been undertaken and used to inform this assessment. The projects identified are summarised in Appendix 4.4.
- 12.10.2 In relation to ecology and nature conservation impacts, the following developments have been identified has having the potential to impact cumulatively with the 3Rs facility and have therefore been examined as part of the assessment:
 - Land west of Brookhurst Wood landfill site (proposed facility for compaction and baling of Refuse Derived Fuel); and
 - Land north of Horsham (proposed mixed use strategic development, including up to 2,750 dwellings, business park, retail, community centre, leisure facilities, education facilities and public open space);

- 12.10.3 The 3Rs Facility site sits within the footprint of an existing development, and would only result in small amounts of habitat loss, which would ultimately be replaced with areas of new habitat creation in the long term. The habitat to be removed has ecological significance for great crested newts at the local level and is contiguous with habitat to the north of the site covered by the Brookhurst Wood Refuse Derived Fuel (RDF) application. The proposed RDF plans show the retention of all great crested newt terrestrial habitat. The ponds would be fenced on their northern elevations to prevent animal ingress into the site during construction and, longer-term, during operation. Therefore, there is no cumulative increase in loss of great crested newt terrestrial habitat or risk of mortality from construction/operational activities.
- 12.10.4 The land north of Horsham proposal has a resolution to grant consent for a large, mixed used strategic development. Great crested newt surveys were undertaken in 2015/2016, where two ponds immediately adjacent to the 3Rs site were found to have populations present. These ponds are to be retained and enhanced within the adjacent development. There would also be an overall increase in suitable terrestrial habitat for newts within the land north of Horsham masterplan. Given this, and that the 3Rs Facility would also provide an overall net increase in newt habitat, no significant adverse to the overall population are anticipated.
- 12.10.5 There are a number of other planning applications within the wider area. Due to the distance between the site and these other applications, no significant cumulative adverse effects upon ecological receptors (including great crested newts) are anticipated.
- 12.10.6 Landscape planting within the green infrastructure of other proposed developments would provide a range of ecological enhancements. Long term management of new habitat creation through management plans would secure biodiversity enhancements beyond the short term.
- 12.10.7 On this basis, given the habitat loss within the boundary is small in its extent, it is not anticipated that the 3Rs Facility would contribute to any significant cumulative effects.
- 12.11 Inter-relationships
- 12.11.1 The principal inter relationship with other topics considered in this ES is with air quality (Chapter 7). This interaction is described above in Section 12.9.
- 12.11.2 There are also inter-relationships between ecology and hydrology/flood risk (Chapter 10) with respect to great crested newts. This is described in Section 12.9.
- 12.12 Further Mitigation Measures
- 12.12.1 Several further measures are recommended in order to provide additional mitigation/enhancements for biodiversity on the site:
 - Bird nest boxes it is suggested that five bird nest boxes could be provided. These would help
 mitigate for the loss of breeding bird habitat from clearance of existing dense scrub in the short
 term while replacement planting established. A possible combination for this development includes
 two Schwegler 1SP sparrow terraces, and three Schwegler bird houses.

12.13 Monitoring and Management Strategies

12.13.1 It will be a requirement of the European Protected Species Licence for great crested newts for the site that Ponds 1 and 2 are monitored for two years post-construction. These surveys would be undertaken by licenced ecologists, and the results would be submitted to the local records centre.

- 12.13.2 The habitats to be created post construction (wildflower grassland and dense scrub) would be managed for biodiversity value according to an appropriate management strategy.
- 12.14 Residual Effects
- 12.14.1 Table 12.4 summarises the significance of effects for the construction and the operational phase for the project taking into account the mitigation measures incorporated into the development.

Parameter	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Construction Pha	ase		•	-	-	•		•	
Designated sites	Medium (County) (LNR)	No impact	N/A	None	None	N/A	None	None	Not significant
Ponds		Habitat loss and dust	Short- medium term	Negligible	Negligible	Dust control measures	Negligible	Negligible adverse	Not significant
Nesting birds	Negligible (site)	Loss of nesting bird habitat	Medium term	Low	Negligible	Avoidance of bird breeding season	Low	Negligible adverse	Not significant
Bats	Negligible (site)	Loss of bat foraging habitat	Medium term	Low	Negligible	Control of construction lighting	Negligible	Negligible adverse	Not significant
Great crested newts	Low (local))	Loss of great crested newt terrestrial habitat	Medium term	Medium	Minor to Moderate	Works to be undertaken under EPS license	Medium	Minor to moderate adverse	Significant (temporary)
Operation Phase									
Designated sites	Medium (County) (LNR)	No impact	Long term	Negligible	Negligible	Stack to be operated in accordance with legislation and	Negligible	Negligible	Not significant

Table 12.4: Summary of Likely Environmental Effects on Ecology and Nature Conservation

ES Chapter 12, Ecology and Nature Conservation RPS

Parameter	Sensitivity of receptor	Likely impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
						environmental permit			
Habitats	Negligible to Low (site/local)	Lighting, dust, creation of new habitats	Long term	Low	Negligible	Long term management of habitats for ecological benefit.	Low	Minor beneficial	Not significant
Nesting birds	Negligible (site)	Activity, lighting, drainage,	Long term	Negligible	Negligible	Provision of nest boxes.	Negligible	Minor beneficial	No
Foraging bats	Negligible (site)	creation of new habitat	Long term	Negligible	Negligible	Planting on southern boundary of Pond 1 & 2, and enhancement scrub and grassland	Negligible	Minor beneficial	No
Great crested newts	Low (local))		Long term	Negligible	Negligible	Planting on southern boundary of Pond 1 & 2, and enhancement scrub and grassland planting.	Low	Minor beneficial	No

12.15 Conclusions

- 12.15.1 Ecological features of interest in the context of the site include two off-site ponds supporting a population of great crested newts and areas of dense scrub/tall ruderal vegetation forming part of the terrestrial habitat for this species.
- 12.15.2 The proposed site layout incorporates new areas of green infrastructure within the layout. Landscape planting would include the creation of grassland and scrub habitats, and new native tree planting. New and retained habitats would be managed to promote their biodiversity value. Impacts on the following habitats and species / species groups identified as ecological features have been assessed:
 - Ruderal vegetation;
 - Dense scrub/small trees;
 - Bats (foraging and commuting);
 - Nesting birds;
 - Great crested newt.
- 12.15.3 Species protection measures would be implemented as best practice to minimise the risk of harm to great crested newts and nesting birds during site preparation and removal of very small areas of dense scrub.
- 12.15.4 Taking into account the overall low ecological value of the majority of the site, species protection measures to be implemented, and the proposed habitat creation and enhancement measures, there would be no long term adverse impacts with significance beyond the level of the site and its surrounds.
- 12.15.5 In the context of the low value of site, the creation of new ecologically-valuable habitats, such as the woodland planting, groundcover planting and tree group planting, would provide ecological enhancements above that which are currently present, resulting in the potential for an overall benefit to biodiversity in the long-term.

12.16 References

Legislation

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

Countryside and Rights of Way Act 2000 (2000 SI No 37)

Natural Environment and Rural Communities Act 2006 (2006 SI No 16)

The Conservation of Habitats and Species Regulations 2017 (2017 SI No 1012)

The Hedgerows Regulations 1997 (1997 SI No 1160)

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13 Population and Health

13.1 Introduction

13.1.1 This chapter summarises the assessment of effects upon population and health associated with the proposed Recycling Recovery and Renewable Energy (3Rs) Facility.

Scope of Study

13.1.2 This assessment considers the construction and operational activities associated with the proposed development that have the potential to influence health within the local population. As shown in Table 13.1, key health pathways fall under environmental (air quality and noise), transport and socio-economic headings.

Feature	Health Pathway	Health Determinant	Potential Implication	Distribution
Construction Phase	Changes to local air quality (potential dust nuisance)	Environment	Adverse	Local
	Changes in noise exposure	Environment	Adverse	Local
	Changes in local transport nature and flow rates	Transport	Adverse	Local
	Increased direct, indirect and induced employment opportunities	Socio-economic	Beneficial	Local/Regional
Operational Phase	Changes to local air quality (emissions to air, including. odour)	Environment	Adverse	Local/Regional
	Changes in noise exposure	Environment	Adverse	Local
	Changes in local transport nature and flow rates	Transport	Adverse	Local
	Change in net transport movements due to regional transportation of waste and reduced vehicle trips to landfill	Transport	Beneficial	Regional
	Direct, indirect and induced income employment opportunities	Socio-economic	Beneficial	Local/Regional

Table 13.1: Health Pathways

- 13.1.3 The scope of this assessment includes the:
 - Potential health outcome from changes in exposure to construction and operational emissions to air;
 - Potential health outcome from changes in exposure to construction and operational noise emissions; and
 - Potential health outcome from changes in local transport movements and nature during construction and operation.
- 13.1.4 This chapter draws from Chapter 6: Traffic and Transport, Chapter 7: Air Quality and Odour, and Chapter 8: Noise and Vibration), but does not seek to repeat the findings of these assessments.
- 13.1.5 Aspects scoped out of this assessment include:

- Socio-economic health benefits from the direct, indirect and induced income and employment opportunities, as significant effects are not considered likely; and
- Potential changes in electro-magnetic field (EMF) exposure during the generation and transmission of electrical energy (as the facility will comply with International Committee on Non-Ionising Radiation Protection (ICNIRP) guidance set to protect health.

13.2 Legislation and Policy Context

13.2.1 This section summarises relevant legislation and policies that are directly relevant to population and health issues.

Legislation

13.2.2 Paragraph 4(2)(a) and Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 require that the Environmental Impact Assessment (EIA) process assesses the effects (where likely to be significant) on population and human health, among other factors. This reinforces the coverage of health within the regulatory assessment process, and improves transparency by further communicating how and where health is inherently addressed within the EIA process.

National Policy and Guidance

National Planning Policy Framework (2012)

13.2.3 Promoting healthy communities is a core theme and underlying aim of the National Planning Policy Framework (NPPF) (DCLG, 2012), which states that "*the planning system can play an important role in facilitating social interaction and creating healthy, inclusive communities*" (paragraph 69).

Non-Statutory Population and Health Guidelines

13.2.4 The Institute of Environmental Management and Assessment (IEMA) is in the process of developing EIA population and health guidelines. Where relevant, knowledge of the likely content of the emerging guidance has been taken into account within this assessment.

Development Plan Policy

West Sussex Waste Local Plan (2014)

13.2.5 Public health protection and promotion is inherently covered throughout the West Sussex Waste Local Plan (West Sussex County Council and South Downs National Park Authority, 2014), where policy states that new waste development facilities will be located to avoid, minimise and mitigate against any potentially adverse impacts on community health, and the amenity of residents, businesses and visitors to West Sussex. This objective is concisely driven through Strategic Objective 13, and Policy W19: Public Health and Amenity, which states that:

"Proposals for waste development will be permitted provided that:

(a) lighting, noise, dust, odours and other emissions, including those arising from traffic, are controlled to the extent that there will not be an unacceptable impact on public health and amenity;

(b) the routes and amenities of public rights of way are safeguarded, or where temporary or permanent re-routeing can be justified, replacement routes of comparable or enhanced amenity value are provided; and

(c) where necessary, a site liaison group is established by the operator to address issues arising from the operation of a major waste management site or facility."

Horsham District Planning Framework (2015)

13.2.6 The Horsham District Planning Framework (Horsham District Council, 2015) reinforces the coupling of environment and health within the NPPF. The most relevant policy to this assessment is Policy 24: Environmental Protection which states that:

"The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution and ensure that they:

1. Address land contamination by promoting the appropriate re-use of sites and requiring the delivery of appropriate remediation;

2. Are appropriate to their location, taking account of ground conditions and land instability;

3. Maintain or improve the environmental quality of any watercourses, groundwater and drinking water supplies, and prevents contaminated run-off to surface water sewers;

4. Minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment;

5. Contribute to the implementation of local Air Quality Action Plans and do not conflict with its objectives;

6. Maintain or reduce the number of people exposed to poor air quality including odour. Consideration should be given to development that will result in new public exposure, particularly where vulnerable people (e.g. the elderly, care homes or schools) would be exposed to the areas of poor air quality; and

7. Ensure that the cumulative impact of all relevant committed developments is appropriately assessed."

13.3 Assessment Methodology

Study Area

13.3.1 The study area for the assessment differs according to the health pathway considered during the construction and operational phases. The study areas in each case are described in the methodology section that follows, with reference to the relevant ES sections from which they are derived.

Approach

13.3.2 The basis of this assessment is set on a broad socio-economic model of health that encompasses conventional health impacts, such as communicable disease, accidents and risk, along with wider determinants of health vital to achieving good health and wellbeing. These wider determinants of health

include income; employment; housing; education; the quality of the urban environment; crime and the perception of crime.

13.3.3 A key aspect of the approach is to draw from and build upon the work undercame to inform other chapters of this ES, and the updated technical disciplines. Such an approach provides continuity, and the development of a proportionate assessment that focuses on key health pathways directly attributable to what is proposed; and does not cover aspects beyond the influence of this project or the decision making process.

Health Assessment Protocols

13.3.4 Given the multidisciplinary nature of health and the varying relative sensitivity of communities, each health assessment is bespoke; tailored to both local circumstance and the individual health pathways that the project has the potential to influence. As previously mentioned, the scope of this study has been set to investigate the potential health outcome of the proposed development from changes in exposure to air quality, noise and from changes in transport flow rate and nature. The individual assessment protocol for each are described below.

Air Quality Health Assessment

- 13.3.5 Research into the potential health effects of air pollution is extensive and provides statistically significant associations between many air pollutants (i.e. particulate matter, nitrogen dioxide and sulphur dioxide) and effects on a wide range of cardiovascular and respiratory health outcomes (COMEAP, 2009).
- 13.3.6 The air quality health assessment draws from the dispersion modelling provided in Chapter 7 (Air Quality and Odour) of the ES, and applies local burdens of poor health and relative exposure to construction and operational emissions (particulate matter and nitrogen dioxide) to assess the magnitude, distribution and significance of any potential risk to population health. The assessment does not consider changes in exposure to dioxins, furans, poly aromatic hydrocarbons and heavy metals, as these will be addressed through a specialist assessment (Human Health Risk Assessment (HHRA)) during the permitting stage.

Noise Health Assessment

- 13.3.7 Consensus on the level and duration of noise required to instigate potential health impacts is not clearly defined. Therefore, the main emphasis of noise standards, regulations and guidance is placed on annoyance and sleep disturbance, as they are the most immediate consequences of noise effects and applicable to everyone.
- 13.3.8 The noise health assessment draws from the dispersion modelling provided in Chapter 8 (Noise and Vibration) of the ES, to consider potential changes in noise exposure with the potential to result in annoyance, impact upon cognitive function in schools or result in sleep interference impacting upon cardiovascular health.

Transport Health Assessment

13.3.9 Potential health pathways associated with changes in road traffic movements include increased risk of road traffic accident and injury, community severance and exposure to vehicle exhaust emissions and noise. Potential changes in exposure to air and noise emissions are addressed through the previous health assessment protocols. The transport health assessment therefore draws from the modelling outputs provided in Chapter 6 (Traffic and Transport) of the ES, to appraise the magnitude and significance of health risk from accident and injury and community severance.

Assessment Criteria

- 13.3.10 Health assessment criteria are primarily defined according to their nature, be they:
 - Beneficial: an impact that is considered to represent an improvement on the health baseline or introduces a positive change.
 - Adverse: an impact that is considered to represent an adverse change from the health baseline, or introduces a new undesirable factor.
 - Temporary: an impact that is transient in nature.
 - Permanent: an impact that constitutes a lasting or long term outcome or influence upon health.
 - Direct: impacts that result from a direct interaction between a planned proposed development activity and the host community/receptor (i.e. direct exposure to a hazard/opportunity).
 - Indirect: impacts that result from other activities that are encouraged to happen as a consequence
 of the proposed development (e.g. indirect and diffuse employment).
 - Cumulative: aspects that act together including those from concurrent or planned third party activities to affect the same health pathways or communities as the proposed project (i.e. cumulative changes in air quality or noise exposure).

Sensitivity of Receptor

- 13.3.11 As detailed in the community profile, the study area is relatively sparsely populated and local communities are not considered particularly sensitive to environmental or socio-economic health pathways. The assessment section, however, applies a conservative approach for the individual residential properties in proximity to the proposed project.
- 13.3.12 The full community profile is provided in Appendix 13.1.

Magnitude of Change

13.3.13 Impact magnitude/severity is a function of the extent, duration and intensity of the impact (i.e. how far the impact deviates from established baseline conditions). Given the multidisciplinary nature of health and the strength of evidence for each health pathway, the individual assessment protocols (i.e. for changes in air or noise exposure), have been applied to inform a judgement on the magnitude and distribution of change.

Magnitude	Typical Descriptors
High	Change in environmental and socio-economic circumstance sufficient to quantify a major change in baseline population health (adverse or beneficial)
Medium	Change in environmental and socio-economic circumstance sufficient to quantify a moderate change in baseline population health (adverse or beneficial)
Low	Change in environmental and socio-economic circumstance sufficient to quantify a minor change in baseline population health (adverse or beneficial)
Negligible	Change in environmental and socio-economic circumstance below what is possible to quantify any manifest health outcome at a population level (adverse or beneficial)
No Change	No opportunity for health outcome (adverse or beneficial)

Table 13.2: Definitions of Magnitude

Significance of Effect

13.3.14 The assessment of significance is a function of the magnitude/severity of impact and the sensitivity of the receptor.

Table 13.3: Assessment Matrix

Sensitivity	Мас	Magnitude of Health Impact (adverse or beneficial)							
-	No Change	Negligible	Low	Medium	High				
Negligible	No Effect	No Effect	Negligible or Minor	Negligible or Minor	Minor				
Low	No Effect	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate				
Medium	No Effect	Negligible or Minor	Minor	Moderate	Moderate or Major				
High	No Effect	Minor	Minor or Moderate	Moderate or Major	Major				

13.3.15 For the purposes of this assessment, effects of moderate significance or greater are considered to be significant in terms of the EIA Regulations.

13.4 Limitations of the Assessment

- 13.4.1 The health assessment draws from and builds upon the technical outputs from the air quality, noise and vibration and transport assessment chapters, and as a consequence are bound by the same limitations, assumptions therein applied. The information available provides a suitable basis for a robust assessment of health for EIA purposes.
- 13.5 Baseline Conditions

Introduction

- 13.5.1 Evidence suggests that different communities have varying susceptibilities to both health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstance. The purpose of the community profile is to establish relative sensitivity of the potential health pathways attributed to what is proposed, forming the basis to the assessment, and providing an insight into how potential health pathways identified may act disproportionately upon certain communities and sensitive groups.
- 13.5.2 This section summarises the findings of the community profile, provided in Appendix 13.1.

Site Location and Setting

- 13.5.3 As detailed in Chapter 2 of the ES, the site comprises approximately 3.8 hectares of land within the former Warnham and Wealden Brickworks, is classified as a brownfield site in the West Sussex Waste Local Plan, and is allocated for waste management uses.
- 13.5.4 The site is located in a relatively sparsely populated area approximately 900 m to the north-west of the edge of the existing settlement boundary of the town of Horsham and approximately 1.3 km to the north-east of the centre of Warnham. There are no residential receptors or public rights of way located on the site. There are three residential properties along Langhurstwood Road to the immediate south of the access road into the site, the nearest of which is approximately 180 m from the centre of the site. Further south along

Langhurtwood Road there are seven residential properties at Greylands Farm, approximately 325 m to the south-east of the site. There is also a cluster of approximately 20 residential properties located along Station Road and Mercer Road, approximately 300 metres to the south-west of the application site.

Community Profile Summary

- 13.5.5 Following a review of the available demographic and health statistics, local communities typically have better health than the national trend, with pockets of health deprivation closer to and within urban areas (closely associated with socio-economic deprivation, lifestyle and poor health behaviour).
- 13.5.6 Population growth in Horsham is higher than both the regional and national trend, and when combined with consistently higher life expectancy for males and females, and a lower all-cause mortality rate than the national and regional trend, has contributed towards an elderly age demographic that is higher than the national trend.
- 13.5.7 Respiratory and cardiovascular hospital admission statistics indicate that Horsham remains consistently lower than national rates.
- 13.5.8 Mental health in Horsham is typically good, with lower levels of depression and anxiety, lower rates of long term mental health problems and lower rates of self-harm than both the national and regional trend. Levels of dementia prevalence are consistent with the regional average, albeit higher than the national trend (correlating with the higher life expectancy and higher elderly age demographic in the area). The suicide rate in Horsham remains consistently higher than national and regional trend.
- 13.5.9 In terms of lifestyle, levels of physical activity in Horsham have fluctuated since 2012, but remain consistently higher than both the regional and national trends. Equally childhood obesity and excess weight in adults in Horsham has remained consistently lower than both the national and regional trend, although the gap between the local and regional trend for adult weight is closing. Smoking and alcohol related harm is, again, consistently lower in Horsham than the national and regional trend.
- 13.5.10 Education attainment and employment within Horsham is consistently better than the regional and national average, while unemployment and socio-economic deprivation statistics remain low. Income in Horsham remains lower than both the national and regional trend.
- 13.5.11 On the above basis, the study area is relatively sparsely populated and local communities are not considered particularly sensitive to environmental or socio-economic health pathways.
- 13.5.12 The assessment section will however, apply a conservative approach for the individual residential properties in proximity to the proposed project.
- 13.6 Future Baseline Conditions
- 13.6.1 As it is challenging to predict the health and wellbeing baseline a decade or more in the future with high confidence, trends are analysed as part of the current baseline to provide insight into likely future local community circumstance.
- 13.6.2 Well-established trends, which are considered as part of this assessment, include an increasing elderly population, and improving socio-economic circumstance. It should be noted that factors such as climate change are not likely to materially influence future health and wellbeing baseline conditions.

13.7 Incorporated Enhancement and Mitigation

Construction Phase

13.7.1 With respect to construction-related health impacts, incorporated mitigation is primarily addressed through the construction methods proposed, such that known hazards are managed to avoid or minimise risk to both occupational and public health during construction. Where potential hazards cannot be fully removed through design, further mitigation is established within each of the EIA technical disciplines (air quality, noise and vibration, transport, hydrology and hydrogeology etc.) to manage the potential hazard so that it does not constitute a significant risk. A Construction Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) are proposed as part of the proposed development, together with effective dust control measures.

Operational Phase

- 13.7.2 Incorporated operational health mitigation focusses on removing or managing known hazards through the planning process, such that they are either designed out or mitigated to the point that they do not present a significant risk to occupational or public health. The extent of incorporated health mitigation is significant, but often poorly communicated primarily due to the fact that planning focusses on precursors to any health impact (e.g. air quality and noise objective thresholds set to be protective of the environment and health). In doing so, the planning process takes a preventative approach to adverse health impacts, but also enables monitoring of environmental pathways relevant to health to be put in place where appropriate. This can facilitate intervention in the causal pathways for potential health impacts before any manifest adverse health outcome occurs (while also avoiding issues epidemiological confounding that arise from health indicator monitoring). The approach is therefore inherently proactive and protective of health.
- 13.7.3 The proposed development includes a stack designed on the basis of a stack height assessment to ensure effective dispersion of pollutants. Given that operational traffic numbers are not predicted to exceed the existing consent, no operational traffic measures are considered to be required.

13.8 Assessment of Construction Effects

- 13.8.1 The following assessment investigates each of the previously identified potential health pathways associated with the construction of the proposed development, including:
 - The potential health risk from changes in emissions to air;
 - The potential for community disruption from noise and vibration; and
 - The potential health risk from additional road movements (risk of accidents and injury).

Health Effect from Changes in Air Quality

- 13.8.2 During the construction phase, activities with the potential to impact upon local air quality include ground clearance and excavation, vehicle and fixed plant emissions; deliveries of construction materials and earthwork activities.
- 13.8.3 Construction related emissions from the construction phase would not materially differ to the sites current use, nor would they be of a type, concentration, duration or present a level of community exposure sufficient to result in any measurable adverse health outcome. As detailed in Chapter 7 (Air Quality and Odour), prior to mitigation, the main effect with the potential to impact neighbouring residential properties could include annoyance from dust deposition (soiling of surfaces, particularly windows, cars and laundry). However, the mitigation measures detailed in the air quality assessment and implemented through the CEMP would be

sufficient to control potential dust nuisance and manage any respiratory risk to staff or neighbouring communities.

13.8.4 Given construction activities would not be of an extent, duration or magnitude to quantify any measurable impact on health, and sub clinical effects (annoyance) would be controlled through the CEMP, it is concluded that there would be no significant effect on health from changes in construction emissions to air. The magnitude of the predicted impact would be low, resulting in a minor adverse significance of effect.

Health Effect from Changes in Noise Exposure

- 13.8.5 As detailed in Chapter 2 of this ES, construction would take place on Monday to Friday between the hours of 07.30 and 19.00, and on Saturday between the hours of 08.00 and 16.00. As a result, there is no risk of sleep disturbance to sensitive receptors within the study area.
- 13.8.6 Any noise generation would be controlled through applying good construction practices as detailed in the CEMP, would be temporary and not of an extent, duration or magnitude to quantify any measurable impact on health. As a result, it is predicted that the magnitude of impact would be low, resulting in minor adverse significance of effect.

Health Effect from Changes in Road Movements

- 13.8.7 Potential health pathways associated with changes in road traffic movements include increased risk of road traffic accident and injury, community severance and exposure to vehicle exhaust emissions and noise.
- 13.8.8 As detailed in Chapter 6 (Traffic and Transport), construction traffic movements would include cars and Light Goods Vehicles (LGVs) for construction workers as well as Heavy Goods Vehicles (HGVs) to deliver construction materials and plant to the site. The transport chapter has investigated the potential impact of these movements upon local capacity and any subsequent risk of community severance, visual impacts, pedestrian delay, pedestrian amenity and safety. The assessment concludes that for these health pathways, the relative change in vehicle movements would not be of a magnitude, timing or duration sufficient to establish a significant effect, and any residual temporary disruption is to be manged through a dedicated CTMP.
- 13.8.9 Given the potential health impact from changes in construction traffic are temporary and are addressed through design and a dedicated CTMP, it is concluded that there would be no significant construction traffic impacts to health. The magnitude of the predicted impact would be low, resulting in a minor adverse significance of effect.

Further Mitigation

- 13.8.10 Mitigation is proposed in the form of the CEMP/CTMP addressing transport risks, air quality and noise precursors to any potential adverse health outcome. In doing so, there is limited opportunity for community hazard exposure sufficient to quantify any measurable adverse health outcome.
- 13.8.11 Further health mitigation would therefore be limited to ongoing engagement with local communities to raise awareness of any particularly disruptive construction activities, to monitor and feedback the effectiveness of mitigation, and respond to community concerns.

Future Monitoring

13.8.12 As detailed in Chapter 7 (Air Quality and Odour), construction air quality monitoring would be agreed with the local planning authority prior to the commencement of construction works. This would focus on appropriate environmental precursors of health impacts, thereby enabling a monitoring regime that enables intervention before any manifest adverse health outcome occurs.

Accidents and/or Disasters

13.8.13 Given the location of the site, and the absence of residential properties with no public right of way across the site, there is limited opportunity for public exposure to construction activities that might present a risk of accident and injury. Activities beyond the site perimeter with the potential for accident and injury would be limited to vehicle movements, and would be managed through the CTMP.

13.9 Assessment of Operational Effects

- 13.9.1 The following assessment investigates each of the previously identified potential health pathways associated with the operation of the proposed development, including:
 - The potential health risk from changes in emissions to air;
 - The potential for community disruption from noise and vibration; and
 - The potential health risk from additional road movements (risk of accidents and injury).

Health Effect from Changes in Air Quality

- 13.9.2 Once operational, the primary source for any change in local air quality would be from the stack of the facility. As detailed in Chapter 7 (Air Quality and Odour), the maximum predicted ground-level concentrations have been modelled applying a range of recent meteorological data in the area, and assuming the facility is operating at the long-term emission limit permitted under the Industrial Emissions Directive. Actual emissions from the facility are likely to be considerably lower than the emission limits applied. The modelling results are therefore conservative and likely to over-estimate the actual contributions that would arise from the proposed development.
- 13.9.3 As shown in Table 7.19, when applying the long-term emission limit, the predicted environmental concentrations all remain well within the air quality environmental objective thresholds set to be protective of the environment and health, and are not considered significant within the air quality assessment.
- 13.9.4 While sufficient to demonstrate compliance, the air quality assessment is complex, and may not fully addresses community health concerns. The following section draws from and builds upon the air quality assessment to further set potential risk into context for changes in exposure to particulate matter (PM_{10} and $PM_{2.5}$) and NO_2 .
- 13.9.5 The Committee on the Medical Effects of Air Pollutants (COMEAP) provides a catalogue of exposure response risk ratios for changes in exposure to a range of pollutants, including PM₁₀, PM₂₅, and NO₂. The relative change in health risk is a function of changes in concentration and population exposure, and existing burdens of poor health.
- 13.9.6 As shown in Table 7.19, the maximum annual mean process contribution of particulate matter (PM₁₀ and PM_{2.5}) at any receptor, is 0.04 µg.m³. Even when disregarding the low burdens of poor health locally, and when assuming that the facility is operating at the maximum long-term emission limit permitted under the Industrial Emissions Directive; the change in concentration and exposure are orders of magnitude lower than are required to quantify any manifest adverse health outcome locally.

- 13.9.7 Such a result is to be expected for a facility that is designed to control hazardous emissions to air, and has demonstrated that it would remain within air quality objective thresholds set to be protective of the environment and health.
- 13.9.8 Given operational emissions are not of a concentration or exposure to quantify any measurable impact to health, and remain within air quality objectives set to be protective of health, it is considered that the impact on health from changes in operational emissions would be low, leading to a minor adverse effect.

Health Effect from Changes in Noise Exposure

- 13.9.9 As detailed in Chapter 2 of this ES, the proposed development would operate 24 hours per day, 7 days a week except during shutdowns for maintenance activities. Waste would normally be received between 07.00 to 18:00 on Mondays to Saturdays. As detailed in Chapter 8 (Noise and Vibration), the maximum predicted increase in ambient sound level from on-site activities is +1 dB, experienced at 11 Station Road during the hours of 23:00 and 07:00.
- 13.9.10 As the total volume of waste imported to the site would be the same as is currently permitted for the existing Waste Transfer Station/Materials Recycling Facility, the proposed development would not materially impact upon noise generated from traffic flows. As detailed in Chapter 8 (Noise and Vibration), the maximum predicted increase in ambient sound level from road traffic would be +1.6 dB, experienced at Link 2: Langhurstwood Rd between Site Access and Mercer Rd.
- 13.9.11 As a result, noise generated from the facility and associated traffic movements will not be of an extent, duration or magnitude to quantify any measurable impact on health. As a result, it is predicted that the magnitude of impact would be low, resulting in minor adverse significance of effect.

Health Effect from Changes in Road Movements

- 13.9.12 Once operational, the total volume of waste imported to the site would be the same as is currently permitted for the existing Waste Transfer Station/Materials Recycling Facility. On this basis the proposed development would not materially impact upon current traffic flows or associated health pathways.
- 13.9.13 The potential operational transport related health impact is therefore considered to be negligible, resulting in a minor adverse effect.

Further Mitigation

- 13.9.14 Prior to mitigation, potential changes in air quality, noise and transport would not be of a magnitude or exposure to quantify any measurable impact to local community health.
- 13.9.15 Further health mitigation would therefore be limited to ongoing engagement with local communities to feedback the effectiveness of mitigation, and respond to community concerns.

Future Monitoring

13.9.16 Where appropriate, monitoring would focus on environmental precursors of health impacts, thereby enabling a monitoring regime that allows intervention before any manifest adverse health outcome occurs.

Accidents and/or Disasters

13.9.17 Potential abnormal operation could include incidents such as technically unavoidable stoppages, disturbances or failures of the pollution control equipment or monitoring equipment. The impact on air quality from periods of abnormal operations, will be assessed when applying for the Environmental Permit to meet the requirements of the Industrial Emissions Directive. In addition, continuous air quality monitoring would be in place, as required by the Environmental Permit which would notify the operator and the Environment

Agency of exceedances of air pollutant emission limits. Due to these controls, abnormal operation would not lead to greater levels of air pollutants and, therefore, any potential public health effects are considered adequately managed.

13.9.18 In addition, the facility would be required to have in place an Accident Management Plan and would be designed and managed to minimise fire risk according to a Fire Prevention Plan (which sets out materials storage and emergency response procedures to ensure that any fire can be contained) approved by the Environment Agency prior to operation.

Potential Changes to the Assessment as a Result of Climate Change

- 13.9.19 Changes in environmental and social parameters as a consequence of climate change with the potential to modify the assumptions and or findings of the health assessment fall into the following three categories:
 - Modification of hazard: i.e. a change in environmental condition modifying the hazardous nature of operational emissions and/or hazardous activities;
 - Modification of exposure: i.e. a change in meteorological conditions modifying dispersion and exposure to emissions and/or hazardous activities; and
 - Modification of sensitivity: i.e. a change in local burdens of poor health, seasonal stress (excess winter and summer mortality) and/or sensitivity to exposure pathways.
- 13.9.20 Changes in environmental and social setting and receptor sensitivity as a consequence of climate change sufficient to alter the findings of the health assessment are not anticipated to be realised within the lifespan of the proposed development.
- 13.10 Assessment of Decommissioning Effects
- 13.10.1 The potential health pathways associated with decommissioning phase would be comparable to the construction phase, and would similarly be managed through the regulatory planning process set to be protective of the environment and health.
- 13.10.2 Given decommissioning activities are unlikely to be of an extent, duration or magnitude to quantify any measurable impact on health, and sub clinical effects (annoyance) would be further addressed through a bespoke management plan tailored to local environmental and social circumstance, it is concluded that there is not likely to be any significant effect on health from decommissioning emissions and activities.

Further Mitigation

13.10.3 Subject to consent, and come the end of the operational life span of the proposed development, an appropriate management plan would be developed accounting for the appropriate standards at that time, and in compliance with environmental and health legislation and planning requirement.

Future Monitoring

13.10.4 Where necessary, monitoring would focus on environmental precursors to health impact, thereby enabling a monitoring regime that enables intervention before any manifest health outcome.

Accidents and/or Disasters

13.10.5 Given the location of site, and absence of residential properties with no public right of way across the site, there is limited opportunity for public exposure to decommissioning activities that might present a risk of accident and injury. Activities beyond the site perimeter with the potential for accident and injury are limited to vehicle movements, and would be managed through legislation and the management plan.

Potential Changes to the Assessment as a Result of Climate Change

13.10.6 Changes in environmental and social setting and receptor sensitivity as a consequence of climate change sufficient to alter the findings of the health assessment are not anticipated to be realised within the lifespan of the proposed facility.

13.11 Inter-relationships

13.11.1 There is a significant level of overlap between public health and a range of EIA technical disciplines. This is in part due to the development of EIA, where the founding principle and overarching aim of the process is to protect the environment in order to facilitate public health and wellbeing. In this instance, and as detailed in Section 3.1.5, the population and health section draws from and supplements the wider ES technical disciplines (most notably Chapter 6: Traffic and Transport, Chapter 7: Air Quality and Odour, and Chapter 8: Noise and Vibration), but does not seek to repeat them.

13.12 Assessment of Cumulative Effects

- 13.12.1 Due to the inter-relationship between health and the wider technical disciplines, potential cumulative effects from third party developments are already considered within the technical disciplines on which the health assessment is derived.
- 13.12.2 No further cumulative effects on health are considered likely.

13.13 Summary of Effects

13.13.1 Table 13.4 summarises the significance of effects for the construction, operational and decommissioning phases of the project, taking into account the mitigation measures incorporated into the development proposals.

Table 13.4: Summary of Likely Effects on Health

Health Pathway	Sensitivity of receptor	Health impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Construction	Phase	1							
Changes in air quality	High	Localised change in emissions to air, with minimal risk of community exposure	Temporary	Low	Minor	CEMP	Negligible	Minor	Not Significant
Changes in noise exposure		Localised change in noise from construction activities with minimal change in community exposure	Temporary	Low	Minor	CEMP and TMP	Negligible	Minor	Not Significant
Change in transport movements		Change in transport vehicle movements on local road networks	Temporary	Low	Minor	TMP	Negligible	Minor	Not Significant
Operational F	Phase								
Changes in Air quality	High	Localised change in emissions to air	Permanent	Low	Minor	Addressed through design	Negligible	Minor	Not Significant
Changes in noise exposure		Localised change in operational noise	Permanent	Low	Minor	TMP	Negligible	Minor	Not Significant
Change in transport movements		No material change in net transport movements from consented waste transfer station	Permanent	Negligible	Minor	TMP	Negligible	Minor	Not Significant

Health Pathway	Sensitivity of receptor	Health impact	Duration	Magnitude of impact	Significance of effect	Mitigation	Magnitude of Residual Impact	Significance of Residual Effect	Significant
Decommissio	oning Phase						-	•	•
Changes in Air quality	High	Localised change in emissions to air, with minimal risk of community exposure	Temporary	Low	Minor	CEMP	Negligible	Minor	Not Significant
Changes in noise exposure		Localised change in noise from decommissioning activities	Temporary	Low	Minor	CEMP and TMP	Negligible	Minor	Not Significant
Change in transport movements		Change in transport vehicle movements on local road networks	Temporary	Low	Minor	TMP	Negligible	Minor	Not Significant

13.14 Conclusions

- 13.14.1 Construction activities would not be of a magnitude, duration or timing to constitute a significant risk to public health. When further considering the absence of residential receptors on site, and no public rights of way through the site, there is limited opportunity for community exposure to such hazards, and no significant risk to health. Potential transport hazards that extend beyond the site boundary would not be of a magnitude, duration or timing to materially impact on health. Following the implementation of the CEMP and CTMP, the potential risk to public health from construction activities would not be of a level to quantify any change in local health, and are not considered significant.
- 13.14.2 Once operational, there would be no material change in HGV movements from the existing Waste Transfer Station/Materials Recycling Facility, and no material change in road safety or community severance.
- 13.14.3 Given the proposed site, design and proposed mitigation, construction and operational noise and vibration is not of a level to result in significant annoyance, result in sleep disturbance or result in any measurable adverse health outcome.
- 13.14.4 The primary health pathway is therefore the potential change in local air quality emissions. However, the potential health consequence for changes in exposure to emissions to air are well known, understood and inherently addressed through design, such that the proposed development would not present a significant source of PM₁₀, PM_{2.5} or NO₂ exposure. Following a review of the available scientific evidence base and based on an exposure response assessment of worst case hypothetical scenarios, it is concluded that changes in concentrations of PM₁₀, PM_{2.5} and NO₂ would not be significant. Total concentrations would remain well within air quality objective thresholds set to protect the environment and health, and would not be of a magnitude sufficient to quantify any measurable adverse health outcome during construction and operation of the proposed project (including transport emissions). Such a conclusion is consistent with the current scientific evidence base and the position of Public Health England.
- 13.14.5 Overall the potential effects of the facility on public health are not considered to be significant.

13.15 References

COMEAP (2009) Long-Term Exposure to Air Pollution: Effect on Mortality," 2009. [Online]. Available: <u>https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304667/COMEAP_long_t</u>erm_exposure_to_air_pollution.pdf.

DCLG (2012) National Planning Policy Framework; Department for Energy and Climate Change. London. HMSO. March 2012.

DCLG (2014) Planning Practice Guidance.

Horsham District Council (2015) Horsham District Planning Framework (excluding South Downs National Park).

West Sussex County Council and South Downs National Park Authority (2014) West Sussex Waste Local Plan. April 2014.

14 Summary of Mitigation and Monitoring

14.1 Introduction

- 14.1.1 The EIA process is an integral part of the project appraisal and design process. During the EIA process for the 3Rs Facility, environmental issues have been taken into account as part of an ongoing design process. The process of EIA has therefore been used as a means of informing the design.
- 14.1.2 The proposed facility assessed within this ES therefore includes a range of measures that have been designed to reduce or prevent significant adverse effects arising. In some cases, these measures result in enhancement of environmental conditions.
- 14.1.3 The topic chapters set out the measures that form part of the project and that have been taken into account in the assessment of effects for that topic. These include:
 - Measures included as part of the design of the proposed facility;
 - Measures to be adopted during construction to avoid and minimise environmental effects such as pollution control measures. These measures would be implemented through the Construction Environmental Management plan (CEMP); and
 - Measures requires as a result of legislative requirements.
- 14.1.4 In addition, the chapters have considered the need for monitoring during either the construction, operational or decommissioning phases of the project.
- 14.1.5 This chapter of the ES presents a summary of the key mitigation and monitoring measures identified during the EIA process in table 14.1. Full details can be found within the ES topic chapters (Chapters 5 13).

Table 14.1: Summary	of Mitigation and	Monitoring Measures

Reason	Mitigation Measures
Design Measures	
Landscape and Visual Assessment	
Minimise visual effects and integrate the proposed facility with the surroundings	 The facility would include a curved roof, referred to as 'curvilinear', incorporating a large sweeping curve across the facility. The curve would start at the bunker hall, cross the bunker and boiler halls and then cover the air cooled condensers and flue gas treatment area. The purpose of the curve is to visually bring all of the separate elements of the facility together as one structure and to visually reduce the building's height. The design builds on the reduction in height achieved from sinking the building into the ground. On the advice of West Sussex County Council's planning and landscape officers, the High Weald AONB 'Guidance on the selection and use of colour in development' has been used in selecting the colours for the 3Rs Facility. The Western High Weald Woodland and Heath Sub Palette was considered the most appropriate for the proposed development. Muted greys, greens and browns have been used, as described in the Design and Access Statement. The landscape proposals (Figure 5.38) are designed to assist in screening low level clutter, such as vehicles in the car park, giving a simplicity to the front of the facility and providing as much screening of as much 'human-scale' activity as possible.
Traffic and Transport	
Provision of suitable parking and internal network	Design includes 31 parking spaces, with 2 accessible spaces and coach parking. Design has taken into account HGV movement around the site.
Air Quality and Odour	
Mitigation of significant adverse effects from stack emissions	The assessment of stack emissions has informed the design of the stack height in order to ensure suitable dispersion. Mitigation measures have been informed by the stack height determination at Appendix 7.2 of the ES.
Noise and Vibration	
To ensure no significant noise increase at sensitive receptors	 Plant would be designed to present Best Available Techniques (BAT). The air cooled condensers would be selected such that they would not exceed a sound power level of 97 dB(A). Acoustic screening would be installed around the perimeter of the air cooled condensers. Other significant items of plant would be located within buildings or enclosures which would be designed to reduce noise levels, as required. Specifically, the turbine hall, which contains the highest noise generating plant would be designed with a high specification façade and roof to reduce the noise levels emitted from these buildings. Furthermore, the plant would be designed such that it would not be tonal in character at the nearest NVSRs. Plant to be designed such that the rating level LAr, Tr of the noise emitted from it shall not exceed the existing representative background sound levels LA_{90,T}, by more than 3 dB during the appropriate time period at the nearest noise sensitive receptors. The assessment shall be carried out in accordance with BS4142:2014 'Methods for rating and assessing industrial and commercial sound'. Noise monitoring will be carried out post completion to ensure that the operational plant complies with the design requirement presented in this condition. The monitoring procedure will be discussed and agreed with the case officer at WSCC (and/or their consultee on noise) in advance.
Archaeology and Cultural Heritage	
Avoidance of adverse effects on	The location of the proposed facility seeks to minimise or remove the effects on the settings of designated assets, being located on previously

Reason	Mitigation Measures
heritage assets	developed land within the context of an industrial development. The remaining boundary alignments around the proposed facility would be preserved <i>in situ</i> and the landscape pattern would remain unchanged.
Hydrology and Flood Risk	
Control of surface water runoff	Drainage strategy designed to ensure that runoff rates to the surrounding water environment which seeks to replicate the existing catchment areas as far as practically possible and also seeks to maintain surface discharge rates and volumes. Drainage Strategy at Appendix 10.4 of the ES.
Hydrogeology and Ground Conditions	
Avoidance of effects on groundwater	Detailed design to take into account existing groundwater levels (to be confirmed through site investigation prior to construction) and avoid any effects on groundwater flow, where possible.
Ecology and Nature Conservation	
Retention and introduction of habitats	 Native trees and scrub/shrubs would be retained where possible mainly along the northern boundary, ensuring that a minimum 20 m vegetation buffer between the development and off-site ponds;
	 New trees would be planted along this buffer zone, and along the eastern boundary towards the south of the site to provide suitable foraging and nesting habitat for birds and bats. The new trees on the northern boundary would also act as a vegetated corridor, creating a link between the existing ponds and the corridor along the railway to the west of the site; and
	 Grassland for birds, mammals, invertebrates and great crested newts (when in their terrestrial stage), would be created in the north and west of the facility without the use of fertiliser.
Population and Health	
Minimise risk to occupational public health	The stack design is based on the stack height assessment to ensure effective dispersion of pollutants (see air quality, above)
Construction Measures	
Overarching Construction Measures	
Minimising temporary construction disturbance	Construction would be undertaken in accordance with a Construction Environmental Management Plan (CEMP), which will set out the key management measures that contractors would be required to adopt and implement
	Working hours would be 07:30 to 19:00 hours Monday to Friday, 08:00 to 16:00 hours on Saturday and at no time on Sundays or Bank Holidays. These hours would be subject to agreement with the local planning authority. In the event that works are required outside of these hours in exceptional circumstances, this would be agreed with the local planning authority prior to commencement of the activity.
Topic-specific Construction Phase Me	asures
Landscape and Visual Effects	
Control of lighting effects	Lighting of the proposed facility would be kept to a minimum;
	 Focussed lighting would be used where illumination of the proposed facility is required; and
	 Night time construction works would be limited to the minimum required and only conducted where necessary.
Traffic and Transport	
Construction access	Approved access during the construction phase would be via the existing site access with necessary restrictions.

Reason	Mitigation Measures
Road safety and conditions	 Temporary signage in the vicinity of the site warning road users of construction traffic;
	Arrangements for road maintenance and cleaning would be made; and
	• Wheel cleaning arrangements and regular road sweeping runs (to ensure dust and dirt is not transported onto the public roads etc.).
Reduced construction traffic	Car sharing would be encouraged to reduce car trips to and from the site, and to reduce traffic ant peak flow times.
Air Quality and Odour	
Control of dust and emissions generated by construction	 Implementation of a Dust Management Plan (DMP) (which may include measures to control other emissions), approved by the local authority;
	 Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
	 Make the complaints log available to the local authority when asked:
	 Record any exceptional incidents that cause dust and/or emissions, either on or off site, and the action taken to resolve the situation in the log book;
	Carry out regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary;
	 Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions;
	 Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority.
	 Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction. e.g. suitable local exhaust ventilation systems:
	 Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible:
	 Use enclosed chutes, conveyors and covered skins, where practicable;
	 Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods:
	 Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
	 Use water-assisted dust sweeper(s) on the access and local roads, to remove, as soon as practicable any material tracked out of the site. This may require the sweeper being continuously in use:
	Avoid dry swooping of large areas:
	 Avoid uty sweepility of large areas, Ensure vehicles entering and leaving sites are severed to prevent escape of materials during transport;
	 Ensure vehicles entering and reaving sites are covered to prevent escape or materials during transport, Decord all increasions of haul routes and any subsequent action in a site log heak; and
	 Record an inspections of naul routes and any subsequent action in a site roy book, and Install hard surfaced have required and any subsequent action with fixed or mahile sprinklar systems, or mahile water have and
	 Instail hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Dust management during site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Use screening

Reason	Mitigation Measures
preparation	intelligently where possible – e.g. locating site offices between potentially dusty activities and the receptors;
	 Erect solid screens or barriers around the site boundary;
	 Avoid site runoff of water or mud;
	Keep site fencing, barriers and scaffolding clean;
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used
	on-site cover as described below; and
	 Depending on the duration that stockpiles will be present and their size - cover, seed, fence or water to prevent wind whipping.
Control of emissions from	 Ensure al vehicles switch off engine when stationary – no idling vehicles;
construction vehicles	 Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable; and
	 Produce a Construction Logistics Plan to management sustainable delivery of good and materials.
Mitigation of emissions from waste	Avoid bonfires and burning of waste on site.
management	
Mitigation of emissions from	 Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to
demolition	equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can
	produce fine water droplets that effectively bring the dust particles to the ground;
	 Avoid explosive blasting, using appropriate manual or mechanical alternatives; and
	Bag and remove any biological debris or damp down such material before demolition.
Mitigation of dust and emissions from	 Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as practicable;
trackout	 Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site);
	• Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout
	permits; and
Naine and Vibratian	Access gates to be located at least 10 metres from receptors where possible.
IVOISE and VIDIation	
and vibration effects	 Mitigation for noise and vibration from construction activities would be based upon the guidance in BS 5228-1:2009+A1:2014 and BS 5228- 2:2009+A1:2014.
	Construction works would follow Best Practicable Means (BPM) outlined in Section 72 of the Control of Pollution Act 1974 (as amended) to
	minimise noise and vibration effects.
	 HGVs would follow the approved access routes to and from site.
	 In the event that noise generating works are required outside of core working hours, this would be agreed with the local authority prior to
	commencement of the activity.
	 Portable acoustic enclosures/screens would be used, as required.
	All vehicles, plant and equipment will be maintained and operated in an appropriate manner, to ensure that extraneous noise from
	mechanical vibration, creaking and squeaking is kept to a minimum.

Archaeology and Cultural Heritage	A programme of exception and recording of the asset would take place prior to construction of the proposed facility	
Archaeological remains	A programmo of average and recording of the asset would take place prior to construction of the proposed facility	
, i e la celogica i ornanio	A programme of excavation and recording of the asset would take place profit to construction of the proposed facility.	
Hydrology and Flood Risk		
Pollution prevention measures	 Refuelling of machinery would be undertaken within designated areas where spillages can be easily contained. Machinery would be routinely checked to ensure it is in good working condition; Any tanks and associated pipe work containing substances included in List 1 of the Groundwater Directive would be double skinned and be provided with intermediate leak detection equipment: The following specific mitigation measures for the protection of surface water during construction activities would be implemented: Management of construction works to comply with the necessary standards and consent conditions as identified by the Environment Agency: A briefing highlighting the importance of water quality, the location of watercourses and pollution prevention included within the site induction: Areas with prevalent run-off to be identified and drainage actively managed, e.g. through bunding and/or temporary drainage; Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) to be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or the local watercourses. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. Bunds used to store fuel, oil etc. to have a 110% capacity; Disturbance to areas close to watercourses reduced to the minimum necessary for the work; Excavated material to be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses; Construction materials to be managed in such a way as to effectively minimise the risk for fuel leaks; Drainage works to be constructed to relevant statutory guidance and approved vi	
Hydrogeology and Ground Conditions	Chamical contamination of acil and securel value	
Exposure of construction workers	 Chemical contamination of soil and groundwater: Appropriate use of Personal Protective equipment (PPE); Appropriate segregation of 'dirty' and 'clean' working areas and the establishment of appropriate washing facilities for construction workers; Appropriate briefing to site staff; and Implementation of Personal hygiene protocols. Ground gases: 	

Reason	Mitigation Measures
	Appropriate use of PPE; and
	Appropriate training and briefing to staff.
	Asbestos (if applicable):
	 Asbestos strip from buildings prior to site clearance and demolition;
	Airborne asbestos monitoring and personal asbestos monitoring;
	Appropriate use of PPE, to include but not restricted to masks (P3 rated), coveralls, boot covers and gloves;
	Appropriate segregation of the asbestos effected area (considered a 'dirty' area) from the remainder of the site and the implementation of
	appropriate decontamination measures;
	Appropriate training and briefing of site staff; and
	Implementation of personal hygiene protocols.
	Airborne particles will be controlled through dust suppression measures such as damping. Removal of asbestos or asbestos contaminated
	materials shall be undertaken by suitably experienced specialist contractors.
Contamination to surface water and	Damping down of exposed formations and stockpiles during dry conditions;
adjacent land uses	Covering of contaminated stockpiles arising during remediation;
	Appropriate location of stockpile away from sensitive receptors;
	Restriction of works which are likely to generate dusts during windy conditions;
	Wheel washing of vehicles leaving site;
	Creation of temporary haul roads away from sensitive receptors;
	 Controlled excavation of known localised contaminated soils prior to bulk excavation works;
	The control of waters entering any excavation;
	The periodic inspection of excavations to identify significant water build up and the implementation of measures to prevent water flow from
	excavations;
	Periodic inspection of excavations to identify residual contamination if required, and allow its removal prior to deepening of excavations;
	 Stockpiling of contaminated materials away from water courses/drains; and
	Covering of stockpiles to prevent leaching of contaminants.
Creation of new areas of	It is considered that the potential for accidental spillage of site process materials can be mitigated through appropriate storage and handling of
contamination	materials in designated areas, with appropriate infrastructure and drainage systems in place. Any chemical and material storage on the proposed
	site will be undertaken in accordance with the Environment Agency guidance in order to avoid pollution.
	Control measures include:
	 Regular servicing and inspection of vehicles used on site;
	 The restriction of refuelling of vehicles to bunded areas underlain by hardstanding, or other impermeable materials; and
	Deployment of spill kits to immediately control any spills that do occur.
Mitigation of impact to controlled	Completion of a piling risk assessment in advance of construction would be undertaken and would identify the most appropriate piling method to

Reason	Mitigation Measures	
waters	minimise the generation of vertical contaminant migration pathways.	
Ecology and Nature Conservation		
Protection of fauna	 Any vegetation clearance would be carried out outside of the breeding bird season (March-September inclusive), where practicable. If this is not possible, any vegetation to be removed would be checked for nesting birds by a suitably qualified ecologist immediately prior to their removal. If any nests are found, they would be left undisturbed until the chicks have fledged (usually around six weeks); It would be necessary to undertake a programme of trapping from within the site to move animals out of the dense scrub into areas of retained habitat. This is particularly in relation to great-crested newts. The trapping would be done via fencing the site with amphibian-proof fencing and the use of pitfall traps and artificial refugia. Lighting outside the standard construction working hours would be restricted to that necessary for individual tasks and would be directional to avoid light spill onto areas where lighting is not required. Construction lighting would be designed to ensure there would be minimal artificial light spill to the railway corridor during the period when bats would be foraging / commuting. 	
Population and Health		
Minimisation or avoidance of risk to construction workers and members of the public	Further mitigation in relation to health would involve ongoing engagement with local communities to raise awareness of any particularly disruptive construction activities, to monitor and feedback the effectiveness of mitigation and respond to community concerns.	
Operational Measures		
Landscape and Visual Assessment		
Minimisation of visual effects	Lighting design has been based on the use of appropriate lighting to provide safe working conditions in all areas of the site, whilst minimising light pollution and the visual effect on the local environment. This would be achieved by the use of luminaries that eliminate the upward escape of light. Details of the proposed site lighting are provided in Appendix 2.2.	
Traffic and Transport		
Avoidance of changes in traffic flow.	Operational traffic flows not exceed existing consent. Vehicles to use existing access route.	
Air Quality and Odour		
Minimisation of significant adverse effects from stack emissions	Stack emissions monitoring to demonstrate compliance with the terms of the environmental permit. The permit will set out details of the type of monitoring and the frequency of data collection and reporting.	
Noise and Vibration		
Monitoring requirements	Noise monitoring would be required to demonstrate compliance with the terms of the Environmental Permit. The permit will set out details of the type of monitoring and the frequency of data collection and reporting.	
Hydrology and Flood Risk		
Pollution prevention	Operational practices to incorporate measures to prevent pollution and increased flood risk, to include emergency spill response procedures, clean up and remediation of contaminated water run-off.	
Ecology and Nature Conservation		
Habitat management	Grasses would only be cut annually in late summer to avoid impacts on the newts.	
Protection of fauna	• Five bird nest boxes could be provided. These would help mitigate for the loss of breeding bird habitat from clearance of existing dense scrub	
Reason	Mitigation Measures	
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	 in the short term while replacement planting established. A possible combination for this development includes two Schwegler 1SP sparrow terraces, and three Schwegler bird houses. An ecologically sensitive artificial lighting scheme has been designed for the site during its operational phase to minimise impacts on retained ecological features (including the adjacent railway corridor). Artificial light spill onto retained features and new grassland has been kept (where possible) to a maximum of 1 lux. Appropriate use of lighting technologies, such as direction lighting, would assist this. Where possible, the use of white LED lamps with a 'cool' colour temperature would be selected as this has lower attractiveness to insects and would be less likely to attract bats away from darker areas where they will more routinely forage. 	
Decommissioning Measures		
To be undertaken in accordance with a decommissioning environmental management plan, prepared in line with good practice and legislative requirements applicable at that time.		