

17 CHAPTER 17 INTERACTION AND ACCUMULATION OF EFFECTS

17.1 INTRODUCTION

In accordance with the EIA Regulations, an ES should give consideration to 'cumulative effects.' By definition, these are effects that result from incremental changes caused by past, present or reasonably foreseeable future actions together with the Proposed Development. For the cumulative assessment, two types of effect are considered:

- The combined effect of individual effects, for example visual, noise, airborne dust or traffic on a single receptor; and
- The combined effects of several developments that may on an individual basis, be insignificant but cumulatively have a significant effect. This considers the Proposed Development together with other developments that are proposed but not operational at the time of the assessment.

17.1.1 Combined Effects of Committed Developments

The combined effects of the Proposed Development with other developments have been considered within the technical chapters 7 to 16. **Table 2.4 in Chapter 2, EIA Methodology** provides details of the committed developments that have been assessed and are shown on **Figure 2.1 in Volume 2**. The assessments concluded that no cumulative effects were identified and are not considered further here.

17.1.2 The Assessment

This assessment therefore considers the combined effect of individual effects as discussed above.

Certain chapters of this ES relate to a specific type of receptor and assess effects on those. These chapters are 8: Ecology & Ornithology and 11: Cultural Heritage and Archaeology. Interrelationships with the potential to cause effect to those particular topic-specific receptors have been considered directly in the technical chapters of this ES and are not considered further here. These are:

- Effects on birds, such as noise, and changes in habitat, (assessed in Chapter 8: Ecology & Ornithology);
- Effects on non-avian ecology (species and habitats), such as associated with construction dust, water pollution, noise, lighting, and changes in habitat, (assessed in Chapter 8: Ecology & Ornithology);
- Primary effects on heritage features, such as visual and noise (assessed in Chapter 11: Cultural Heritage and Archaeology)

It is acknowledged that while heritage assets are protected, and effects on them assessed, in their own right, individual people having relationships with those heritage assets (e.g., listed buildings or conservation areas) and may experience appreciation effects associated with changes to these assets. Non-negligible effects on heritage receptors are not included in the matrix in **Table 17.2**. This is because in EIA terms, no significant effects were recorded. However, it was reported in Chapter 11 that for both construction and operational phases temporary perceived changes to the land would enable for some people, changes in appreciation to the setting of heritage features within Lound Conservation Area, Sutton-cum-Lound (e.g., Grade 1 Listed St Bartholomew's Church and Babworth Hall Registered Park and Garden). This change however was noted as reversible post completion.

17.1.3 Development Parameters Assessed

The Rochdale Envelope parameters for the Proposed Development have been considered with respect to the potential effects considered in this chapter, and in the other chapters that are referred to in it, and worst-case values/scenarios for this are captured by the design, as set out in **Chapter 2, EIA Methodology**. This chapter therefore reports the assessment of effects associated with the Proposed Development.

17.1.4 Study Area / Survey Area

The cumulative effects for each environmental topic are assessed in the context of other developments within 5km of the Site.

17.2 LEGISLATION, POLICY AND GUIDANCE

17.2.1 Legislation

In accordance with Schedule 4, paragraph 5 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) as amended states: *"The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development..."*;

Schedule 4, paragraph 5(e) of the EIA Regulations requires the following: *"a description of the likely significant effects of the development on the environment resulting from, inter alia (e) the cumulation of effects with other existing and / or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources."*

17.2.2 Planning Policy

The need to consider cumulative effects in planning and decision making is set out in planning policy, including the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019) and the Planning Practice Guidance (PPG) (Ministry of Housing, Communities and Local Government, 2017), which states: *"Each application (or request for a screening opinion) should be considered on its own merits. There are occasions, however, when other existing or approved development may be relevant in determining whether significant effects are likely as a consequence of a proposed development. The local planning authorities should always have regard to the possible cumulative effects arising from any existing or approved development."* (paragraph 024, reference ID 4-024-20170728).

17.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

17.3.1 Scoping Responses and Consultations

A Scoping Opinion was submitted to Nottinghamshire County Council on 14th February 2022. The response received in relation to this topic is provided in **Table 17.1**

Table 17.1: Scoping and Consultation Response

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Nottinghamshire County Council	Scoping Response 04/11/2022	NCC stated that <i>"Whilst it is understood that each chapter/topic area would consider any potential significant cumulative effects with other developments or ongoing activities locally, there is clear potential for significant effects to arise from the combination of multiple individual effects- especially to the SSSI. The overall conclusions of the ES therefore need to look across the range of environmental issues in order to categorise the level of impact to the environmental receptors and specifically to identify any likely significant impacts and the need for further, additional forms of mitigation."</i>	The response refers specifically to the potential for in combination and multiple effects on receptors and mentions specifically the SSSI this is interpreted more generally in the ES, specifically: Chapters: 7, Landscape and Visual Impact, Chapter 8, Ecology and Ornithology, Chapter 9, Hydrology, Hydrogeology and Flood Risk, 12, Noise, 13, Air Quality, 14, Traffic and Transport. The assessment will draw on information provided in these chapters and their supporting information and highlight those receptors that are likely to experience multiple effects.

There is no standard prescriptive method for assessing cumulative effects and interactions. With regard to cumulative effects, the ability to quantify the extent to which the environmental effects can interact with those associated with the Proposed Development depends upon the level of information available the cumulative assessment is necessarily qualitative, and assessment is primarily based upon professional opinion.

Potential sources of environmental effect are not identified specifically in this chapter; this chapter instead relies on the other technical chapters (7 to 16) in this ES for the identification of receptors, potential effects and their assessment. Mitigation, where proposed in other technical chapters, is assumed to be implemented before consideration of the effects in this chapter, i.e., mitigated residual effects are considered here. Similarly, this chapter draws from the other technical chapters for descriptions of aspects of the baseline environment, where required.

Effects with a magnitude assessed as "negligible" (described generally as "no detectable or material change," or "a barely discernible change") in other chapters are considered

not to have the potential to contribute to interrelationship effects and are not considered in this chapter. For the avoidance of doubt, all effects not explicitly assessed elsewhere in the ES are considered to be of negligible magnitude and are therefore not assessed. Effects have been considered where they have been identified and assessed in other chapters of the ES.

Only receptors that are predicted to be the subject of more than one potential effect have been included in the assessment. Receptors predicted to be the subject of only a single effect are excluded because there is considered to be no potential for a cumulative interrelationship effect to take place.

The rationale for receptor inclusion or exclusion has been explicitly detailed in **Section 17.1.2**. A matrix has been used to detail which potential effects from various sources are predicted to impact each of the included receptors.

It should be noted that uncertainty in the assessment of effects, for most of the technical chapters in this ES, is dealt with by making conservative, or worst-case, assumptions. As this chapter considers the "in-combination" effects of multiple individual effects, it is based on there being multiple worst-cases simultaneously, which is likely to be overly conservative.

17.3.2 Assessment of Significance

Following the matrix, a description of the interrelationships will be undertaken for each receptor and a conclusion drawn, using experience and professional judgement, as to whether any receptor will be subject to significant effects as a result, in EIA terms.

The interrelationship effect is the effect over and above the individual effects assessed in other chapters and is described as the difference between the change caused to a receptor from one effect alone and the change caused to the receptor from all effects combined.

Significance has been determined by qualitative consideration of the sensitivity of receptors and the magnitude of effects using the following general criteria in accordance with **Chapter 2: Environmental Impact Assessment Methodology** :

- Negligible – no detectable or material change to a location or environment;
- Minor – a detectable but non-material change to a location or environment
- Moderate – a material, but non-fundamental change to a location or environment
- Major – a fundamental change to a location, environment, or species.

Effects assessed as Moderate, or Major are treated as being significant in terms of the EIA Regulations.

17.3.3 Effect Interrelationship Matrix

A matrix, **Table 17.2** has been used to detail which potential residual effects are predicted to impact each of the included receptors. Only receptor that have effects from more than one chapter are listed.

As noted in **Section 17.1.2** this matrix excludes effects on ecological species and ornithological receptors, and effects on heritage receptors, the interrelationship effects of which have been considered in other chapters. Air quality and dust related impacts are not considered in this Assessment as impacts are reported as **negligible adverse, and not significant** in EIA terms. For further information, refer to **Chapter 13, Air Quality**. Similarly in **Chapter 14, Traffic and Transport**, small increases in traffic flows have been predicted, including HGVs, on the surrounding highway network but the scale of impacts is considered to be **negligible and not significant** in EIA terms.

All other effects relate to people and sensitive receptors e.g., Sutton & Lound SSSI. Where recreational receptors (e.g., users of Public Rights of Way) are included in the assessment of interrelationships because there may be secondary effects on local residents.

Table 17.2 Matrix of Non-Negligible Magnitude Effects Arising in Two or More Chapter

Chapter/ Effect Type	Footpaths	Residents/Settlements	Sensitive Ecological Features
7:Landscape and Visual Appraisal	x	x	
8: Ecology and Ornithology excluding ecological species and ornithology receptors			x
9: Hydrology, Hydrogeology and Flood Risk			x
12:Noise	x	x	x

Specific receptors that were identified in each of these chapters are detailed in **Table 17.3** for construction phase effects, **Table 17.4** for operational and restoration phase effects and **Table 17.5** for post restoration effects. Decommissioning effects are expected and assumed to be similar to, though of lesser magnitude than, construction phase effects, and are not assessed explicitly in this chapter.

Specific sources of this information within this ES are:

- Chapter 7: Landscape and Visual Impact Appraisal, Section 7.12 Tables 7.7 (Visual Effect Assessment); Technical Appendices 7.1 to 7.7, Figures 7.1 to 7.12
- Chapter 8, Ecology and Ornithology; Sections 1.4 and 1.7-1.9, Technical appendix 8.4 to 8.6, Figures 8.2 and 8.3
- Chapter 9, Hydrology, Hydrogeology and Flood Risk, Section 9.5 and 9.6
- Chapter 12: Noise, Section 12.3, 12.5 and 12.6.

The Assessment for ecological receptors is based on the prevailing CIEEM guidance which avoids and discourages use of the matrix approach to determining significance and describes only two categories: 'significant' or 'not significant.' Accordingly, only those that have been identified as significant are included in the tables below.

The assessment also draws on cumulative impacts within the Site itself resulting from the phased construction of Areas A, B and C as described in **Chapter 5, Site Description**. This is because the duration of the construction and extraction would occur over an approximate 25-year period.

Table 17.3 Non-Negligible Magnitude Temporary Construction Phase Effects Arising in Two or More Chapters

Chapter/Effect Type	Receptor	Sensitivity / Magnitude effect	Effects
7: Landscape and Visual Impact Appraisal	Cross Road Farm, Sutton Lane (VP3)	High Sensitivity/ Low magnitude	Minor-moderate adverse. Resulting from temporary construction works when nearby.
	Botney and Brooklyn, Great North Road (R4)	High sensitivity/ Low magnitude	Minor-moderate adverse. Resulting from temporary construction works when nearby.
	Landscape Character: IL10 Ranskill (BDLCA) Including Sutton & Lound SSSI, Sutton & Lound LWS & Idle Valley Nature Reserve Including the Site: Areas A, B, C	Medium sensitivity/ Medium magnitude	Moderate. Resulting from temporary construction works when nearby.
12: Noise	Footpath NT (Sutton) /FP1 (NSR 4)	High sensitivity/ Medium magnitude	Minor. Resulting from temporary construction works when nearby.
	Sutton & Lound SSSI, Lound LWS ad Idle Valley Nature Reserve. (NSR 5,6, 7,8)	High sensitivity Medium (NSR 5) Negligible (NSR,6,7and 8)	Minor for NSR 6,7 and 8. Resulting from temporary construction works when nearby. Major for NSR 5. Note impact attributed to ecology (bird species rather than human receptors. Noise levels recorded would be negligible -minor for human receptors.
	Cross Road Farm (Sutton Lane) (NSR9)	High sensitivity/ Negligible	Minor. Resulting from temporary construction works when nearby
	Botney & Brooklyn House, Great North Road (NSR 10).	High sensitivity/ Negligible /	Minor adverse .Resulting from temporary

Chapter/Effect Type	Receptor	Sensitivity / Magnitude effect	Effects
			construction works when nearby.

Table 17.4 Non-Negligible Magnitude Temporary Operational and Restoration Phase Effects Arising in Two or More Chapters

Chapter/Effect Type	Receptor	Sensitivity/Magnitude Effect	Effects
7:landscape and Visual Impact Appraisal	NT (Sutton) /FP1(VP9)	High sensitivity/ Medium	Moderate-major adverse. Limited to limited to short-term lagoon embankment removal during restoration and traffic using haul road.
	Landscape Character: IL10 Ranskill (BDLCA) Including Sutton & Lound SSSI, Sutton & Lound LWS & Idle Valley Nature Reserve Including the Site: Areas A, B, C Landscape Viewpoints (3,4,5,6 and 9)	Medium sensitivity/ High	Moderate-major adverse. Resulting from simultaneous extraction of PFA and restoration.
	Low Farm, Lound Low Road. (R1)	High sensitivity/ Low	Minor- moderate adverse. Limited to short-term lagoon embankment removal during restoration.
	Bellmoor Farm and adjacent properties (R2)	High sensitivity/ Medium	Moderate-major adverse. Limited to short-term lagoon embankment removal during restoration.
	Cross Road Farm, Sutton Lane (VP7 and R3)	High sensitivity/ Low of change	Minor - moderate adverse. Limited to impacts from construction traffic on haul road and conveyor.
	Botney and Brooklyn Great North Road (R4),	High sensitivity/ Low- moderate	Minor - moderate adverse. Limited to impacts from construction traffic on haul road and conveyor.
	Hill Top. Town Street, (R7)	High sensitivity/ Low	Minor - moderate adverse. Limited to short-term lagoon embankment removal during restoration. –

Chapter/Effect Type	Receptor	Sensitivity/Magnitude Effect	Effects
	Wetland Fisheries, Low Lound Road (VP11) (NT Sutton BOAT7)	High sensitivity/ Medium	Moderate -major adverse for PRoW users. Limited to short-term lagoon embankment removal during restoration. Moderate adverse for road users on Low Lound Road. As above.
12: Noise	Sutton & Lound SSSI, Lound LWS ad Idle Valley Nature Reserve. (NSR 5,6, 7,8)	Very high sensitivity/ Medium (NSR 5) Negligible, 6,7 8)	Minor. Resulting from simultaneous extraction of PFA and restoration.
	Low Farm/Lound Low Road (NSR3)	Very high sensitivity/ negligible	Minor. Limited to short-term lagoon embankment removal during restoration.
	Wetland fisheries, Low Lound Road (NSR 1)	Very high sensitivity Negligible	Minor. Limited to short-term lagoon embankment removal during restoration.
	Bellmoor Farm and adjacent properties (NSR4)	Very high sensitivity/ Negligible - medium	Minor. Limited to short-term lagoon embankment removal during restoration. –
	Cross Road Farm, Sutton Lane (NSR 9)	Very high sensitivity/ Negligible	Minor adverse. Limited to impacts from construction activities.
	Botney and Brooklyn Great North Road. (NSR10),	Very high sensitivity/ Negligible (day)/Low (night)	Minor adverse. Limited to impacts from construction activities
	Hill Top, Yew Tree Farm (NSR 2)	Very high sensitivity/ Negligible	Minor adverse. Limited to short-term lagoon embankment removal during restoration

Table 17.5 Non- Negligible Magnitude Post- Restoration Permanent Effects Arising in Two or More Chapters

Chapter/Effect Type	Receptor	Sensitivity/Magnitude of effects	Residual permanent effect
	Footpath NT (Sutton) /FP1(VP9)	High sensitivity/ Medium	Minor-moderate beneficial
7:landscape and Visual Impact Assessment	Landscape Character: IL10 Ranskill (BDLCA) Including Sutton & Lound SSSI, Sutton & Lound LWS & Idle Valley Nature Reserve Including the Site: Areas A, B, C Landscape Viewpoints (3,4,5,6 and 9)	Medium Sensitivity Medium	Moderate Beneficial
	Low Farm, Lound Low Road (R1)	High sensitivity Low	Minor-moderate beneficial
	Bellmoor Farm and adjacent properties (R2)	High sensitivity/ Medium	Minor-moderate beneficial
	Wetland Fisheries, Low Lound Road (VP11)	Medium sensitivity Low	Minor Beneficial
	Bellmoor Farm and adjacent cottages (R2)	High sensitivity Low	Minor -moderate Beneficial
8: Ecology	Lound SSSI, Sutton & Lound LWS & Idle Valley Nature Reserve Including the Site: Areas A, B, C	High sensitivity Low - negligible	Moderate beneficial
	Lound SSSI, Sutton & Lound LWS & Idle Valley Nature Reserve Including the Site: Areas A, B, C	High sensitivity Major	Minor beneficial

The above effects have been set out for each receptor in **Tables 17.3 to 17.5**. it is possible that people occupying properties considered as part of the LVIA or more generally, using local roads and footpaths and trails in the vicinity of the site and from further afield in the historic cores of Sutton-cum - Lound and Lound Conservation Area would, depending on personal circumstance and preference, also receive the following effects:

- Construction, operation & restoration phases minor temporary inconvenience due to temporary increases of construction and operational traffic (though not deemed a significant effect in terms of EIA) on the local road network.
- Construction and operational phase minor effect on amenity for users of the wider footpaths and trails in and around the Site and in the adjoining Sutton & Lound

SSSI and Lound and Sutton LWS due to noise and visual related impacts as the Site is worked. These effects have not been included in this assessment because they have been assessed in the relevant chapters as not significant in terms of EIA and also because they were screened out at the scoping stage or during the EIA process.

17.4 ASSESSMENT OF EFFECTS

This section considers the effects of the interrelationship between the individual effects identified in **Tables 17.3 to 17.5** for each residential receptor and environmental resource frequented by people (e.g., Sutton & Lound SSSI, Sutton & Lound LWS and the Idle Valley Nature Reserve).

17.4.1 Landscape Character Area:IL10 Ranskill (BDLCA) Landscape Viewpoints (3,4,5,6 and 9) and Noise (NSR 5,6, 7and 8).

This landscape character area coincides with Sutton & Lound Gravel Pits SSSI, Sutton and Lound LWS, the Site, and the Idle Valley Nature Reserve. They are therefore considered as part of this assessment because these are areas frequented by people for recreational purposes. Only the fringes of these areas that abut and within the Site have been considered.

Over the 25 years predicted for the development of the Proposed Development, areas closest to the Site and within the Site itself, would experience a range of differing impacts allied to the progressive operational and restoration phasing within Area A; the establishment of the haul road and conveyor in Area B and to a lesser extent, the Main Processing Site in Area C which forms part of the operational Bellmoor Industrial Estate. Key impacts would be those relating to physical effects (i.e., changes to the Site arising from changes to the landform, loss of planting, etc through the progressive clearance, extraction and restoration works, and effects on amenity (visual and noise) for people using the footpaths and trails within the adjoining SSSI, the LWS and the Idle Valley Nature Reserve.

Construction Impacts

During construction key impacts that people would observe relate to the setup of the site infrastructure (the haul road, conveyor and the Main Processing Site). These activities border the SSSI and therefore impacts for people are likely to be noticeable where the footpath and trails coincide. The **Landscape and Visual Impact Assessment (LVIA), Chapter 7** of the ES provides representative viewpoints of the area taken from footpaths and walks in the locality. The LVIA assessment reports that impacts for users of these footpaths and walks would most likely be attributed to the construction of the haul road and setting up of the Main Processing Site. The public rights of way (PRoW) that would be affected the most would be NT Sutton FP1 and a section of FP Sutton BW4 where it connects with NT Sutton FP. At this point, the haul road would cross the PRoW which would be kept open (with safeguards in place) enabling users views of moving traffic creating a temporary **moderate-major adverse impact**. Visual impacts for all other trails and PRoWs assessed were deemed to be **negligible adverse**, temporary and reversible. In the LVIA, overall impact on the character of the area was assessed to be **moderate adverse** (refer to **7.7 'Summary of Residual Effects' in Chapter 7, LVIA**).

With regard to the effects of construction noise; noise sensitive receptors (NSR) were identified at NSR 4, 5, 6, 7 and 8 as shown on **Figure 12.2 in Volume 2**. With the exception of land within the vicinity of NSR5 (NT Sutton Footpath FP1), predicted construction noise levels would be below the thresholds identified in **Chapter 12, Noise Table 12.14 (Construction Noise Assessment)**. At NSR 5, the noise assessment has

predicted an exceedance of the limit (55 $L_{eq,T}$ dB(A) set following consultation with NWT¹, during temporary construction works only. This limit was set to reduce noise impacts for the wetland breeding and wintering birds rather than for people experiencing the trails and footpaths around the SSSI, LWS and nature reserve. The duration for the impact would be over a period of approximately 6-12 months. For people using this area the noise levels would be no louder than normal conversation, the noise assessment concluded that with measures in place as identified in the Outline Construction Environmental Plan (OCEMP), the impact would be of **minor significance**.

Significance of Construction Effects

Taking into consideration the visual impact and predicted construction noise impacts and, that only part of the landscape character area would be temporarily affected, the overall cumulative effect with regard to construction is considered to be a detectable but non-material change and therefore considered to be **minor**.

Operational and Restoration Impacts

Impacts on the landscape character are reported in the LVIA to be **moderate to major** adverse attributed to the effects on openness of the landscape as the Site is progressively worked and restored. These are attributed to impacts within Area A and stem from the cumulative impacts of the simultaneous extraction of PFA and restoration as the Proposed Development transitions from one phase to the next from the Low-Rise area (LRP1-LRP5 to the High-Rise area (HR1- HR6).

The LVIA viewpoints (VP3, VP4, VP5, VP6 and VP9)² have been taken as representative views within and close to the SSSI, LWS and Idle Valley Nature Reserve. Taken from ProWs, people on these footpaths would experience **negligible adverse** impacts with the exception of users of NT Sutton FP1 (VP9). Users of this footpath where it borders the Site would experience **moderate-major adverse** visual impacts. At first these would be attributed to glimpsed views of operational vehicles on the embankments when they are removed at the end of each extraction phase as part of restoration. Importantly, it is anticipated that these activities would be limited to a 4-6 week period following extraction in each phase. Impacts would therefore be temporary and reversible.

During the operational and restoration phases, predicted noise levels are considered to be of **minor significance**.

Significance of Operational Effects

Taking into account the impacts identified and the localised nature and duration of the impacts reported to be of moderate to major adverse/significance for the area represented by VP 9, and the overall impact on amenity for people that frequent this local area, the overall cumulative impacts are considered to constitute a detectable but non material change. Impacts are therefore considered to be **minor**.

Post Restoration

Post restoration, the embedded mitigation and changes to the landscape of the Site is reported as **beneficial** in **Chapter 7: LVIA, 8: Ecology and Ornithology and 9: Hydrology, Hydrogeology and Flood Risk**. The restoration design would provide the implementation of a balanced landscape enabling the reinstatement of some of the existing farming activities, including grazing of the Site and habitat management using sheep. It would also provide new habitats comprising wet grassland, species-rich

¹ Measures to mitigate ecological impacts provided in **Outline Monitoring and Mitigation Plan (Appendix 8.3, Volume 3)**. This sets out the methodologies, requirements and assurances for monitoring impacts in so far as they effect the Sutton and Lound SSSI and LWS and commitments given for regular updates

² Refer to Figure 7.5 in Volume 2

grassland, reed beds, woodland, and water bodies. The proposed ditches that would be implemented to control surface water would also contribute to biodiversity enhancement providing, with the other habitats, a biodiversity net gain of around 12.66%. All in combination would provide a **moderate to major** effect by improving the Site biodiversity and, indirectly, an enhanced buffer to the SSSI and LWS. Also, through the removal of the existing embankments, open up the landscape to wider views at first (before woodland planting matures), improving as the landscape matures, the amenity of this area for local people. In terms of cumulative impacts this is considered to be a fundamental change, but beneficial. This impact is therefore assessed as **major**.

17.4.2 Cross Road Farm (Sutton Lane) - Landscape Receptor (R3) and Noise (NSR 9)

Construction Impacts

Cross Road Farm would experience both visual impact and noise impacts. In terms of visual impacts during construction, Cross Road Farm would experience impact arising from additional traffic on the A638 (North Road) and direct effects such as construction lighting, for any limited works happening after sunset. The removal of vegetation to facilitate the new vehicular and conveyor would be noticeable and reveal potential views towards the processing plant (Area C). Visual impact from this receptor is predicted to be **minor- moderate** adverse, but temporary and reversible. During the construction phase predicted noise levels were assessed as being temporary and of **minor significance**.

Significance of Construction Effects

Taking into consideration the visual impact and predicted construction noise impacts, the overall cumulative effect with regard to construction is considered to be a detectable but non material change and is therefore considered to be **minor**.

Operational and Restoration Impacts

With regard to operation, impacts would be broadly similar to those for the construction phase. A new wooden fence and a line of native mix hedgerow planting with trees would provide partial screening and the retention of an existing area of woodland would provide a screen to views into Area B of the haul road and conveyor. Operational and restoration impacts are therefore considered to be **minor to moderate**, temporary and reversible, and to be viewed in the context of the existing industrial estate of which Area C forms part. This would reduce to **negligible** post restoration. During the operational and restoration phases, predicted noise levels are considered to be of **minor significance**.

Significance of Operational Effects

Taking into consideration the cumulative effect of both visual impact and predicted operational and restoration noise impacts, the overall effect is considered to be a detectable but non-material change and is therefore considered to be **minor**.

17.4.3 Botney and Brooklyn, Great North Road - Landscape Receptor (R4) and Noise (NSR 10)

Construction Impacts

The construction visual impacts would be broadly similar to Cross Road Farm as they are relatively close to each other. Accordingly visual impacts are recorded as **minor to moderate** adverse, temporary and reversible. Similar impacts to Cross Road Farm were also recorded for predicted noise levels. Although, it was noted that for these receptors, night-time ambient noise levels would be affected by road traffic noise on the A638. However, when residents are located inside their dwellings the predicted noise levels would be low enough not to cause noise disturbance or interrupt sleep. In circumstances

where residents open their windows for ventilation during the warmer summer months, the internal noise levels were also predicted to not exceed internal noise level thresholds³. Overall noise impacts were reported as being of **minor significance**.

Significance of Construction Effects

Taking into consideration the visual impact and predicted construction noise impacts, the overall cumulative effect with regard to construction is considered to be a detectable but non-material change and is therefore considered to be **minor**.

Operational Impacts

Botney and Brooklyn would experience similar impacts reported for Cross Road Farm and therefore also assessed as **minor to moderate**, adverse and reversible. With regard to noise, predicted impacts would also be similar to Cross Road Farm and are considered to be **minor significance**.

Significance of Operational Effects

Taking into consideration the cumulative effect of both visual impact and predicted operational and restoration noise impacts, the overall effect is considered to be a detectable but non-material change for construction impact and is therefore considered to be **minor**.

17.4.4 Low Farm/Low Lound Road. Landscape Receptor (R1) and Noise (NSR3)

Construction Impacts

Construction impacts are not considered for this receptor as the LVIA has assessed that during construction, impacts would be **negligible** and this assessment does not consider individual impacts.

Operational and Restoration Impacts

With regard to operational impacts, the LVIA predicts **minor to moderate** impacts attributed to glimpsed views of traffic movements and construction activities on Site. As the progressive extraction and restoration proceed the most pronounced effects would occur during the working of the phases adjacent to the northern boundary (Phases LR P5 and HR P2). This vegetated embankment would be retained during extraction activities and would only be removed for the final landform restoration. It is anticipated that this work would take place in around years 10 and 11, and for a short (4-6 weeks) duration within each area.

For both the operational and restoration phases, predicted noise levels are considered to be of **minor significance**.

Significance of Operation and Restoration Effects

Taking into consideration the cumulative effect of both visual impact and predicted operational and restoration noise impacts, the overall effect is considered to be a material but non-fundamental change and is therefore considered to be **minor**.

Post Restoration

Post restoration, it should be noted that the LVIA reports that this property would in the long-term, obtain a **minor to moderate benefit** as it would enable potential views across the restored landscape towards the proposed lake and new planting.

³ Thresholds provided in BS: 8233

17.4.5 Bellmoor Farm and adjacent properties - Landscape Viewpoint 9 and Receptor R2, and Noise (NSR 4)

Construction Impacts

Construction impacts are not considered for these receptors as the LVIA has assessed that during construction, impacts would be **negligible** and this assessment does not consider individual impacts.

Operational and Restoration Impacts

Bellmoor Farm and adjacent properties during the operational and restoration phases would experience changes to their existing views arising from works undertaken in around years 17 to 20 in areas HR P5 and P6. Key landscape features that would be affected are the wooded western embankment boundary of the Site, east of Bellmoor Farm and adjacent properties.

Following the extraction of PFA this embankment would be removed to provide fill as part of the restoration works. The southern embankment would be retained in perpetuity (the northern half of it is not controlled by the Applicant). Visual impacts as reported in the LVIA relate to a visible loss of woodland from the eastern embankment (western site boundary), but this would be temporary and only evident until the area is restored, which would be ongoing as soon as the embankment is removed.

Based on a high sensitivity and a medium magnitude of change, landscape visual impacts have been assessed as **moderate to major adverse** temporary and reversible.

The noise assessment identified predicted impacts to be of **moderate to major significance** for Bellmoor Farm and adjacent properties. This is due to the limited but intensive restoration activities rather than the longer-term extraction of PFA. As discussed above, the restoration activities leading to the potential impacts relate solely to the removal of the eastern embankment which would bring activities up to the boundary of the Site and closer to these receptors. It should be noted that the prior extraction of PFA would not contribute to this potential impact, largely due to containing extractive activities behind the eastern embankment, using it as a noise screen. The duration of this activity is programmed over a 4–6-week period.

With the control measures as described in the OCEMP, residual noise impacts are considered to be **minor**.

Significance of Operational and Restoration Effects

Taking into consideration the visual impact and predicted operational noise impacts, the overall cumulative effect with regard to operational and restoration phases is considered to be a material, but non-fundamental change and therefore **minor**. This reflects the short but intensive duration of the restoration works attributed to the removal of the eastern embankment and that effects would be reduced by mitigation as set out in **Chapter 7, Landscape and Visual Appraisal (LVIA), section 7.9.1 and Chapter 9, Noise, section 12.8.**

Post Restoration

Post restoration it should be noted that the LVIA reports that open views would be revealed across the Site, which would provide an open aspect, with long-distance views, a characteristic of the surrounding landscape character. Replacement woodland would eventually filter this view as the vegetation matures. This would provide a small positive change in the magnitude of change resulting in **minor-moderate** beneficial effects.

17.4.6 Hill Top, Town Street - Landscape Receptor (Viewpoint 12 and R7) and Noise (NSR 2)

Construction Impacts

Construction impacts are not considered for these receptors as the LVIA has assessed that during construction, impacts would be **negligible** and this assessment does not consider individual impacts.

Operational and Restoration Impacts

Views from this receptor location are also representative of road users on Town Street.

Views from Hill Top are representative views available from the higher ground along Town Street. The view encompasses a panoramic view of the High-Rise embankment along the northern boundary of the Site bordering Lound Low Road above an existing hedgerow which would be retained. The LVIA reports that glimpsed views of traffic movements on the embankment would be possible during the operation at HR P3 and P4. The most pronounced effects would occur during the restoration of these phases around years 11 to 14. The vegetated embankment in each phase would be retained during extraction activities and would only be removed for the final landform restoration. This work would take place for a short (4-6 weeks) duration.

The magnitude of change has been appraised as small. This would result in a **minor-moderate adverse** effect on the residential receptors which are of high sensitivity and a **minor adverse** effect on the visual amenity of road users that are of medium sensitivity as their primary focus is on their direction of travel. Both impacts are deemed to be temporary and reversible in nature.

For both the operational and restoration phases, predicted noise levels considered to be of **minor significance**.

Significance of Operational and Restoration Effects

Taking into consideration the visual impact and predicted operational noise impacts, the overall cumulative effect with regard to operational and restoration phases is considered to be a detectable but non-material change and is noted as **minor**.

Post Restoration

17.4.7 Wetland Fisheries. Landscape Receptor (VP11 and R9) and Noise (NSR 1)

Construction Impacts

Construction impacts are not considered for these receptors as the LVIA has assessed that during construction, impacts would be **negligible** and this assessment does not consider individual impacts.

Operational and Restoration Impacts

Views from this receptor location are also representative of road users on Lound Low Road and PRoW NT|Sutton|BOAT7.

During the operation and restoration phases of the Proposed Development, as reported in the LVIA, the embankment adjoining the northern boundary of the Site and the hedgerow and mature avenue style trees fronting Lound Low Road would be retained to screen views of extraction activities within HR P2 and HR P3. Once the PFA has been extracted within these phases, the embankment would be removed to provide fill for the restoration works. This would enable for a short period of time, open views into the Site. As reported in the LVIA, impacts are considered to **moderate adverse** effect for road users and a **moderate-major adverse** effect for PRoW users based on a medium

magnitude of change. This would be temporary and reversible. With regard to the properties at Wetlands Fisheries; visual impacts are considered to be negligible, but largely to the screening effect of the retained hedgerow and lagoon embankment. The main impacts, as explained for Bellmoor Farm, would be the short-term removal of the embankment following PFA extraction.

The noise assessment identified potential operational and restoration noise impacts as being of **major significance**. This is attributed to the restoration activities and would relate solely to the removal of the lagoon embankments closest to this receptor in order to provide restoration fill, which would bring restoration activities up to the boundary of the Site and closer to the Wetland Fisheries. The prior extraction of PFA does not contribute to this potential impact, largely due to the containment of the extractive activities which would be screened behind the lagoon embankments. The duration of this activity is programmed over a 4–6-week period. With control measures as described in the CEMP, residual noise impacts are considered to be **minor**.

Significance of Operational and Restoration Effects

Taking into consideration the visual impact and predicted operational noise impacts, the overall cumulative effect with regard to operational and restoration phases is considered to be a material, but non-fundamental change and **minor**. This reflects the short but intensive duration of the restoration works attributed to the removal of the northern embankment and that effects would be reduced by mitigation as set out in **Chapter 7, LVIA, section 7.9.1 and Chapter 9, Noise, section 12.8**.

Post Restoration

Post restoration, it should be noted that the LVIA reports that road users on Lound Low and PRoW NT|Sutton|BOAT7 would in the long-term, obtain a **minor to moderate benefit** as it would enable potential views above the retained hedgerow across the restored landscape. Over time, this view would diminish as the new supplementary planting matures.

17.5 STATEMENT OF SIGNIFICANCE

Interrelationship effects on ecological, ornithological, heritage and recreational receptors are considered in other chapters of this ES.

Other interrelationship effects have been assessed in this chapter, principally on individual properties or groups of properties in the vicinity of the Proposed Development. For the purposes of making this assessment as meaningful and complete as practicable, the potential changes to the experiences of the people residing at these properties have been considered, including experiences in their local lives away from their properties. Hence, factors have been included such as nearby public footpaths and trails. The approach uses worst-case assessments from other technical chapters of this ES and assumes they apply simultaneously, which is likely to be an overly conservative, and certainly precautionary, assessment of interrelationship effects.

It is clear that there may be several different effects considered elsewhere in this ES that could change, relative to the baseline, the experience of someone living in the locality. These effects have been assessed in combination and found to be consistent with the description “detectable but non-material change,” and hence assessed as **minor, and not significant**, in all cases during the construction, operational and restoration phases.

A fundamental change to the landscape of the Site which is **major (beneficial) and significant** is predicted due to the implementation of the Restoration Landscape Masterplan as shown on **Figure 7.12 in Volume 2**. This would bring benefits to local people through the provision of new vistas and access via NT Sutton FP1, into a balanced

landscape providing the reinstatement of some of the existing farming activities; the creation of new priority habitats, woodland, and water bodies.

Decommissioning effects associated with the processing plant, haul road and the conveyor are expected and assumed to be similar to, though of lesser magnitude than, construction phase effects, and are not assessed explicitly in this chapter; however, as a worst-case, it may be assumed that the significant effects identified for the construction phase would also occur during the decommissioning phase.

No additional mitigation has been identified to reduce these effects, beyond that set out in the other technical chapters of this ES.