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8. Traffic & Transport

8.1 Introduction

- 8.1.1 This Traffic and Transport chapter has been prepared by AECOM. It reports the results of baseline studies and the assessment of the 3 m on traffic and transport.
- 8.1.2 The assessment focusses on the construction phase of the Proposed Developments; operational traffic generation is expected to be low (up to 10 HGV trips and up to 100 car/LGV trips per day) and below the threshold requiring assessment, therefore has been scoped out of the assessment.
- 8.1.3 The assessment also considers the cumulative effects during the construction of the two Proposed Developments.
- 8.1.4 Traffic and transport impacts are interrelated with noise and vibration impacts – reference should also be made to Chapter 7: Noise and Vibration of this Environmental Statement (ES).
- 8.1.5 This chapter is supported by Figure 8.1: ATC Locations in Volume III of this ES.
- 8.1.6 This chapter is also supported by the following appendices, found in Volume II of this ES:
- Appendix 8A: Transport Assessment;
 - Appendix 8B: Construction Traffic Management Plan;
 - Appendix 8C: Construction Worker Travel Plan; and
 - Appendix 8D: Flow Diagrams.

8.2 Legislation and Planning Policy Context

- 8.2.1 This section provides a brief overview of the relevant legislation, planning policy and technical guidance relevant to the traffic and transport assessment, as summarised below.

Legislation

- 8.2.2 The Proposed Developments have been considered in the context of national legislation.
- 8.2.3 The Proposed Developments will be consented under the Town and Country Planning Act 1990 (TCPA).

National Policy

- 8.2.4 The Proposed Developments have been considered in the context of a number of national planning and transport guidelines and policies.
- 8.2.5 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2021) sets out the Government's planning policies for England, superseding the earlier Planning Policy Guidance Notes. The NPPF aims to contribute to the achievement of sustainable development through the planning system.
- 8.2.6 Paragraph 32 indicates that *“developments should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe”*.

Local Policy

8.2.7 The Proposed Developments have been considered in the context of a number of local planning and transport guidelines and policies. The following documents have been reviewed:

- Humber Local Enterprise Partnership, ‘Transport Plan for the Humber (2018 Refresh)’; and
- North Lincolnshire Council Local Plan - once agreed (formally adopted), it will replace the current North Lincolnshire Core Strategy and the Housing and Employment Land Allocations Development Plan Documents (DPDs). The development stages of the North Lincolnshire Local Plan to date have been -
 - Issues and Options (Regulation 18) (2018) – the first stage of the process and set the scope of the new local plan and presented key issues along with a number of options, and
 - Preferred Options (2020) – informed by the issues and options stage, this stage established the Council’s preferred spatial strategy.

Other Guidance

8.2.8 In addition to the above policies and documents, the following guidance documents have been taken into account in the production of the chapter.

- Department for Communities and Local Government (2014), ‘Travel Plans, Transport Assessments and Statements – Planning Practice Guidance’;
- Institute of Environmental Management and Assessment’s (IEMA (1993), ‘Guidelines for the Environmental Assessment of Road Traffic’;
- National Highways (2008), ‘Design Manual for Road and Bridges (DMRB) Volume 11, Section 2, Part 5 – HA 205/08 Assessment and Management of Environmental Effects’; and
- National Highways (2020), ‘Design Manual for Roads and Bridges (DMRB) – LA 104 Environmental assessment and monitoring’.

8.3 Assessment Methodology and Significance Criteria

Impact Assessment and Significance Criteria

Approach to Assessment

8.3.1 This section describes the approach to the identification and assessment of traffic and transport impacts resulting from the construction of the Proposed Developments. As set out in the EIA Scoping Report (see Appendix 1A in ES Volume II), the operational phase of the Proposed Development has been scoped out of the Traffic and Transport section of this assessment as traffic generation during this stage is expected to be minimal. The decommissioning phase of the Proposed Developments has also been scoped out of the assessment as impacts are expected to be similar or less than during the construction period.

8.3.2 The methodology for assessing the impact of development-generated traffic is based on that outlined in Institute of Environmental Assessment’s (IEA, now known as the Institute of Environmental Management and Assessment (IEMA)) ‘Guidelines for the Environmental Assessment of Road Traffic’ (January 1993). The IEA guidelines state that a link on the highway network should be included within the study if one of the following criteria is met:

- traffic flows increase by more than 30% (or HGV flows increase by more than 30%); or
- traffic flows in sensitive areas increase by more than 10%.

- 8.3.3 The IEMA guidelines recommend that several environmental effects may be considered important when considering traffic from an individual development. This chapter considers the following potential effects:
- impact of HGV construction traffic;
 - severance;
 - pedestrian delay;
 - pedestrian amenity; and
 - accidents and safety.
- 8.3.4 The type of traffic which is anticipated to be generated by the Proposed Developments will be categorised as follows; primarily general traffic, light goods vehicles (LGVs), heavy goods vehicles (HGVs) and Abnormal Indivisible Loads (AILs).
- 8.3.5 The Proposed Developments will utilise the existing accesses to the VPI Site and to the Phillips 66 Site (see Figures 3.1 and 3.2) during both construction and operation.
- 8.3.6 A new access (also shown on Figure 3.2) is also proposed to be constructed from the public highway (Eastfield Road) into the north-west area of the Phillips 66 Site. This new access will be used as the main HGV and abnormal load access and egress during construction use. It is also proposed to provide egress for operational deliveries (which will access via the existing access road on Eastfield Road approximately 170 m to the north). Staff access during construction and operation will be via the existing access points into the Refinery and associated car parking areas.
- 8.3.7 A new access (also shown on Figure 3.2) is also proposed to be constructed from the public highway (Rosper Road) into the VPI Site. This new access will be used as the main HGV access and egress during construction and for maintenance and emergency use during operation. Staff access will be via the existing main entrance to the CHP Plant.
- 8.3.8 The proposed vehicle routing and movement associated with the construction of the Proposed Developments is considered in the Construction Traffic Management Plan (Appendix 8B in ES Volume II).
- 8.3.9 The locations and volumes of the Proposed Developments' traffic have been identified and receptors which could be affected upon due to the increase in vehicle movements have been identified. This has been undertaken by identifying the percentage increase in vehicular activity along the identified construction routes compared to the existing baseline. Automated Traffic Count (ATC) data has been used to derive Annual Average Daily Traffic (AADT) for individual links, subdivided into 24 hour counts for total traffic and HGVs.
- 8.3.10 In order to calculate the trip distribution of workers travelling to and from the Proposed Developments, a simple gravity model has been developed. Construction traffic associated with the Proposed Developments has been distributed onto the local highway network to calculate the resultant percentage increase on each link.
- 8.3.11 Assessments have been undertaken for the peak overall construction traffic period and peak HGV construction traffic period for each of the Proposed Developments individually and the cumulative effect of both Proposed Developments.
- 8.3.12 Currently, it is anticipated that the construction of the Proposed VPI Development will begin in Q3 of 2024 while the Proposed Phillips 66 Development is anticipated to begin in Q2 of 2024 and both Proposed Developments are expected to be operational by late 2027/ early 2028. If historical data is utilised, base traffic flows would therefore be growthed to the base year in order to establish baseline flows and then growthed to the identified peak year of construction. Growth factors were derived from TEMPro v7.2c within the Yorkshire and Humber geographical area. Meanwhile, the peak construction traffic flows have been derived by analysing construction traffic data and construction programmes provided by Phillips 66 and VPI.

- 8.3.13 It is anticipated that an AIL report will be needed prior to commencement of construction to assess the delivery of large components, which will be supported by desk based swept path analysis and a record of consultation and agreement with North Lincolnshire Council (NLC). This would not be needed to inform the planning application process.

Construction Traffic Assessment

- 8.3.14 Construction traffic associated with the Proposed Developments has been distributed onto the local highway network and the impacts of this traffic have been measured against baseline future traffic flows to indicate a percentage increase in the traffic as a result. Road links within the study area where a traffic count has been undertaken have hence been assessed.
- 8.3.15 Two relevant periods have been assessed, those being the period during construction when the peak of HGV traffic is expected and the period when overall peak traffic associated with the construction of the Proposed Developments is expected. These occur in different time periods for each of the Proposed Developments and are as follows:
- Proposed VPI Development: Peak HGV – 2026, Peak Total – 2027;
 - Proposed Phillips 66 Development: Peak HGV - 2025, Peak Total – 2025; and
 - Cumulative Peak: Peak HGV – 2026, Peak Total – 2025.

Construction Assumptions

- 8.3.16 A number of assumptions relating to traffic and transport have also been included as part of the assessment. These assumptions are described below:
- AADT flows at each location have been assessed using ATC data collected over a 7 day period for 24 hours on each day;
 - the generation of HGV traffic has been assumed to follow the same schedule for both the VPI Site and the Phillips 66 Site. This would be considered a worst case scenario and it is likely the periods of peak HGV generation may differ slightly; and
 - it has been assumed for the basis of the assessment that every worker is travelling on their own by private car. This is considered a worst case scenario as it is likely workers will car share and small numbers may use public transport or active travel.

Operation

- 8.3.17 The Proposed Developments would be expected to generate a small number of trips once in operation. This could be as much as 10 HGV trips and 100 car/LGVs trips daily. As this trip generation falls significantly below the traffic generation during peak construction, this period has not been assessed. This was agreed at in the Scoping stage to be scoped out of the assessment due to the limited impact on the road network that the Proposed Developments were anticipated to have once in operation.
- 8.3.18 When operational both the Proposed Phillips 66 Development and Proposed VPI Development will be subject to planned maintenance events, however the traffic related to these events will be minimal and lower than the peak of construction assessed within this chapter.

Assessment Criteria - Sensitivity of Receptors

- 8.3.19 The general criteria for defining the importance or sensitivity of receptors are set out in Table 8.1. Key factors influencing this include:
- the value of the receptor or resource based upon empirical and/ or intrinsic factors, for example taking into account any legal or policy protection afforded which is indicative of the receptor or resources' value internationally, nationally or locally; and
 - the sensitivity of the receptor or resource to change, for example is the receptor likely to acclimatise to the change. This will take into account legal and policy thresholds which are indicative of the ability of the resource to absorb change.

Table 8.1: Sensitivity of receptors

Sensitivity	Description
Very High	Schools, colleges, playgrounds, hospitals, retirement homes
High	Heavily congested junctions, residential properties very close to the carriageway
Medium	Congested junctions, shops/businesses, pedestrians/cyclists, areas of ecological/nature conservation value, residential properties close to the carriageway
Low	Sites of tourist/visitor attraction, places of worship, residential areas set back from the highway with screening
Negligible	Those people and places located away from the affected highway link

Assessment Criteria - Magnitude of Impacts

8.3.20 General criteria for defining the magnitude of an impact are set out in Table 8.2. Key factors influencing this include:

- the physical or geographical scale of the impact (note that this will be relative to the scale of the receptor or resource affected);
- the duration of the impact – will it be short term, lasting a few days or weeks, or long terms, lasting a number of years;
- the frequency of the impact – will it occur hourly, daily, monthly or will it be permanent lasting for the duration of the development; and
- the reversibility of the effect – can it be reversed following completion of construction of the development.

Table 8.2: Impact magnitude criteria (traffic and transport)

Magnitude	Description	Illustrative Criteria
High	HGV Construction Traffic	High number of construction vehicles using roads over a protracted period of time. More than a 30% increase for more than 6 months.
	Pedestrians/ Cyclists	Limited or no facilities for pedestrians and cyclists with limited crossing facilities and low quality linkages to the local facilities.
	Severance	Increase in total traffic flows of 90% and above (or increase in HGV flows over 10% based on the sensitivity of the receptors).
	Road Safety	High increase in traffic at known accident locations.
Medium	HGV Construction Traffic	Moderate number of construction vehicles using roads over a protracted time period. 16%-29% increase for more than 6 months; or More than 30% increase for 3-6 months.
	Pedestrians/ Cyclists	Few facilities for pedestrians with limited crossing facilities and linkages to local facilities.
	Severance	Increase in total traffic flows of 60-89% (or increase in HGV flows over 10% based on the sensitivity of the receptors).
	Road Safety	Moderate increase in traffic at known accident location.

Magnitude	Description	Illustrative Criteria
Low	HGV Construction Traffic	Small number of construction vehicles using roads over a short period of time. 6-15% increase for more than 6 months; or Between 21-30% for 3-6 months. More than 30% increase for less than 3 months.
	Pedestrians/ Cyclists	Facilities for pedestrians and cyclists with safe and convenient crossing facilities and good linkages to the local facilities.
	Severance	Increase in total traffic flows of 30-59% (or increase in HGV flows over 10% based on the sensitivity of the receptors).
	Road Safety	Minor increase in traffic at known accident locations.
Negligible	HGV Construction Traffic	Occasional construction vehicles using roads over a short period of time. Less than 5% Increase for more than 6 months; or Between 6-20% increase for 3-6 months; or Between 21-30% for less than 3 months.
	Pedestrians/ Cyclists	Dedicated facilities for pedestrians and cyclists with safe and convenient crossing facilities and good linkages to the local facilities.
	Severance	Increase in total traffic flows of 29% or under (or increase in HGV flows under 10%).
	Road Safety	Negligible increase in traffic at known accident locations.

Assessment Criteria – Significance of Effects

8.3.21 The general approach adopted for evaluating the significance of effects taking into account the sensitivity of the receptor and the magnitude of impact is outlined in Table 8.3. The IEMA guidelines require the likely significant effects to be identified. Effects predicted to be ‘major’ or ‘moderate’ are considered to be significant whilst effects predicted to be ‘minor’ or ‘negligible’ are considered to be not significant.

Table 8.3: Significance of effects

Magnitude of Impact	Sensitivity or Value of Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

HGV Construction Traffic Impacts

8.3.22 A summary of the potential effects of the additional HGV traffic generated by the Proposed Developments is provided in Section 8.6. It should be noted that the nature of effect is based on the worst case scenario for HGV traffic which differs from the overall peak traffic generation of the Sites during construction.

8.3.23 The most significant impact generated by HGV traffic to the Sites is anticipated to occur in the 2026 assessment year for the Proposed VPI Development, 2025 for the Proposed Phillips 66

Development and 2026 for the cumulative Proposed Developments. A percentage change has been calculated to provide an indication of the level of impact generated by the traffic upon the key road links within the study area.

Road Safety Impacts

8.3.24 A summary of the potential effects on road safety during the construction phase has been provided. The magnitude of potential impacts, described in Table 8.2 is summarised below.

- high – High increase in traffic at known accident locations;
- medium – Moderate increase in traffic at known accident locations;
- low – Minor increase in traffic at known accident locations; and
- negligible – Negligible increase in traffic at known accident locations.

Severance Impacts

8.3.25 A summary of the potential effects on severance during the construction phase has been provided in Section 8.6. The determination of potential impact magnitude is based on the information in Table 8.2.

Pedestrian/ Cyclist Impacts

8.3.26 A summary of the potential effects on pedestrians and cyclists during the construction phase has been provided in Section 8.6. The magnitude of potential impacts, described in Table 8.2 is summarised below:

- high - Limited or no facilities for pedestrians and cyclists with limited crossing facilities and low quality linkages to the local facilities;
- medium - Few facilities for pedestrians and cyclists with limited crossing facilities and linkages to the local facilities;
- low - Facilities for pedestrians and cyclists with safe and convenient crossing facilities and good linkages to the local facilities; and
- negligible - Dedicated facilities for pedestrians and cyclists with safe and convenient crossing facilities and good linkages to the local facilities.

Study Area

8.3.27 This section provides a description of the study area, which is defined by those roads where there is the potential for significant impact due to the addition of construction traffic associated with the Proposed Developments.

8.3.28 Prediction of construction effects has focused on activities that could directly and indirectly impact on receptors within the defined study area. The study area includes those roads which may be utilised during construction, and upon which there is the potential for a significant impact.

8.3.29 The study area covered the key roads surrounding the proposed carbon capture facilities, namely the A180 between the A15 junction and A1173 junction, the A160, the A15, Humber Road, Rosper Road and Eastfield Road.

8.3.30 The Sites are located on land north of A160 Humber Road, Immingham, within the administrative boundary of NLC which, as a unitary authority, is responsible for both Planning and Highways matters.

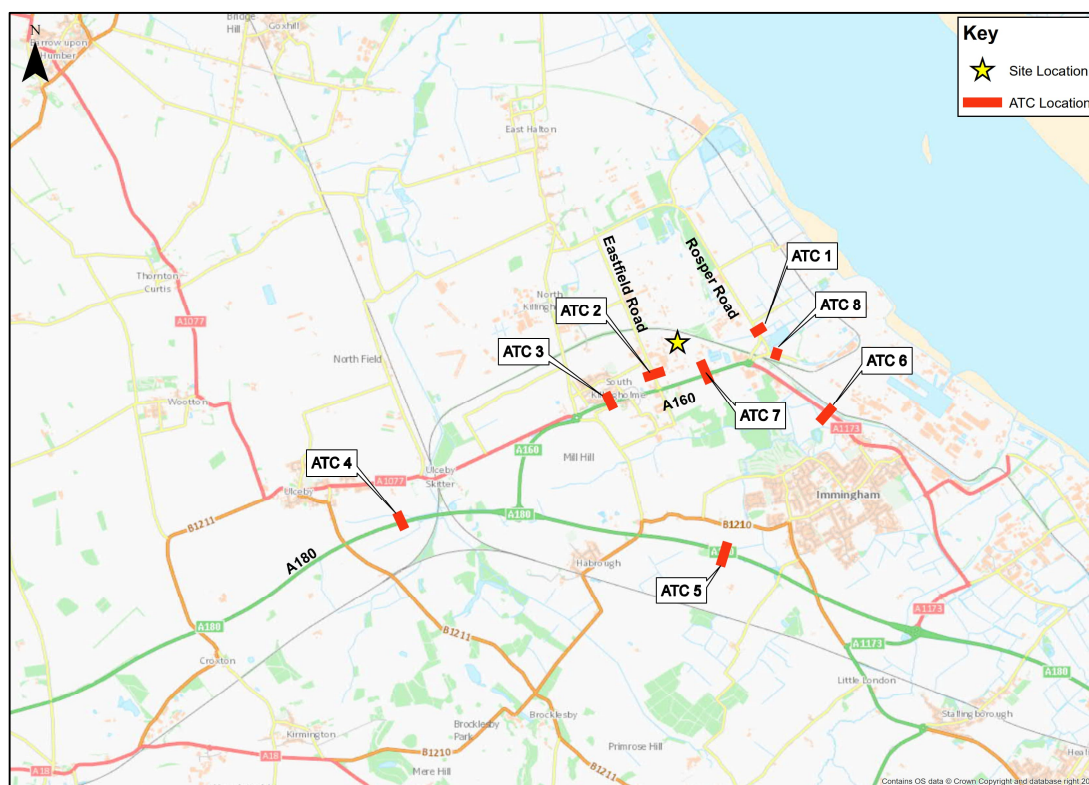
8.3.31 The Sites are split over two parcels of land with a small area of overlap. The Phillips 66 Site is located to the west of the area, between Eastfield Road and just east of the existing Network Rail railway line which runs between the Port of Immingham and Ulceby. The VPI Site occupies the east of the area, entirely to the east of the railway line and to the west of Rosper Road.

- 8.3.32 The VPI Site (see Figure 1.2 in ES Volume III) is within and adjacent to the south of the operational VPI Immingham CHP Power Station Plant site, accessed from Rosper Road and separated from the Phillips 66 Humber Refinery by the Network Rail railway line discussed above. The Site currently benefits from three existing access points from Rosper Road to the west.
- 8.3.33 The Phillips 66 Site (see Figure 1.3 in ES Volume III) is largely within the operational Humber Refinery, accessed from Eastfield Road, but also includes land to the east of the Refinery for pipeline and cable connections, including part of the Network Rail railway line which will need to be traversed by pipelines and cables. The Phillips 66 Site currently benefits from two existing vehicular accesses to the west via Eastfield Road, both of which are provided with ghost island right turn facilities. A new vehicular access is proposed to the west of the Proposed Phillips 66 Development via Eastfield Road. Other access points into the wider Humber Refinery site are also available from Eastfield Road and the A160.

Sources of Information/ Data

- 8.3.34 Baseline traffic conditions were established using Automatic Traffic Counts (ATCs) in locations agreed with NLC within the study area. Locations of the ATCs within the study area are shown in Plate 8.1. The numbers refer to the original ATC reference numbers, which have been retained for continuity purposes.

Plate 8.1: ATC locations



- 8.3.35 The surveyed flows for the ATC locations within the study area were collected in February 2022 and are presented in Section 8.4 (Baseline Conditions) below.
- 8.3.36 The ATC count data has been supplemented by HGV percentages obtained from Department for Transport (DfT) counters and through WebTRIS. This is due to the road safety aspect of installing equipment on heavily trafficked dual carriageways therefore HGV percentages were unable to be collected at certain locations. Locations where this has been applied are indicated in the Baseline Conditions section below and an appropriate footnote included to state the source of the information used.

- 8.3.37 Personal injury accidents within the study area for the most recent full five-year period available (2011-2015), were obtained from the Crashmap Database¹.

Consultation

- 8.3.38 This section of the report outlines the scoping responses received from NLC in their role as the Local Highway Authority (LHA).
- 8.3.39 Table 8.4 summarises the scoping process undertaken with relevant statutory and non-statutory consultees in relation to traffic and transport and outlines how and where this has been addressed in this chapter.

Table 8.4: Summary of consultation (traffic and transport)

Consultee	Date	Summary of Consultation	Consultee Comments
NLC (Highways)	23 rd December 2021	Email outlining the scope and content of the ES chapter to be produced. This included request for comment in relation to the methods and assessment to be undertaken and the location of baseline traffic surveys to be collected.	NLC confirmed they were happy with the proposed locations and methodology for the surveys. NLC also noted that dependent on any national restrictions in place next year, it may be beneficial to compare the results with previous survey data which may be available.
	20 th January 2022	Email request to request the usage of National Highways 'Webtris' traffic count data for locations on the A63 near Hull for 2021, in place of new counts.	NLC were happy with the proposed use of the data.
	23 rd September 2022	Email sent asking for advice on whether a Construction Traffic Management Plan and Construction Worker Travel Plan would be required.	NLC confirmed that they required both documents as part of the submission.

8.4 Baseline Conditions

- 8.4.1 In order to assess the potential impacts and effects of the Proposed Developments, it is necessary to determine the environmental conditions that currently exist on Sites and in the surrounding area, for comparison. These are known as the existing baseline conditions. Baseline conditions are determined using the results of site surveys and investigations or desk-based data searches, or a combination of these, as appropriate.
- 8.4.2 It is also relevant for the EIA to consider future baseline conditions taking account of any planned or likely changes to the existing baseline, for comparison against the future 'With Construction' scenario.

Existing Baseline

Existing Highway Network

- 8.4.3 Plate 8.2 below identifies the Local and Strategic Road Network within the vicinity of the Sites.

¹ <https://www.crashmap.co.uk/>

Plate 8.2: Local and strategic road network



Eastfield Road

- 8.4.4 Eastfield Road is an adopted highway, maintained at public expense which is formed of a lit, 7.3 m wide single carriageway and extends c. 2.4 km north from a signalised crossroads junction with the A160 Humber Road.
- 8.4.5 Eastfield Road is subject to a 40 mph speed limit throughout and forms the Phillips 66 Site's western frontage. Three priority T junctions provide access to the Humber Refinery to the east of Eastfield Road, which are provided with ghost island right turn facilities, and a Pelican crossing is located some 50 m north of the Humber Refinery site's main vehicular access on Eastfield Road.
- 8.4.6 Eastfield Road also provides access to a number of industrial units and a car park along its western flank, opposite the Phillips 66 Site.
- 8.4.7 Some 900 m north of its signalised crossroads junction with A160 Humber Road, Eastfield Road crosses an existing railway line in the form of an overbridge and provides access to Lindsey Oil Refinery and Church Lane, via signalised crossroads junction and priority T junction, respectively. The route then continues north, before diverting east as Chase Hill Road, along the northern boundary of Lindsey Oil Refinery.

Rosper Road/ Humber Road

- 8.4.8 Chase Hill Road extends east from Eastfield Road along the northern boundary of Lindsey Oil Refinery before meeting Haven Road in the form of priority T junction, with the priority route continuing south as Rosper Road.
- 8.4.9 Rosper Road extends c. 2.25 km on a north-south alignment between Chase Hill Road and A160 Humber Road, providing access to a large vehicle storage and distribution facility and the operational VPI Immingham CHP Plant to the north-east and south-west, respectively.
- 8.4.10 Rosper Road is an adopted highway which is formed of a c. 6.75 m wide single carriageway flanked by areas of grassed verge to both sides and is subject to a 40 mph speed limit. At its southern extent, Rosper Road serves Marsh Lane before meeting Humber Road, at which point the north and southbound lanes divert on approach to a gyratory system which is formed around the Immingham West Fire Station. The southbound lane meets the east-west section

of Humber Road in the form of a left out/right out exit only junction. To the west, Humber Road crosses underneath a railway overbridge, before meeting a 5-arm roundabout junction with the A160 and A1173, known as the Manby Roundabout.

- 8.4.11 Humber Road also provides entry only dual lane one-way access to the northbound lane of Rosper Road and the aforementioned gyratory system from the Manby Roundabout.

A160

- 8.4.12 The A160 forms part of the Strategic Road Network (SRN) which is operated and managed by National Highways. The route extends c. 4.3 km between the Mandy Roundabout and a grade separated junction with the A180, known as the Brocklesby Interchange. The A160 forms the Humber Refinery's southern frontage and comprises a dual carriageway with c. 3.65 m lane widths, with the east and westbound running carriageways separated by c. 6 m wide traffic island.

- 8.4.13 The A160 benefits from street lighting and is subject to the national speed limit (70 mph), although this reduces to 50 mph on approach to the Habrough Roundabout, before reverting to the national speed limit upon existing the roundabout junction, on route to the A180.

A180

- 8.4.14 The A180 forms part of the SRN and extends c. 24 km eastbound from the A16 within Grimsby, before meeting the A15/ A18 at a grade separated junction known as the Barnetby Interchange, where the route continues as M180.

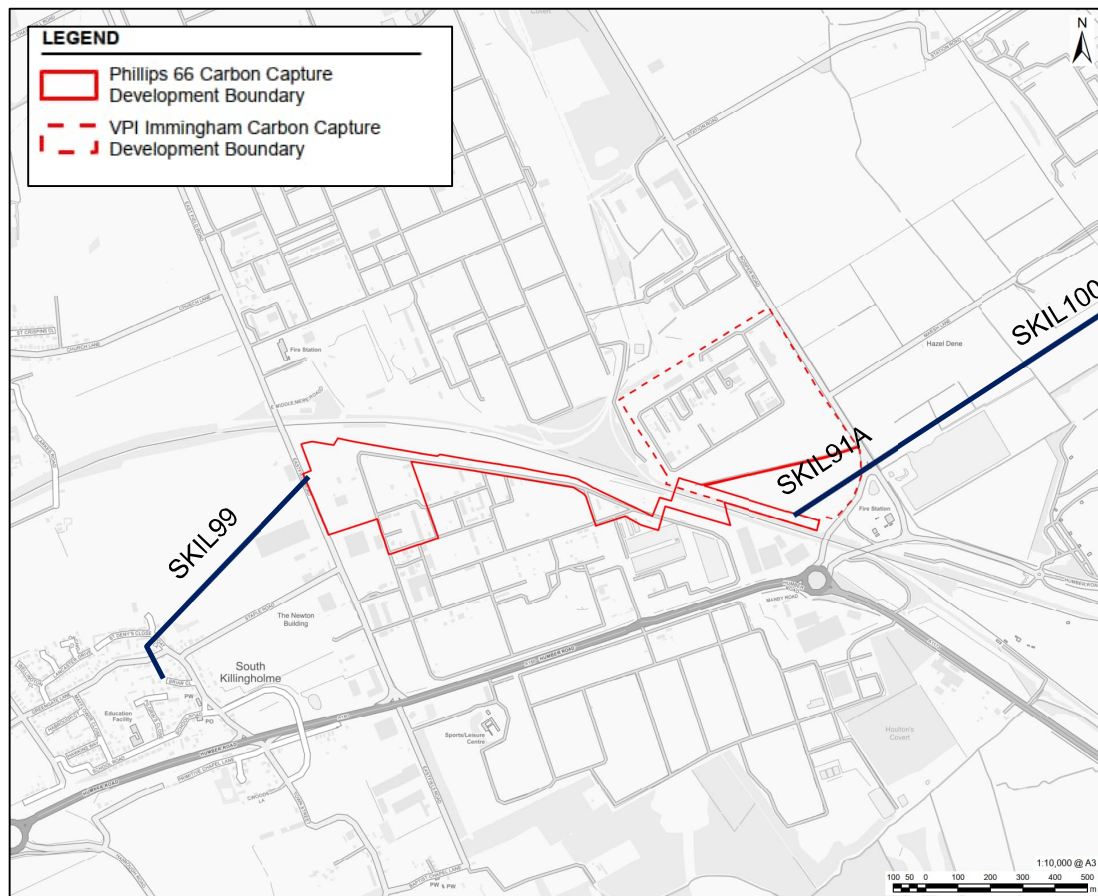
M180

- 8.4.15 The M180 also forms part of the SRN, and, together with the A180, forms the major east – west access route for Immingham Dock and Grimsby. M180 can be utilised to access the M181, Scunthorpe, the A15 and M18 over its c. 40 km route.

Public Right of Way/ Cycle Network

- 8.4.16 There are a number of Public Rights of Way (PRoWs) within and adjacent to the Proposed Development Sites, key routes are identified on Plate 8.3 below, which also shows the Sites boundaries.

Plate 8.3: PRoW/ Cycle Network²



- 8.4.17 PRoW SKIL91A runs within the VPI Site, between the existing railway line and Rosper Road. However, site observations and further research with NLC indicated that this PRoW has not been in use for many years despite still being included on the definitive map. Therefore, an application has been submitted associated with the Proposed VPI Development to extinguish this PRoW, and is currently being processed.
- 8.4.18 An existing Pelican crossing is provided across Eastfield Road along the Phillips 66 Site's western frontage and controlled pedestrian crossing facilities are also provided at the A160 Humber Road/ Eastfield Road signalised crossroads junction, south-east of the Site.
- 8.4.19 It is not anticipated that the Proposed Developments will impact on any elements of the existing pedestrian/ cycle network within the vicinity of the Sites.

Baseline Traffic Data

8.4.20 As noted in the Sources of Information/ Data section above, baseline traffic conditions were established using ATCs at the locations shown in Plate 8.1 supplemented by HGV percentages obtained from Department for Transport (DfT) counters and through WebTRIS. The base traffic is provided in flow diagrams within Appendix 8D in ES Volume II. Locations where this has been applied are indicated on Table 8.5 below and an appropriate footnote included to state the source of the information used.

Table 8.5: 2022 surveyed two-way traffic flows

Site Number	Road Link	Car and LGV	HGV	HGV%	Total Vehicles
1	Rosper Road	2,686	1,114	29.3%	3,800
2	Eastfield Road	6,236	840	11.9%	7,076

² Source: www.northlincs.gov.uk/planning-and-environment/definitive-map

Site Number	Road Link	Car and LGV	HGV	HGV%	Total Vehicles
3	A160 (near Killingholme Petrol Station (PS))*	6,430	6,640	50.8%	13,070
4	A180 (near Ulceby Skitter)*	17,144	10,133	37.2%	27,277
5	A180 (near Immingham)*	11,133	2,065	15.7%	13,198
6	A1173 Manby Road	7,352	1,045	12.4%	8,397
7	A160 (south of Phillips 66 site)*	5,278	5,638	51.7%	10,916
8	Humber Road	7,802	2,018	20.5%	9,820
9	A15*	20,848	2,129	9.3%	22,977

*HGV percentage not recorded at these sites. Has been derived from alternative sources.

8.4.21 The locations that have required their HGV percentage to be derived from an alternative source to the ATC counts have been derived from the sources shown in Table 8.6 below.

Table 8.6: HGV percentage alternative sources

Road Link	HGV%	Source	Site
A160 (near Killingholme PS)	50.8%	WebTRIS	ADT Sites 7072/1 and 7072/2
A180 (near Ulceby Skitter)	37.2%	WebTRIS	ADT Sites 8752/2 and 8753/2
A180 (near Immingham)	15.7%	WebTRIS	ADT Sites 8849/1 and 8850/1
A160 (south of Phillips 66 site)	51.7%	WebTRIS	ADT Sites 9958/1 and 9959/1
A15	9.3%	DfT Counters	Site 57942

8.4.22 As can be seen from the ATC data above, the roads within the study area generally have a high percentage of HGV traffic, over 50% on the A160, reflecting the industrial nature of the area. The percentage of HGV traffic remains high beyond the A160, with the A180 at Ulceby Skitter having an HGV percentage of 37.2% and the Humber Road having an HGV percentage of 20.5%.

Traffic Growth

8.4.23 It is anticipated that construction of the Proposed VPI Development will commence in Q3 of 2024 and the Proposed Phillips 66 Development will commence in Q1 of 2024 with the granting of consent and last approximately 3½ years with the Proposed Phillips 66 development expected to have a marginally shorter construction period. It is therefore necessary to apply a growth factor to the ATC data which has been collected within the study area. Growth factors have been derived from TEMPro v7.2c using the Yorkshire and Humber geographical area. It has been determined that the peak year for HGV traffic differs from the overall peak year for traffic generation for each individual development and the Proposed Developments. Therefore growth factors have been determined for three years to account for the differing peak years of both HGV and Total Construction Traffic Generation for the

individual and cumulative Proposed Developments. The growth factors used are shown in Table 8.7 below.

Table 8.7: Construction year base traffic growth factor

Year	Growth Factor
2025 (Peak HGV and Total Traffic Generation for Proposed Phillips 66 Development)	1.0221
2026 (Peak HGV Traffic Generation of Proposed VPI Development and the Cumulative Developments)	1.0294
2027 (Peak Total Traffic Generation for Proposed VPI Development)	1.036

Source: TEMPro v7.2c

Road Safety

8.4.24 Personal injury accidents within the study area for the most recent full five-year period available (2011-2015), were obtained from the Crashmap Database³. A detailed assessment of accidents is included below.

8.4.25 A comparison with existing national average accident rates (Lynam et al, 2003) has been undertaken on the road sections described below. Table 8.8 shows the fatal and serious accident densities (e.g. accidents per kilometre) for single carriageway roads in the UK by traffic flow (stated as Annual Average Daily Traffic (AADT) flow). It can be seen that as flow increases, the accident density generally increases.

Table 8.8: National fatal and serious accident densities (accident per km) for single carriageway roads by flow group

Flow (AADT)	Accident Density
<5,000	0.14
5,000-10,000	0.23
10,000-20,000	0.35
20,000-40,000	0.46

Rosper Road

8.4.26 The accidents that occurred on Rosper Road have been identified and are shown in Table 8.9.

Table 8.9: Rosper Road Accidents

Year	Slight	Serious	Fatal	Total
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	0	0
2018	0	0	0	0
2019	1	0	0	1
Total	1	0	0	1

³ <https://www.crashmap.co.uk/>

8.4.27 As Table 8.9 shows there has been a very low number of accidents on Rosper Road in the five year period between 2015 and 2019, with only 1 'slight' accident recorded during that time. This link has an AADT of <5000 vehicles with an accident density of 0, therefore the rate is well below the national average of 0.14 accidents per km.

Eastfield Road

8.4.28 The accidents that occurred on Eastfield Road have been identified and are shown in Table 8.10.

Table 8.10: Eastfield Road accidents

Year	Slight	Serious	Fatal	Total
2015	0	0	0	0
2016	0	0	0	0
2017	1	0	0	1
2018	0	0	0	0
2019	0	0	0	0
Total	1	0	0	1

8.4.29 As Table 8.10 shows there has been a very low number of accidents on Eastfield Road in the five year period between 2015 and 2019, with only 1 'slight' accident recorded during that time. This link has an AADT of 5,000-10,000 but has an accident density of 0, therefore below the national average of 0.23 accidents per km.

A160 (Near Killingholme)

8.4.30 The accidents that occurred on the A160 near Killingholme have been identified and are shown in Table 8.11.

Table 8.11: A160 (Near Killingholme) accidents

Year	Slight	Serious	Fatal	Total
2015	2	0	0	2
2016	2	0	0	2
2017	2	0	0	2
2018	1	0	0	1
2019	1	1	0	2
Total	8	1	0	9

8.4.31 As Table 8.11 shows the accidents statistics on this section of the A160 are relatively low, recording 8 'slight' accidents and 1 'serious' accidents in the five year period between 2015 and 2019. This link has an AADT of 10,000-20,000 but has an accident density of 3.9×10^{-15} , therefore below the national average of 0.35 accidents per km.

A180 (Near Ulceby Skitter)

8.4.32 The accidents that occurred on the A180 near Ulceby Skitter have been identified and are shown in Table 8.12.

Table 8.12: A180 (Near Ulceby Skitter) accidents

Year	Slight	Serious	Fatal	Total
2015	12	5	1	18
2016	9	1	2	12
2017	13	4	1	18
2018	12	5	1	18
2019	7	3	0	10
Total	53	18	5	76

8.4.33 As Table 8.12 shows, the A180 near Ulceby Skitter has recorded 53 ‘slight’ accidents, 18 ‘serious’ accidents and 5 ‘fatal’ accidents in the five year period between 2015 and 2019. A large number of these accidents centre around the A180/ A15 roundabout. This link has an AADT of 20,000-40,000 but has an accident density of 5.4×10^{-16} , therefore below the national average of 0.46 accidents per km.

A180 (Near Immingham)

8.4.34 The accidents that occurred on the A180 near Immingham have been identified and are shown in Table 8.13.

Table 8.13: A180 (Near Immingham) Accidents

Year	Slight	Serious	Fatal	Total
2015	5	0	0	5
2016	3	0	0	3
2017	2	0	0	2
2018	4	2	0	6
2019	3	0	0	3
Total	17	2	0	19

8.4.35 As Table 8.13 shows, the A180 near Immingham has recorded 17 ‘slight’ accidents, 2 ‘serious’ accidents and 0 ‘fatal’ accidents in the five year period between 2015 and 2019. This is considered a low accident rate on a road of this type. This link has an AADT of 10,000-20,000 but has an accident density of 4.3×10^{-16} , therefore below the national average of 0.35 accidents per km.

A1173 Manby Road

8.4.36 The accidents that occurred on the A1173 Manby Road have been identified and are shown in Table 8.14.

Table 8.14: A1173 Manby Road Accidents

Year	Slight	Serious	Fatal	Total
2015	1	0	0	1
2016	2	0	0	2
2017	1	1	0	2
2018	0	0	0	0
2019	3	0	0	3

Year	Slight	Serious	Fatal	Total
Total	7	1	0	8

8.4.37 As Table 8.14 shows, the A1173 Manby Road has recorded a relatively low number of accidents at 7 'slight' accidents, 1 'serious' accidents and 0 'fatal' accidents in the five year period between 2015 and 2019. This link has an AADT of 5,000-10,000 but has an accident density of 9.2×10^{-16} , therefore below the national average of 0.23 accidents per km.

A160 (South of Phillips 66 Site)

8.4.38 The accidents that occurred on the A160 South of the Phillips 66 Site have been identified and are shown in Table 8.15.

Table 8.15: A160 (South of Phillips 66 Site) Accidents

Year	Slight	Serious	Fatal	Total
2015	0	0	0	0
2016	3	0	0	3
2017	0	0	0	0
2018	0	0	0	0
2019	1	0	0	1
Total	4	0	0	4

8.4.39 As Table 8.15 shows, the A160 South of the Phillips 66 Site has recorded a relatively low number of accidents at 4 'slight' accidents, 0 'serious' accidents and 0 'fatal' accidents in the five year period between 2015 and 2019. This link has an AADT of 10,000-20,000 but has an accident density of close to 0, therefore below the national average of 0.35 accidents per km.

Humber Road

8.4.40 The accidents that occurred on the Humber Road have been identified and are shown in Table 8.16.

Table 8.16: Humber Road Accidents

Year	Slight	Serious	Fatal	Total
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	0	0
2018	0	0	0	0
2019	0	0	0	0
Total	0	0	0	0

8.4.41 As Table 8.16 shows, this section of Humber Road recorder zero accidents during the five year period between 2015 and 2019. This link has an AADT of 5,000-10,000 but has an accident density of 0, therefore below the national average of 0.23 accidents per km.

A15

8.4.42 The accidents that occurred on the A15 have been identified and are shown in Table 8.17.

Table 8.17: A15 Accidents

Year	Slight	Serious	Fatal	Total
2015	0	0	0	0
2016	5	0	0	5
2017	3	3	0	6
2018	2	0	0	2
2019	3	0	1	4
Total	13	3	1	17

8.4.43 As Table 8.17 shows, the A15 has recorded 13 ‘slight’ accidents, 3 ‘serious’ accidents and 1 ‘fatal’ accident in the five year period between 2015 and 2019. This is considered a low accident rate on a road of this type, however it should be noted that the junction between the A180 and A15 did show a higher number of recorded accidents which have been reflected in the A180 Ulceby Skitter statistics rather than the A15 statistics. This link has an AADT of 20,000-40,000 but has an accident density of 2.9×10^{-16} , therefore below the national average of 0.46 accidents per km.

Receptor Sensitivity

8.4.44 A number of receptors have been identified where potential impacts have subsequently been assessed. For the purposes of the assessment, the receptor locations are the same as the locations of the ATC surveys. The locations, along with their baseline sensitivity are provided in Table 8.18.

Table 8.18: Receptor Sensitivity

Receptor Location	ATC Site	Sensitivity Rating	Description	Distance from Proposed Phillips 66 Site	Distance from Proposed VPI Site
Rosper Road	1	Low	Industrial area with no nearby residential areas	0 km	0 km
Eastfield Road	2	Low	Industrial area with no nearby residential areas	0 km	1 km
A160 (near Killingholme PS)	3	Low	School and residential areas nearby but well set back from the carriageway with screening	1 km	2 km
A180 (near Ulceby Skitter)	4	Negligible	Highway with no adjacent places or residential areas.	4.5 km	5 km
A180 (near Immingham)	5	Negligible	Highway with no adjacent places or residential areas.	3 km	3 km
A1173 Manby Road	6	Low	Industrial area with no nearby residential areas	2 km	1 km

Receptor Location	ATC Site	Sensitivity Rating	Description	Distance from Proposed Phillips 66 Site	Distance from Proposed VPI Site
A160 (south of Phillips 66 Site)	7	Low	Industrial area with no nearby residential areas	0.5 km	1 km
Humber Road	8	Low	Industrial area with no nearby residential areas	2 km	1 km
A15	9	Negligible	Highway with no adjacent places or residential areas.	11.5 km	13 km

8.5 Development Design and Impact Avoidance

8.5.1 Measures that have been integrated into the Proposed Development designs in order to avoid or reduce possible adverse environmental effects.

Construction Phase

8.5.2 During the construction phase, suitable access points will be used for vehicles to arrive at and depart from the Sites. In addition, a new access point will be constructed on Eastfield Road to facilitate safe traffic movements to/ from the Phillips 66 Site. For the VPI Site, a new access junction on Rosper Road is proposed to be constructed.

8.5.3 The Sites are also well located for direct access to the SRN therefore HGVs will not need to pass through residential areas or other sensitive areas.

8.6 Likely Impacts and Effects of the Proposed Developments

8.6.1 This section identifies the likely impacts and effects resulting from the construction phase for the Proposed Developments. The magnitude of impacts is defined with reference to the relevant baseline conditions and effects are determined in accordance with the identified methodology. As described earlier, where relevant the effects of the Proposed Developments are described compared to future baselines with and without the Proposed Developments.

Basis of Assessment

8.6.2 This section outlines the basis of assessment, which includes further details of the traffic implications during the construction phase. Further details of the following are provided below:

- construction traffic volumes;
- construction programmes;
- construction traffic distribution and assessment; and
- construction assumptions.

Construction Traffic Volumes

8.6.3 Information regarding the likely number and types of vehicular trips that will be necessary to construct the Proposed Developments has been provided by the Applicants and is based on the estimated material quantities required as the number of workers estimated to be required on site throughout the construction period.

8.6.4 Construction trips generated by the Proposed Developments have been split into worker trips (assumed as 1 car per worker, which is considered as a worst case scenario as some would

be expected to travel using other modes such as car share, public transport etc.) and HGV trips.

- 8.6.5 The breakdown of the total two-way vehicle movements expected as part of the construction phases, along with those expected in the peak month, is summarised in Table 8.19. Construction traffic was provided in the form of daily requirements of HGV and workers on each Site for each month during anticipated construction period. The cumulative peak period for HGVs and overall traffic has then been determined from these monthly profiles. It should be noted that HGV traffic generation was not provided for the Phillips 66 Site and therefore it has been assumed to follow the same schedule as the expected VPI Site construction traffic numbers, albeit with differing programme commencement dates. Flow diagrams indicating the separate construction traffic movements are provided within Appendix 8D (ES Volume II).

Table 8.19: Estimated construction traffic - Proposed VPI Development (two-way movements)

Site	Vehicle Type	Peak HGV Period (2026)	Peak Total Traffic Period (2027)
VPI	HGVs	230	80
	Cars/ LGVs	442	1,686
	Total	672	1,766

Table 8.20: Estimated construction traffic – Proposed Phillips 66 Development (two-way movements)

Site	Vehicle Type (Peak Year)	Peak HGV Period (2025)	Peak Total Traffic Period (2025)
Phillips 66	HGVs	230	230
	Cars/ LGVs	1,580	1,580
	Total	1,810	1,810

Table 8.21: Estimated construction traffic - combined (two-way movements)

Site	Vehicle Type (Peak Year)	Peak HGV Period (2026)	Peak Total Traffic Period (2025)
Both Sites	HGVs	350	260
	Cars/ LGVs	1,358	1,694
	Total	1,708	1,954

- 8.6.6 Whilst it is accepted that there will be movements of larger construction vehicles in addition to the HGVs, such as cranes, the number of daily movements is expected to be small, therefore has not been considered as part of the assessment.

- 8.6.7 It should be noted that some works may be carried out overnight, resulting in a small number of associated vehicle movements. As this number would be small, further assessment of traffic outside of the current daytime periods was not considered necessary.

Construction Programme

- 8.6.8 The construction phase is expected to commence in Q3-2024 for the Proposed VPI Development and Q1 of 2024 for the Proposed Phillips 66 Development and be completed by late 2027/early 2028.

- 8.6.9 Analysis of the month by month traffic profile allowed a peak month for HGV traffic and overall traffic to be derived, based on the daily trips to and from the Sites and their overall percentage impact on the roads within the study area.
- 8.6.10 Whilst traffic would be expected throughout the construction period, only the peak month for traffic has been assessed to determine the impact of the worst case traffic scenario.
- 8.6.11 The peak months of HGV traffic occur in 2026 for the Proposed VPI Immingham Development (Month 30), 2025 for the Proposed Phillips 66 Development (Month 23) and 2026 for the Proposed Developments when combined (Month 27). Based on the anticipated construction programmes, the peak month for overall traffic generation has been determined to be Month 40, occurring in 2027 for the Proposed VPI Immingham Development, Month 23, occurring in 2025 for the Proposed Phillips 66 Development and Month 23, occurring in 2025 for the Proposed Developments combined based on the anticipated programmes.

Construction Traffic Distribution and Assessment

- 8.6.12 The construction traffic detailed in the above sections has been distributed onto the local road network within the study area to facilitate the assessment work.
- 8.6.13 Traffic distribution diagrams have been produced to aid the process of distributional assignment onto the local road network within the study area.
- 8.6.14 The distribution methodology has been separated into two elements, with one focussing on the distribution of workers and one on the distribution of HGVs during the construction period. Both methodologies have been agreed with NLC.

Car/ LGV Traffic Distribution (Workers)

- 8.6.15 In order to assume a robust traffic distribution of workers travelling to and from the Sites each day, a gravity model has been developed.
- 8.6.16 It is currently unknown where workers may originate, therefore the distribution of worker origin has been based on the approximate populations of large settlements (>6,000 people) within a 60 minute driving time of the Sites. For those settlements towards the maximum journey time of 60 minutes, a weighting of 0.7 has been applied to reflect the additional distance needed to travel, hence the reduce likelihood of people travelling from that area. This methodology has been agreed with NLC.
- 8.6.17 Table 8.22 indicates the distribution based on each settlement identified.

Table 8.22: Worker location distribution

Town	Population	Distance Weighting	Weighted Population	Distribution
Hull	261,149	1	261,149	37.4%
Doncaster	109,805	0.7	76,864	11.0%
Lincoln	97,541	0.7	68,279	9.8%
Grimsby	88,105	1	88,105	12.6%
Scunthorpe	82,334	1	82,334	11.8%
Beverley	31,198	0.7	21,839	3.1%
Gainsborough	23,243	0.7	16,270	2.3%
Retford	22,013	0.7	15,409	2.2%
Goole	19,518	0.7	13,663	2.0%
Thorne	17,295	0.7	12,107	1.7%
Louth	16,419	0.7	11,493	1.6%

Town	Population	Distance Weighting	Weighted Population	Distribution
Barton-Upon-Humber	11,066	1	11,066	1.6%
Immingham	9,642	1	9,642	1.4%
Hedon	7,100	0.7	4,970	0.7%
Horncastle	6,815	0.7	4,771	0.7%

8.6.18 The above distribution percentages were then applied to the relevant road links within the study area in order to carry out the impact assessment. This is summarised in Table 8.23 below and a diagram of the distribution is provided in Appendix 8A (in Volume II of this ES).

Table 8.23: Worker distribution percentage by road link

Site	Road	Proposed VPI Development Distribution	Proposed Phillips 66 Development Distribution
1	Rosper Road	100%	0%
2	Eastfield Road	0%	100%
3	A160 (near Killingholme PS)	83.7%	98.6%
4	A180 (near Ulceby Skitter)	83.7%	83.7%
5	A180 (near Immingham)	0%	12.6%
6	A1173 Manby Road	15.7%	1.4%
7	A160 (south of Phillips 66 Site)	84.3%	1.4%
8	Humber Road	0%	0%
9	A15	42.8%	42.8%

HGV Distribution

8.6.19 A separate methodology has been developed in order to assume a robust distribution of HGVs onto the local network. Vehicles have been distributed according to the relative number of HGVs which have been recorded in the baseline flows from traffic surveys undertaken in 2022, DfT counters and WebTRIS counters.

8.6.20 The result of these calculations when applied to the relevant road links is summarised in Table 8.24 below and a diagram containing the HGV distributions is contained with Appendix 8D (in Volume II of this ES).

Table 8.24: HGV distribution percentage by road link

Site	Road	Proposed VPI Development Distribution	Proposed Phillips 66 Development Distribution
1	Rosper Road	100%	0%
2	Eastfield Road	0%	100%
3	A160 (near Killingholme PS)	64.8%	54.1%
4	A180 (near Ulceby Skitter)	53.8%	44.9%
5	A180 (near Immingham)	11.0%	9.2%
6	A1173 Manby Road	12.0%	15.7%

Site	Road	Proposed VPI Development Distribution	Proposed Phillips 66 Development Distribution
7	A160 (south of Phillips 66 Site)	64.8%	45.9%
8	Humber Road	23.2%	30.3%
9	A15	9.4%	7.8%

Likely Impacts

Overview of Potential Impacts

- 8.6.21 This section assesses the temporary impacts of percentage increases in traffic associated with the construction of the Proposed Developments on the surrounding road network and receptors.
- 8.6.22 The worst case potential impacts of traffic are likely to be temporary in nature (e.g. the peak period of construction), therefore have been assessed as such within this section.
- 8.6.23 Whilst traffic would be expected throughout the construction phases, only the peak months for HGV and overall traffic have been assessed. This ensures that a robust worst case traffic scenario is considered.
- 8.6.24 The assessment describes the likely impacts and effects associated with each of the Proposed Developments separately and cumulatively.
- 8.6.25 A number of impacts have been specifically assessed, as follows:
- HGV construction traffic;
 - road safety;
 - severance; and
 - pedestrian and cycle amenities.
- 8.6.26 The assessment of significance for each of the above elements has been assessed using the criteria set out in Table 8.3 in Section 8.3.

HGV Construction Traffic Impacts

- 8.6.27 The following tables summarise the potential effects of the additional HGV traffic generated by the Proposed VPI Development and the Proposed Phillips 66 Development, as well as their combined effects during the construction period in the peak HGV month.

Table 8.25: HGV traffic impact significance of effects (Proposed VPI Development)

Site	Road Link	Receptor Sensitivity	% Increase HGVs	Magnitude	Significance of Effect
1	Rosper Road	Low	20.1%	Low	Negligible (not significant)
2	Eastfield Road	Low	0%	Negligible	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	2.2%	Negligible	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	1.2%	Negligible	Negligible (not significant)
5	A180 (near Immingham)	Negligible	1.2%	Negligible	Negligible (not significant)

Site	Road Link	Receptor Sensitivity	% Increase HGVs	Magnitude	Significance of Effect
6	A1173 Manby Road	Low	2.6%	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	2.6%	Negligible	Negligible (not significant)
8	Humber Road	Low	2.6%	Negligible	Negligible (not significant)
9	A15	Negligible	1%	Negligible	Negligible (not significant)

8.6.28 As shown in Table 8.25 above, all the links in the study area would experience a **negligible** effect as a result of the construction of the Proposed VPI Development with the largest effect observed in Rosper Road which was an increase of 20.1%. The effects are considered to be **not significant**.

Table 8.26: HGV traffic impact significance of effects (Proposed Phillips 66 Development)

Site	Road Link	Receptor Sensitivity	% Increase HGVs	Magnitude	Significance of Effect
1	Rosper Road	Low	0%	Negligible	Negligible (not significant)
2	Eastfield Road	Low	26.8.0%	Medium	Minor adverse (not significant)
3	A160 (near Killingholme PS)	Low	1.8%	Negligible	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	1%	Negligible	Negligible (not significant)
5	A180 (near Immingham)	Negligible	1%	Negligible	Negligible (not significant)
6	A1173 Manby Road	Low	3.4%	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	1.8%	Negligible	Negligible (not significant)
8	Humber Road	Low	3.4%	Negligible	Negligible (not significant)
9	A15	Negligible	0.8%	Negligible	Negligible (not significant)

8.6.29 As Table 8.26 above shows, all links within the study would experience a **negligible** effect due to construction of the Proposed Phillips 66 Development, except Eastfield Road, which experiences a **minor adverse** effect, as a result of the 26.8% increase in HGV traffic during the peak month of HGV traffic generation. The effects are considered to be **not significant**.

Table 8.27: HGV traffic impact significance of effects (combined Proposed Developments)

Site	Road Link	Receptor Sensitivity	% Increase HGVs	Magnitude	Significance of Effect
1	Rosper Road	Low	17.4%	Low	Negligible (not significant)
2	Eastfield Road	Low	17.3%	Low	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	3.1%	Negligible	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	1.7%	Negligible	Negligible (not significant)
5	A180 (near Immingham)	Negligible	1.7%	Negligible	Negligible (not significant)
6	A1173 Manby Road	Low	4.4%	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	3.4%	Negligible	Negligible (not significant)
8	Humber Road	Low	4.4%	Negligible	Negligible (not significant)
9	A15	Negligible	1.4%	Negligible	Negligible (not significant)

8.6.30 As shown in Table 8.27, all locations identified within the study area are judged to experience a **negligible** effect due to increases in HGV traffic. The highest increases in HGV traffic are experienced on the access roads leading to each of the Sites at 17.4% and 17.3% for Rosper Road and Eastfield Road, respectively. Combined with the receptor being of low sensitivity, this results in an overall **negligible** effect at these locations. Similar to the assessment of HGV traffic at each, the combined effects are considered to be **not significant**.

8.6.31 HGV increases on all other links apart from Rosper Road and Eastfield Road are less than 10% and therefore **negligible** effects (**not significant**). The percentage increase at these links is low as they already have significant HGV traffic and therefore these links are well accustomed to HGV traffic.

Road Safety Impacts

8.6.32 The following tables summarise the potential effects on road safety during the Proposed VPI Development and Proposed Phillips 66 Development construction phases, as well as their combined effects during this period.

Table 8.28: Road safety impact significance of effects (Proposed VPI Development)

Site	Road Link	Receptor Sensitivity	Traffic Increase	Magnitude	Significance of Effect
1	Rosper Road	Low	High	Negligible	Negligible (not significant)
2	Eastfield Road	Low	Medium	Negligible	Negligible (not significant)

Site	Road Link	Receptor Sensitivity	Traffic Increase	Magnitude	Significance of Effect
3	A160 (near Killingholme PS)	Low	Medium	Negligible	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Low	Low	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Negligible	Negligible	Negligible (not significant)
6	A1173 Manby Road	Low	Negligible	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Low	Negligible	Negligible (not significant)
8	Humber Road	Low	Negligible	Negligible	Negligible (not significant)
9	A15	Negligible	Low	Negligible	Negligible (not significant)

8.6.33 As shown in Table 8.28 above, it is anticipated that all links within the study area would experience a **negligible** effect on road safety during the construction of the Proposed VPI Development, which would be considered **not significant**.

Table 8.29: Road safety impact significance of effects (Proposed Phillips 66 Development)

Site	Road Link	Receptor Sensitivity	Traffic Increase	Magnitude	Significance of Effect
1	Rosper Road	Low	High	Negligible	Negligible (not significant)
2	Eastfield Road	Low	Medium	Negligible	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Medium	Negligible	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Low	Negligible	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Negligible	Negligible	Negligible (not significant)
6	A1173 Manby Road	Low	Negligible	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Low	Negligible	Negligible (not significant)
8	Humber Road	Low	Negligible	Negligible	Negligible (not significant)
9	A15	Negligible	Low	Negligible	Negligible (not significant)

8.6.34 As shown in Table 8.29 above, it is anticipated that all links within the study area would experience a **negligible** effect on road safety during the construction of the Proposed Phillips 66 Development, which would not be considered significant.

Table 8.30: Road safety impact significance of effects (combined Proposed Developments)

Site	Road Link	Receptor Sensitivity	Traffic Increase	Magnitude	Significance of Effect
1	Rosper Road	Low	High	Negligible	Negligible (not significant)
2	Eastfield Road	Low	Medium	Negligible	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Medium	Negligible	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Low	Low	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Negligible	Negligible	Negligible (not significant)
6	A1173 Manby Road	Low	Negligible	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Low	Negligible	Negligible (not significant)
8	Humber Road	Low	Negligible	Negligible	Negligible (not significant)
9	A15	Negligible	Low	Low	Negligible (not significant)

8.6.35 As shown in Table 8.30 above, the effect in terms of road safety is judged to be **negligible (not significant)** on all links within the study area. Traffic increases are highest on Rosper Road, Eastfield Road and the A160 (near Killingholme PS), however, these links have very low instances of accidents and therefore remain **negligible (not significant)** in their effect. The links that have the highest rates of accidents in the study area are the A180 (near Ulceby Skitter) and the A15, both of which are not expected to experience high traffic increases as a result of the Proposed Developments.

Severance Impacts

8.6.36 The following tables summarise the potential effects on severance during the Proposed Developments construction phases, as well as their combined effects during this period.

Table 8.31: Severance significance of effects (Proposed VPI Development)

Site	Road Link	Receptor Sensitivity	Nature of Effect (% increase in Traffic)	Magnitude	Significance of Effect
1	Rosper Road	Low	Total = 44.9% HGV = 6.9%	Low	Negligible (not significant)
2	Eastfield Road	Low	Total = 0% HGV = 0%	Negligible	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Total = 10.8% HGV = 0.8%	Negligible	Negligible (not significant)

Site	Road Link	Receptor Sensitivity	Nature of Effect (% increase in Traffic)	Magnitude	Significance of Effect
4	A180 (near Ulceby Skitter)	Negligible	Total = 5.1% HGV = 0.4%	Negligible	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Total = 0.1% HGV = 0.4%	Negligible	Negligible (not significant)
6	A1173 Manby Road	Low	Total = 3.1% HGV = 0.9%	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Total = 13% HGV = 0.9%	Negligible	Negligible (not significant)
8	Humber Road	Low	Total = 0.2% HGV = 0.9%	Negligible	Negligible (not significant)
9	A15	Negligible	Total = 3.1% HGV = 0.3%	Negligible	Negligible (not significant)

8.6.37 Table 8.31 above shows that all links within the study area would experience a **negligible (not significant)** effect on severance as a result of the Proposed VPI Development. The magnitude of effect is highest on Rosper Road, however this effect is considered low. None of the severance effects due to the Proposed VPI Development are considered to be significant.

Table 8.32: Severance significance of effects (Proposed Phillips 66 Development)

Site	Road Link	Receptor Sensitivity	Nature of Effect (% increase in Traffic)	Magnitude	Significance of Effect
1	Rosper Road	Low	Total = 0% HGV = 0%	Negligible	Negligible (not significant)
2	Eastfield Road	Low	Total = 25.0% HGV = 26.8%	Low	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Total = 12.6% HGV = 1.8%	Negligible	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Total = 5.1% HGV = 1.0%	Negligible	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Total = 1.6% HGV = 1.0%	Negligible	Negligible (not significant)
6	A1173 Manby Road	Low	Total = 0.7% HGV = 3.4%	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Total = 1.1% HGV = 1.8%	Negligible	Negligible (not significant)
8	Humber Road	Low	Total = 0.7% HGV = 3.4%	Negligible	Negligible (not significant)
9	A15	Negligible	Total = 3.0% HGV = 0.8%	Negligible	Negligible (not significant)

8.6.38 Table 8.31 above shows that all links within the study area would be expected to experience a **negligible** effect as a result of the construction of the Proposed Phillips 66 Development, which would be considered **not significant**.

Table 8.33: Severance significance of effects (combined Proposed Developments)

Site	Road Link	Receptor Sensitivity	Nature of Effect (% increase in Traffic)	Magnitude	Significance of Effect
1	Rosper Road	Low	Total = 3.7% HGV = 2.6%	Negligible	Negligible (not significant)
2	Eastfield Road	Low	Total = 25.0% HGV = 26.8%	Low	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Total = 13.5% HGV = 2.1%	Negligible	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Total = 5.5% HGV = 1.2%	Negligible	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Total = 1.7% HGV = 1.2%	Negligible	Negligible (not significant)
6	A1173 Manby Road	Low	Total = 0.9% HGV = 3.7%	Negligible	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Total = 2.2% HGV = 2.2%	Negligible	Negligible (not significant)
8	Humber Road	Low	Total = 0.8% HGV = 3.7%	Negligible	Negligible (not significant)
9	A15	Negligible	Total = 3.2% HGV = 1.0%	Negligible	Negligible (not significant)

8.6.39 As shown in Table 8.33 above, the effects of severance on all links within the study area are considered to be **negligible**, which is considered to therefore impacts are **not significant**.

Pedestrian/ Cycling Impacts

8.6.40 The following tables summarise the potential effects on pedestrians and cyclists during the construction phases of the Proposed Developments, as well as their combined effects during this period.

Table 8.34: Pedestrian/Cyclist significance of effects (Proposed VPI Development)

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect
1	Rosper Road	Low	No pedestrian or cycle facilities	High	Moderate (significant)
2	Eastfield Road	Low	Some pedestrian facilities set back from the carriageway with a safe signalised crossing point	Negligible	Negligible (not significant)

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect
3	A160 (near Killingholme PS)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
4	A180 (near Ulceby Skitter)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)
5	A180 (near Immingham)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)
6	A1173 Manby Road	Low	Footways with limited crossing opportunities and no cycle facilities	Medium	Minor adverse (not significant)
7	A160 (south of Phillips 66 Site)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
8	Humber Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
9	A15	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)

8.6.41 Table 8.34 above shows that there are **moderate adverse (significant)** effects on pedestrians and cyclists at four links in the study area during the construction period of the Proposed VPI Development: Rosper Road, A160 (near Killingholme PS), A160 (south of Phillips 66 site) and Humber Road. The other links present **minor adverse** or **negligible (not significant)** effects.

Table 8.35: Pedestrian/Cyclist significance of effects (Proposed Phillips 66 Development)

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect
1	Rosper Road	Low	No pedestrian or cycle facilities	Negligible	Negligible (not significant)
2	Eastfield Road	Low	Some pedestrian facilities set back from the carriageway with a safe signalised crossing point	Low	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
4	A180 (near Ulceby Skitter)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect
5	A180 (near Immingham)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)
6	A1173 Manby Road	Low	Footways with limited crossing opportunities and no cycle facilities	Medium	Minor adverse (not significant)
7	A160 (south of Phillips 66 site)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
8	Humber Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
9	A15	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)

8.6.42 Table 8.35 above shows that there are **moderate adverse (significant)** effects on pedestrians and cyclists at three links in the study area during the construction period of the Proposed Phillips 66 Development: A160 (near Killingholme PS), A160 (south of Phillips 66 site) and Humber Road. The other links present **minor adverse** or **negligible (not significant)** effects.

Table 8.36: Pedestrian/Cyclist significance of effects (Combined Proposed Developments)

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect
1	Rosper Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
2	Eastfield Road	Low	Some pedestrian facilities set back from the carriageway with a safe signalised crossing point	Low	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	No pedestrian or cycle facilities	High	Moderate (significant) adverse
4	A180 (near Ulceby Skitter)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)
5	A180 (near Immingham)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)
6	A1173 Manby Road	Low	Footways with limited crossing opportunities	Medium	Minor adverse (not significant)

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect
			and no cycle facilities		
7	A160 (south of Phillips 66 Site)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
8	Humber Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)
9	A15	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)

8.6.43 As shown in Table 8.34 above, a number of links present a **moderate adverse** or **minor adverse (significant)** effect on pedestrians and cyclists. There is very limited pedestrian/cyclist infrastructure on most of the links identified meaning a high magnitude of impact in accordance with Section 8.3. However, many of these links are not associated with pedestrian or cyclist movements and would not be considered appropriate routes for those modes to access the Proposed Developments. The works are also temporary in nature, and therefore any significant effects experienced on the Rosper Road, A160 (near Killingholme PS), A160 (South of Phillips 66 Site) and Humber Road links, although considered significant, would only be apparent for a limited period of time. The effects at the remaining sites were **minor adverse or negligible** and are therefore considered to be **not significant**.

8.7 Mitigation and Enhancement Measures

8.7.1 This section describes the measures that will be implemented to reduce any significant adverse effects identified by the assessment and enhance beneficial effects.

8.7.2 Mitigation will be delivered through the Construction Environmental Management Plan (CEMP) (see Outline CEMP in Appendix 4A in Volume II of this ES), Construction Traffic Management Plan (CTMP) (Appendix 8B in Volume II of this ES) and Construction Worker Travel Plan (CWTP) (Appendix 8C in Volume II of this ES).

HGV Construction Traffic

8.7.3 Mitigation relating to traffic movements associated with the Proposed Developments would be focused primarily on HGV traffic, as the additional car/ LGV trips will have a negligible impact on future traffic flows. However, as best practice the impacts of car /LGV trips will also be mitigated through the encouragement of worker car share and other measures detailed within the CWTP.

8.7.4 Based on the assessment criteria of HGV traffic, the only method of reducing the overall significance of effect would be through a reduction in overall HGV traffic during construction (either by reducing the total number required or re-routeing traffic). This will not be possible, hence the residual impacts would remain the same post mitigation, however, there are a number of softer measures that would help to lessen the general impacts of the construction traffic.

8.7.5 The number of HGVs associated with construction is likely to have a potentially adverse, but temporary and isolated effect on the local highway network. Therefore, the programming of such movements could potentially be subject to restrictions during certain periods of the day.

8.7.6 In addition, extensive route planning and analysis was carried out during the assessment of traffic impacts in order to devise the most appropriate route for vehicles travelling to and from the proposed site (e.g. to ensure avoidance of residential and other sensitive areas) as much as possible. This process involved a detailed assessment of all A-roads, B-roads and

unclassified roads in the study area to ascertain their suitability for use by HGVs and other large vehicles required.

8.7.7 A desktop review, supported by a site visit, was conducted that identified a number of features on the routes that could potentially affect their suitability, as follows:

- proximity to settlements;
- road width;
- weight restrictions;
- height restrictions;
- bridges;
- level crossings; and
- other obstacles.

8.7.8 A CTMP has also been developed, which identifies how traffic would be managed throughout the duration of the construction period. The CTMP includes the following:

- location of site and the entry/exit arrangements;
- traffic routing plans – defining the routes to be taken by HGVs to the site. For example, prioritising the use of A and B-roads as far as possible and avoidance of sensitive locations;
- construction hours and delivery times;
- strategy for traffic management and measures for informing construction traffic of local access routes, road restrictions, timing restrictions and where access is prohibited;
- measures to protect the public highway (e.g. wheel wash facilities);
- measures for the monitoring of the CTMP to ensure compliance from drivers and appropriate actions in the event of non-compliance;
- mechanism for responding to traffic management issues arising during the works (including concerns raised from the public) including a joint consultation approach with relevant highways authorities;
- details of traffic management requirements; and
- strategy for traffic management and measures for informing construction traffic of local access routes, road restrictions (statutory limits: width, height, axle loading and gross weight), timing restrictions (if applicable) and where access is prohibited.

8.7.9 Control measures will include:

- all construction traffic to adhere to the Traffic Route Plans included in the CTMP;
- all vehicles will be able to access and egress the site in a forward gear, with sufficient room off the public highway to allow them to wait without blocking the main carriageway;
- welfare facilities will be provided so as to minimise the need for off-site trips by staff during the working day;
- at all site accesses, suitable supervision will be provided as required to ensure that traffic is controlled at access points during construction (for example banksman checking road traffic and controlling construction vehicle movements) and mud deposits on the roads are minimised; and
- where required, traffic signals (in accordance with New Roads and Street Works Act (NRSWA) or stop-go boards will be used to control road traffic. Road signs will conform to Chapter 8 of the Traffic Signs Manual (DfT, 2009) and NRSWA.

Road Safety

- 8.7.10 Whilst the majority of impacts relating to road safety are negligible, the accesses from the public highways Rosper Road and Eastfield Road will use banksmen to manage the movement of HGVs on and off the public highway. Warning signage will be provided on the approaches to the access junctions.

Pedestrians and Cyclists

- 8.7.11 As both Sites are currently operational, it is likely that travel plans within the Sites will be well established. However, the construction period will represent a significant increase in numbers of workers on these Sites at one time and therefore a Construction Workers Travel Plan (CWTP) would be beneficial (see Appendix 8C in ES Volume II).
- 8.7.12 As part of a CWTP developed for the Proposed Developments, measures such as internal site layouts to accommodate the movement of pedestrian and cyclists will be designed. This will provide benefits within the Sites, but will not provide benefits to external receptors.
- 8.7.13 There will, however, be very few pedestrian/ cyclist movements expected as part of the construction phase of the development, given the industrial nature of the site and distances to nearby settlements.

Travel Plan

- 8.7.14 Construction Workers Travel Plans for both sites would be introduced in order to encourage sustainable travel to both Proposed Developments. The Travel Plans would include measures such as encouragement of car sharing and public transport usage, better marketing of information and implementation of a Travel Plan Co-ordinator. Where appropriate, a shuttle bus to transport workers to key interchange locations could be introduced.
- 8.7.15 It is considered that with the implementation of the above measures, any minor effects on road users during the construction period will be reduced further. Where appropriate, HGVs would access and egress in a forward gear. At all accesses, warning signage will be provided on the approaches to the access junctions.

8.8 Residual Effects and Conclusions

- 8.8.1 Effects of the Proposed Developments remaining following the implementation of available mitigation measures are known as 'residual effects'. This section of the report outlines the residual effects of the potential traffic impacts, following the implementation of mitigation.

HGV Construction Traffic

- 8.8.2 Table 8.37 presents a summary of the residual effects of the additional HGV traffic generated by the Proposed VPI Development following the implementation of associated mitigation.

Table 8.37: HGV traffic impact significance of effects – residual effects (Proposed VPI Development)

Site	Road Link	Receptor Sensitivity	HGV % Increase	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	20.1%	Low	Negligible (not significant)	Negligible (not significant)
2	Eastfield Road	Low	0.0%	Negligible	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	2.2%	Negligible	Negligible (not significant)	Negligible (not significant)

Site	Road Link	Receptor Sensitivity	HGV % Increase	Magnitude	Significance of Effect	Residual Significance
4	A180 (near Ulceby Skitter)	Negligible	1.2%	Negligible	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	1.2%	Negligible	Negligible (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	2.6%	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	2.6%	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	2.6%	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	1.0%	Negligible	Negligible (not significant)	Negligible (not significant)

8.8.3 Table 8.37 above shows that the residual effect at every link within the study area is **not significant** as a result of the construction period for the Proposed VPI Development.

Table 8.38: HGV traffic impact significance of effects – residual effects (Proposed Phillips 66 Development)

Site	Road Link	Receptor Sensitivity	HGV % Increase	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	0.0%	Negligible	Negligible (not significant)	Negligible (not significant)
2	Eastfield Road	Low	26.8%	Medium	Minor adverse (not significant)	Minor adverse (not significant)
3	A160 (near Killingholme PS)	Low	1.8%	Negligible	Negligible (not significant)	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	1.0%	Negligible	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	1.0%	Negligible	Negligible (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	3.4%	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 site)	Low	1.8%	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	3.4%	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	0.8%	Negligible	Negligible (not significant)	Negligible (not significant)

8.8.4 Table 8.38 above shows that the residual effect at every link within the study area is **not significant** as a result of the construction period for the Proposed Phillips 66 Development.

Table 8.39: HGV traffic impact significance of effects – residual effects (combined Proposed Developments)

Site	Road Link	Receptor Sensitivity	HGV % Increase	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	17.4%	Low	Negligible (not significant)	Negligible (not significant)
2	Eastfield Road	Low	17.3%	Low	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	3.1%	Negligible	Negligible (not significant)	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	1.7%	Negligible	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	1.7%	Negligible	Negligible (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	4.4%	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	3.4%	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	4.4%	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	1.4%	Negligible	Negligible (not significant)	Negligible (not significant)

8.8.5 As indicated in Table 8.39, the residual effects of increases in HGV traffic are as they were prior to any mitigation. The links within the study area experienced a **negligible** effect as a result of increases in HGV traffic. It was determined that little can be done to decrease the HGV traffic requirements of the construction of the Proposed Developments and therefore there is no change to the expected effects. The period assessed for HGV traffic is also the worst case scenario, during the absolute peak of traffic generation for HGVs. Table 8.40 presents a summary of the residual effects on road safety during the construction phase.

Road Safety Impacts

8.8.6 Table 8.40 presents a summary of the residual effects on road safety during the construction phase.

Table 8.40: Road safety impact significance of effects – residual effects (Proposed VPI Development)

Site	Road Link	Receptor Sensitivity	Road Safety Impact	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	High	Negligible	Negligible (not significant)	Negligible (not significant)

Site	Road Link	Receptor Sensitivity	Road Safety Impact	Magnitude	Significance of Effect	Residual Significance
2	Eastfield Road	Low	Medium	Negligible	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Medium	Negligible	Negligible (not significant)	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Low	Low	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Low	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	Low	Low	Negligible (not significant)	Negligible (not significant)

8.8.7 Table 8.40 above shows that the residual effect at every link within the study area is **not significant** as a result of the construction period for the Proposed VPI Development.

Table 8.41: Road safety impact significance of effects – residual effects (Proposed Phillips 66 Development)

Site	Road Link	Receptor Sensitivity	Road Safety Impact	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	High	Negligible	Negligible (not significant)	Negligible (not significant)
2	Eastfield Road	Low	Medium	Negligible	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Medium	Negligible	Negligible (not significant)	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Low	Low	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)

Site	Road Link	Receptor Sensitivity	Road Safety Impact	Magnitude	Significance of Effect	Residual Significance
6	A1173 Manby Road	Low	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Low	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	Low	Low	Negligible (not significant)	Negligible (not significant)

8.8.8 Table 8.41 above shows that the residual effect at every link within the study area is **not significant** as a result of the construction period for the Proposed Phillips 66 Development.

Table 8.42: Road safety impact significance of effects – residual effects (combined Proposed Developments)

Site	Road Link	Receptor Sensitivity	Road Safety Impact	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	High	Negligible	Negligible (not significant)	Negligible (not significant)
2	Eastfield Road	Low	Medium	Negligible	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Medium	Negligible	Negligible (not significant)	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Low	Low	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Low	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	Negligible	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	Low	Low	Negligible (not significant)	Negligible (not significant)

8.8.9 The residual effects on road safety, as Table 8.40 – Table 8.42 above show, are expected to be **negligible (not significant)** at every location, as they were prior to any mitigation.

Severance Impacts

8.8.10 Table 8.43 presents a summary of the residual effects on severance during the construction phase.

Table 8.43: Severance significance of effects – residual effects (Proposed VPI Development)

Site	Road Link	Receptor Sensitivity	Nature of Effect (% increase in Traffic)	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	Total = 44.9% HGV = 6.9%	Low	Negligible (not significant)	Negligible (not significant)
2	Eastfield Road	Low	Total = 0% HGV = 0%	Negligible	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Total = 10.8% HGV = 0.8%	Negligible	Negligible (not significant)	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Total = 5.1% HGV = 0.4%	Negligible	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Total = 0.1% HGV = 0.4%	Negligible	Negligible (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	Total = 3.1% HGV = 0.9%	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Total = 13% HGV = 0.9%	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	Total = 0.2% HGV = 0.9%	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	Total = 3.1% HGV = 0.3%	Negligible	Negligible (not significant)	Negligible (not significant)

8.8.11 Table 8.43 above shows that the residual effect at every link within the study area is **not significant** as a result of the construction period for the Proposed VPI Development.

Table 8.44: Severance significance of effects – residual effects (Proposed Phillips 66 Development)

Site	Road Link	Receptor Sensitivity	Nature of Effect (% increase in Traffic)	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	Total = 0% HGV = 0%	Negligible	Negligible (not significant)	Negligible (not significant)
2	Eastfield Road	Low	Total = 25.0% HGV = 26.8%	Low	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Total = 12.6% HGV = 1.8%	Negligible	Negligible (not significant)	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Total = 5.1% HGV = 1.0%	Negligible	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Total = 1.6% HGV = 1.0%	Negligible	Negligible (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	Total = 0.7% HGV = 3.4%	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Total = 1.1% HGV = 1.8%	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	Total = 0.7% HGV = 3.4%	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	Total = 3.0% HGV = 0.8%	Negligible	Negligible (not significant)	Negligible (not significant)

8.8.12 Table 8.44 above shows that the residual effect at every link within the study area is **not significant** as a result of the construction period for the Proposed Phillips 66 Development.

Table 8.45: Severance significance of effects – residual effects (combined)

Site	Road Link	Receptor Sensitivity	Nature of Effect (% increase in Traffic)	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	Total = 3.7%	Negligible	Negligible (not significant)	Negligible (not significant)

Site	Road Link	Receptor Sensitivity	Nature of Effect (% increase in Traffic)	Magnitude	Significance of Effect	Residual Significance
			HGV = 2.6%			
2	Eastfield Road	Low	Total = 25.0% HGV = 26.8%	Low	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	Total = 13.5% HGV = 2.1%	Negligible	Negligible (not significant)	Negligible (not significant)
4	A180 (near Ulceby Skitter)	Negligible	Total = 5.5% HGV = 1.2%	Negligible	Negligible (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	Total = 1.7% HGV = 1.2%	Negligible	Negligible (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	Total = 0.9% HGV = 3.7%	Negligible	Negligible (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	Total = 2.2% HGV = 2.2%	Negligible	Negligible (not significant)	Negligible (not significant)
8	Humber Road	Low	Total = 0.8% HGV = 3.7%	Negligible	Negligible (not significant)	Negligible (not significant)
9	A15	Negligible	Total = 3.2% HGV = 1.0%	Negligible	Negligible (not significant)	Negligible (not significant)

8.8.13 The residual effects on severance at all locations is expected to be **negligible (not significant)**, as they were prior to mitigation. The assessment presented a worst possible case scenario with an assumption of 1 car per worker and therefore even under this worst case, the impact is expected to be negligible.

Pedestrian/ Cycling Impacts

8.8.14 Table 8.46 – Table 8.48 present a summary of the residual effects on pedestrians and cyclists during the construction phase.

Table 8.46: Pedestrian/ cyclist impact significance of effects – residual effects (Proposed VPI Development)

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
2	Eastfield Road	Low	Some pedestrian facilities set back from the carriageway with a safe signalised crossing point	Low	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
4	A180 (near Ulceby Skitter)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	Footways with limited crossing opportunities and no cycle facilities	Medium	Minor adverse (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
8	Humber Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
9	A15	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)

8.8.15 Table 8.46 above shows that the residual effect at every link within the study area is **not significant** as a result of the construction period for the Proposed VPI Development.

**Table 8.47: Pedestrian/ cyclist impact significance of effects – residual effects
(Proposed Phillips 66 Development)**

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	No pedestrian or cycle facilities	High	Negligible (not significant)	Negligible (not significant)
2	Eastfield Road	Low	Some pedestrian facilities set back from the carriageway with a safe signalised crossing point	Low	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
4	A180 (near Ulceby Skitter)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	Footways with limited crossing opportunities and no cycle facilities	Medium	Minor adverse (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 Site)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
8	Humber Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
9	A15	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)

8.8.16 Table 8.47 above shows that the residual effect at every link within the study area is **not significant** as a result of the construction period for the Proposed Phillips 66 Development.

Table 8.48: Pedestrian/ cyclist impact significance of effects – residual effects (combined Proposed Development)

Site	Road Link	Receptor Sensitivity	Pedestrian/ Cycling Impacts	Magnitude	Significance of Effect	Residual Significance
1	Rosper Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
2	Eastfield Road	Low	Some pedestrian facilities set back from the carriageway with a safe signalised crossing point	Low	Negligible (not significant)	Negligible (not significant)
3	A160 (near Killingholme PS)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
4	A180 (near Ulceby Skitter)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)
5	A180 (near Immingham)	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)
6	A1173 Manby Road	Low	Footways with limited crossing opportunities and no cycle facilities	Medium	Minor adverse (not significant)	Negligible (not significant)
7	A160 (south of Phillips 66 site)	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
8	Humber Road	Low	No pedestrian or cycle facilities	High	Moderate adverse (significant)	Minor adverse (not significant)
9	A15	Negligible	No pedestrian or cycle facilities	High	Minor adverse (not significant)	Negligible (not significant)

8.8.17 The impact on pedestrians and cyclists largely depends on the existing facilities at each of the assessed locations. At the majority of receptor locations, there are little or no facilities for pedestrians or cyclists and would not be appropriate routes for them in any case. Similarly very few pedestrians and cyclists are anticipated to be accessing the Sites during construction. CWTPs for the Proposed Developments (see Appendix 8C) would deliver soft

measures to lessen the significance of effects noted on some links. As Table 8.48 above shows, the effect at each link has therefore been reduced to **negligible** at the majority of links and **minor adverse** on Rosper Road, the A160 and Humber Road. These effects are considered to be **not significant**.

8.8.18 A summary of significant effects are provided in the following tables.

Table 8.49: Summary of effects (Proposed VPI Development)

Phase	Description of Effect	Significance of Effect (Before Mitigation)	Mitigation Measures	Significance of Effect (After Mitigation)	Duration (short/ medium/ long term) and Reversibility
Construction	Impact of HGV construction traffic (all receptors)	Negligible (not significant)	Measures set out in CTMP	Negligible (not significant)	Short term
	Severance (all receptors)	Negligible (not significant)	Measures set out in CTMP and CWTP	Negligible (not significant)	Short term
	Pedestrian/ cyclist effects (at receptors on Rosper Road, A160 (near Killingholme PS and south of Phillips 66 Site), and Humber Road	Moderate adverse (significant)	Measures set out in CWTP	Minor adverse (not significant)	Short term
	Pedestrian/ cyclist effects (all other receptors)	Minor adverse/ negligible (not significant)	Measures set out in CWTP	Negligible (not significant)	Short term
	Accidents and safety (all receptors)	Negligible (not significant)	None	Negligible (not significant)	Short term
Operation	N/A - Scoped out of assessment				
Decommissioning	N/A - Scoped out of assessment				

Table 8.50: Summary of effects (Proposed Phillips 66 Development)

Phase	Description of Effect	Significance of Effect (Before Mitigation)	Mitigation Measures	Significance of Effect (After Mitigation)	Duration (short/ medium/ long term) and Reversibility
Construction	Impact of HGV construction traffic (all receptors)	Minor adverse/ Negligible (not significant)	Measures set out in CTMP	Minor adverse/ Negligible (not significant)	Short term
	Severance (all receptors)	Negligible (not significant)	Measures set out in CTMP and CWTP	Negligible (not significant)	Short term
	Pedestrian/ cyclist effects (at receptors on A160 (near Killingholme PS and south of Phillips 66 Site), and Humber Road	Moderate adverse (significant)	Measures set out in CWTP	Minor adverse (not significant)	Short term
	Pedestrian/ cyclist effects (all other receptors)	Minor adverse/ negligible (not significant)	Measures set out in CWTP	Negligible (not significant)	Short term
	Accidents and safety (all receptors)	Negligible (not significant)	None	Negligible (not significant)	Short term
Operation	N/A - Scoped out of assessment				
Decommissioning	N/A - Scoped out of assessment				

Table 8.51: Summary of effects (Combined Developments)

Phase	Description of Effect	Significance of Effect (Before Mitigation)	Mitigation Measures	Significance of Effect (After Mitigation)	Duration (short/ medium/ long term) and Reversibility
Construction	Impact of HGV construction traffic (all receptors)	Negligible (not significant)	Measures set out in CTMP	Negligible (not significant)	Short term
	Severance (all receptors)	Negligible (not significant)	Measures set out in CTMP and CWTP	Negligible (not significant)	Short term
	Pedestrian/ cyclist effects (at receptors on Rosper Rd, A160 (near Killingholme PS and south of Phillips 66 Site), and Humber Road	Moderate adverse (significant)	Measures set out in CWTP	Minor adverse (not significant)	Short term
	Pedestrian/ cyclist effects (all other receptors)	Minor adverse/ negligible (not significant)	Measures set out in CWTP	Negligible (not significant)	Short term
	Accidents and safety (all receptors)	Negligible (not significant)	None	Negligible (not significant)	Short term
Operation	N/A - Scoped out of assessment				
Decommissioning	N/A - Scoped out of assessment				

8.9 References

- Department for Communities and Local Government (2014) 'Travel Plans, Transport Assessments and Statements – Planning Practice Guidance'
- Department for Transport (2009) 'Traffic Signs Manual - Chapter 8'
- Humber Local Enterprise Partnership (2018) 'Transport Plan for the Humber (2018 Refresh)'
- Institute of Environmental Assessment (1993) 'Guidelines for the Environmental Assessment of Road Traffic'
- Lynam et al (2003) 'The European Road Assessment Programme'
- Ministry of Housing, Communities and Local Government (2021) 'National Planning Policy Framework'
- National Highways (2008) 'Design Manual for Road and Bridges (DMRB) Volume 11, Section 2, Part 5 – HA 205/08 Assessment and Management of Environmental Effects'
- National Highways (2020) 'Design Manual for Roads and Bridges (DMRB) – LA 104 Environmental assessment and monitoring'
- North Lincolnshire Council 'Emerging Local Plan'