TEESWORKS

LACKENBY ENVIRONMENTAL STATEMENT

VOLUME 2: CHAPTER L
CUMULATIVE EFFECTS

DECEMBER 2020

Lackenby, South Tees

Volume 2: Environmental Statement (December 2020)

Chapter L: Cumulative and Residual Effects

Lichfields
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Contents

L1.0 Introduction

L1.1 This chapter draws together and summarises the findings from the individual inputs into the Environmental Statement ('ES'); defines inter-relationships between these assessments and any other developments in the area surrounding the site; and establishes whether there are any other residual effects on the identified sensitive receptors which may require additional mitigation not previously identified.

L1.2 Chapter M then summarises the mitigation and monitoring measures identified within this ES and how this can be delivered and secured.

L1.3 There are different inter-relationships between the various assessments within the ES and this chapter identifies the key links between any impacts identified and how these may influence each other. Where these relationships give rise to other combined direct effects arising from the development, it is necessary to identify how these impact on those defined sensitive receptors identified in this ES.

L1.4 There may also be other indirect effects arising from the development when considered with other proposals or schemes in the surrounding area, including the four other outline South Tees Development Corporation ('STDC') applications. These effects may also give rise to the need to consider additional mitigation measures; albeit it is necessary to consider the likelihood of those other schemes proceeding and the ability or necessity of the applicant to mitigate any such effects for other sites.

L1.5 Accordingly, this chapter considers two types of cumulative environmental effect in association with the proposed development:

- Synergistic – the combined effect of different types of impacts attributable to the proposed development ('direct impacts') in respect of a particular receptor. This includes consideration of the impacts during the construction and operational phases; and
- Cumulative – these arise from the combined effect of the proposed development with committed development schemes that, individually, may be insignificant, but when combined with other impacts, may be significant.

L1.6 25 developments are identified as those requiring consideration in relation to those other indirect or cumulative effects. These are listed in Table L4.1, shown on Figure L4.1 and are reviewed further in this chapter.

L1.7 Sensitive receptors have been identified in individual chapters of the ES and are summarised in Section L2.0. These receptors are those with varying degrees of sensitivity to environmental impact and change as a result of the proposed development. Regard has been given to the sensitivity of the identified receptors to ensure consideration is then given to those which are potentially the most susceptible to impact, taking into account the extent of the effects arising. The professional judgement of those undertaking the Environmental Impact Assessment ('EIA') as well as topic specific criteria, legislation or guidelines have been used to identify the degree of sensitivity.

L1.8 A consideration of the impacts arising from the construction and operational phases of the development has been carried out within the ES and is also addressed in the assessment of interrelationship and cumulative effects arising from the scheme.

L1.9 The structure of this chapter is as follows:

- Section L2.0 – Summary of residual effects (following mitigation) identified within the ES and identification of sensitive receptors;

- Section L3.0 – Inter-relationship of direct effects arising from the proposals (synergistic effects) and any additional mitigation measures required to have regard to those effects;
- Section L4.0 – Identification of the scope of the cumulative assessment;
- Section L5.0 – Consideration of any cumulative effects arising from the scheme when considered with the other identified proposals in the surrounding area;
- Section L6.0 – Summary and conclusions from both this chapter and from the ES as a whole;
- Section L7.0 – Abbreviations and Definitions; and
- Section L8.0 – References.

L1.10 This Chapter is supported by the following Appendices:

1 **Appendix L1:** Cumulative Sites Plan and Site Location Plans;

2 **Appendix L2:** Phasing Schedule

3 **Appendix L3:** Cumulative Transport Assessment Tables and Results; and

4 **Appendix L4:** Cumulative Air Quality Assessment Tables.

About the Author

L1.11 This ES has been coordinated by Katie Brown, Heather Overhead and Melissa Wilson all Senior Planners at Lichfields. Katie is a Practitioner Member of the Institute of Environmental Management and Assessment ('IEMA') and has 3 years' experience in co-ordinating EIAs for a range of major development projects across the United Kingdom ('UK'). Heather is working towards her EIA Practitioner membership of IEMA and has 1 year of experience in EIA projects. Melissa is working towards her EIA Practitioner membership of IEMA and has 2 years of experience in EIA projects. Their coordination role included the production of this chapter of the ES, with input from the wider technical project team.

L1.12 Kate McGill, Associate Director at Lichfields, and Practitioner Member of IEMA, has reviewed this chapter in accordance with the EIA Regulation requirements. Kate has over 10 years of experience of co-ordinating EIAs for a range of development projects.

L2.0 Summary of Residual Effects and Identification of Key Sensitive Receptors

L2.1 This section summarises the key residual environmental effects identified in the ES and those sensitive receptors most likely to be affected. It is with regard to those receptors that the analysis of any additional impacts associated with the accumulation of effects has been carried out.

L2.2 This approach accords with EIA legislation and best practice which focuses on the main or significant effects arising from the development. The Planning Practice Guidance states (ID: 4-035- 20170728, last updated 28 July 2017):

"Whilst every Environmental Statement should provide a full factual description of the development, the emphasis should be on the "main" or "significant" environmental effects to which a development is likely to give rise."

Summary of Residual Effects

L2.3 Table L2.1 provides a summary of the main residual effects (following incorporation of the mitigation measures described in Chapter M) as identified in Chapters C to K of this ES that could be expected to arise during the construction and operational phases of the proposed development.

Table L2.1 Summary of Residual Effects

Environmental Topic	Summary of Residual Effects
During Construction	
Transport	No significant residual effects in terms of severance or amenity, as a result of construction traffic.
Noise and Vibration	No significant residual effects identified on residential or non-residential noise sensitive receptors.
Air Quality	No residual effects identified.
Water Management and Flooding	Negligible Beneficial (Not Significant) effect on: - River Tees Estuary (Tees WFD waterbody); and - Other surface water bodies. Negligible Adverse (Not Significant) effect on: - Mercia Mudstone aquifer; and - Superficial aquifer.
Ground Conditions and Remediation	Minor Adverse (Not Significant) effect on: - Construction workers. Negligible Adverse (Not Significant) effects on: - Off-site human health receptors; - surface water; - ground water; and - the built environment: waste facilities.
Socio-Economic	**Substantial Beneficial** (**Significant**) (short-term, temporary) effect on: - Employment; and

Environmental Topic	Summary of Residual Effects
	- Economic output.
Climate Change	Minor Adverse (Not Significant) effect on: - Atmosphere/Climate.
Landscape and Visual Impact	**Moderate Adverse (Significant)** effect on Viewpoint (VP 1). Negligible (Not Significant) effect for: - All LCZ; and - VP, 2-6, 8, 13-15
Waste and Materials Management	Negligible Adverse (Not Significant) effect on: - Regional landfill capacity; and - Regional materials availability.
During Operation	
Transport	**Moderate Adverse (Significant)** effects on: - Driver and bus delay at A66/ Tees Dock Road roundabout; Minor Adverse (Not Significant) effects on: - Driver and bus delay at A174 / Greystones Road roundabout; - Pedestrian and cycle amenity at A1085 Trunk Road / A1053 Greystones Road roundabout, and A66 west of Tees Dock Road; Negligible (Not Significant) effects on: - Pedestrian and cycle amenity at A174 / Greystones Road roundabout.
Noise and Vibration	No Significant residual effects identified on residential or non-residential receptors.
Air Quality	Negligible (Not Significant) effects on: - Residential receptors; - Teesmouth and Cleveland Coast SSSI; and - Teesmouth and Cleveland Coast SPA.
Water Management and Flooding	Minor Beneficial (Not Significant) effects on: - Mercia Mudstone aquifer (in terms of pollution from spills); and - Superficial aquifer (in terms of pollution from spills). Negligible Beneficial (Not Significant) effect on: - River Tees estuary (Tees WFD waterbody; - Other surface water bodies. Negligible Adverse (Not Significant) effects on: - Mercia Mudstone aquifer (reduced infiltration); and - Superficial aquifer (reduced infiltration).
Ground Conditions and Remediation	No significant residual effects anticipated. Scoped out of assessment.
Socio-Economic	**Substantial Beneficial** (**Significant**) effect on: - Employment **Moderate Beneficial** (**Significant**) effect on:

Environmental Topic	Summary of Residual Effects
	- Economic output.
Climate Change	Minor Adverse (Not Significant) effect on: - Atmosphere/Climate.
Landscape and Visual Impact	Minor Beneficial (Not Significant) effect on: - LCZ1 – Industrial Negligible (Not Significant) effect on: - LCZ 3 – Intertidal Estuary - LCZ 4: Coast and Peninsula - LCZ 5: Coatham Marsh - LCZ 7 – Saltholme wetlands - LCZ8 – Rural - Viewpoints: 6, 8 and 15 Minor Adverse (Not Significant) effect on: - LCZ 2 – Urban - LCZ 6 – Eston Hills - LCZ – Urban Green Space - VPs 2, 3, 4,5, 13 and 14 **Moderate Adverse (Significant)** effect on: VP1
Waste and Materials Management	Negligible Adverse (Not Significant) effect on: - Regional landfill capacity.

Summary of Sensitive Receptors

L2.4 The technical assessments contained within this ES have identified a range of sensitive receptors which have varying degrees of sensitivity to environmental impact and change as a result of the proposed development. Those receptors potentially sensitive to the effects identified in Table L2.1 are identified below:

1 Users of the highway network: Tees Dock Road, A66 (west of Tees Dock Road), A1053, A1085 Trunk Road, A1053 Greystones Road and A174;

2 Designated sites - including Teesmouth and Cleveland Coast Special Protection Area ('SPA') and Ramsar Site and Teesmouth and Cleveland Coast Site of Special Scientific Interest ('SSSI');

3 Landscape Character Areas – including industrial, urban, intertidal estuary, coast and peninsula, Coatham Marsh, Eston Hills, Salthouse Wetlands, rural and urban green space;

4 Nearby sensitive viewpoints;

5 Surrounding built environment;

6 Nearby residential receptors, including those in South Bank, Grangetown, Old Lackenby/Eston, Newport, Middlesborough, North Ormesby. Dormanstown and Redcar and the mobile home travellers' site at King's George Terrace, mobile homes site at Redcar Beach front and Marsh Farmhouse.

7 Surface water including the River Tees estuary, Holme Beck Culvert, Boundary Beck Culvert, Kinkerdale Beck Culvert, the Mill Race Culvert and Knitting Wife Culvert;

8 Ground water including Mercia Mudstone and Superficial Aquifer;

9 Regional landfill void capacity;

10 Regional materials availability;

11 Waste Management Facilities;

12 Construction and operational employment;

13 Construction workers;

14 Off-site Human Health Receptor;

15 Construction and Operational Economic output;

16 National and local carbon targets and greenhouse gas ('GHG') emissions; and

17 Existing businesses – industrial estate Bolckow

L3.0 Inter-Relationship of Direct Effects

L3.1 This section considers the inter-relationship between the direct effects arising from the proposed development. It takes account of the residual effects only as they relate to the key sensitive receptors identified in Section L2.0.

L3.2 The analysis identifies both positive and negative effects and makes reference to the degree of effect as identified within the technical assessments. The objective is to identify where the accumulation of effects on particular receptors, and the relationship between those effects, may give rise to a need for additional mitigation not identified previously.

L3.3 This section focuses only on those issues where the impact identified is significant; however, reference is made to Minor or Negligible 'insignificant' residual effects where relevant. The EIA process has identified that for the majority of the technical assessments carried out, with the exception of Landscape Visual Impact Assessment ('LVIA') (during construction and operation) and Transport (during operation), where there are some **Significant Adverse** effects predicted, the residual effects of the development are either Minor or Negligible Adverse and Not Significant or **Substantial Beneficial (Significant)** or Minor Beneficial or Neutral.

L3.4 To assist in this analysis, Table L3.1 summarises the effects anticipated against each receptor and identifies where particular receptors may be subject to an accumulation of environmental impacts.

Table L3.1 Direct Residual Environmental Effects for Identified Sensitive Receptors

Receptor	Construction Phase	Operational Phase
Users of the highway network: Tees Dock Road, A66 (west of Tees Dock Road), A1053, A1085 Trunk Road, A1053 Greystones Road and A174.	X	T (T)
Designated sites - including Teesmouth and Cleveland Coast SPA and Ramsar Site and Teesmouth and Cleveland Coast SSSI	X	(AQ)
Landscape Character Areas – including industrial, urban, intertidal estuary, coast and peninsula, Coatham Marsh, Eston Hills, Salthouse Wetlands, rural and urban green space	(LV)	(LV) (LV) (LV)
Nearby sensitive viewpoints	(LV) LV	(LV) LV (LV)
Surrounding built environment	X	X
Nearby residential receptors, including those in South Bank, Grangetown, Old Lackenby/Eston, Newport, Middlesborough, North Ormesby. Dormanstown and Redcar and the mobile home travellers' site at King's George Terrace, mobile homes site at Redcar Beach front and Marsh Farmhouse.	(NV)	(AQ) (NV)
Surface Water (including River Tees Estuary, Boundary Beck Culvert, Kinkerdale Beck Culvert, and the Cleveland and Lackenby Channels)	(GC) (WMF)	(WMF)
Ground water including Mercia Mudstone and Superficial aquifer	(GC) (WMF)	(WMF-WMF)
Regional Landfill Capacity	(WMM)	(WMM)
Regional Materials Availability	(WMM)	X
Waste Facilities	(GC)	X
Employment	SE*	SE
Construction workers	(GC)	X
Offsite human health receptors	(GC)	X

Receptor	Construction Phase	Operational Phase
Economic Output	SE*	SE
Atmosphere/Climate	(CC)	(CC)
Existing businesses – Bolckow Industrial Estate	X	X

Key:

T – Transport; NV – Noise and Vibration; AQ – Air Quality; WMF - Water Management and Flooding; GC - Ground Conditions; SE – Socio-Economics; WMM - Waste and Materials Management; CC - Climate Change LV - Landscape and Visual Impact;

RED - adverse effect; **GREEN** - beneficial effect; ( ) - Minor/Negligible non-significant effect; X no/neutral effect anticipated; *- transitory/short term effect

L3.5 Table L3.1 highlights residual effects on identified receptors after mitigation. Where a series of technical aspects have the potential to impact (adversely or beneficially; significantly or non-significantly), then a review of whether the interaction of these different effects could give rise to a new significant effect giving rise to a need for mitigation has been undertaken. This has been conducted with reference to the technical aspect chapters of this ES and the understanding of sensitivity of the relevant receptor which those chapters have identified. Consideration has also been given to mitigation measures already either embedded into the development or capable of being delivered through planning conditions or planning obligations.

L3.6 As can be seen in Table L3.1 there are no sensitive receptors, with the exception of surface and groundwater receptors and existing residential receptors, likely to be subject to effects from more than one technical aspect. Effects on surface water and groundwater have been discussed in both the Ground Conditions and Water Management and Flood Risk Chapter; any adverse effects identified in both chapters relate to water quality as the result of potential contamination. No significant effects are anticipated in either chapter on these receptors. Negligible noise and air quality effects have been predicted for existing residents and therefore even in combination, no significant effects are anticipated for existing residents.

L3.7 In the context of the analysis above, there is no requirement for additional mitigation measures to address effects arising from the inter relationship between impacts on sensitive receptors, over and above the mitigation and monitoring measures already proposed in Chapters C to K and summarised in Chapter M. These are described further in Chapter M of this ES and are all capable of being secured via planning condition or s106 Agreement.

L4.0 Other Cumulative Effects

L4.1 It has been agreed with Redcar and Cleveland Borough Council ('RCBC') that an assessment will be carried out on whether any cumulative effects may arise from the proposed development when considered with the four other STDC outline applications, submitted at the same time as the proposed development, and various other schemes in proximity to the site.

L4.2 The objective is to identify whether effects from several developments which individually might be insignificant could, when considered together, cause significant indirect and cumulative effects requiring mitigation.

Schemes to be Assessed

L4.3 Best practice dictates that cumulative assessments of this nature should have regard to those schemes which are 'reasonably foreseeable' (i.e. usually those under construction or with planning permission, as specified in guidance such as IEMA's "Guidelines for Environmental Impact Assessment" (2004) and the European Commission's ('EC's') "Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions" (1999)). This is further clarified in the Planning Practice Guidance (Environmental Impact Assessment) which states that:

"The local planning authorities should always have regard to the possible cumulative effects arising from any ***existing or approved development****"* [our emphasis] (ID: 4-024-20170728) (last updated 28 July 2017)

L4.4 It is also clarified in Schedule 4 of the 2017 Regulations (as amended) that the ES should describe the likely significant effects of the development on the environment resulting from, inter alia, the cumulation of effects with other existing and/or approved projects.

L4.5 We interpret this guidance and Schedule 4 to mean schemes that are under construction and those with planning permission. We have also undertaken a pre-cautionary approach and have included relevant schemes that are currently pending determination or due to be submitted shortly, as schemes that could be approved prior to the determination of this planning application.

L4.6 The cumulative schemes to be assessed have been selected as developments with the potential to give rise to cumulative effects as a result of their geographic proximity to the site, scale of development or other relationships which may be relevant. The schemes have been identified via a review of planning records held by RCBC, a review of recent cumulative assessments prepared for other EIA developments within the Teeswork area and based on discussions with Officers at RCBC.

L4.7 In total 31 schemes were initially identified for inclusion within the cumulative assessment. These were included in the informal Scoping Note, submitted to RCBC (see Appendix A2). Six 'schemes' have subsequently been 'scoped out' of further assessment. These scoped out schemes are lettered A-F in Table L4.2 which also sets out the reason for scoping them out of further assessment.

L4.8 The remaining 25 schemes to be considered in the cumulative assessment are listed in Table L4.1, along with a description of development, the current known status of each scheme and a brief review of its potential relevance to this EIA. Point locations for these schemes are shown on Figure L4.1 below and a larger version of this plan and Site Location Plans for each scheme can be viewed at Appendix L1 to this ES.

L4.9 As outlined in Chapter A, the planning application for the proposed development is one of five outline planning applications in the Teesworks area being submitted by STDC simultaneously. The rationale for submitting five separate planning applications is set out in paragraph A2.8 of Chapter A, but in summary the approach allows the Council to consider the individual sites' characteristics, environmental effects and will enable detailed end user requirements to be addressed on a site by site basis without affecting the consent and thus delivery of the other schemes.

L4.10 For robustness, it is, however, considered important to consider the cumulative effects of the five STDC outline applications together, in isolation from wider committed development. This is on the basis that the five schemes:

- have the same applicant;
- are in close proximity;
- are the subject of outline planning applications which are being submitted simultaneously; and
- together provide an opportunity for RCBC to have greater control over the mitigation of this group of schemes where necessary, given that they lie within the Teesworks area and are controlled by STDC.

L4.11 In this context, the cumulative schemes in Table L4.1 have been divided into 'Tier 1' and 'Tier 2' schemes, where Tier 1 schemes include the proposed development and the other four STDC outline applications and Tier 2 schemes comprise 'other relevant development'. As discussed further below, a two-stage cumulative assessment has been undertaken to allow independent assessment of the Tier 1 schemes. This is followed by a second stage assessment, which seeks to identify whether there are any additional cumulative effects identified when the Tier 1 development is considered alongside other schemes in the area (e.g. those schemes in Tier 2 of Table L4.1).

Figure L4.1 Cumulative schemes map

Table L4.1 Schemes Identified for Cumulative Assessment: Tier 1 and Tier 2

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for inclusion in assessment
Tier 1						
1	The proposed development: Dorman Point	Outline	N/A	Outline planning application for the development of up to 139,353 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking, works to watercourses including realignment and associated infrastructure works. All matters reserved.	To be submitted to RCBC in December 2020	The proposed development
2	Lackenby	Outline	N/A	Outline planning application for the development of up to 92,903sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking and associated infrastructure works. All matters reserved.	To be submitted to RCBC in December 2020	One of five STDC outline schemes to be submitted in December 2020. Close to proposed development and likely to be constructed and operational within a similar timescale
3	The Foundry	Outline	N/A	Outline planning application for the development of up to 464,515qm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking and associated infrastructure works. All matters reserved.	To be submitted to RCBC in December 2020	One of five STDC outline schemes to be submitted in December 2020. Close to proposed development and likely to be constructed and operational within a similar timescale
4	Long Acres	Outline	N/A	Outline planning application for the development of up to 185,806 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), HGV and car parking, works to watercourses including realignment and associated infrastructure works. All matters reserved.	To be submitted to RCBC in December 2020	One of five STDC outline schemes to be submitted in December 2020. Close to proposed development and likely to be constructed and operational within a similar timescale
5	Steel House	Outline	N/A	Outline planning application for the development of up to 15,794sqm (gross) of office accommodation (Use Class E) and car parking and associated infrastructure works. All matters reserved.	To be submitted to RCBC in December 2020	One of five STDC outline schemes to be submitted in December 2020. Close to proposed development and likely to be

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for inclusion in assessment
						constructed and operational within a similar timescale
Tier 2						
6	Land at and adjoining Eston Road including Gateway Junction of A66 to Middlesbrough Road East Grangetown	Full	R/2020/0270/FFM	Engineering operations including widening of Eston Road, formation of new roundabout and internal access roads, works to enhance Holme Beck and associated hard and soft landscaping works	Granted, 12.08.2020	Site partly within Dorman Point outline application site
7	Land at Low Grange Farm South Bank	Outline	R/2014/0372/OOM	Outline application for residential development (up to 1250 dwellings) (all matters reserved)	Granted, 31.03.16	At the request of Officer. The development has been granted, the site is adjacent to the Teesworks area. Given the scale of the development and its proximity there is potential for cumulative effects.
8	Land North of Kirkleatham Business Park and West of Kirkleatham Lane Redcar	Outline	R/2016/0663/OOM	Outline planning application for up to 550 residential units with associated access, landscaping and open space	Granted, 25.07.2020	At the request of the Officer. The development has been granted and the site is located to the east of the Teesworks area. Given the scale of the development and its proximity there is potential for cumulative effects.
9	Land North of Kirkleatham Business Park and West of	Reserved Matters	R/2019/0485/RMM	Reserved matters application (appearance, landscaping, layout and scale) following approval of outline planning permission r/2016/0663/oom for up to 550 residential units with associated access, landscaping and open space	Granted, 31.10.19	At the request of the Officer. This reserved matters application relates to the above planning application and provides further

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for inclusion in assessment
	Kirkleatham Lane Redcar					information on the detailed design of the scheme.
10	Dogger Bank Wind Farm	Development Consent Order	DCO Reference. 5192	Large offshore wind farm at Dogger Bank Teesside (in international waters) and associated offshore export cabling and onshore infrastructure, with a generating capacity of up to 4.8GW. Both developments will result in increases in employment in the area, during construction and operation.	Order made 17.02.15. A Non-Material Amendment was submitted on 11.01.2019	At the request of the Officer. This DCO has both onshore and offshore elements. Construction of the onshore elements have the potential for cumulative impacts.
11	Teesside Combined Cycle Power Plant (CCPP)	Development Consent Order	DCO Reference 2019	Construction of a 1,700mwe combined-cycle gas turbine power station at Wilton International was granted permission.	Order made 05.04.19	At the request of the Officer. The order has been made for this DCO. It is located at the west of the Wilton International Complex to the south of the Teesworks area.
12	Land at Wilton International Complex Redcar	Full	R/2017/0876/FFM	Construction and operation of a mineral processing and refining facility including ancillary development, car parking and landscaping	Granted, 16.01.18	At the request of the Officer. This permission relates to the York Potash project and it is located at the Wilton International Complex to the south of the Teesworks area.
13	Land at Teesport, Grangetown	Outline	R/2006/0433/OO	Outline application for development of a container terminal	Granted 04. 10.07	At the request of the Officer. This site is location on the bank of the River Tees. It is located within the Teesworks area.
14	York Potash Port and Materials Handling Facilities	Development Consent Order	The York Potash Harbour Facilities DCO Order	Harbour facilities associated with Bran Sands	Order made, 20.07.2016	At the request of the Officer. The DCO order has been made and it relates to the York Potash project. It is located within the Teesworks area.

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for inclusion in assessment
			2016 (No. 772)			
15	York Potash Land at Wilton International Complex Redcar	Outline	R/2017/0906/OOM	Outline planning application for an overhead conveyor and associated storage facilities in connection with the York Potash Project	Granted, 30.04.2018	At the request of the Officer. This permission relates to the York Potash project and it is located at the Wilton International Complex and in part of the Redcar Bulk Terminal area.
16	Land at Wilton International Complex	Full	R/2018/0139/VC	Variation of condition 2 (approved plans) of planning permission R/2014/0626/FFM to allow for minor material amendments to the approved layout and size of buildings; site mounding; on-site attenuation ponds, Swales and internal roads following the progression of more detailed design engineering	Granted, 23.05.2018	At the request of the Officer. This permission relates to the York Potash project and it is located at the Wilton International Complex.
17	The York Potash Project - (Doves Nest now known as Woodsmith)	Full	R/2014/0627/FFM	The winning and working of polyhalite by underground methods including the construction of a minehead at doves nest farm involving access, maintenance and ventilation shafts, the landforming of associated spoil, construction of buildings, access roads, car parking and helicopter landing site, attenuation ponds, landscaping, restoration and aftercare and associated works. In addition, the construction of an underground tunnel between doves nest farm and land at wilton that links to the mine below, comprising 1 shaft at doves nest farm, 3 intermediate access shaft sites, each with associated landforming of associated spoil, construction of buildings, access roads and car parking, landscaping, restoration and aftercare, the construction of a tunnel portal at wilton comprising buildings, landforming of spoil and associated works	Granted, 19.08.2015	At the request of the Officer. This permission relates to the York Potash Project and the red line boundary extends from the North York Moors to the Wilton International Complex. The most relevant part of the scheme includes the construction of an underground tunnel between Doves Nest Farm and Wilton.

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for inclusion in assessment
18	Lianhetech Seal Sands Seal Sands Road Seal Sands TS2 1UB (Stockton Council)	Full	19/2161/FUL	Erection of new plant, new buildings and extensions to existing buildings. Works to include Warehouse D Extension, Boiler House Structure, Amenities & Workshop Building, Drum Storage Workshop Extension, Amenities extension, 2 no. Warehouse buildings, Contractors cabins, Gate House and Weighbridge, Receivers, Driers, Extension to existing Tank Farm, Tanker Offloading stations, Process and control buildings, Installation of new and replacement cooling towers and industrial apparatus, Pipe Bridge, Swale and the demolition of old plant and buildings.	Granted, 21.02.2020	At the request of the Officer.
19	Land to the South of Tofts Road West Graythorp Hartlepool (Hartlepool Council)	Full	H/2019/0275	Energy from waste ('EfW') facility and associated infrastructure	Granted, 10.07.2020	At the request of the Officer.
20	Regent Cinema Newcomen Terrace Redcar TS10 1AU	Deemed Consent	R/2020/0075/F3M	Demolition of existing cinema and replace with new cinema including external terraces; landscaping and temporary sea wall	Granted, 06.08.2020	At the request of the Officer.
21	South Bank Site, STDC	Outline planning application	R/2020/0357/OOM	Outline planning application for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated infrastructure works all matters reserved other than access	Decision pending	This application was submitted by STDC in July 2020 and the proposed development is located directly to the north of Dorman Point.

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for inclusion in assessment
22	South Bank, marine side application, STDC	Outline	This application is yet to be submitted to RCBC, but it is anticipated a submission will be made in the first week of November	Demolition of the existing wharf, jetties and other minor infrastructure along the river bank at South Bank (including an electrical substation), capital dredging (to deepen the northern half of the Tees Dock turning circle, a section of the existing approach channel and to create a berth pocket), offshore disposal of dredged sediments and construction and operation of a new quay (to be set back into the riverbank). `	Decision pending. Lichfields to confirm target determination date once application has been submitted.	This application was submitted by STDC in November 2020 and the proposed development is located at the South Bank site on the bank of the River Tees.
23	Land at Metals Recovery Area North west of PD ports; North East of Sembcorp pipeline corridor and Tees Dock Road South East of former Slem waste management facility and	Full	R/2020/0465/FFM	Demolition of existing buildings/structures and engineering operations associated with ground remediation and preparation of land for development	Pending decision, target determination date 18.12.2020	This application has been submitted by STDC for ground works at the South Bank site. It is located to the north of Dorman Point.

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for inclusion in assessment
	South West of Highfield Environmental Facility South Bank					
24	Land at Redcar Bulk Terminal Redcar TS10 5QW	Full	R/2020/0411/FFM	Construction of the Redcar Energy Centre ('REC') consisting of a material recovery facility incorporating a bulk storage facility; an energy recovery facility; and an incinerator bottom ash recycling facility along with ancillary infrastructure and landscaping	Pending decision, target determination date 02.11.2020	At the request of the Officer. This application is located within the Teesworks area.
25	Grangetown prairie Land East of John Boyle Road and West of Tees Dock Road Grangetown	Outline	R/2019/0767/OOM	Outline application for the construction of an energy recovery facility ('ERF') and associated development	Granted, 24.07.2020	This development lies wholly within Dorman Point outline application site. The Dorman Point EIA has assessed maximum floorspace parameter of 139,353 sqm (gross) (use class B2/B8). For robustness, the cumulative assessment will need to test a scenario where the Dorman Point site delivers 139,353 sqm (gross), plus the ERF scheme (as defined in the ERF EIA).

Table L4.2 Schemes Identified for Cumulative Assessment, which have been subsequently scoped out

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for exclusion in assessment
A	Land at Former South Bank Works; Grangetown Prairie; British Steel and Warrenby Area	Full	R/2019/0427/FFM	Demolition of structures and engineering operations associated with ground preparation and temporary storage of soils and its final use in the remediation and preparation of land	Granted, 27.09.2019	Development covers most of the Dorman Point site, most of the Long Acres site and part of the Steel House site. The Dorman Point EIA has been prepared on the basis that all structures and buildings are demolished (via separate consents) and then ground is prepared and remediated (via Dorman Point application). Construction works will not start until the demolition work has been completed. No cumulative effects are therefore anticipated, and this permission has

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for exclusion in assessment
						been scoped out of the assessment.
B	Land at Prairie Site Grangetown	Full	R/2020/0318/FFM	Engineering operations associated with ground remediation and preparation including removal of former railway embankment and works to Holme Beck and knitting wife beck	Granted, 30.09.2020	Site wholly within Dorman Point outline application site. The Dorman Point EIA has been prepared on the basis that whilst this permission exists it may not be implemented and therefore the Dorman Point application seeks permission for remediation works. No cumulative effects are therefore likely as any environmental effects of remediating the Dorman Point site are considered in Chapters C to M of the Dorman Point ES.

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for exclusion in assessment
C	Land associated with outline application sites, including Dorman Point, Lackenby, the Foundry, Long Acre and Steel House	Prior approval, possible full applications for structures	N/A	Demolition of existing structures and buildings associated with the requirement to create sites that are able to accommodate development.	Not yet submitted	All 5 STDC Tier 1 EIAs have been prepared on the basis that all structures and buildings are demolished (via separate consents) and then ground is prepared and remediated (via Tier 1 applications). Construction works on an individual sites will not start until the demolition work has been completed for that site. A worst case, high level assessment considering the greenhouse gas emissions of the demolition phases has been undertaken and emissions are expected to be of Negligible significance. No

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for exclusion in assessment
						cumulative effects are therefore anticipated and no further consideration to demolition works on the 5 tier 1 sites is given in this cumulative assessment.
D	Steel House	Full	R/2020/0598/FF	Retrospective demolition of existing gatehouse; redevelopment of site to provide new single storey gatehouse with associated car parking and landscaping.	Pending decision, target determination date 08.12.2020	This development lies partly within the Steel House outline application site boundary. The gatehouse forms part of the baseline for the Steelhouse EIA and no further assessment is therefore required.
E	Port Blyth Biomass Power Station	Development Consent Order	DCO Reference. 1873	Proposed construction of a 300 Mw biomass fired renewable energy power station on land adjacent to the main southern dock at Teesside on the south bank of the River Tees.	Order made 24.07.2013	This development was included at the request of Officers. However, following review of this by the project team, it has been excluded from further assessment, as it is located in Blyth and

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for exclusion in assessment
						there are no opportunities for cumulative effects, given the distance of the proposed development from the application site.
F	Land at and in the vicinity of the former SSI Steel Works site, Redcar and in Stockton-on-Tees, Teesside	Development Consent Order	EN10103	Net Zero Teesside Project	Pre-application consultation stage.	It is understood that a Development Consent Order ('DCO') application for this development will be submitted potentially in the first quarter of 2021 with a decision expected in the Summer of 2022. Given the early stage of preparation of this DCO this has not been included in the cumulative assessment. It is anticipated that should this DCO application be submitted, the cumulative effects

Map Ref.	Address	Type of Application	Ref. Number	Description of Development	Current Known Status	Reason for exclusion in assessment
						assessment within the DCO Environmental Statement will take into consideration this proposed development and the other four STDC outline applications.

Cumulative Effects Methodology

L4.12 As noted above a two-stage approach has been taken to assessing cumulative effects of the proposed development and the cumulative schemes shown on Figure L4.1. The first stage has been to consider the cumulative effects of the proposed development and the 'Tier 1' schemes identified in Table L4.1, which comprise the other four outline STDC applications.

L4.13 The second stage has been to assess whether there are any additional cumulative effects identified when the Tier 1 development collectively is considered alongside other schemes in the area (e.g. those schemes in Tier 2 of Table L4.1). Any variations from this approach are clearly outlined in Section L5.0 below.

L4.14 This two-tier assessment has been undertaken based on the following assumptions:

1 The phasing schedule at Appendix L2 provides a basis for making assumptions as to the potential build-out rate and phasing of development across the five STDC sites;

2 In considering potential cumulative construction effects, the project team has assumed a worst-case scenario of considering construction effects at 2030 when it is anticipated that construction will take place across all five (Tier 1) outline application sites. Furthermore, it is assumed that some construction could be taking place on all other development sites identified under Tier 2 of Table L4.1, although this is unlikely;

3 Where demolition is required to 'clear' the Dorman Point, Lackenby or Foundry sites, it is assumed that this demolition will take place ahead of construction commencing on that particular site;

4 In considering potential cumulative operational effects, the project team has assumed a worst-case scenario of assessing operational effects at 2033 when all five outline (Tier 1) developments are anticipated to be operational. It is assumed for the purpose of this assessment that all other Tier 2 schemes identified in Table L4.1 will also be operational by 2033; and

5 The assessment is also only capable of being carried out based on the information available at the time.

L5.0 Consideration of Cumulative Effects

Stage 1: Cumulative assessment of 'Tier 1 Development'

L5.1 The cumulative schemes in Tier 1 of Table L4.1 have been reviewed by the ES project team.

L5.2 Those topics where significant cumulative effects are not considered to be reasonably foreseeable have been scoped out of the cumulative assessment. Having undertaken this process no or negligible cumulative effects, as a result of the Tier 1 schemes in Table L4.1 coming forward together, are considered reasonably foreseeable in relation to the following topics:

- Ground Conditions and remediation:
  - a the proposed development and the other 4 Tier 1 schemes have identified embedded and additional mitigation measures, which when implemented will result in no significant effects from ground conditions and contamination on human health, and water body receptors. There is some potential for more than one Tier 1 scheme to interact upon the same receptor e.g. ground water and surface water and potentially some neighbouring residents. However, as effects on these receptors from all schemes are Negligible, there is anticipated to be no or at worst negligible cumulative effects on these receptors. Cumulative impacts on waste management facilities is considered within the Waste and Materials Management section;
  - b All Tier 1 developments have or will need to satisfy planning conditions with regards to land quality / remediation with regulatory approval prior to construction. Each development will also follow best practice, such as a Construction Environmental Management Plan ('CEMP') and health and safety regulations, with regards to contamination during the construction phase reducing the risk of introducing new contaminants and ensuring that there are no significant adverse effects on human health. In summary as each Tier 1 site is required to address construction worker safety and the risk of contaminating water bodies as part of any construction works, no cumulative residual effects are anticipated, and this topic has been scoped out of further assessment;
- Below Ground Heritage: A review of the Tier 1 cumulative schemes identified in Table L4.1 has shown that none of schemes are relevant to the assessment of below ground heritage cumulative effects. It is therefore considered that there is no potential for cumulative effects during the construction and operational phases.

L5.3 Below consideration is given, by topic, as to whether there will be any additional effects when the development is assessed in combination with the Tier 1 developments in Table L4.1.

Transport

L5.4 No assessment of Tier 1 sites in isolation of other committed developments has been undertaken for operational traffic. This is because the traffic data used within the transport assessment in Chapter C of this ES includes committed development growth for the area (modelled traffic growth to 2033 in Highways England's North Regional Transport Model). The assessment is therefore inherently cumulative, and an assessment cannot be undertaken based on just the Tier 1 developments set out within Table L4.1 of this Chapter.

Noise and Vibration

L5.5 This section summarises the predicted impacts and effects of the noise and vibration due to the proposed development when considered in addition to those from other proposed

developments. A review of the Tier 1 cumulative schemes identified in Table L4.1 identified that schemes Lackenby, The Foundry, Long Acres and Steel House are relevant to the assessment of noise and vibration cumulative effects.

Receptors

L5.6 Noise sensitive receptors relevant to this cumulative assessment are shown in Table L5.1 below.

Table L5.1 Noise sensitive receptors – Residential

Address ID	Noise and Vibration Receptor Reference	Address name	Receptor Sensitivity
C01	Dorman Point 6, Lackenby 6	8 St. James Court, Grangetown, Middlesbrough, TS6 7SX	High
C02	Dorman Point 1	19 Jones Road, South Bank, Middlesbrough, TS6 6QQ	High
C03	Dorman Point 8, Lackenby 9	26 Corncroft Mews, Middlesbrough, TS6 7HJ	High
C04	Foundry 3, Long Acres 3, Steel House 3	28 Broadway West, TS10 5PB	High
C05	Foundry 2, Long Acres 2, Steel House 2	68 Broadway West, TS10 5PA	High
C06	Dorman Point 7, Lackenby 7	72 Bolckow Road	High
C07	Foundry 1, Long Acres 1, Steel House 1	128 Broadway West, TS10 5PJ	High
C08	Dorman Point 9	Committed development for residential properties, R.2014.0372.OOM	High
C09	Dorman Point 4, Lackenby 1	Elgin Avenue	High
C10	Foundry 4, Long Acres 4, Steel House 4	Housing South of Todd Point	High
C11	Additional receptor for cumulative assessment	Kings George Terrace	High
C12	Foundry 5, Long Acres 5, Steel House 5	Marsh Farmhouse	High

Table L5.2: Noise sensitive receptors – Non-residential receptors

Address ID	Noise and Vibration Chapter Receptor Reference	Address name	Receptor Sensitivity
C13	Dorman Point 2, Lackenby 2	Dental Repair Shop	Low
C14	Dorman Point 5, Lackenby 5	M&K Design Shop	Low
C15	Dorman Point 3, Lackenby 3	Materials Processing Institute (Education and lab / testing facilities)	Medium
C16	Foundry 6, Long Acres 6, Steel House 6	Mobile homes on Redcar Beach Front	Medium
C17	Dorman Point 10, Lackenby 4	Workshops (East of M&K Design Shop)	Low
C18	Foundry 8, Long Acres 8	Redcar Beach (Centre)	Low
C19	Foundry 9, Long Acres 9	Redcar Beach (North)	Low

Address ID	Noise and Vibration Chapter Receptor Reference	Address name	Receptor Sensitivity
C20	Foundry 7, Long Acres 7, Steel House 7	Redcar beach (South)	Low
C21	Foundry 10, Long Acres 10, Steel House 8	Steel House, Redcar, TS10 5QW	Medium

Figure L5.1 Noise sensitive receptor locations

During Construction

L5.7 A cumulative construction assessment has been carried out on the Tier 1 developments using the assessment methodology and significance criteria described in Chapter D section D3.0 Assessment Methodology and Significance Criteria.

Construction Activity Noise

L5.8 The potential construction noise levels at surrounding noise sensitive receptors have been calculated by considering the source noise levels from a hydraulic hammer (impact piling) located within the indicative building footprint of each proposed development. It is assumed that the piling works would be carried out at all five sites simultaneously, which is the foreseeable worst-case. The assumptions on the piling works can be found as follows:

- Dorman Point ES – Vol 2 – Chapter E Noise and Vibration, paragraph E3.58
- Lackenby ES – Vol 2 – Chapter D Noise and Vibration, paragraph D3.56
- The Foundry ES – Vol 2 – Chapter E Noise and Vibration, paragraph E3.57
- Long Acres ES – Vol 2 – Chapter E Noise and Vibration, paragraph E3.58; and
- Steel House ES – Vol 2 – Chapter E Noise and Vibration, paragraph E3.58.

L5.9 The predicted cumulative construction noise levels for piling work and identification of potential significant effects at residential receptors during day, evening and night-time are presented in Table L5.3, Table L5.4 and Table L5.5.

Table L5.3: Construction noise levels at residential receptors – Daytime (07:00-19:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
C01 (8 St. James Court)	62	65	54	-12	No
C02 (19 Jones Road)	69	75	45	-30	No
C03 (26 Corncroft Mews)	64	70	55	-15	No
C04 (28 Broadway West)	54	65	51	-15	No
C05 (68 Broadway west)	50	65	55	-10	No
C06 (72 Bolckow Road)	67	70	54	-16	No
C07 (128 Broadway west)	57	65	50	-16	No
C08 (Committed development)	70	75	44	-31	No
C09 (Elgin Avenue)	69	75	50	-25	No
C10 (Housing South of Todd Point)	55	65	45	-20	No
C11 (Kings George Terrace)	59	65	37	-28	No
C12 (Marsh Farmhouse)	40	65	49	-16	No

Table L5.4: Construction noise levels at residential receptors – Evening (19:00-23:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
C01 (8 St. James Court)	59	65	54	-12	No
C02 (19 Jones Road)	66	69	45	-24	No
C03 (26 Corncroft Mews)	61	65	55	-10	No
C04	50	55	51	-5	No

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
(28 Broadway West)					
C05 (68 Broadway west)	47	55	55	0	No
C06 (72 Bolckow Road)	64	67	54	-12	No
C07 (128 Broadway west)	54	60	50	-11	No
C08 (Committed development)	67	70	44	-26	No
C09 (Elgin Avenue)	66	69	50	-19	No
C10 (Housing South of Todd Point)	54	60	45	-15	No
C11 (Kings George Terrace)	57	60	37	-23	No
C12 (Marsh Farmhouse)	37	55	49	-6	No

Table L5.5: Construction noise levels at residential receptors – Night-time (23:00-07:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
C01 (8 St. James Court)	54	57	54	-4	No
C02 (19 Jones Road)	60	63	45	-18	No
C03 (26 Corncroft Mews)	56	59	55	-4	No
C04 (28 Broadway West)	46	50	51	1	Yes
C05 (68 Broadway West)	43	50	55	5	Yes
C06 (72 Bolckow Road)	58	61	54	-7	No
C07 (128 Broadway west)	49	55	50	-6	No
C08 (Committed development)	61	64	44	-20	No

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
C09 (Elgin Avenue)	60	63	50	-13	No
C10 (Housing South of Todd Point)	53	56	45	-11	No
C11 (Kings George Terrace)	52	55	37	-18	No
C12 (Marsh Farmhouse)	34	45	49	4	Yes

L5.10 Predicted construction noise at residential receptors are below the threshold levels during the day and evening. No temporary construction significant effect has been identified at residential receptors during these periods.

L5.11 The predicted construction noise levels at some residential receptors, C04, C05 and C12 (Broadway West and Marsh Farmhouse), exceed the construction threshold levels during night-time. With the implementation of best practice CEMP measures which are embedded into the development (see Chapter B of this ES for further detail) and considering the exceedance and sensitivity of the receptor, this is assessed, as being Not Significant.

L5.12 The predicted cumulative construction noise levels for piling work and identification of potential significant effects at non-residential receptors during the daytime are set out in Table L5.6 below.

Table L5.6: Construction noise levels at non-residential receptors – Daytime (07:00-19:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes, No)
C13 (Dental Repair)	50	75	61	-14	No
C14 (M&K Design shop)	54	75	60	-15	No
C15 (Materials Processing Institute)	57	75	56	-19	No
C16 (Mobile Homes)	43	75	44	-31	No
C17 (M&K Design Workhops)	56	75	61	-14	No
C18 (Redcar Beach Front, Centre)	35	40	39	0	No
C19	31	36	37	1	Yes

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes, No)
(Redcar Beach Front, North)					
C20 (Redcar Beach Front, South)	37	42	39	-3	No
C21 (Steel House)	53	75	56	-19	No

L5.13 Predicted ambient noise levels at non-residential receptors, C18 and C19 (at Redcar Beach) are at or below 35 $dBL_{Aeq, 16hr}$, which is considered to be low. Considering the low existing ambient noise levels, the slight exceedances above threshold levels and the sensitivity of the receptor, this is not assessed as a significant effect. No temporary cumulative construction significant effects have been identified at non-residential receptors.

Summary

1.1 At residential receptors, the predicted construction noise levels at residential receptors C04, C05 and C12 (Broadway West and Marsh Farmhouse) exceed the construction threshold levels during night-time only. With the implementation of best practice CEMP measures which are embedded into the development (see Chapter B of this ES for further detail) and considering the exceedance and sensitivity of the receptor, this is assessed, as being Not Significant.

L5.14 All other impacts at residential receptors are expected to be Not Significant.

L5.15 At non-residential receptors, considering the predicted construction noise levels would slightly exceed the threshold levels at Redcar Beach and its sensitivity, this is assessed as being Not Significant.

L5.16 It should be noted that this cumulative assessment assumes that piling works would be undertaken simultaneously on all five sites as a worst-case scenario. The assessment therefore assumes that the worst-case scenario at each development would all occur simultaneously, which in practice is highly unlikely to occur. This Tier 1 assessment considers the implementation of best practice CEMP measures and as well as ensuring impacts are Not Significant, they will also help ensure the noise associated with the schemes in kept to a minimum.

During Operation

L5.17 A cumulative operational assessment has been carried out on the Tier 1 developments using the assessment methodology and significance criteria described in Chapter D section D3.0 Assessment Methodology and Significance Criteria.

Traffic

No Tier 1 assessment has been undertaken for operational traffic. This is because the traffic data used within the transport assessment in Chapter C of this ES includes committed development growth for the area (modelled traffic growth to 2033 in Highways England's North Regional Transport Model). The assessment is therefore inherently cumulative, and an assessment cannot be undertaken based on just the Tier 1 developments set out within Table L4.1 of this Chapter.

Operational Building Services and Industrial Activity Noise

L5.18 It is expected that building services plant and industrial activity noise from the proposed development with the Tier 1 developments in Teesworks will be designed to ensure that the combined noise from the operational of all developments would not exceed the ambient noise levels at noise sensitive receptors.

L5.19 The assumptions on the building services and industrial activities can be found from:

- Dorman Point Volume 2: Environmental Statement E: Noise and vibration, paragraph E3.60;
- Lackenby Volume 2: Environmental Statement D: Noise and vibration, paragraph D3.58;
- The Foundry Volume 2: Environmental Statement E: Noise and vibration, paragraph E3.59;
- Long Acres Volume 2: Environmental Statement E: Noise and vibration, paragraph E3.60; and
- Steel House Volume 2: Environmental Statement E: Noise and vibration, paragraph E3.60.

L5.20 The predicted noise emission from building services and on-site activities at residential receptors during the daytime and night time are presented in Table L5.7 – L5.8.

Table L5.7: Predicted operational noise levels at residential receptors – daytime (07:00-23:00hrs)

Receptor (see Figure L5.1)	Predicted ambient noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Predicted total operational external noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Difference between ambient and operational noise level, $dBL_{Aeq,07:00-23:00hrs}$	Exceedance above ambient noise level (Yes/No)
C01 (8 St. James Court)	62	46	-16	No
C02 (19 Jones Road)	69	39	-29	No
C03 (26 Corncroft Mews)	64	50	-14	No
C04 (28 Broadway West)	53	41	-12	No
C05 (68 Broadway West)	50	44	-5	No
C06 (72 Bolckow Road)	66	47	-19	No
C07 (128 Broadway west)	57	49	-8	No
C08	70	40	-30	No

Receptor (see Figure L5.1)	Predicted ambient noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Predicted total operational external noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Difference between ambient and operational noise level, $dBL_{Aeq,07:00-23:00hrs}$	Exceedance above ambient noise level (Yes/No)
(Committed development)				
C09 (Elgin Avenue)	68	42	-26	No
C10 (Housing South of Todd Point)	54	37	-18	No
C11 (Kings George Terrace)	59	30	-29	No
C12 (Marsh Farmhouse)	39	43	4	Yes

L5.21 At residential receptor C12 (Marsh Farmhouse) the predicted operational noise emission levels due to the operation of the Foundry is 37$dBL_{Aeq, T}$ and due to Long Acres is 42$dBL_{Aeq, T}$ during daytime. The combined noise emission level at this receptor is therefore predicted to be 43$dBL_{Aeq, T}$, which exceeds the existing day time ambient noise level by 4dB. Considering the sensitivity of the receptor and exceedance, this exceedance is considered as a permanent **Significant Adverse effect.** All other effects are considered to be Not Significant.

Table L5.8: Predicted operational noise levels at residential receptors – night-time (23:00-07:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, night-time $dBL_{Aeq,23:00-07:00hrs}$	Predicted total operational external noise level, night-time $dBL_{Aeq,23:00-07:00hrs}$	Difference between ambient and operational noise level, $dBL_{Aeq,23:00-07:00hrs}$	Exceedance above ambient noise level (Yes/No)
C01 (8 St. James Court)	54	46	-8	No
C02 (19 Jones Road)	60	39	-21	No
C03 (26 Corncroft Mews)	56	50	-6	No
C04 (28 Broadway West)	46	41	-5	No
C05 (68 Broadway West)	43	44	1	Yes
C06 (72 Bolckow Road)	58	47	-11	No
C07 (128 Broadway west)	49	49	0	No
C08	61	40	-22	No

Receptor (Figure L5.1)	Predicted ambient noise level, night-time $dBL_{Aeq,23:00-07:00hrs}$	Predicted total operational external noise level, night-time $dBL_{Aeq,23:00-07:00hrs}$	Difference between ambient and operational noise level, $dBL_{Aeq,23:00-07:00hrs}$	Exceedance above ambient noise level (Yes/No)
(Committed development)				
C09 (Elgin Avenue)	60	42	-18	No
C10 (Housing South of Todd Point)	53	37	-16	No
C11 (Kings George Terrace)	52	30	-22	No
C12 (Marsh Farmhouse)	34	43	9	Yes

L5.22 At residential receptor C05 (68 Broadway West) the predicted operational noise emission levels due to the operation of Steel House is 40dB$L_{Aeq,T}$ and Long Acre is 40 dB$L_{Aeq,T}$ during night-time. The combined noise emission level at this receptor is predicted to be 44dB$L_{Aeq,T}$ and exceeds the existing night-time ambient noise levels. Considering the sensitivity of the receptor and exceedance, this exceedance is considered as a permanent **Significant Adverse effect.**

At residential receptor C12 (Marsh Farmhouse) the predicted operational noise emission levels due to the operation of the Foundry is 37dB$L_{Aeq,T}$ and Long Acres is 42dB$L_{Aeq,T}$ during night-time. The combined noise emission level at this receptor is predicted to be 43dB$L_{Aeq,T}$, which exceeds the existing night-time ambient noise level by 9dB. Considering the sensitivity of the receptor and exceedance, this exceedance is considered as a permanent **Significant Adverse effect.**

Non-Residential Receptors

L5.23 The predicted noise emission from building services and on-site activities at non-residential receptors during the daytime are presented in Table L5.9.

Table L5.9: Predicted operational noise levels at non-residential receptors – daytime (07:00-23:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Predicted total operational external noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Difference between ambient and operational noise level, $dBL_{Aeq,07:00-23:00hrs}$	Exceedance above ambient noise levels (Yes/No)
C13 (Dental Repair)	49	50	1	Yes
C14 (M&K Design shop)	54	52	-2	No
C15 (Materials Processing Institute)	57	48	-8	No
C16 (Mobile Homes)	43	36	-7	No

Receptor (Figure L5.1)	Predicted ambient noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Predicted total operational external noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Difference between ambient and operational noise level, $dBL_{Aeq,07:00-23:00hrs}$	Exceedance above ambient noise levels (Yes/No)
C17 (M&K Design Workhops)	56	52	-4	No
C18 (Redcar Beach Front, Centre)	35	37	2	Yes
C19 (Redcar Beach Front, North)	31	35	4	Yes
C20 (Redcar Beach Front, South)	37	36	-1	No
C21 (Steel House)	53	52	0	No

L5.24 At non-residential receptors C18 and C19 (Redcar Beach) predicted existing ambient noise levels are low. Considering the magnitude of the exceedances and the sensitivity of the receptors, this is not assessed as a Significant Adverse effect.

L5.25 At non-residential receptor C13 (Dental Repair shop), the predicted operational noise level would slightly exceed the existing ambient noise levels (by 1dB) during the daytime. This exceedance is due to the operation of Dorman Point. Considering the sensitivity of the receptor and the level of exceedance, this is assessed as a Not Significant effect.

Summary

L5.26 At residential receptor C12 (Marsh Farmhouse), a combined noise emission levels at this receptor is predicted to be $43dBL_{Aeq,T}$, which exceeds the existing day time ambient noise level by 4dB and the night-time ambient noise level by 9dB. Considering the sensitivity of the receptor and the exceedance, this is assessed as a permanent **Significant effect.**

L5.27 At residential receptor C05 (68 Broadway West), a combined noise emission level at this receptor is predicted to be $44dBL_{Aeq,T}$ and exceeds the existing night-time ambient noise levels. Considering the sensitivity of the receptor and the exceedance, this is assessed as a permanent **Significant Adverse effect.**

L5.28 No permanent significant effects have been identified due to the operation of the Tier 1 developments at non-residential receptors.

L5.29 The Long Acres, Foundry and Steel House sites have been identified as the main contributors to the combined operational noise emission levels at those receptors (C05 and C12) where criteria are predicted to be exceeded. In order to ensure that the combined noise from building services plant and on-site activities would not exceed the existing ambient noise levels at the noise sensitive receptors, the additional site specific mitigation for Long Acres, Foundry and Steel House sites should be considered once the exact location and intended operation of each building is known. Further information on these additional site-specific mitigation measures are set out in the Mitigation and Monitoring sections of the Noise and Vibration Chapters of the relevant ESs.

L5.30 With the implementation of the additional site specific mitigation measures set out in the Noise and Vibration chapter for Long Acres, Foundry and Steel House sites to maintain the combined noise emission levels below the existing ambient noise levels at the receptors, no significant operational residual effects of noise is identified.

Air Quality

L5.31 A review of the Tier 1 cumulative schemes identified in Table L4.1 shows that schemes no. 1 to 5 are relevant to the assessment of Air Quality cumulative effects.

L5.32 It is considered that there is potential for cumulative effects during the operational phase. Information is also provided below about the potential cumulative effects of the construction phase.

During Construction

Construction Traffic

L5.33 As described in Chapter E (Air Quality) of the ES, specifics of construction, are not known at the time of writing as the proposed development is at the early outline stage of planning. Once construction traffic data for the construction phase are available, the data should be screened using the IAQM/EPUK criteria [Ref 5] and, if the criteria are exceeded, then an air quality modelling assessment would be required. Any cumulative effects associated with construction traffic are therefore not known at this time and would be determined if a detailed construction traffic modelling assessment was required.

Construction Dust

L5.34 With regards to construction dust, high risk mitigation measures from the best practice IAQM dust guidance [Ref 6] have been recommended for each of the proposed Tier 1 developments and are included as embedded mitigation. It is considered that as high-risk measures are likely to be in excess of what is required for each individual Tier 1 site, these measures will be appropriate to protect against cumulative construction dust impacts. It is not considered that there will be any construction dust cumulative impacts resulting from Tier 1 sites. With the successful implementation of appropriate mitigation measures, the effects will be Not Significant.

During Operation

L5.35 No assessment of Tier 1 sites in isolation of other committed developments has been undertaken for operational traffic. This is because the traffic data used within the transport assessment in Chapter C of this ES includes committed development growth for the area (modelled traffic growth to 2033 in Highways England's North Regional Transport Model). The assessment is therefore inherently cumulative, and an assessment cannot be undertaken based on just the Tier 1 developments set out within Table L4.1 of this Chapter.

Water Management and Flooding

L5.36 A review of the Tier 1 cumulative schemes identified in Table L4.1 has shown that scheme no. 1 (Dorman Point) is relevant to the assessment of Water Management and Flooding cumulative effects. It is considered that there is potential for cumulative effects during the construction and operational phases.

L5.37 This cumulative impacts section is a high-level assessment based on the assumptions made in the ES (Environmental Statement) Chapter F for Water Management and Flooding for the

proposed development site: that mitigation of impacts will be achieved through the CEMP and secondary mitigation measures. In addition, the assessment is also based on the assumptions set out in Paragraph L4.14.

L5.38 Schemes no. 3, 4 and 5 are scoped out of cumulative assessment for Tier 1 due to their distance from the proposed development.

During Construction

L5.39 This section describes the potential cumulative effects arising from the construction of the Lackenby proposed development in relation to the construction phase of the proposed development at Dorman Point (site no. 1 in Table L4.1).

L5.40 The construction phase activities for the proposed development at Lackenby relate to the development of general industry floorspace, storage/distribution facilities, office blocks, car parking, realignment of watercourses and associated infrastructure. The construction phase activities for the proposed development at the adjacent Dorman Point site includes construction of large areas of general industry floorspace, storage/distribution facilities, car parking, offices, and associated infrastructure.

L5.41 Potential cumulative effects during construction could result from movement of materials across the site and mobilisation of contaminants which could reach both surface water and groundwater receptors. Excavations can lead to contaminants entering the soils, subsequent leaching could result in altering groundwater quality through recharge and infiltration. Additional effects during construction could include increased runoff and spillages / leakages causing pollution to waterbodies.

L5.42 In addition to the Framework CEMP and other embedded mitigation measures, secondary mitigation measures for both schemes include a Construction Stage Surface Water Management Plan ('SWMP') that will be incorporated into the sites so that run off can be carefully controlled using temporary drainage, consideration of adverse weather conditions and localised depressions in the current ground surface (at risk from low likelihood surface water flooding) to inform placement of excavation and construction vehicles. All previously identified receptors have the potential to be impacted.

L5.43 In terms of groundwater, excavations at Lackenby are unlikely to reach the water table and the geographical extent to which any excavations impact the regional water table would be limited. With the implementation of the similar, effective pollution control and mitigation measures at both sites, the cumulative effects will therefore be Negligible Adverse and Not Significant for groundwater.

L5.44 In terms of surface water, the mitigation measures are anticipated to have a Negligible Beneficial and Not Significant impact for the small waterbodies draining to the Tees and the Tees itself (the designated Tees Water Framework Directive ('WFD') transitional water body).

During Operation

L5.45 This section describes the potential cumulative effects arising from the operation of the proposed development at Lackenby in relation to the operational phase of the proposed development at Dorman Point (site no. 1 in Table L4.1).

L5.46 Potential cumulative impacts during the operational phase of the proposed development include those arising from the finalised nature and implementation of the site, which include reduced recharge/infiltration from increased hardstanding as well as a change to runoff and drainage patterns. All previously identified receptors have the potential to be impacted.

L5.47 Measures to mitigate potential impacts, in addition to adherence to the minimum Finished Floor Level, include the production of a Flood Risk Assessment ('FRA') and Drainage Impact Assessment ('DIA') with drainage strategy, WFD assessment and environmental permits (as required) that shall be undertaken prior to construction of each phase of development. The drainage design shall account for climate change scenarios and shall not include infiltration sustainable drainage systems ('SuDS') such as soakaways to limit connection to contaminated ground and the groundwater aquifers are not utilised as a resource.

L5.48 With the implementation of similar, mitigation measures at the Lackenby site, the cumulative effects are deemed to be Minor Beneficial and Not Significant (in terms of groundwater pollution / contamination), Minor Adverse and Not Significant for ground water flows. Smaller watercourses draining to the Tees and the River Tees Estuary (WFD transitional water body) are deemed to be Negligible Beneficial and Not Significant.

Socio-Economic

L5.49 A review of the Tier 1 cumulative schemes identified in Table L4.1 has shown that all schemes are relevant to the assessment of Socio-Economic cumulative effects.

L5.50 It is considered that there is potential for cumulative effects during the construction and operational phases.

During Construction

L5.51 If all the Tier 1 cumulative schemes came forward for development, it is likely that the construction of these schemes could support on average up to 2,090 full time equivalent ('FTE') jobs (including direct and indirect employment) per annum throughout the construction period. This is equivalent to 20% of employment within the construction sector across the Area of Impact ('AOI') (comprising the Local Authority areas of Redcar & Cleveland, Middlesbrough and Stockton-on-Tees). Subject to there being no issues with regard to the availability of labour, it is considered that the delivery of all Tier 1 cumulative schemes could represent a **Substantial** and **Beneficial** effect in terms of construction industry employment. In accordance with the proposed Teesworks phasing schedule, the Tier 1 cumulative schemes are likely to be built out over an 11-year time period (2022-2033). Delivery of individual schemes is also proposed to be staggered throughout this period meaning that the demand for construction labour should, in theory, be relatively constant and avoid any significant spikes in demand. Cognisant of the proposed phasing schedule, and the fact that not all labour is likely to be local, the availability of construction labour is therefore unlikely to be an issue.

During Operation

L5.52 If all the Tier 1 cumulative schemes came forward for development, it is assessed that these schemes could deliver in the order of 12,300 FTE jobs. Lichfields has carried out the assessment of all Tier 1 cumulative schemes. As a result, they have all been assessed using a consistent methodological basis. Therefore, this estimate makes allowance for multiplier (indirect and induced) effects across the regional economy as well as making an allowance for displacement.

L5.53 The scale of estimated operational employment represents approximately 6.5% of the total workforce within the AOI. The delivery of this many jobs in a short time period could result in a tightening of the job market and bidding up of wages locally. It is noted, however, that the AOI currently has a significantly higher level of unemployment and higher rate of residents who are claimants compared to the national average. According to unemployment data for the most recent full year (ONS Annual Population Survey, 2019) the AOI would require there to be approximately 4,840 extra residents in employment to match the national unemployment rate

(4.0%). Similarly, using data from October 2020 (ONS Claimant Count) the AOI would require there to be approximately 5,300 fewer claimants in order to match the national claimant rate (6.3%). As such, this analysis demonstrates theoretically that there is considerable slack in the local labour market to absorb additional job growth. In addition, and in accordance with the Teesworks phasing schedule, it is anticipated that all schemes will be operational by 2033 thereby spreading delivery over an 11-year period. This could help to alleviate any potential labour market tightening in the short to medium term. Furthermore, as is set out within the STDC Master Plan, each 'zone' will target investment and occupiers within specific sectors, each with their own labour requirements. Not all jobs will therefore be competing in the same market for the same workers. Having regard to the above, it is likely that the impact of labour market tightening will be modest. In this context, the cumulative effect during the operational phase is likely to represent a **Substantial** and **Beneficial** effect.

Greenhouse Gas Emissions

L5.54 A review of the Tier 1 cumulative schemes identified in Table L4.1 show that schemes no. 1, 3, 4 and 5 are relevant to the assessment of Lackenby cumulative effects.

L5.55 It is considered that there is potential for cumulative effects during the construction and operational phases.

L5.56 It is not typical to undertake a cumulative assessment for GHG emissions within an assessment of climate impacts for EIA. GHG emissions are inherently cumulative and the location of the emissions source is not linked to the impact they have, which is to affect the concentration of GHGs in the world's atmosphere. Additionally, many of the impacts associated with the proposed development will take place at a location removed from the proposed development site itself e.g. material extraction and manufacture, electricity generation, transportation etc. The result of this understanding is that instead emissions are generally measured and presented in the context of international, national and subnational targets.

L5.57 However, given the scale of the Tier 1 schemes combined, their spatial and ownership commonality, and the potential for combined mitigation strategies, it is proposed that the GHG impact of the Teesworks sites are aggregated to further understand the impact of the STDC as one total area. The proposed methodology for this undertaking is to:

- Aggregate the construction stage impacts for each year of phased construction and identify the maximum year. Compare this against the relevant national carbon budget period;
- Present a single aggregated GHG construction total for all sites; and,
- Present a single aggregated annual operational GHG emissions total for all sites.

L5.58 Each of the 5 schemes within Tier 1 will have varying levels of contribution to the cumulative assessment results depending on the scale of development. Table L5.10 below shows the area and percentage coverage contribution of each scheme to the overall development.

Table L5.4 Contribution of each scheme to the overall development area

Receptor	Scheme Area (ha)	Contribution to development (%)
Dorman Point	57.8	18%
Lackenby	35.8	11%
The Foundry	133.5	42%
Long Acres	67	21%
Steel House	24.4	8%
Total	**318.5**	**100%**

During Construction

L5.59 The construction of the Tier 1 schemes is phased over a 12-year period, starting in 2022 and finishing in 2033. The aggregated construction impacts for each year of phased construction are presented in Table L5.11 below. The annual aggregated construction emissions range from a minimum of 59,498 tCO2e in 2032 to a maximum of 144,887 tCO2e in 2031. The aggregated total emissions for all sites across all of the 12 years of construction is 1.2 MtCO2e with the average per year being 91,846tCO2e.

Table L5.5 Cumulative assessment of construction emissions for five sites within the STDC proposed development including aggregated impacts at each year of the phased construction and a total for all sites and all construction

Construction Year	Lackenby (tCO2e)	The Foundry (tCO2e)	Long Acres (tCO2e)	Steel House (tCO2e)	Dorman Point (tCO2e)	Aggregated (tCO2e)
2022		35,866			44,040	79,906
2023			21,089		76,226	97,315
2024		24,540	39,014		20,326	83,880
2025		56,631			24,562	81,193
2026		113,261				113,261
2027			79,083	10,822		89,905
2028		42,473		10,822	31,337	84,632
2029	65,705	48,137		10,822		124,664
2030		56,631		10,822		67,453
2031	43,803	28,316	9,490	12,460	50,818	**144,887**
2032			52,723		6,775	59,498
2033		66,069	9,490			75,559
Total	109,508	471,924	210,888	55,748	254,085	**1,102,153**

L5.60 At a national scale the most relevant benchmarks for assessing significance are the UK carbon budgets. The assessment is compared to these benchmarks in Table L5.12. A worst-case scenario has been compared which uses the highest annual emissions value for the years which are relevant to that carbon budget.

Table L5.6 Emissions arising from construction of the development (Tier 1 schemes inclusive)

UK Carbon budget period	UK carbon budget	Annual average carbon budget	Peak annual construction emissions from proposed development (aggregated)	Proportion of national carbon benchmarks
3rd carbon budget (2018 to 2022)	2,544 $MtCO_2e$	509 $MtCO_2e$	0.08 $MtCO_2e$	0.02 %
4th carbon budget (2023 to 2027)	1,950 $MtCO_2e$	390 $MtCO_2e$	0.11 $MtCO_2e$	0.03 %
5th carbon budget (2028 to 2032)	1,725 M tCO_2e	345 $MtCO_2e$	0.14 $MtCO_2e$	0.04 %

L5.61 It should be noted that the UK carbon budgets have not been updated following the change in the UK Climate Change Act from an 80% reduction by 2050, to a 100% reduction by 2050. In practice the annual limits at which the UK can emit GHGs between now and 2050 will be lower than those in the current budgets. However, given the overall Minor Adverse contribution of the proposed development to national carbon budgets, it is not expected to compromise the ability of the UK to meet its national targets. The cumulative construction emissions are assessed, therefore, as Not Significant.

During Operation

L5.62 In order to present a single aggregated total for operational emissions the first year of operation for each scheme has been used. This provides a reasonable worst-case scenario, as operational emissions are expected to reduce temporally as decarbonisation of the UK grid network and transport sector continues. This method also allows consistency in operational emissions reporting between the cumulative chapter and the individual Tier 1 scheme ES chapters, avoiding confusion.

Table L5.7 Operational annual emissions for all Tier 1 schemes and a single aggregated total

Site	First Year of Operation	Building energy (tCO_2e)	Transport (tCO_2e)	Total (tCO_2e)
Lackenby	2032	3,860	3,401	7,261
The Foundry	2034	19,302	11,147	30,449
Long Acres	2034	7,721	4,461	12,182
Steel House	2032	698	807	1,505
Dorman Point	2033	5,790	5,073	10,563
Aggregated Total	**2032-2034**	**37,371**	**24,889**	**61,960**

L5.63 The individual scheme operational emissions within Redcar and Cleveland for the first full year of operation over the development sites range from 1,505 tCO2e to 30,449 tCO2e. The total aggregated operational emissions in a reasonable worst-case scenario from all schemes within Tier 1 for one year is 61,960 tCO2e. 60% of the aggregated emissions are from the energy required to operate buildings, and 40% arise from operational transport emissions, including employee commuting and service vehicle transport.

L5.64 The forecast emissions can be contextualised by comparing against the most recent local authority area emissions for Redcar and Cleveland from 2018. Table L5.14 shows this comparison.

Table L5.8 Comparison of aggregated operational emissions against Redcar and Cleveland 2018 baseline emissions

Emissions sector	2018 GHG emissions (ktCO2)	Aggregated operational year emissions (ktCO2e)	Proportion of RCBC annual emissions
Industrial and commercial	2,213	37.37	1.69%
Transport	198	24.89	12.57%
Full Local Authority emissions (including LULUCF Net)	2,602	61.96	2.38%

L5.65 This indicates that the operational proposed development, inclusive of all schemes in Tier 1, represents annual emissions equivalent to 2.38% of the 2018 annual emissions from Redcar and Cleveland as a whole. A limitation of this approach is that the assessment includes consideration of first year emissions in 2032-2034, compared to local authority emissions targets in 2018. The

future forecast includes consideration of the external decarbonisation of energy and transport which is expected between now and 2034 which has not been applied to the 2018 emissions. This is therefore not a direct comparison but does provide a scale and context within which to set our emissions findings. It is expected that over time emissions within Redcar and Cleveland will reduce due to external factors, and any initiatives within the local authority area focused on authority-scale emissions reductions. As this (notional) future emissions trajectory reduces then the calculated emissions for the cumulative schemes would contribute a larger proportion of overall local authority emissions.

L5.66 For context, the estimated regulated operational energy use represents annual emissions equivalent to 1.69% of 2018 annual industrial and commercial emissions for Redcar and Cleveland. This assumes a reasonable worst-case assumption in terms of regulated energy use comprising full use of grid electricity and natural gas, and no onsite renewable energy generation.

L5.67 It should be noted that the portion of the calculated aggregated emissions relating to transport represents annual emissions equivalent to a significant proportion of local authority transport emissions (12.57%).

L5.68 Whilst individual sites are expected to have a Minor Adverse (Not Significant) contribution individually, the cumulative impact of site operations (in GHG terms) is considered to be **Significant** in EIA terms.

L5.69 The operational cumulative impact on GHG emissions of the Tier 1 schemes is assessed as Significant in EIA terms. It is not expected that the cumulative emissions will compromise the ability of the UK to meet its national targets. However, the relatively large proportion of operational transport emissions when compared to local authority historic transport needs further consideration and mitigation. Once further information is available on the end users of the site, it is expected that a detailed site wide energy strategy will be developed that will utilise low and zero carbon energy supply options, as well as a Full Travel Plan to encourage a modal shift of transport with lower use of private cars, and a reduction of aggregate emissions from HGV and LGV use.

Landscape and Visual Impact

L5.70 A review of the Tier 1 cumulative schemes identified in Table L4.1 shown that schemes no's. 1, 3, 4 and 5 are relevant to the assessment of landscape and visual cumulative effects.

L5.71 It is considered that there is potential for cumulative effects during the construction and operational phases.

During Construction

L5.72 During construction there is the potential for cumulative impacts upon both sensitive landscape and visual receptors arising from construction activities such as tower cranes. Material stockpiling and construction hoarding. The potential for cumulative effects will be dependent on construction phasing, but assuming a worst-case scenario there is the potential for a **Moderate Adverse (Significant)** cumulative effect.

During Operation

L5.73 During operation there is the potential for a **Significant (Moderate Adverse)** impact upon sensitive visual receptors, notably Viewpoint 1; The Eston Hills arising from the cumulation of the Tier 1 cumulative schemes.

Waste and Materials Management

L5.74 It is considered that there is potential for cumulative waste and materials effects of all five Tier 1 schemes during the construction and operational phases. The total construction and operational waste generated, and likely construction material use for the 5 sites is summarised in the table below.

Table L5.9 Tier 1 Schemes: Waste and Material Use

	Dorman Point	Long Acres	Steel House	The Foundry	Lackenby	Total	Total % of Regional Capacity
Construction							
Waste	41,047	50,740	7,708	118,268	23,762	**241,525**	**1.03%**
Materials	50,740	52,943	18,417	99,162	114,027	**335,290**	**3.88%**
Operation							
Operational waste	9,565	12,754	1,971	31,884	6,377	**62,551**	**0.27%**

During Construction

L5.75 The total impact from all five sites upon construction waste will be 241,525 tonnes, which is a percentage impact of 1.03% on the regional landfill capacity. This is considered to be a minor magnitude of change on a low sensitivity receptor, which is a Negligible effect (Not Significant).

L5.76 Total construction materials required for all five STDC sites will be 335,290 tonnes per year, which equates to an annual impact of 3.88% on the total regional material availability. Materials availability is considered to be of low sensitivity and the impact magnitude of change is considered to be minor. The overall significance is considered to be Negligible (Not Significant).

During Operation

L5.77 The total impact from all five sites upon operational waste will be 62,551 tonnes, which is a percentage impact of 0.27% on the regional landfill capacity. This is a is considered to be a negligible magnitude of change on a low sensitivity receptor, which is a Negligible effect (Not Significant).

Synergistic cumulative effects

Based on the assessment above, no synergistic cumulative effects are predicted.

Summary

L5.78 In conclusion, **Significant** Adverse cumulative effects are likely for the Tier 1 Schemes during the construction phase in relation to Landscape and Visual Impact and during the operation phase in relation to Noise, Greenhouse Gas Emission and Landscape and Visual Impact. Significant Beneficial Socio-Economic Cumulative effects are also anticipated.

L5.79 No mitigation is proposed or possible in relation to the Significant Beneficial effects and Significant Adverse Noise and LVIA effects. Once further information is available on the end users of the site, it is expected that a detailed site wide energy strategy will be developed that will utilise low and zero carbon energy supply options, which will help to mitigation the cumulative

greenhouse gas emissions. There are ongoing discussions regarding other potential transport mitigation measures.

Stage 2: Cumulative assessment of 'Tier 1 Development' alongside 'Tier 2 Development'

L5.80 The cumulative schemes in Tier 2 of Table L4.1 have been reviewed by the ES project team.

L5.81 Those topics where significant cumulative effects are not considered to be reasonably foreseeable have been scoped out of the cumulative assessment. Having undertaken this process no or negligible cumulative effects, as a result of the Tier 1 and Tier 2 schemes in Table L4.1 coming forward together, are considered reasonably foreseeable in relation to the following topics:

- Ground Conditions- All Tier 1 and 2 developments have or will need to satisfy planning conditions with regards to land quality / remediation with regulatory approval prior to construction. Each development will also follow best practice, such as a CEMP and health and safety regulations, with regards to contamination during the construction phase reducing the risk of introducing new contaminants and ensuring that there are no significant adverse effects on human health. In summary as each Tier 1 and 2 site is required to address construction worker safety and the risk of contaminating water bodies as part of any construction works, no cumulative residual effects are anticipated, and this topic has been scoped out of further assessment. Cumulative impacts on waste management facilities is considered within the Waste and Materials Management section;
- Landscape and Visual Impact – The identified Tier 2 schemes do not interact significantly with the defined Viewpoints for the visual impact assessment. The most significant visual impacts reasonably expected from the proposed development will be in longer range views where the Tier 2 development will not be appreciable in the wider visual context. It is expected that any cumulative effect of the Tier 2 schemes on the visual impact arising from the proposed development will be negligible and therefore should be scoped out of the assessment.
- Below Ground Heritage: A review of the Tier 2 schemes identified in Table L4.1 has shown that none of the schemes are relevant to the assessment of below ground heritage cumulative effects.

L5.82 Below consideration is given, by topic, as to whether there will be any additional effects arising as a result of Tier 1 and Tier 2 cumulative developments, identified in Table L4.1, coming forward together.

Transport

L5.83 The Tier 2 assessment for operational traffic includes each of the five STDC sites, the committed development growth for the area (modelled traffic data growth to 2033 from Highways England's North Regional Transport Model ('NRTM') and used within Chapter C of this ES) and the South Bank scheme. This approach varies to that set out within paragraphs L4.11-L4.14 and Table L4.1. Rather than review and extract traffic flows for each of the committed developments, cumulative traffic growth has been extracted from the NRTM. This approach is considered to be reasonable as the model is underpinned by the National Trip End Model ('NTEM') which informs TEMPro growth, as well as a full variable demand model, accounting for changing economic conditions and competing transport modes. The traffic data for South Bank has been added to the assessment; this development has recently received permission (2020) and therefore the trips associated with its operation have not yet been included in the NRTM.

Overall the approach to the Tier 2 assessment is therefore considered a reasonable future scenario.

L5.84 This section of the Chapter is supported by Appendix L3. This includes information on the methodology adopted to undertake the cumulative assessment (more information can be found in Chapter C of this ES) and includes a series of tables to show the identified cumulative impacts. A summary of the identified impacts are set out below for each stage of the development.

L5.85 It is considered that there is potential for cumulative effects during the construction and operational phases.

During Construction

L5.86 As this is an outline planning application the end users of the development site, and therefore specifics of construction, are not known at the time of writing. As such, construction traffic has not been included in the assessment and instead it will be undertaken once the detailed design of the scheme is known. Notwithstanding this, a Framework CEMP and Construction Traffic Management Plan ('CTMP') has been embedded into the proposed development and this will be taken into account in any future assessment.

L5.87 Whilst a detailed assessment cannot be undertaken at this stage, professional judgement indicates that, with a CTMP and phased construction programme, any impacts would be Minor and therefore the severance or amenity effect of construction traffic would be Not Significant.

During Operation

L5.88 The operational assessment has identified a number of **Significant** effects on severance, driver and bus delay, pedestrian and cyclist amenity and accidents and safety.

L5.89 The additional traffic from the cumulative developments is forecast to have a **Substantial Adverse** effect on severance on the A1053 Greystones Road and the A1085 Trunk Road. A **Moderate Adverse** effect is forecast on the A66 and Normanby Road, with a **Minor Adverse** effect on Eston Road.

L5.90 There are **Substantial Adverse** effects on driver and bus user delay at five junctions (A66/Old Station Road roundabout, A66/Eston Road signalised junction, A1085 Trunk Road / A1053 Greystone Road roundabout, A174/Greystones Road roundabout and the A1085 Steel House roundabout). There are also **Moderate Adverse** effects on delay at the A66/Normanby Road signalised junction and the A66/Tees Dock Road/Lackenby site access junction.

L5.91 There are **Moderate Adverse** effects on pedestrian and cyclist amenity at A66/Eston Road signalised junction, the A1085 Trunk Road / A1053 Greystone Road roundabout, along the A1053 and at the A174/Greystones Road roundabout.

L5.92 A **Moderate Adverse** effect on accidents and safety is also forecast at the A66/Normanby Road signalised junction.

L5.93 At this stage of the development, additional mitigation measures to reduce the cumulative impact of the Tier 2 schemes have not been identified. STDC and the technical consultants will liaise with RCBC and statutory consultees throughout the determination of the application to consider measures to minimise these impacts.

Noise and Vibration

L5.94 A review of the Tier 2 cumulative schemes identifies that the following schemes are relevant to the noise and vibration cumulative assessment:

- Land at Low Grange Farm South Bank (planning ref.: R/2014/0372/OOM);
- South Bank Site (planning ref.: R/2020/0357/OOM);
- Grangetown Prairie Land East of John Boyle Road and West of Tees Dock Road Grangetown (planning ref.: R/2019/0767/OOM);
- York Potash Port and Materials Handling Facilities (Ref.: The York Potash Harbour Facilities DCO Order 2016);
- York Potash Land at Wilton International Complex Redcar (Ref.: R/2017/0906/OOM); and
- Land at Wilton International Complex (Ref.: R/2018/0139/VC).

L5.95 All other committed developments (not listed above) are located at a greater distance and it is anticipated that the activities associated with those developments would not add to the cumulative effect of noise at the sensitive receptors.

During Construction

L5.96 A cumulative construction assessment has been carried on the Tier 1 and Tier 2 developments using the assessment methodology and significance criteria described in Chapter E section E3.0 Assessment Methodology and Significance Criteria.

Construction Activity Noise

L5.97 The potential construction noise levels at surrounding noise sensitive receptors have been calculated by considering the source noise levels from a hydraulic hammer (impact piling) within the indicative building footprint arrangement of each proposed Tier 1 development, alongside the information available for South Bank and Grangetown Prairie Land East of John Boyle Road and West of Tees Dock Road Grangetown. The information for committed developments has been collated from the Redcar and Cleveland Borough Council (RCBC) planning portal [Ref 1].

L5.98 Information for each committed development that is relevant to this cumulative assessment is listed below:

- South Bank Site (planning ref.: R/2020/0357/OOM) and Grangetown Prairie Land East of John Boyle Road and West of Tees Dock Road Grangetown (planning ref.: R/2019/0767/OOM) assumed the hydraulic hammer piling method would be used as assumed for the Tier 1 sites;
- York Potash Port and Materials Handling Facilities (Ref.: The York Potash Harbour Facilities DCO Order 2016) and York Potash Land at Wilton International Complex Redcar (Ref.: R/2017/0906/OOM) assumes various construction activities including percussive piling technique (0.9m hammer drop – 300kgm/blow)[2]. The noise and vibration chapter indicates that the predicted construction noise emission levels from piling works at residential receptors C07 and C12 (Broadway West and Marsh Farmhouse) are 45dBA after implementing mitigation measures during day, evening and night-time;
- Land at Wilton International Complex (Ref.: R/2018/0139/VC)[3] assumes augured piling rigs with 100% on-time. The predicted piling noise emission levels at the nearest residential receptor location, C07 (Broadway West), are around 55dB$L_{Aeq,\ 12hr}$.

L5.99 It is assumed that construction works could be undertaken simultaneously on the Tier 1 and Tier 2 developments.

L5.100 The predicted cumulative construction noise levels for piling work and identification of potential significant effects at residential receptors during day, evening and night-time are presented in Table L5.16, Table L5.17 and Table L5.18.

Table L5.10: Construction noise levels at residential receptors – Daytime (07:00-19:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, $dBLA_{eq,T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
C01 (8 St. James Court)	62	65	54	-12	No
C02 (19 Jones Road)	69	75	45	-30	No
C03 (26 Corncroft Mews)	64	70	55	-15	No
C04 (28 Broadway West)	54	65	51	-15	No
C05 (68 Broadway west)	50	65	55	-10	No
C06 (72 Bolckow Road)	67	70	54	-16	No
C07 (128 Broadway west)	57	65	51	-14	No
C08 (Committed development)	70	75	44	-31	No
C09 (Elgin Avenue)	69	75	50	-25	No
C10 (Housing South of Todd Point)	55	65	45	-20	No
C11 (Kings George Terrace)	59	65	37	-28	No
C12 (Marsh Farmhouse)	40	65	56	-9	No

Table L5.11: Construction noise levels at residential receptors – Evening (19:00-23:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq,T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
C01 (8 St. James Court)	59	65	54	-12	No
C02	66	69	45	-24	No

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
(19 Jones Road)					
C03 (26 Corncroft Mews)	61	65	55	-10	No
C04 (28 Broadway West)	50	55	51	-5	No
C05 (68 Broadway west)	47	55	55	0	No
C06 (72 Bolckow Road)	64	67	54	-12	No
C07 (128 Broadway west)	54	60	51	-9	No
C08 (Committed development)	67	70	44	-26	No
C09 (Elgin Avenue)	66	69	50	-19	No
C10 (Housing South of Todd Point)	54	60	45	-15	No
C11 (Kings George Terrace)	57	60	37	-23	No
C12 (Marsh Farmhouse)	37	55	56	1	Yes

Table L5.12: Construction noise levels at residential receptors – Night-time (23:00-07:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
C01 (8 St. James Court)	54	57	54	-4	No
C02 (19 Jones Road)	60	63	45	-18	No
C03 (26 Corncroft Mews)	56	59	55	-4	No
C04 (28 Broadway West)	46	50	51	1	Yes
C05 (68 Broadway West)	43	50	55	5	Yes
C06 (72 Bolckow Road)	58	61	54	-7	No
C07	49	55	51	-4	No

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
(128 Broadway west)					
C08 (Committed development)	61	64	44	-20	No
C09 (Elgin Avenue)	60	63	50	-13	No
C10 (Housing South of Todd Point)	53	56	45	-11	No
C11 (Kings George Terrace)	52	55	37	-18	No
C12 (Marsh Farmhouse)	34	45	56	11	Yes

L5.101 Predicted construction noise levels at residential receptors are below the threshold levels for daytime, therefore no temporary construction significant effect has been identified.

L5.102 The predicted construction noise levels at residential receptor C12 (Marsh Farmhouse) slightly exceed the construction threshold level during the evening.

L5.103 The predicted construction noise levels at residential receptors C04, C05 and C12 (Broadway West and Marsh Farmhouse) exceed the construction threshold levels at night.

L5.104 With the implementation of best practice CEMP measures which are embedded into the design of the Tier 1 schemes (see Chapter B of the relevant ESs) and considering the exceedance during the evening and night and the sensitivity of the receptors, these impacts are assessed as being Not Significant.

L5.105 The impacts at all other residential receptors are identified as being Not Significant.

L5.106 The predicted cumulative construction noise levels for piling work and identification of potential significant effects at non-residential receptors during the daytime are set out in Table L5.19 below.

Table L5.19: Construction noise levels at non-residential receptors – Daytime (07:00-19:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
C13 (Dental Repair)	50	75	61	-14	No
C14 (M&K Design shop)	54	75	60	-15	No
C15 (Materials Processing Institute)	57	75	56	-19	No
C16	43	75	44	-31	No

Receptor (Figure L5.1)	Predicted ambient noise level, $dBL_{Aeq, T}$	Threshold value (dB)	Predicted construction noise level, $dBL_{Aeq,T}$ (façade)	Level above threshold, dB	Exceedance above threshold (Yes/No)
(Mobile Homes)					
C17 (M&K Design Workhops)	56	75	61	-14	No
C18 (Redcar Beach Front, Centre)	35	40	39	0	No
C19 (Redcar Beach Front, North)	31	36	37	1	Yes
C20 (Redcar Beach Front, South)	37	42	39	-3	No
C21 (Steel House)	53	75	56	-19	No

L5.107 Predicted ambient noise levels at non-residential receptors C18 and C19 (at Redcar Beach) are at or below 35 $dBL_{Aeq, 16hr}$, which is considered to be low. Considering the low existing ambient noise levels, the slight exceedances above threshold levels and the sensitivity of the receptor, this is assessed as being a Not Significant effect. No other temporary cumulative construction significant effect has been identified at non-residential receptors.

Summary

L5.108 The predicted construction noise levels at residential receptors C04, C05 and C12 (Broadway West and Marsh Farmhouse) exceed the construction threshold levels during evening and night-time. With the implementation of best practise CEMP measures that are embedded into the Tier 1 schemes and considering the exceedance and sensitivity of the receptor, this is assessed as being Not Significant.

L5.109 At non-residential receptors, considering that the predicted construction noise levels would only slightly exceed the threshold levels at Redcar Beach and its sensitivity, this is assessed as a Not Significant effect.

L5.110 It should be noted that this cumulative assessment is based on a scenario that piling works would be undertaken simultaneously on all sites as a worst-case scenario. In practice, this assumes that the worst-case scenario would occur simultaneously on each development, which may not occur at all during the entire construction period. Best practicable means will be included within the Framework CEMP measures (identified within Chapter B (Site Description and Scheme Proposals) will ensure that impacts are Not Significant. They will also help keep noise associated with the schemes to a minimum.

During Operation

L5.111 Cumulative operation assessment have been carried out on the Tier 1 and Tier 2 developments by the assessment methodology and significance criteria described in Chapter E section E3.0 Assessment Methodology and Significance Criteria.

L5.112 Significance of the predicted impacts has been assessed by considering the difference in noise for the 'do minimum' and 'do something' scenarios. The 'do minimum' scenario represents the

situation without the Tier 1 and Tier 2 developments in 2033. The 'do something' scenario represents the situation with Tier 1 and Tier 2 developments in 2033.

Traffic Noise

L5.113 The Tier 2 assessment for operational traffic includes each of the five STDC sites, the committed development growth for the area (modelled traffic data growth to 2033 from Highways England's North Regional Transport Model (NRTM) and used within Chapter C of this ES) and the South Bank scheme. This approach varies to that set out within paragraphs L4.11-14 and Table L4.1. Rather than review and extract traffic flows for each of the committed developments, cumulative traffic growth has been extracted from the NRTM. This approach is considered to be reasonable as the model is underpinned by the National Trip End Model (NTEM) which informs TEMPro growth, as well as a full variable demand model, accounting for changing economic conditions and competing transport modes. The traffic data for South Bank has been added to the assessment; this development has recently received permission (2020) and therefore the trips associated with its operation have not yet been included in the NRTM. Overall the approach to the Tier 2 assessment is therefore considered a reasonable future scenario.

L5.114 The predicted noise levels at receptors for the future 'do minimum' and 'do something' scenarios with the difference in noise levels are presented in Table L5.21 and L5.22 below.

L5.115 The following factors are considered to identify the potential significance:

- A moderate impact (3dB or greater) is taken as an indicator of a potential significant effect for noise exposures between the LOAEL and SOAEL; and
- For areas exposed to higher noise levels (above SOAEL), a minor impact (1dB or greater) is taken as an indicator of potential significance.

Table L5.13: Predicted cumulative road traffic noise levels at residential receptors – daytime (0700 to 2300hrs)

Receptor (see Figure L5.1)	Daytime noise levels, free field ($dBL_{Aeq,16h}$)			
	'Do minimum' road traffic noise, 2033	'Do something' road traffic noise, 2033	Difference in road traffic noise	Potential significant effect (Yes/No)
C01 (8 St. James Court)	62	64	1.5	Yes
C02 (19 Jones Road)	69	70	1	Yes
C03 (26 Corncroft Mews)	64	66	1.9	Yes
C04 (28 Broadway West)	53	56	2.4	No
C05 (68 Broadway West)	50	54	3.8	Yes
C06 (72 Bolckow Road)	66	68	1.5	Yes
C07 (128 Broadway west)	57	59	2	No
C08 (Committed development)	70	71	1	Yes
C09	69	70	1.1	Yes

Receptor (see Figure L5.1)	Daytime noise levels, free field ($dBL_{Aeq,16h}$)			
	'Do minimum' road traffic noise, 2033	'Do something' road traffic noise, 2033	Difference in road traffic noise	Potential significant effect (Yes/No)
(Elgin Avenue)				
C10 (Housing South of Todd Point)	55	55	0.5	No
C11 (Kings George Terrace)	59	61	1.5	No
C12 (Marsh Farmhouse)	39	43	3.5	No

Table L5.14: Predicted cumulative road traffic noise levels at residential receptors – night-time (2300 to 0700hrs)

Receptor (see Figure L5.1)	Night-time noise levels, free field ($dBL_{Aeq,8h}$)			
	'Do minimum' road traffic noise, 2033	'Do something' road traffic noise, 2033	Difference in road traffic noise	Potential Significant (Yes/No)
C01 (8 St. James Court)	54	56	1.4	Yes
C02 (19 Jones Road)	61	62	0.9	Yes
C03 (26 Corncroft Mews)	56	58	1.8	Yes
C04 (28 Broadway West)	46	48	2.3	No
C05 (68 Broadway West)	43	46	3.4	Yes
C06 (72 Bolckow Road)	58	60	1.4	Yes
C07 (128 Broadway west)	49	51	1.8	No
C08 (Committed development)	62	63	0.9	Yes
C09 (Elgin Avenue)	60	61	1	Yes
C10 (Housing South of Todd Point)	53	53	0.2	No
C11 (Kings George Terrace)	52	53	1.2	No
C12 (Marsh Farmhouse)	34	37	2.6	No

L5.116 At residential receptors C01, C02, C03, C06, C08 and C09, located relatively close to the A66 and A1085 Trunk Road/Corporation Road, the predicted baseline noise levels are above SOAEL (of 63dB$L_{Aeq, 16hr}$ and 55dB$L_{Aeq, 8hr}$ during day and night-time periods respectively). The difference in road traffic noise levels between do minimum and do something at these residential receptors is greater than 1dB. The receptors would be exposed to noise levels above SOAEL and have an increase greater than 1 dB and are therefore assessed as a permeant **Significant effect**.

L5.117 At residential receptors C04, C07, C10 and C11, the predicted noise levels without the Tier 1 and Tier 2 developments are between LOAEL and SOAEL (between 50dB$L_{Aeq, 16hr}$ and 63dB$L_{Aeq, 16hr}$ during day and 40dB$L_{Aeq, 8hr}$ and 55dB$L_{Aeq, 8hr}$at night). At those receptors, the difference in road traffic noise levels between do minimum and do something are less than 3dB which is assessed as a Not Significant effects.

L5.118 At residential receptor C05 (68 Broadway West) the predicted noise levels without the cumulative development are between LOAEL and SOAEL and the difference in road traffic noise levels between do minimum and do something are greater than 3dB. This is assessed as a permanent **Significant effect.**

L5.119 At residential receptor C12 (Marsh Farmhouse), the predicted noise levels with and without the cumulative developments are below LOAEL so no effect due to the cumulative developments has been identified.

L5.120 The predicted noise levels at non-residential receptors for the future 'do minimum' and 'do something' scenarios with the difference in noise levels are presented in Table L5.22.

Table L5.15: Predicted cumulative road traffic noise levels at non-residential receptors – daytime (0700 to 2300hrs)

Receptor (Figure L5.1)	Daytime noise levels, free field (dB$L_{Aeq,16h}$)			
	'Do minimum' road traffic noise, 2033	'Do something' road traffic noise, 2033	Difference in road traffic noise	Potential Significant effect (Yes/No)
C13 (Dental Repair)	50	51	1.5	No
C14 (M&K Design shop)	54	56	1.9	No
C15 (Materials Processing Institute)	57	60	2.6	No
C16 (Mobile Homes)	43	47	4.1	No
C17 (M&K Design Workhops)	56	58	1.7	No
C18 (Redcar Beach Front, Centre)	35	39	4.1	No
C19 (Redcar Beach Front, North)	31	35	3.7	No
C20	37	41	3.7	No

Receptor (Figure L5.1)	Daytime noise levels, free field ($dBL_{Aeq,16h}$)			
	'Do minimum' road traffic noise, 2033	'Do something' road traffic noise, 2033	Difference in road traffic noise	Potential Significant effect (Yes/No)
(Redcar Beach Front, South)				
C21 (Steel House)	53	56	3.7	Yes

L5.121 At non-residential receptor C21 (Steel House Office) the predicted noise levels are between LOAEL and SOAEL and the predicted change in road traffic noise levels is greater than 3dB. This is assessed as a permanent **Significant effect**.

L5.122 At non-residential receptors C13, C14, C15 and C17 (Dental Repair, M&K Design shop and workshop and Materials Processing Institute) the predicted noise levels are between LOAEL and SOAEL and the difference in road traffic noise levels are less than 3dB. This is assessed as being Not Significant.

L5.123 At non-residential receptors (C16, C18, C19 and C20, Mobile homes on Redcar Beach Front, Redcar Beach) the predicted noise levels without the Tier 2 developments are below LOAEL of 50$dBL_{Aeq, 16h}$ and no significant cumulative effect is predicted.

Summary

L5.124 Residential receptors C01, C02, C03, C05, C06, C08 and C09 and non-residential receptor C21 (Steel House Office) have been assessed as experiencing a permanent **Significant effect** due to the additional traffic from the cumulative developments.

A detailed road traffic noise assessment should be carried out once the detailed design of the scheme is known and STDC will liaise with RCBC and relevant statutory consultees throughout the determination of the planning application to discuss potential mitigation measures.

Operational Building Services and Industrial Activity Noise

L5.125 The predicted cumulative noise from building services and on-site activities at residential receptors of the Tier 2 developments are presented in Table L5.23 and Table L5.24.

Table L5.16: Predicted operational noise levels at residential receptors – daytime (07:00-23:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Predicted total operational external noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Difference, $dBL_{Aeq,07:00-23:00hrs}$	Exceedance above ambient (Yes/No)
C01 (8 St. James Court)	62	46	-16	No
C02 (19 Jones Road)	69	43	-26	No
C03 (26 Corncroft Mews)	64	50	-14	No
C04 (28 Broadway West)	53	41	-12	No

Receptor (Figure L5.1)	Predicted ambient noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Predicted total operational external noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Difference, $dBL_{Aeq,07:00-23:00hrs}$	Exceedance above ambient (Yes/No)
C05 (68 Broadway West)	50	44	-5	No
C06 (72 Bolckow Road)	66	47	-19	No
C07 (128 Broadway west)	57	50	-7	No
C08 (Committed development)	70	41	-29	No
C09 (Elgin Avenue)	68	43	-26	No
C10 (Housing South of Todd Point)	54	37	-18	No
C11 (Kings George Terrace)	59	37	-22	No
C12 (Marsh Farmhouse)	39	43	4	Yes

Table L5.17: Predicted operational noise levels at residential receptors – night-time (23:00-07:00hrs)

Receptor (Figure L5.1)	Predicted ambient noise level, night-time $dBL_{Aeq,23:00-07:00hrs}$	Predicted total operational external noise level, night-time $dBL_{Aeq,23:00-07:00hrs}$	Difference, $dBL_{Aeq,23:00-07:00hrs}$	Exceedance above ambient (Yes/No)
C01 (8 St. James Court)	54	46	-8	No
C02 (19 Jones Road)	60	43	-18	No
C03 (26 Corncroft Mews)	56	50	-6	No
C04 (28 Broadway West)	46	41	-5	No
C05 (68 Broadway West)	43	44	1	Yes
C06 (72 Bolckow Road)	58	47	-11	No
C07 (128 Broadway west)	49	50	1	Yes

Receptor (Figure L5.1)	Predicted ambient noise level, night-time $dBL_{Aeq,23:00-07:00hrs}$	Predicted total operational external noise level, night-time $dBL_{Aeq,23:00-07:00hrs}$	Difference, $dBL_{Aeq,23:00-07:00hrs}$	Exceedance above ambient (Yes/No)
C08 (Committed development)	61	41	-21	No
C09 (Elgin Avenue)	60	43	-17	No
C10 (Housing South of Todd Point)	53	37	-16	No
C11 (Kings George Terrace)	52	37	-15	No
C12 (Marsh Farmhouse)	34	43	9	Yes

L5.126 Building services plant and site activity noise emission levels at residential receptors C05 and C07 (Broadway West) exceed the existing ambient noise levels during night-time and C12 (Marsh Farmhouse) exceed the existing ambient noise levels during daytime and night-time.

L5.127 At residential receptor C05 (68 Broadway West) the predicted operational noise emission levels due to the operation of Steel House is 40dB$L_{Aeq,T}$ and the Long Acre is 40 dB$L_{Aeq,T}$ during night-time. A combined noise emission level at this receptor is predicted to be 44dB$L_{Aeq,T}$ which slightly exceeds the existing night-time ambient noise levels. Considering the sensitivity of the receptor and exceedance, this exceedance is considered as a permanent **Significant effect**.

L5.128 At residential receptor C07 (128 Broadway West) the predicted operational noise emission levels due to the operation of Steel House is 37dB$L_{Aeq,T}$, the Long Acre is 44 dB$L_{Aeq,T}$, the Foundry is 47dB$L_{Aeq,T}$ and York Potash Port and Materials Handling Facilities is 42dB$L_{Aeq,T}$ during night-time. A combined noise emission level at this receptor is predicted to be 50dB$L_{Aeq,T}$ which slightly exceeds the existing night-time ambient noise levels by 1 db. Considering the sensitivity of the receptor, the noise absolute level and the exceedance, this is considered as a permanent **Significant effect.**

L5.129 At residential receptor C12 (Marsh Farmhouse) the predicted operational noise emission levels due to the operation of the Foundry is 37dB$L_{Aeq,T}$ and Long Acres is 42dB$L_{Aeq,T}$ during night-time. No other committed developments in this area would contribute to a combined noise emission level at this receptor. The combined noise emission level is predicted to be 43dB$L_{Aeq,T}$ at this receptor, which exceeds the existing day time ambient noise levels by 4dB and night-time ambient noise level by 9dB. Considering the sensitivity of the receptor and the exceedances, this is considered as a permanent **Significant effect.**

L5.130 The predicted cumulative noise from building services and on-site activities at non-residential receptors of the Tier 2 developments are presented in Table L5.25.

Table L5.18: Predicted operational noise levels at non-residential receptors – daytime (07:00-23:00hrs)

Receptor (see Figure L5.1)	Predicted ambient noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Predicted total operational external noise level, daytime $dBL_{Aeq,07:00-23:00hrs}$	Difference, $dBL_{Aeq,07:00-23:00hrs}$	Exceedance above ambient (Yes/No)
C13 (Dental Repair)	49	50	1	Yes
C14 (M&K Design shop)	54	52	-2	No
C15 (Materials Processing Institute)	57	49	-8	No
C16 (Mobile Homes)	43	36	-7	No
C17 (M&K Design Workhops)	56	52	-4	No
C18 (Redcar Beach Front, Centre)	35	37	2	Yes
C19 (Redcar Beach Front, North)	31	35	4	Yes
C20 (Redcar Beach Front, South)	37	36	0	No
C21 (Steel House)	53	52	0	No

L5.131 At non-residential receptor C13 (Dental Repair shop), the predicted operational noise level would slightly exceed the existing ambient noise levels (by 1dB) during the daytime. This exceedance is due to the operation of Dorman Point only. Considering the sensitivity of the receptor and the level of exceedance, this effect is considered to be Not Significant.

L5.132 At receptors C18 and C19 (Redcar Beach) where predicted existing ambient noise levels are low, considering the magnitude of the exceedances and the sensitivity of the receptors, this assessed as being Not Significant.

Summary

L5.133 The cumulative assessment has identified **Significant Adverse** effects at three residential receptors due to the operation of the Tier 2 developments, including CO5 (68 Broadway West), CO7 (128 Broadway West) C12 (Marsh Farmhouse).

L5.134 No permanent significant cumulative effects have been identified due to the operation of the Tier 2 developments at non-residential receptors.

L5.135 The Long Acres, Foundry, Steel House and York Potash Port and Materials Handling Facilities sites have been identified as the main contributor to the combined operational noise emission levels at receptors C05, C07 and C12. In order to ensure a combined noise from building services plant and on-site activities would not exceed the existing ambient noise levels at these receptors,

the proposed additional site specific mitigation for Long Acres, Foundry and Steel House sites should be considered once the exact location and intended operation of each building is known. Further details on these site-specific measures are included in the Mitigation and Monitoring section of the Noise and Vibration Chapters in the relevant ESs.

L5.136 With the implementation of the additional site specific mitigation measures set out in the Noise and Vibration chapter for Long Acres, Foundry and Steel House sites to maintain the combined noise emission levels below the existing ambient noise levels at the receptors, no significant operational residual effects of noise is identified. This is dependent upon the operational noise from York Potash Port and Materials Handling Facilities being designed to comply with the requirements for that site.

Air Quality

L5.137 It is considered that there is potential for cumulative effects during the operational phases. Information is also provided below about the potential cumulative effects of the construction phase.

During Construction

L5.138 This section of the chapter is supported by Appendix L4.

Construction Traffic

L5.139 As described in Chapter E (Air Quality) of the ES, specifics of construction, are not known at the time of writing as the proposed development is at the early outline stage of planning. Once construction traffic data for the construction phase are available the data should be screened using the IAQM/EPUK criteria[**Error! Bookmark not defined.**] and, if the criteria are exceeded, then an air quality modelling assessment would be required. Any cumulative effects associated with construction traffic are therefore not known at this time and would be determined if a detailed construction traffic modelling assessment was required.

Construction Dust

L5.140 With regards to construction dust, high risk mitigation measures from the best practice IAQM dust guidance [**Error! Bookmark not defined.**] have been recommended for each of the proposed Tier 1 developments and are included as embedded mitigation. It is considered that as high-risk measures are likely to be in excess of what is required for the proposed development site, these measures will be appropriate to protect against cumulative construction dust impacts.

L5.141 If each of the Tier 2 developments successfully implements an appropriate level of mitigation for construction dust, the resulting effects would be Not Significant. The best practice IAQM construction dust guidance uses the category 'high' as the most stringent level of mitigation measures that can be proposed, and as the Tier 1 sites all include high risk mitigation measures and each of the Tier 2 sites should include appropriate mitigation measures, no further mitigation measures are suggested here. This is considered the most appropriate approach to mitigate against potential cumulative impacts to the best ability of the project.

During Operation

Cumulative Sites

L5.142 The Tier 2 operational assessment for air quality includes schemes considered for their traffic emissions and for other relevant non-traffic emissions to air.

L5.143 The Tier 2 assessment for operational traffic includes each of the five STDC sites, the committed development growth for the area (modelled traffic data growth to 2033 from Highways England's North Regional Transport Model (NRTM) and used within Chapter C of this ES) and the South Bank scheme. This approach varies to that set out within paragraphs L4.11-14 and Table L4.1. Rather than review and extract traffic flows for each of the committed developments, cumulative traffic growth has been extracted from the NRTM. This approach is considered to be reasonable as the model is underpinned by the National Trip End Model (NTEM), which informs TEMPro growth, as well as a full variable demand model, accounting for changing economic conditions and competing transport modes. The traffic data for South Bank has been added to the assessment; this development has recently received permission (2020) and therefore the trips associated with its operation have not yet been included in the NRTM. Overall the approach to the Tier 2 assessment is therefore considered a reasonable future scenario.

L5.144 Emissions to air associated with road traffic have been considered for all committed development included in the transport data, as outlined above. As agreed with RCBC's Environmental Health Officer ('EHO'), the Energy from Waste ('EfW') plant known as Prairie, has also been included within this cumulative assessment because it has atmospheric emissions associated with its operation. Predicted process contributions from the EfW plant have been added to the modelled concentrations to provide a full picture of potential cumulative effects from an air quality perspective. The Air Quality Assessment for the Prairie EfW plant was supplied by the EHO and the process contributions from the maximum point of potential impact for NO_2, PM_{10} and $PM_{2.5}$ are detailed in that assessment [Ref 7]. As an initial assumption to simplify the assessment, the process contributions were applied uniformly to each receptor for the DM and DS results to provide a conservative assessment. If necessary, a more detailed estimate of the actual process contribution was applied. These process contributions were 2.1µg/m^3, 0.4ug/m^3 and 0.1 ug/m^3 for NO_2, PM_{10} and $PM_{2.5}$ respectively.

L5.145 It should be noted that in addition to the sensitive receptors used in the main assessment, another residential receptor (R29) was included in the cumulative assessment as additional roads were screened into the assessment (these roads are shown in Figure E3.1 of Chapter E). R29 was not identified as a receptor in any of the Tier 1 schemes as the road which R29 is located on was not predicted to experience a change in traffic flows, as a result of any of the Tier 1 schemes in isolation. It could be concluded therefore that no change in predicted pollutant concentration would have resulted at the location of R29 in the ES assessments. However, the data provided for the cumulative assessment showed that there was likely to be a change in traffic flows on this road and therefore R29 was added. R29 is located at OS coordinates 452707, 520935 at a height of 1.5m and represents the residential receptors at King Georges Terrace. R29 is shown in Figure L5.2.

Figure L5.2 Location of receptor R29

Assessment Results

Model Results – NO_2

L5.146 The predicted annual mean concentrations of NO_2 for all three scenarios (Baseline 2019, DM 2033 and cumulative DS 2033) at each receptor are presented in Appendix L4, Table 1. The magnitude of impact with the proposed cumulative developments operational has been assessed using the EPUK significance criteria [**Error! Bookmark not defined.**] and results are also provided in Appendix L4, Table 1. The methodology and criteria are the same as those used within Chapter E of the ES and further details are included at section E3.0. Predicted concentrations are below the annual mean air quality objective (40µg/m^3) at all of the sensitive receptor locations for each modelled scenario. The highest concentration was predicted at receptor R18 (an existing residential receptor at Aidan Court) and was 36.1µg/m^3 in the baseline scenario, 38.6µg/m^3 in the DM scenario and 39.3µg/m^3 in the DS scenario.

L5.147 The magnitude of change for annual mean NO_2 concentrations is predicted to result in a Negligible impact at most receptor locations and Slight (Minor) Adverse at five receptor locations (R17, R19, R20, R24 and R27, which are Dunlane Close, Brunswick Street (R19 and R20), the A1085 and Kirkleatham Lane respectively). Negligible and Slight (Minor Adverse) impacts are considered to be Not Significant.

L5.148 The magnitude of change for annual mean NO_2 concentrations is predicted to result in a Moderate Adverse impact at two receptor locations (R16 and R18, which are West Lane and Aidan Court respectively). Therefore, these two receptors have been examined in greater detail. As noted in Paragraph L5.147, the initial assessment assumed that the process contribution from the Prairie EfW is the same across the whole modelling domain. This is clearly not the case and therefore the specific levels at the two receptors R16 and R18 have been reviewed. The Prairie Air Quality Assessment [**Error! Bookmark not defined.**] includes the predicted concentrations as a contour plot, which are shown in Figure L5.3. From this figure it has been

estimated that the actual process contribution at those receptor locations is less than 0.4µg/m3. If a value of 0.4µg/m3 is assumed that the impact at the two receptors becomes Slight (Minor) Adverse, which is considered to be Not Significant (details are provided in Appendix L4, Table 2).

L5.149 Operational adverse impacts can be considered to be permanent, long term, direct and negative.

Figure L5.3 An extract from the EfW air quality assessment showing annual mean NO2 process contributions (µg/m3) [iii]

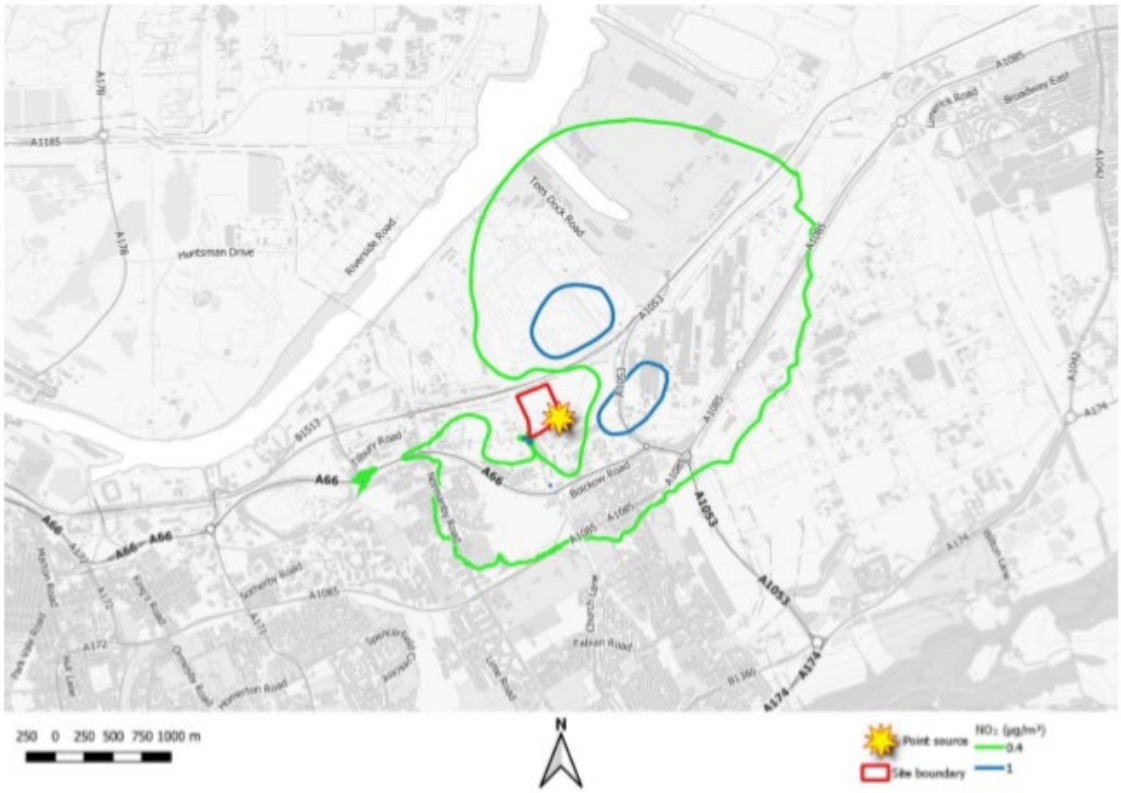

Figure 20: Annual Mean NO_2 Process Contriubtions (µg/m^3)

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Model Results – PM_{10}

L5.150 The predicted annual mean concentrations of PM_{10} for all three scenarios (Baseline 2019, DM 2033 and DS 2033) at each receptor are presented in Appendix L4, Table 3. The magnitude of impact with the scheme under operation has been assessed using the EPUK significance criteria [**Error! Bookmark not defined.**] and results are also provided in Appendix L4, Table 3. Predicted concentrations are below the annual mean air quality objective (40µg/m3) at all of the sensitive receptor locations for each modelled scenario. The highest concentration was predicted at receptor R18 (an existing residential receptor at Aidan Court) and was 17.7µg/m3 in the baseline scenario and 18.3µg/m3 in the DM and 18.4µg/m3 in the DS scenarios.

L5.151 The magnitude of change for annual mean PM_{10} concentrations is predicted to result in a Negligible impact at all existing receptor locations and is considered to be Not Significant.

Model Results – $PM_{2.5}$

L5.152 The predicted annual mean concentrations of $PM_{2.5}$ for all three scenarios (Baseline 2019, DM 2033 and DS 2033) at each receptor are presented in Appendix L4, Table 4. The magnitude of impact with the scheme under construction has been assessed using the EPUK significance

criteria [**Error! Bookmark not defined.**] and results are also provided in Appendix L4, Table 4. Predicted concentrations are below the annual mean air quality objective (25µg/m^3) at all of the sensitive receptor locations for each modelled scenario. The highest concentration was predicted at receptor R18 (an existing residential receptor at Aidan Court) and was 11.2µg/m^3 in the baseline scenario and 11.4µg/m^3 in the DM and 11.5µg/m^3 in the DS scenarios.

L5.153 The magnitude of change for annual mean $PM_{2.5}$ concentrations is predicted to result in a Negligible impact at all existing receptor locations and is considered to be Not Significant.

Assessment of significance

L5.154 The magnitude of change for NO_2, PM_{10} and $PM_{2.5}$ concentrations is Negligible at all receptors. Where the impact is Negligible or Slight (Minor Adverse) then the overall effect of the proposed development on local air quality is predicted to be Not Significant.

Water Management and Flooding

L5.155 Within this study, the assessment of Tier 2 sites encompasses all those sites which may be impacted by the proposed developments and all Tier 1 sites in totality.

L5.156 A review of the Tier 2 schemes identified in Table L4.1 shown that schemes no. 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24 and 25 are relevant to the assessment of water management and flooding cumulative effects. It is considered that there is potential for cumulative effects during the construction and operational phases.

L5.157 This cumulative effects section is a high-level assessment based on the assumptions made in the ES Chapter F for Water Management and Flooding for the proposed development: that mitigation of impacts will be achieved through the council making the mitigation measures planning conditions of the application. In addition, the assessment is also based on the assumptions set out in Paragraph L4.14.

L5.158 Schemes no. 10, 18, 19, 20 are scoped out of cumulative assessment. This is due to the absence of surface and groundwater pathways to the sites. Schemes no. 18 and 19 are on the opposite (left) bank of the River Tees and so are therefore unlikely to experience any cumulative effects. Scheme no. 10 is a pipeline for an offshore pipeline that extends into the North Sea and whilst it crosses a waterbody that flows to Ash Gill Beck through Steel House site (Scheme 5), it is not anticipated that it would connect with the water body and since it is 3km away from Scheme 5, cumulative impacts are not anticipated. Scheme no. 10 is located on the coast to the north east of the Teesworks area but is not hydrologically connected and is also approximately 2km from The Foundry (Scheme 3). The other sites are out with the catchments for the Tier 1 sites, so are therefore unlikely to experience any cumulative effects.

During Construction

L5.159 The key potential impacts to the water environment during the construction phase have been described above under the Tier 1 assessment of Water Management and Flooding (Paragraph L5.44).

L5.160 The schemes listed above all have their catchments within those of the Tier 1 sites or are in close proximity, either upgradient or downgradient of the proposed development. All previously identified receptors have the potential to be impacted. Nonetheless, with mitigation in place, the cumulative magnitude of impact of the developments would be Negligible Beneficial and Not Significant for ground water and the watercourses draining to the Tees.

During Operation

L5.161 The key potential impacts to the water environment during the operation phase have been described above under the Tier 1 assessment of Water Management and Flooding (Paragraph L5.49).

L5.162 The schemes listed above all have their catchments within those of the Tier 1 sites or are in close proximity, either upgradient or downgradient of the proposed development. All previously identified receptors have the potential to be impacted. Nonetheless, with mitigation in place, the cumulative magnitude of impact of all the developments under consideration would be Minor Adverse and Not Significant for ground water, and for surface water the impact on watercourses draining to the Tees and the Tees itself would be Negligible Beneficial and Not Significant.

L5.163 In addition to the above assessment, it is noted that for the proposed development, Lackenby, not all of the schemes in Table L4.1 are applicable with regard to cumulative impacts due to their distance from the site or their location out with, or sufficiently upgradient from, the catchment of the site. These schemes include 8 to 17, and 24.

Socio-Economic

L5.164 A review of the Tier 2 schemes identified in Table L4.1 has shown that all schemes are relevant to the assessment of Socio-Economic cumulative effects. A review of supporting documentation for the identified cumulative schemes has enabled an estimation of the anticipated employment impacts – during both the construction and operational phases – which are presented here on an aggregate basis.

L5.165 The cumulative schemes consist of a wide variety of major employment-generating schemes ranging from the offshore wind energy sector, to renewables and energy recovery, to a container terminal and a mineral processing and refining facility. The cumulative schemes also include residential development which has the potential to generate employment during construction phases. Due to the variation in approaches to the assessment and the presentation of employment impacts, it is not possible to accurately quantify the aggregate employment effects; rather an estimate is presented. This approach does, however, provide a broad indication of the magnitude and significance of cumulative effects. It is considered that there is potential for cumulative effects during the construction and operational phases.

During Construction

L5.166 If all the Tier 2 cumulative schemes came forward for development in addition to the Tier 1 schemes it is likely that the construction of these schemes could lead to the generation of approximately 8,990 jobs (including direct, indirect and induced employment). This is equivalent to 88% of employment within the construction sector across the AOI. Although it is likely that the cumulative schemes will be delivered at different times, the scale of direct construction and supply chain labour required is likely to have a significant interaction with the local labour market and would potentially require labour to be imported from outside of the AOI. In Lichfields' experience of large commercial/industrial schemes, local labour agreements are commonly supplemented by labour imported from out-of-region, particularly where specialist skills are required.

L5.167 On the assumption that these factors mitigate the scale of growth within the construction labour market to deliver all Tier 1 and 2 cumulative schemes, it is considered that the delivery of all cumulative schemes could represent a **Substantial** and **Beneficial** effect in terms of construction industry employment.

During Operation

L5.168 If all the Tier 2 cumulative schemes came forward for development in addition to the Tier 1 cumulative schemes it is estimated that these could deliver in the order of 26,750 operational jobs (encompassing direct, indirect and induced effects). For reasons outlined above, this figure only represents an estimate since it reflects a spread of approaches: for some, only an assessment of gross direct impacts was made whereas others made allowances for net additionality/displacement and considering the multiplier (indirect and induced) employment effects throughout the wider economy. Notwithstanding, it is considered that the scale of estimated operational employment represents approximately 14% of the total workforce within the Area of Impact (comprising Redcar and Cleveland, Middlesbrough and Stockton-on-Tees). The delivery of this many jobs could have a significant interaction with the local labour market and could result in a tightening of the job market and bidding up of wages locally. As referenced above in relation to the cumulative effects of Tier 1 schemes during operation, there is theoretically considerable slack in the local labour market at present to absorb additional job growth, cognisant of the gap to the national average in terms of both unemployment and claimant rates. In this context, the cumulative effect during the operational phase is likely to represent a **Substantial** and **Beneficial** effect.

Greenhouse Gas Emissions

L5.169 As noted above, it is not typical to undertake a cumulative assessment for GHG emissions within an assessment of climate impacts for EIA. GHG emissions are inherently cumulative. The environmental impact arising from GHG emissions is their aggregation and increased concentration within the atmosphere. The location of the emissions source is not relevant to the impact arising from it, any development leading to GHG emissions has the same impact whether it be located in South Tees or in another region/country. Similarly, the impacts of climate change at a given location arise from global aggregated GHG levels in the atmosphere and not the magnitude of GHG emitted in the local area.

L5.170 Many of the impacts associated with the proposed development will take place at a location removed from the proposed development site itself e.g. material extraction and manufacture, electricity generation, transportation etc. The result of this understanding is that instead emissions are generally measured and presented in the context of international, national and subnational targets.

L5.171 Including all Tier 2 scheme emissions in the cumulative assessment for GHG would not be justified given they are not directly linked to the Tier 1 schemes through ownership or spatial commonality and will not share combined mitigation strategies. For this reason, the full list of Tier 2 schemes has not been included as part of the cumulative assessment along with Tier 1 schemes.

L5.172 However, Arup understands that the South Bank scheme in Tier 2 is linked to the Tier 1 schemes spatially and in terms of both ownership and likely mitigation measures. As such a high-level assessment has been made which considers South Bank alongside the cumulative impacts of the Tier 1 schemes.

During Construction

L5.173 Aggregate construction emissions for South Bank, across both phases, were estimated as 626,462 tCO_2e. Adding these to the Tier 1 schemes and comparing against national carbon budgets as set out in Table L5.12, indicates that in aggregate these are still <0.1% of national carbon budgets. On this basis the cumulative construction emissions are assessed as being Not Significant.

During Operation

L5.174 The total operational emissions for the first full year of operation at South Bank (2028) is 33,793 tCO2e. The aggregated total annual operational emissions for the first year of operation for the Tier 1 schemes is 61,960 tCO2e. Therefore, the addition of South Bank would result in an aggregated annual operational total of 95,753 tCO2e.

L5.175 South Bank is a comparatively large site to add to the Tier 1 schemes however the conclusion regarding significance remain the same despite these additional emissions. The cumulative impact of Tier 1 schemes and South Bank are not expected to prevent the UK meeting its national emissions targets. However, the operational emissions with the addition of South Bank will have further impact in the context of regional emissions budgets and this is expected to be **Significant**. This emphasises the need for mitigative measures including the FTP and Occupier Travel Plans, particularly for the operational emissions associated with transport.

Waste and Materials Management

L5.176 A review of publicly available data for the Tier 2 schemes identified in Table L4.1 was undertaken. Data was available for schemes at both Teesside Combined Cycle Power Plant and Wilton International Complex which are relevant to the assessment of Waste and Materials Management cumulative effects. A quantitative assessment for these schemes alongside Tier 2 has been undertaken. For the other schemes where waste and materials data was not available a qualitative assessment was carried out. Schemes 6 to 25 are considered relevant to this assessment, however the amount to which they could potentially pose an impact varies significantly, this is discussed further below.

During Construction

L5.177 Combining both the impacts of the Tier 1 schemes and the Teesside Combined Cycle Power Plant and Wilton International Complex schemes (see Table L5.26 below), the overall construction impact is 1.06% of the total regional landfill capacity, which equates to 248,501 tonnes. Landfill capacity is considered to have a Low sensitivity and the magnitude of change is considered to be Minor. Consequently, the overall significance is considered to be Negligible (Not Significant).

Table L5.19 Tier 2 Quantitative Analysis of Waste

Waste Type	Teesside Combined Cycle Power Plant (CCPP)	Land at Wilton International Complex	Total
Inert/Non Haz	5,820	1,156	6,976

L5.178 As noted above, potentially all Tier 2 schemes pose an impact on waste management infrastructure. The ability to make a complete assessment for waste and materials management is limited by the lack of supporting data contained within the individual applications to quantify any potential impact.

L5.179 Nonetheless a qualitative assessment can be considered. As with Tier 1 schemes it is expected that the greatest percentage impact from construction activities will be generated from construction materials usage within the region. Typically, any waste generation associated with construction is mitigated through re-use and recycling activities i.e. working towards becoming cut & fill neutral.

L5.180 It can be assumed that due to the Low sensitivity of the receptor a worst-case scenario impact of Major would lead to an overall Moderate Adverse impact. Yet, as the majority of large-scale

applications within the region (such as the Tier 1 applications) have Minor impacts, a similar influence could be anticipated from Tier 2 schemes. Therefore, the overall adverse impact of Tier 2 schemes on waste management infrastructure during construction is expected to be Negligible (Not Significant).

L5.181 There is no publicly available quantifiable data for Tier 2 schemes for materials. However as per waste management infrastructure, it can be assumed due to the Low sensitivity of receptor a worst-case scenario impact of Major would lead to an overall Moderate Adverse impact. Yet, as the Majority of large-scale applications within the region, such as the Tier 1 application, have Minor impacts a similar influence could be anticipated from Tier 2 schemes. Therefore, the overall adverse impact of Tier 2 schemes on materials during construction are expected to be Negligible (Not Significant).

During Operation

L5.182 There is no publicly available quantifiable data for Tier 2 schemes for operational waste. It is therefore necessary to make a qualitative assessment based on the typical waste impact associated during the operational phases of the planning applications. Utilising the previous approach of considering the impact of the Tier 1 applications, it can be assumed that due to the Low sensitivity of the receptor a worst-case scenario impact of Major would lead to an overall Moderate adverse impact. Yet, as the majority of large-scale applications within the region, such as the Tier 1 applications, have Minor impacts a similar influence could be anticipated from Tier 2 schemes. Therefore, the overall adverse impact of individual Tier 2 schemes on waste management infrastructure during operation are expected to be Negligible (Not Significant).

Synergistic cumulative effects

Based on the assessment of Tier 1 and 2 above, no synergistic cumulative effects are predicted.

Summary

L5.183 In conclusion, **Significant Adverse** cumulative effects are likely when considering Tier 1 and 2 schemes together during the construction phase in relation to and Landscape and Visual Impact (LVIA) and during the operation phase in relation to Transport, Noise, Greenhouse Gas Emissions and Landscape and Visual Impact. Significant Beneficial Socio-Economic Cumulative effects are also anticipated. It should be noted that in relation to LVIA no additional cumulative effects are anticipated beyond those identified in relation to Tier 1.

L5.184 No mitigation is proposed or possible in relation to the Significant Beneficial effects and Significant Adverse Noise and LVIA effects. Once further information is available on the end users of the site, it is expected that a detailed site wide energy strategy will be developed that will utilise low and zero carbon energy supply options, which will help to mitigation the cumulative greenhouse gas emissions. There are ongoing discussions regarding other potential transport mitigation measures.

L6.0 Summary & Conclusions

L6.1 This chapter has considered the inter-relationships between effects identified within this ES and whether there is a need for further mitigation (synergistic effects). It also considers the potential for cumulative effects when the development is considered with other developments in the surrounding area.

L6.2 No Significant synergistic effects have been identified.

L6.3 The cumulative assessment, outlined in Section L5.0 above, has identified **Significant** adverse and beneficial cumulative effects both when considering Tier 1 schemes together and when considering Tier 1 and Tier 2 schemes together. **Significant Adverse** cumulative effects are predicted during the construction phase, in relation to Landscape and Visual Impact (LVIA) and during the operation phase in relation to Transport, Noise, Greenhouse Gas Emissions and Landscape and Visual Impact.

L6.4 **Significant Beneficial** Socio-Economic Cumulative effects are anticipated during both the construction and operational phases.

L6.5 No mitigation is proposed or possible in relation to the Significant Beneficial cumulative effects and Significant Adverse cumulative Noise and LVIA effects.

L6.6 Once further information is available on the end users of the site, it is expected that a detailed site wide energy strategy will be developed that will utilise low and zero carbon energy supply options, which will help to mitigation the cumulative greenhouse gas emissions. There are ongoing discussions regarding other potential transport mitigation measures.

L6.7 In terms of the residual effects of the proposed development in isolation, presented in section L2.0, it can be seen that during the construction phase there are **Significant Adverse** LVIA effects and **Significant Beneficial** Socio-Economic effects. During the Operational Phase, there are **Significant Adverse** Transport and LVIA effects and **Significant Beneficial** Socio-Economic effects. All other environmental effects assessed in Chapters C to K are considered to be Not Significant.

L7.0 Abbreviations & Definitions

1 AOI – Area of Impact
2 CCPP – Combined Cycle Power Plant
3 CEMP – Construction Environmental Management Plan
4 CTMP – Construction Traffic Management Plan
5 DCO – Development Consent Order
6 DIA – Drainage Impact Assessment
7 EC – European Commission
8 EfW – Energy from Waste
9 EIA – Environmental Impact Assessment
10 ERF – Energy Recovery Facility
11 ES – Environmental Statement
12 FRA – Flood Risk Assessment
13 FTE – Full Time Equivalent
14 GHG – Greenhouse Gas
15 HGV – Heavy Goods Vehicle
16 IEMA – Institute of Environmental Management and Assessment
17 LVIA – Landscape Visual Impact Assessment
18 NRTM – North Regional Transport Model
19 NTEM – National Trip End Model
20 ONS – Office for National Statistics
21 RCBC – Redcar and Cleveland Borough Council
22 REC – Redcar Energy Centre
23 SPA – Special Protection Area
24 SSI - Sahaviriya Steel Industries
25 SSSI – Site of Special Scientific Interest
26 STDC – South Tees Development Corporation
27 SuDS – Sustainable Drainage Systems
28 SWMP – Surface Water Management Plan
29 UK – United Kingdom
30 WFD – Water Framework Directive

L8.0 References

1 European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions

2 IEMA (2004) Guidelines for Environmental Impact Assessment

3 Planning Practice Guidance (Environmental Impact Assessment) (2017) (ID: 4-035-20170728)

4 UK Climate Change Act (2008)

5 EPUK/IAQM, 2017. Land-Use Planning & Development Control: Planning for Air Quality

6 IAQM, 2016. Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)

7 JBA Consulting, 2020. Energy Recovery Facility, Grangetown Prairie Air Quality Assessment. Provided by the RCBC EHO.