10. TRANSPORT AND ACCESS

Introduction

10.1 This chapter of the ES assesses the likely significant effects of the Development on the environment in respect of transport and access.

10.2 This chapter has been prepared by Vectos and assesses the traffic, transport and access effects arising from the construction and operation of the Development. It details the assessment methodology; the baseline conditions; the likely significant effects; the mitigation measures required to prevent, reduce or offset any significant, negative impacts; and the likely residual effect after these measures have been implemented.

10.3 The chapter is supported by a Transport Assessment and a Travel Plan (Volume 3 of the Environmental Statement (ES)).

10.4 Traffic flows used in modelling for the EIA are provided within the Transport Assessment (Volume 3 of the ES). An assessment of likely significant effects in respect of air quality, resulting from predicted changes in traffic flows, are provided in Chapter 11 Air Quality of the ES.

10.5 This ES chapter was written by Stuart Morse, an Associate Director at Vectos with 17 years' experience in highways and transportation. Stuart has a BSc (Hons) in Geography and a MSc in Transport Planning and Management and has undertaken many Transport Assessments and prepared associated ES inputs for numerous private and public-sector developments in the retail, residential and commercial sectors, including for developments similar in nature, size and scale to the Development.

Policy Context

National Planning Policy

National Planning Policy Framework[i]

10.6 The National Planning Policy Framework (NPPF) was updated in February 2019 and sets out national planning policies for England and how they should be applied. The NPPF must be taken into account in preparing the development plan and is a material consideration in planning decisions.

10.7 The NPPF identifies that *'plans and decisions should apply a presumption in favour of sustainable development'* and for decision-taking this means:

> *'c) approving development proposals that accord with an up-to-date development plan without delay; or*
>
> *d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:*
>
> *i the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or*
>
> *ii any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.'*

10.8 In terms of promoting sustainable transport, the following paragraphs of the NPPF are considered relevant to the Development.

10.9 Paragraph 102 states:

> *'Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:*
>
> *a) the potential impacts of development on transport networks can be addressed;*
>
> *b) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
>
> *c) opportunities to promote walking, cycling and public transport use are identified and pursued;*
>
> *d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*
>
> *e) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places.'*

10.10 Paragraph 108 states:

'In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;
b) safe and suitable access to the site can be achieved for all users; and
c) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.'

10.11 Paragraph 109 states:

'Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.'

10.12 Paragraph 110 states:

'Within this context, applications for development should:

a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;
b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;
c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;
d) allow for the efficient delivery of goods, and access by service and emergency vehicles; and
e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.'

10.13 Paragraph 111 states:

> *'All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed.'*

Planning Practice Guidance[ii]

10.14 The national Planning Practice Guidance (PPG) provides a web-based source of all national planning guidance.

10.15 In the section relating to Travel Plans, Transport Assessments and Statements, the PPG defines these documents as ways of assessing and mitigating the negative transport impacts of development in order to promote sustainable development. They are required for all developments which generate substantial amounts of traffic movements.

10.16 The PPG provides guidance as to what should be considered when setting the scope of a Transport Assessment, as well as the level of detail to be included, whilst acknowledging that this will vary between development proposals. Topics that should be included in the Transport Assessment include: the likely associated environmental impacts of transport related to the development, particularly in relation to proximity to environmentally sensitive areas (such as Air Quality Management Areas) as well as an appropriate assessment of the cumulative impacts arising from the proposed development in combination with committed developments.

Local Planning Policy

Medway Local Plan[iii]

10.17 The Medway Council Local Plan was adopted in May 2003 and sets out the planning strategy and policies for the plan period 1996-2006. Medway Council has not yet adopted its new Local Plan which is being developed. As such, this remains the current Local Plan.

10.18 The Local Plan was adopted prior to the introduction of the NPPF in 2012. Paragraph 213 of the NPPF notes that due weight should be given to local plan policies according to their degree of consistency with the NPPF.

10.19 Policy T1 – Impact of the Development states:

'In assessing the highways impact of development, proposals will be permitted provided that:

i. *(i) the highway network has adequate capacity to cater for the traffic which will be generated by the development, taking into account alternative modes to the private car; and*
ii. *the development will not significantly add to the risk of road traffic accidents; and*
iii. *the development will not generate significant HGV movements on residential roads; and*
iv. *the development will not result in traffic movements at unsociable hours in residential roads that would be likely to cause loss of residential amenity.'*

10.20 Policy T2 – Access to the Highway states:

'Proposals which involve the formation of a new access, or an intensification in the use of an existing access, will only be permitted where:

i. *the access is not detrimental to the safety of vehicle occupants, cyclists and pedestrians; or*
ii. *can, alternatively, be improved to a standard acceptable to the council as Highway Authority.'*

10.21 Policy T3 – Provision for Pedestrians states:

'Development proposals shall provide attractive and safe pedestrian access. In all cases, they should maintain or improve pedestrian routes related to the site.'

10.22 Policy T4 – Cycle Facilities states that:

'Major trip attracting development proposals should make provision for cycle facilities related to the site. This may include, where appropriate, the Strategic Cycle Network, cycle priority measures and new or enhanced cycle routes that relate to cyclists' preferred routes.'

10.23 Policy T5 – Public Transport provision identifies that:

'Where of sufficient scale, new developments will be expected to make provision for access by public transport (for example, bus, rail or light rail)'

10.24 Policy T14 Travel Plans confirms that Travel Plans will be required for all developments which require a Transport Assessment.

Emerging Medway Local Plan[iv]

10.25 Medway Council are currently working on a new Local Plan, Future Medway, which will replace the current Local Plan. The Medway Council Local Plan 2012 – 2035 Development Strategy, Regulation 18 consultation report was published in 2018 and provided a draft vision for Medway.

10.26 Section 11 of the Local Plan Development Options consultation document considers matters relating to Sustainable Transport. This section identifies Medway's third Local Transport Plan (LTP), which provides the transport strategy for the period 2011 to 2026. The LTP contains five priorities:

1. Regeneration, economic competitiveness and growth;
2. The natural environment;
3. Connectivity;
4. Equality of opportunity; and
5. Safety, security and public health.

10.27 The policy approach to transport identifies ways that the Council will work with others to cover elements such as:

- support the Medway Local Transport Plan (2011-26) and subsequent iterations;
- ensure development is located and designed to enable sustainable transport;
- mitigate the impacts of new development according to Transport Assessments where its residual cumulative impacts are severe;
- require a Travel Plan for development which will generate significant amounts of movement;
- improve public transport provision and the walking and cycling network;
- undertake any necessary revisions to the adopted Parking Standards; and
- improve air quality as a result of vehicular emissions.

10.28 Other specific policy areas cover aspects such as cycle and vehicle parking and connectivity.

Legislative Context

10.29 There is no legislation specific to the consideration of the environmental effects in terms of access, traffic and transport.

Assessment Methodology

10.30 The scope of this chapter is to identify the transport and access impacts from the Development and assess its likely significant effects. This assessment includes consideration of traffic and transport impacts upon environmental receptors associated with the construction and operation of the Development.

10.31 The assessment presented in this chapter has been prepared in accordance with the relevant national, regional and local guidance and policies outlined in this chapter.

Guidance

10.32 Guidance for preparing an assessment of the likely significant effects of a proposed development on transport is provided within the following documents:

- Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment (IEMA))[v]; and
- Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (now IEMA)) (the 'IEMA Guidelines')[vi].

10.33 The IEMA Guidelines refer to the Manual of Environment Appraisal (MEA) published by the (then) Department of Transport (DoT) in 1983[vii]. This has been superseded and reference has therefore been made to the relevant sections of the DMRB - specifically Volume 11[viii] entitled 'Environmental Assessment' in the chapter.

Consultation

10.34 An EIA scoping exercise was carried out to inform this assessment. The scope of this chapter was set out within the EIA Scoping Report (Appendix 2.1 of the ES) submitted to Medway Council, which was subject to consultation with the Council and various consultation bodies.

10.35 The transport and access related comments from Medway Council set out in the EIA Scoping Opinion have been reflected in the methodology and assessment of this chapter and the Transport Assessment (Volume 3 of the ES). The comments made by the highway department within Medway Council and Highways England are presented in Table 10.1.

Table 10.1: Summary of Consultation

Impact	Medway Council	Highways England	Addressed through
Study area	Local roads and transport infrastructure	M2/A2(west) in the vicinity of the Hoo Peninsula	Subnetworks 1 and 2 of the Medway Council model used to assess the Development. Use of the Medway Council model ensures committed development sites are accounted for.
Road Safety	Accidents in last 5 years		Review of most recently available 5-year accident data across the local highway network
Accessibility	Walk, cycle, bus, rail facilities in local area		An accessibility review of the local area has been undertaken
Trip Attraction and Assignment	Use of TRICS, and Census Journey to work	Full details of the assessment, derivation of traffic generation	TRICS and Medway Council model assumptions have been used to assess the trip attraction and Census used to distribute vehicle trips to the wider network
Impact & Mitigation	Severity, improvements	Should consider the likely build-out period for the Development. require assessment of the full build-out impact	Medway Council model used to identify capacity of the local highway network. Consideration of Housing Infrastructure (HIF) improvements. 2037 year assessed.
Travel Plan	Required	Required	Travel Plan has been prepared (refer to Volume 3 Transport Assessment of the ES)
Construction		The Transport Assessment will need to separately assess the construction period and operational period. Framework Construction Management Plan anticipated to be required.	Construction traffic impacts from the Development are considered within the ES chapter. Construction Management Plan to be secured by planning condition.

10.36 A pre-application meeting was held with highways officers from Medway Council prior to a Transport Assessment Scoping Report being submitted in May 2020. The scoping report is provided in the Transport Assessment (Volume 3 of the ES). This was followed by further discussions with the Council's Highways officers and Vectos. A further pre-application meeting with Highways England was also held.

Study Area and Scope

10.37 The study area for this assessment covers the links and junctions of the road network in the vicinity of the Site, where the majority of construction and operational traffic generated by the Development will be routed. The extent of the study area was agreed with the highway authorities as part of pre-application discussions.

10.38 The geographical extent of the study area for the local highway network is shown in Figure 10.1 and Table 10.2 identifies each link.

Figure 10.1: Extent of Study Area

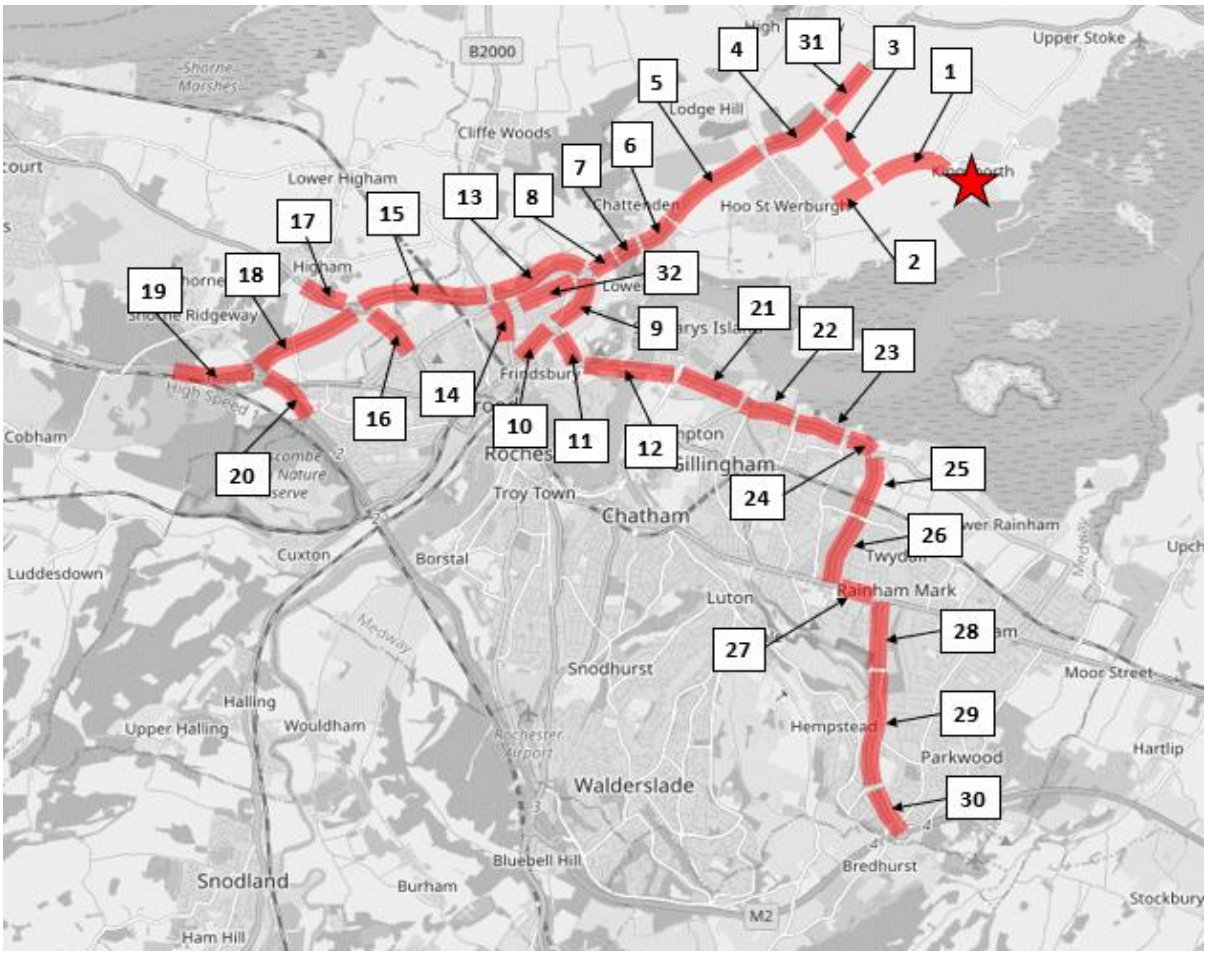

Table 10.2: Summary of Links within the Study Area

Link Reference	Location
1	Stoke Road east of Ropers Lane
2	Stoke Road west of Ropers Lane
3	Ropers Lane north of Stoke Road
4	Peninsula Way west of Ropers Lane

Link Reference	Location
5	Peninsula Way west of Bell's Lane
6	Four Elms Hill west of Main Road Hoo
7	Four Elms Hill East of Upchat Road
8	Four Elms Hill east of Four Elms Roundabout
9	A289 south of Four Elms Roundabout
10	A228 south of Berwick Way
11	Berick Way south of A228 and A289
12	A289 east of Berwick Way
13	A289 west of Four Elms Roundabout
14	B2108 west of Four Elms Roundabout
15	A289 east of Gravesend Road
16	Gravesend Road south of A289
17	Lower Rochester Road north of A289
18	A289 east of M2
19	A2 north of A289
20	M2 south of A289
21	Pier Road west of Gillingham Gate Road
22	Pier Road West of Church Street
23	Pier Road / Gads Hill west of Lower Woodlands Road
24	Gads Hill to Yokosuka Way
25	Yokosuka Way
26	Ito Way
27	A2 (Will Adams Roundabout to Bowaters Roundabout)
28	Hoath Way south of Bowaters Roundabout / north of Hoath Way Roundabout
29	Hoath Way south of Hoath Way Roundabout / north of Wigmore Road Roundabout
30	Hoath Way Wigmore Road Roundabout to M2 J4
31	Ratcliffe Highway
32	B2108

10.39 This assessment has considered the following scenarios which incorporate a baseline situation and 'core' assessment to consider the effects of the Development on the local highway network:

- 2016 base year;

- 2037 with committed development 'Do Minimum' (future baseline);
- 2037 with committed development plus the Development 'Do Something';
- 2028 with committed development, Local Plan growth and HIF infrastructure; and
- 2028 with committed development, Local Plan growth and HIF infrastructure plus the Development.

10.40 The assessment for 2037 represents the forecast year that is consistent with the emerging Local Plan forecast year and allows committed developments to be cumulatively assessed. In this scenario, development associated with the emerging Local Plan is not included. This scenario allows development impacts on specific links to be identified, in line with the assessment methodology set out in this chapter.

10.41 The 2028 scenario provides a scenario for highway capacity assessment. This incorporates highway improvements at several junctions that will be delivered through the Government's HIF. This scenario incorporates committed development and includes forecast housing to this period as a cumulative assessment.

10.42 Medway Council secured £170 million of funding to deliver strategic transport and environmental projects on the Hoo Peninsula through the HIF[ix]. Medway Council state that the funding enables further development in the area that could help to meet Medway's growth needs over the next 20 years, playing an important part of the new Medway Local Plan.

10.43 The proposals comprise highway improvements on the Hoo Peninsula, a new railway station south of Sharnal Street and the reintroduction of a passenger rail service, and environmental management measures. The funding received by the council from Homes England to deliver these works requires that the infrastructure is in place by spring 2024.

10.44 Of particular relevance to the Development and the traffic modelling for 2028 are the improvements to the Four Elms Roundabout, Main Road Hoo Roundabout and Bell's Lane Roundabout, which form part of the HIF proposals.

10.45 For the assessment of the likely significant effects of the Development, reference has been made to the peak period core scenarios outlined in the Transport Assessment to assess the likely significant effects of the Development on the highway network.

10.46 The assessment in the Transport Assessment provides a 2037 'Do Minimum' and 2037 'Do Something' scenarios and these provide the basis for providing a likely worst-case assessment of impacts associated with the Development. All 'Do Minimum' and 'Do Something' scenarios

include committed development traffic and so cumulative effects have been taken into account in the assessments.

Baseline Data

10.47 Baseline traffic flow information has been taken from Medway Council's Aimsun traffic model. This model provides existing traffic movements on the local highway network for the year 2016. The base year is suitable insofar as it represents an appropriate baseline against which impacts may be assessed. The survey year is also prior to the Covid-19 pandemic, which has resulted in adjustments to movements, particularly during peak periods, that are considered to have a lasting effect. The acceleration of remote working is likely to result in fewer commuter trips particularly during peak hours. As such, the pre-Covid-19 survey data is considered to be robust.

10.48 Baseline flows for 2037 are also taken from the Council traffic model and include assumptions on committed developments. The 2028 baseline flows also consider cumulative assessment in addition to emerging Local Plan housing growth and associated highway improvements.

Construction Phase Methodology

10.49 The estimated numbers of construction related vehicle journeys for the construction phase of the Development is explained in detail later in paragraphs 10.123 to 10.129.

10.50 It is likely that the construction traffic generation (both total traffic and Heavy Goods Vehicles (HGVs)) is likely to be less than the operational Development would generate at the Site. The construction phase assessment is based on the peak period for the Development's combined construction and operational traffic movements, which has been determined to occur in 2030 to represent a realistic 'worst case' scenario for the construction phase of the Development.

10.51 The construction traffic forecast has been determined with reference to information relating to staff numbers as set out in Chapter 6 Socio-economics of the ES and on judgements based on experience of assessing schemes of a similar nature and scale.

10.52 As set out in Chapter 3 Site and Development Description of the ES, the parameters for the Development consider a range of possible land uses and considers a maximum floor area of up to 315,000sqm gross internal area (GIA)/ 324,450sqm gross external area (GEA), excluding up to 1 hectare (ha) for a potential lorry park. In order to assess a realistic 'worst case' scenario, land uses that are likely to attract the greatest volume of traffic has been assessed.

The assessment is based upon a combination of industrial (E(g)(iii) and B2) and warehousing (B8) land uses to provide a realistic worse case.

Operational Phase Methodology

10.53 Appropriate transport modelling tools have been used to assess the likely significant operational effects of the Development.

10.54 Trip attraction considered the Trics database[x] and surveys of sites similar in terms of nature, size and scale to the Development. Traffic flows have been calculated on the basis of the total daily flow based on 24-hour operation for the Development.

10.55 Trips were distributed onto the surrounding network with reference to population centres, Census data, Medway Council's Aimsun model and consideration of the most likely routes. This separately assigned HGV movements and those associated with lighter vehicles and employee trips to various routes, as explained in the Transport Assessment.

10.56 The Council's Aimsun model was used to assess the effects of the Development on the local highway network.

10.57 Future year traffic flows have been extracted from Medway Council's model, which incorporates background growth and committed development sites to ensure a cumulative assessment can be made.

Identifying Impacts

10.58 The IEMA Guidelines have been used to ensure that the likely significant environmental effects arising due to predicted changes in traffic levels as a result of the Development are properly and comprehensively addressed. In addition, the Design Manual for Roads and Bridges (DMRB) Volume 11 has been referred to in developing the methodology.

10.59 The IEMA Guidelines advise the use of a 'check-list' of likely effects covering relevant transport and access matters such as severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, accidents and safety and hazardous loads.

10.60 The IEMA Guidelines acknowledge that for many developments some of the effects listed may not be relevant, but suggests that reasons should be provided for any exclusions.

10.61 This chapter considers only with those transport effects likely to be relevant to the Development, i.e., severance; pedestrian amenity (which for the purposes of this assessment includes fear and intimidation); driver delay; pedestrian delay and accidents and safety.

10.62 Other effects such as air quality are dealt with in other chapters of this ES. Hazardous loads were scoped out of this assessment as there will be no requirement for unusual or hazardous HGV movements in either the construction or operational phases of the Development.

10.63 The effects considered within this chapter therefore comprise:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian amenity; and
- Accidents and safety.

Severance

10.64 Severance is defined as the perceived division that can occur within a community when it becomes separated by a major traffic artery and describes a series of factors that separate people from places and other people. Such division may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself.

10.65 The measurement and prediction of severance is difficult, but relevant factors include road width, traffic flow, speed, the presence of crossing facilities and the number of movements across the affected route.

10.66 IEMA Guidelines refer to the DfT 'Manual of Environmental Appraisal', which suggests that changes in traffic flow of 30%, 60% and 90% would be likely to produce 'slight' (‘minor’), 'moderate' and 'major' changes in severance, respectively. This is summarised below.

Table 10.3: Criteria for Severance, Pedestrian Fear and Intimidation

Impact	Negligible	Minor	Moderate	Major
Severance	Change in total traffic or HGV flows of less than 30%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows of over 90%

10.67 It is advised that these broad indicators should be used with care and regard paid to specific local conditions. Whilst the criteria above set out a numerical threshold to determine a

magnitude of the impact on severance, professional judgement should be applied to fully determine the magnitude of the effect, accounting for the other factors as identified.

Driver Delay

10.68 IEMA Guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at or close to the capacity of the system.

10.69 A qualitative assessment has been undertaken to establish the impact on driver delay as a result of the Development. This is based on the traffic generation of the Development tested using Medway Council's Aimsun model of the network as reported in the Transport Assessment (Volume 3 of the ES).

Pedestrian Delay

10.70 The IEMA Guidelines note that changes in the volume, composition and or speed of traffic may affect the ability of people to crossroads. Typically, increases in traffic levels result in increased pedestrian delay, although increased pedestrian activity itself also contributes. The IEMA Guidelines do not set any thresholds, recommending instead that assessors use their judgement to determine the significance of the impact.

10.71 It is important to note that qualitative aspects, such as the quality of the pedestrian and cycle environment, and the existing and planned land uses which generate trips that are served by these environments, also influence the propensity for individuals to walk and cycle. Sense of personal security and safety, gradient, permeability, legibility and maintenance of this infrastructure aid in encouraging their use and discouraging the use of non-car modes. These, in addition to the quantitative aspects of assessment such as changing traffic flows, are therefore an important consideration in this chapter for some of the criteria.

10.72 The IEMA Guidelines refer to a report published by the Transport Research Laboratory (TRL) as providing a useful approximation for determining pedestrian delay. The TRL research concluded that mean pedestrian delay was found to be eight seconds at flows of 1,000 vehicles per hour and up to 20 seconds at 2,000 vehicles per hour for various types of crossing condition. This research has been reproduced in DMRB Volume 11, Section 3, Part 8. Figure 1 of this part of the DMRB (Part 8) provides predictive mean pedestrian delay based on empirical data, taking into account traffic flow and a range of parameters, such as crossing width and vehicle speeds. This is summarised in Table 10.4.

Table 10.4: Criteria for Pedestrian Delay

Impact	Negligible	Minor	Moderate	Major
Pedestrian delay	Two-way traffic flow < 1,400 vehicles per hour	A judgement based on the road links with two-way traffic flow exceeding 1,400 vehicles per hour in context of the individual characteristics		

10.73 A two-way flow of 1,400 vehicles per hour has been adopted as a lower threshold for assessment (equating to a mean 10 second delay for a link with no pedestrian facilities) in the TRL report. Below this flow, pedestrian delay is unlikely to be a significant factor. This provides a starting point for narrowing down the modelled routes within the study area and ensuring the routes selected exceeded the suggested threshold of analysis in DMRB Volume 11. It should be noted that for controlled forms of pedestrian crossing, the pedestrian delays are less.

Pedestrian Amenity (including Fear and Intimidation)

10.74 According to the IEMA Guidelines, pedestrian amenity is *'broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width / separation from traffic'*. It can include fear and intimidation, if these are relevant. The guidelines suggest tentative thresholds of significance, which are where the traffic flow is halved or doubled.

10.75 Pedestrian fear and intimidation is related to the effects of traffic, such as the volume of traffic, HGV composition, proximity to pedestrians or lack of protection.

10.76 In the absence of commonly agreed thresholds for judging the significance of likely fear and intimidation effects, the IEMA Guidelines suggest thresholds summarised in Table 10.5, which have been applied to this assessment.

Table 10.5: Criteria for Pedestrian Amenity, Fear and Intimidation

Impact	Negligible	Minor	Moderate	Major
Pedestrian amenity	Change in total traffic or HGV flows <100%	A judgement based on the routes with >100% change in context of their individual characteristics		

Accidents and Safety

10.77 The IEMA Guidelines do not include any definition in relation to the assessment of a proposed development's effects on accidents and safety, suggesting that professional judgement should

be used to assess the implications of local circumstance, or factors which may increase or decrease the risk of accidents.

Magnitude of Impact

10.78 Each effect is determined as the predicted deviation from the baseline conditions. The IEMA Guidelines advise that changes in traffic flow can be categorised by the magnitude of change and categorised as a level of significance accordingly. This guidance sets out consideration, and in some cases thresholds, in respect of changes in the volume and composition of traffic to facilitate a subjective judgement of traffic impact and significance. These thresholds are guidance only and provide a starting point by which a detailed analysis will inform a subjective analysis of the impact magnitude.

10.79 Within the IEMA Guidelines, two broad rules are suggested which can be used as a screening process to limit the scale and extent of the assessment:

- Rule 1: include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%); and
- Rule 2: include any other specifically sensitive areas where traffic flows have increased by 10% or more.

10.80 Where the predicted increase in traffic flows is lower than the above thresholds, the IEMA Guidelines suggest that the significance of the effects can be stated to be negligible and further detailed assessments are not warranted. Furthermore, increases in traffic flows below 10% are generally considered to be insignificant in environmental impact terms, given that daily variations in background traffic flow may vary by this amount.

10.81 The standard significance criteria relate to the magnitude of impact: 'negligible', 'minor', 'moderate' or 'major'.

10.82 Table 10.6 demonstrates the criteria used to determine magnitude of impacts. However, the absolute level of an impact is also important e.g. the total flow of traffic or HGVs on a link. This is because an increase of, for example, 100% in the traffic flow on a road is likely to still lead to impacts of negligible or minor magnitude if the existing flows are low.

Table 10.6: Summary of Magnitude of Impact (Based on IEMA Guidelines)

Issue / Impact	Magnitude of Impact			
	Negligible	Minor	Moderate	Major
Severance	Change in total traffic or HDV flows of less than 30%	Change in total traffic or HDV flows of 30-60%	Change in total traffic or HDV flows of 60-90%	Change in total traffic or HDV flows over 90%
Pedestrian Delay	Two-way traffic flow < 1,400 vehicles per hour	A judgement based on the road links with two-way traffic flow exceeding 1,400 vehicles per hour in context of the individual characteristics		
Pedestrian Amenity	Change in total traffic or HDV flows 100%	A judgement based on the routes with >100% change in context of their individual characteristics		
Driver Delay	A judgement based on the results of junction capacity assessment			
Accidents and Safety	A judgement based on quantitative analysis as set out in the Transport Assessment and summarised in this chapter			

Determining Effect Significance

10.83 The significance criteria within the IEMA Guidelines provide definitions of environmentally sensitive receptors, as well as affected groups and special interests. It further advises that the traffic effects from a proposed development should be considered in respect of these receptors.

10.84 The sensitivity of a road or street can be defined by the vulnerability of the user groups who may use it, e.g. elderly people or children. A sensitive area may be where pedestrian activity is high, for example, in the vicinity of a school or where there is already an existing safety issue. It should be noted that the sensitivity of the receptor is judged on the sensitivity of road users (primarily pedestrians). It also takes account of the existing nature of the road e.g. an existing 'A' road is likely to have a lower sensitivity than a minor residential road.

10.85 Table 10.7 details the environmentally sensitive receptors as defined by the IEMA Guidelines.

Table 10.7: Receptor Sensitivity Criteria

High Sensitivity	Moderate Sensitivity	Low Sensitivity
Receptors of greatest sensitivity to traffic flows: • schools; • colleges; • playgrounds; • links and junctions with accident clusters; • retirement homes; • roads without footways that are used by pedestrians; • road safety black-spots; and • significant junctions on the road network	Traffic flows sensitive receptors: • congested junctions/ links; • doctor's surgeries; • hospitals; • shopping area with roadside frontage; and • roads with narrow footways, recreation facilities	Receptors with some sensitivity to traffic flow: • places of worship; • public open space; • tourist attractions; and • residential areas with adequate footway provision

10.86 A desktop exercise, augmented by a number of site visits has been undertaken to identify the sensitivity of each receptor in the study area. All road links within the study area as detailed in Figure 10.2 and Table 10.2 have been assessed and assigned sensitivity, primarily based on the criteria set out in the above table and the assessors professional experience and judgement. The sensitivity of each link is provided in the 'Baseline Conditions' section of this chapter.

Significance Criteria

10.87 The significance of the effect has been judged on the relationship of the magnitude of impact to the assessed sensitivity of the receptor.

10.88 The magnitude of impact and the sensitivity of the receptor are considered further to determine the significance of the effect.

Table 10.8: Significance Matrix

		Sensitivity of Receptor		
		High	**Moderate**	**Low**
Magnitude of Impact	**Major**	Major	Major - Moderate	Moderate - Minor
	Moderate	Major - Moderate	Moderate - Minor	Minor
	Minor	Moderate - Minor	Minor	Minor - Negligible
	Negligible	Negligible	Negligible	Negligible

10.89 Potential effects are therefore concluded to be of negligible, minor, moderate or major significance. For each effect, it has been concluded whether the effect is 'beneficial' or 'adverse'. For the purposes of this assessment, effects of major or moderate significance are considered to be significant.

10.90 The temporal scope of effects is described as short, medium or long term, or permanent, as shown below. For the assessment of the Development's operational phase, the impacts are permanent, whereas for construction they are likely to be short to long term and temporary.

- Short term: < 12 months;
- Medium term: 1 – 5 years;
- Long term: + 5 years; and
- Permanent: effects that are considered to be long lasting.

Limitations and Assumptions

10.91 A number of assumptions have been made throughout this chapter. The Transport Assessment (refer to Volume 3 of the ES), which has informed this chapter, is subject to a number of limitations and assumptions.

10.92 The baseline data is obtained from Medway Council's Aimsun model which references traffic surveys undertaken in 2016. Given the Covid-19 pandemic situation and the inability to update the 2016 traffic surveys at the time of writing, the use of this data is considered to be appropriate but may not reflect the long-term trends associated with the Covid-19 pandemic.

10.93 Traffic associated with the historic use of the Site has not been assumed as part of the baseline. For the purposes of the assessment set out in this chapter, the existing conditions at the Site have been assessed.

10.94 The assessment set out in the 'Likely Significant Effects' section of the chapter assesses Development-generated traffic flows prior to the implementation of the proposed Sustainable Distribution Plan and Travel Plan measures (refer to Volume 3 Transport Assessment of the ES) to identify the likely significant effects of the Development prior to the implementation of mitigation measures.

10.95 The 2028 assessments assume delivery of highway schemes delivered through the HIF.

10.96 The following are assumptions made for the assessment presented in this ES chapter:

- It is assumed that all construction and freight vehicles, other than a small amount of

delivery vehicles will use the route via the A289 towards the M2 and A2 to the west of the Site;

- The construction vehicle trip generation is based on judgements associated with experience of comparable sites, similar in nature size and scale to the Development. As such, the forecast construction vehicle trips are liable to change once a construction contractor has been appointed; and
- A number of assumptions have been made in order to establish the trip generation of the operational Development, including the proportion of new vehicle trips on the local highway network. The trips forecasts are based upon consideration of floor areas and with consideration of trip rates proportional to those floor areas taken from surveys of traffic movements associated with comparable sites. Further assumptions have been made regarding the assignment of these trips onto the highway network. Details regarding these assumptions can be found within the Transport Assessment (Volume 3 of the ES).

10.97 Full details of how trips associated with the Development were determined are provided in the Transport Assessment (Volume 3 of the ES).

10.98 The Development does not involve the transportation of dangerous or hazardous loads by road and this has therefore not been assessed in this chapter.

Baseline Conditions

Pedestrian and Cycle Network

10.99 Footways are generally located around the existing access points of the Site. A footway commences at Kingsnorth Work Entrance C on the southern side of Eshcol Road and continues east. At the Eshcol Road roundabout, pedestrian crossing points are provided on all arms in the form of dropped kerbs, tactile paving, and central reserves.

10.100 Continuing north along Eschol Road, a 3m wide footway is provided along the eastern side of the road which connects to existing footways along Stoke Road routing into Hoo. Hoo can be reached on foot within approximately 30-40 minutes, depending on the destination. This is a distance of approximately 3km when taking the footways along Eshcol Road and Stoke Road.

10.101 In addition, the Site is well served by a number of Public Rights of Way (PRoWs). To the west of the Site, Footpath RS92 connects the Site to Hoo via a series of PRoWs, including footpaths and restricted byways.

10.102 It should be noted that at present, footways are not provided along Eshcol Road to the west of Kingsnorth Work Entrance C, or along Jacobs Lane. This is due to their remote locations that offer limited trip attraction for people on foot.

10.103 National Cycle Network Route (NCNR) 179 can be accessed from the Site within 1.5km, or a 5-minute cycle ride, at the Ropers Lane/Stoke Road roundabout. Access is gained from the north-west corner of the Site via Jacobs Lane and Stoke Road.

10.104 NCNR 179 routes west along Stoke Road through Hoo and Chattenden to connect to NCNR 1 and beyond into Rochester. To the north, NCNR 179 routes along Roper's Lane offering a connection to the smaller settlements of High Halstow, Cliffe, Cliffe Woods, and Higham before joining onto NCNR 1, which routes into Gravesend and beyond.

10.105 As part of NCNR 179 an off-road shared foot/cycleway is provided along the western side of Ropers Lane. An off-road provision continues along the southern side of the A228 into Hoo. Cyclists can then continue on-road along Ratcliffe Way, a quieter route, before re-joining an off-road shared foot/cycleway provision on the A228 that routes to Strood via Chattenden and the Four Elms roundabout.

10.106 This offers a continuous cycle route between the Site and eastern side of Strood taking approximately a 25-30 minute cycle. The route extends to approximately 7km.

Public Transport Network

Bus Services

10.107 There are currently no bus stops within walking distance of the Site. The nearest bus stops are located in Hoo, approximately 3km to the east, and on Ratcliffe Highway, approximately 3.5km to the north.

Rail Services

10.108 The nearest railway station to the Site is located at Strood, which is approximately 7km to the west. By road, this equates to approximately 10.5km, or a 15-20 minute drive.

10.109 Strood Railway Station is managed by Southeastern rail and provides onward connectivity to destinations such as London St Pancras International, Luton, Tonbridge, Rainham and Faversham.

Highway Network

Eshcol Road

10.110 Eshcol Road is a two-way single carriageway that routes between Jacobs Lane and Stoke Road. The road provides the main access route for the Site. Eshcol Road is subject to a 50mph speed limit reducing to 30mph within the vicinity of the Site.

Jacobs Lane

10.111 Jacobs Lane is a narrow country lane that provides local access to Burnt House Farm and a connection to Eshcol Road and Stoke Road. The road is subject to the national speed limit which is 60mph, although it is likely vehicles will be travelling at lower speeds due to the narrow road width and reduced visibility caused by vegetation and bends in the road.

Stoke Road

10.112 Stoke Road is a two-way single carriageway that routes to the small settlement of Lower Stoke to the east, and into the local centre of Hoo to the west, where it connects to Main Road and Bells Lane. The road is subject to a 50mph speed limit reducing to 30mph on approach to Hoo, whereby on-street parking is observed.

10.113 Between its junction with Ropers Lane and Main Road, Stoke Road has a 7.5t weight restriction. This section of the road also forms part of the NCNR 179 in the form of an on-road route.

Ropers Lane

10.114 Ropers Lane is a two-way single carriageway that routes between Stoke Road and the A228 Peninsula Way. The route is subject to a 50mph speed limit and forms part of NCNR 179 in the form of an off-road shared foot/cycleway along its western side.

A228 Peninsula Way/Four Elms Hill

10.115 The A228 forms a strategic link between Grain to the east, and the A289 and B2108 via the Four Elms Roundabout to the west. The A228 is grade-separated, dual-lane carriageway subject to the national speed limit of 70mph.

A289 Hasted Road

10.116 The A289 routes between Four Elms roundabout, the M1 Junction 1 to the east, and the A228 and Medway Tunnel to south. The road is a grade-separated dual-carriageway subject to a 70mph speed limit.

A2

10.117 The A2 commences routes between Dover and London and intersects Junction 1 of the M1 at Strood. The A2 offers a strategic motorway route onto the M25 at Junction 2. The A2 is subject to the national speed limit, which is 70mph.

M2

10.118 The M2 commences south of its junction with the A2 and the A289 at the M2 Junction 1. The M2 routes south-east Faversham and connects to the M20 via the A229 at Maidstone at Junction 6. The M20 then offers connections to the south coast of England and the M25 around London via Junction 3. The M2 is subject to the national speed limit which is 70mph.

Baseline Traffic Flows

10.119 Baseline traffic flows have been taken from Medway Council's Aimsun model for the local highway network.

10.120 This approach is consistent with that used by Medway Council for wider traffic modelling. Two future year scenarios are considered; 2037, which is consistent with the Local Plan future year and incorporates sites with planning permission and background traffic and 2028, which has been assessed for traffic modelling purposes considering committed development, background growth, movements associated with emerging Local Plan growth to that period in addition to infrastructure to be delivered through the HIF.

10.121 Table 10.9 outlines the 2037 baseline traffic data with Table 10.10 presenting the 2028 data.

Table 10.9: Baseline 2037 Annual Average Daily Traffic

Ref.	Location	AADT	HGV
1	Stoke Road east of Ropers Lane	9764	646
2	Stoke Road west of Ropers Lane	2109	131
3	Ropers Lane north of Stoke Road	7934	535

Ref.	Location	AADT	HGV
4	Peninsula Way west of Ropers Lane	13881	1156
5	Peninsula Way west of Bell's Lane	18720	1515
6	Four Elms Hill west of Main Road Hoo	24615	2048
7	Four Elms Hill East of Upchat Road	27491	2193
8	Four Elms Hill east of Four Elms Roundabout	26965	2340
9	A289 south of Four Elms Roundabout	22568	1612
10	A228 south of Berwick Way	7945	971
11	Berick Way south of A228 and A289	26426	1178
12	A289 east of Berwick Way	25038	536
13	A289 west of Four Elms Roundabout	22674	1491
14	B2108 west of Four Elms Roundabout	11728	396
15	A289 east of Gravesend Road	28306	1334
16	Gravesend Road south of A289	4893	56
17	Lower Rochester Road north of A289	11349	659
18	A289 east of M2	28414	1513
19	A2 north of A289	62868	4750
20	M2 south of A289	55413	4304
21	Pier Road west of Gillingham Gate Road	25778	725
22	Pier Road West of Church Street	20196	557
23	Pier Road / Gads Hill west of Lower Woodlands Road	17720	346
24	Gads Hill to Yokosuka Way	17857	359
25	Yokosuka Way	13865	272
26	Ito Way	12290	227
27	A2 (Will Adams Roundabout to Bowaters Roundabout)	17921	424
28	Hoath Way south of Bowaters Roundabout / north of Hoath Way Roundabout	14103	263
29	Hoath Way south of Hoath Way Roundabout / north of Wigmore Road Roundabout	12824	220
30	Hoath Way Wigmore Road Roundabout to M2 J4	26396	1089
31	Ratcliffe Highway	6860	642
32	B2108	2853	282

Table 10.10: Baseline 2028 Annual Average Daily Traffic

Ref.	Location	AADT	HGV
1	Stoke Road east of Ropers Lane	13585	918
2	Stoke Road west of Ropers Lane	4284	206
3	Ropers Lane north of Stoke Road	10723	736
4	Peninsula Way west of Ropers Lane	18663	1367
5	Peninsula Way west of Bell's Lane	28593	1461
6	Four Elms Hill west of Main Road Hoo	35597	1695
7	Four Elms Hill east of Upchat Road	35132	1718
8	Four Elms Hill east of Four Elms Roundabout	34794	1844
9	A289 south of Four Elms Roundabout	28736	1178
10	A228 south of Berwick Way	14363	462
11	Berick Way south of A228 and A289	33818	1423
12	A289 east of Berwick Way	30551	615
13	A289 west of Four Elms Roundabout	22771	1367
14	B2108 west of Four Elms Roundabout	12986	285
15	A289 east of Gravesend Road	38058	1938
16	Gravesend Road south of A289	4730	53
17	Lower Rochester Road north of A289	12725	730
18	A289 east of M2	37780	2145
19	A2 north of A289	68976	5391
20	M2 south of A289	61416	4617
21	Pier Road west of Gillingham Gate Road	23544	814
22	Pier Road West of Church Street	20188	530
23	Pier Road / Gads Hill west of Lower Woodlands Road	16361	383
24	Gads Hill to Yokosuka Way	16332	398
25	Yokosuka Way	13500	259
26	Ito Way	12012	231
27	A2 (Will Adams Roundabout to Bowaters Roundabout)	18847	288
28	Hoath Way south of Bowaters Roundabout / north of Hoath Way Roundabout	14467	244
29	Hoath Way south of Hoath Way Roundabout / north of Wigmore Road Roundabout	13298	220
30	Hoath Way Wigmore Road Roundabout to M2 J4	29100	1241
31	Ratcliffe Highway	10798	702
32	B2108	6228	256

Sensitivity

10.122 A desktop exercise, augmented by a number of site visits, has been undertaken to identify the sensitivity of each receptor in the study area. All links within the study area have been assessed and assigned sensitivity primarily based on the criteria set out in Table 10.7 and the assessors' professional experience and judgement. The results of the analysis are shown at Table 10.11.

Table 10.11: Sensitivity of Receptors

Ref	Link	Severance	Driver Delay	Pedestrian Delay	Pedestrian Amenity
1	Stoke Road east of Ropers Lane	Low	Low	Low	Low
2	Stoke Road west of Ropers Lane	Low	Low	Low	Low
3	Ropers Lane north of Stoke Road	Low	Low	Low	Low
4	Peninsula Way west of Ropers Lane	Low	Low	Low	Low
5	Peninsula Way west of Bell's Lane	Low	Low	Low	Low
6	Four Elms Hill west of Main Road Hoo	Low	Low	Low	Low
7	Four Elms Hill East of Upchat Road	Low	Low	Low	Low
8	Four Elms Hill east of Four Elms Roundabout	Low	High	Low	Low
9	A289 south of Four Elms Roundabout	Low	High	Low	Low
10	A228 south of Berwick Way	Moderate	Moderate	Moderate	Moderate
11	Berick Way south of A228 and A289	Low	Moderate	Low	Low
12	A289 east of Berwick Way	Low	Moderate	Low	Low
13	A289 west of Four Elms Roundabout	Low	High	Low	Low
14	B2108 west of Four Elms Roundabout	Low	Moderate	Low	Low
15	A289 east of Gravesend Road	Low	Low	Low	Low
16	Gravesend Road south of A289	Low	Low	Low	Low
17	Lower Rochester Road north of A289	Low	Low	Low	Low
18	A289 east of M2	Low	Moderate	Low	Low
19	A2 north of A289	Low	Moderate	Low	Low
20	M2 south of A289	Low	Moderate	Low	Low
21	Pier Road west of Gillingham Gate Road	Low	Moderate	Low	Low
22	Pier Road West of Church Street	Moderate	Moderate	Moderate	Moderate
23	Pier Road / Gads Hill west of Lower Woodlands Road	Moderate	Moderate	Moderate	Moderate
24	Gads Hill to Yokosuka Way	Low	Moderate	Low	Low
25	Yokosuka Way	Low	Moderate	Low	Low

Ref	Link	Severance	Driver Delay	Pedestrian Delay	Pedestrian Amenity
26	Ito Way	Low	Moderate	Low	Low
27	A2 (Will Adams Roundabout to Bowaters Roundabout)	Moderate	Moderate	Moderate	Moderate
28	Hoath Way south of Bowaters Roundabout / north of Hoath Way Roundabout	Low	Moderate	Low	Low
29	Hoath Way south of Hoath Way Roundabout / north of Wigmore Road Roundabout	Low	Moderate	Low	Low
30	Hoath Way Wigmore Road Roundabout to M2 J4	Low	Moderate	Low	Low
31	Ratcliffe Highway	Low	Low	Low	Low
32	B2108	Moderate	High	Moderate	Moderate

Likely Significant Effects

Construction Phase

10.123 To provide a basis for assessment of the 'construction phase' of the Development, an assumption has been made that 300 construction workers would be present at any one time. This judgement is based on experience of assessing schemes of a similar nature and scale. This includes construction workers associated with any demolition works and therefore provides a robust position for assessment.

10.124 The following assumptions have been made to determine an appropriate traffic generation associated with construction staff.

10.125 It is unlikely that all construction staff would work on any one day given factors such as annual leave, sickness etc. Equally, it is unlikely that all construction staff would drive to the Site and the nature of construction activities means that car sharing is a popular mode of travel.

10.126 The 2011 Travel to Work Census Data[xi] for the area shows that 81% or people travel to work by vehicle with 6% as a passenger. It is likely that for construction, the proportion of vehicle drivers would be lower and passengers higher. For the purposes of assessing a realistic 'worst case' scenario, a conservative judgement has been made to assume a vehicle driver mode share of 81%, however, in reality, this is likely to be lower.

10.127 Staff traffic could therefore equate to 243 vehicle arrivals and 243 vehicle departures daily (486 two-way vehicle trips).

10.128 The volume of construction HGV traffic has not been determined in detail at this stage, however, based on professional experience of other developments similar in nature, size and scale to the Development, the construction phase of the Development could generate 100 HGV arrivals and 100 departures daily (200 two-way vehicle trips).

10.129 A summary of the construction vehicle trip generation for the Development is set out in Table 10.12.

Table 10.12: Forecast Construction Traffic

Vehicle type	Daily Vehicle Trips (AADT)		
	Arrive	Depart	Two-way
HGV	100	100	200
Cars and vans	243	243	486
Total	**343**	**343**	**686**

10.130 The traffic impact of the construction phase of the Development is set out in Table 10.13. This comparison is made against the 2037 baseline.

10.131 Both staff traffic and HGV traffic has been routed as per the operational phase. This assumes traffic movements in line with journey to work travel patterns from the 2011 Census and HGV movements along the A289 towards the M2.

Table 10.13: Construction Vehicle Movement Assessment

Ref.	Location	2037		Construction		% change	
		Veh	HGV	Veh	HGV	Veh	HGV
1	Stoke Road east of Ropers Lane	9764	646	686	200	7.0%	31.0%
2	Stoke Road west of Ropers Lane	2109	131	96	0	4.6%	0.0%
3	Ropers Lane north of Stoke Road	7934	535	590	200	7.4%	37.4%
4	Peninsula Way west of Ropers Lane	13881	1156	515	200	3.7%	17.3%
5	Peninsula Way west of Bell's Lane	18720	1515	515	200	2.7%	13.2%
6	Four Elms Hill west of Main Road Hoo	24615	2048	515	200	2.1%	9.8%
7	Four Elms Hill East of Upchat Road	27491	2193	515	200	1.9%	9.1%
8	Four Elms Hill east of Four Elms Roundabout	26965	2340	515	200	1.9%	8.5%

Ref.	Location	2037		Construction		% change	
		Veh	HGV	Veh	HGV	Veh	HGV
9	A289 south of Four Elms Roundabout	22568	1612	123	0	0.5%	0.0%
10	A228 south of Berwick Way	7945	971	27	0	0.3%	0.0%
11	Berick Way south of A228 and A289	26426	1178	89	0	0.3%	0.0%
12	A289 east of Berwick Way	25038	536	82	0	0.3%	0.0%
13	A289 west of Four Elms Roundabout	22674	1491	370	200	1.6%	13.4%
14	B2108 west of Four Elms Roundabout	11728	396	0	0	0.0%	0.0%
15	A289 east of Gravesend Road	28306	1334	370	200	1.3%	15.0%
16	Gravesend Road south of A289	4893	56	62	0	1.3%	0.0%
17	Lower Rochester Road north of A289	11349	659	0	0	0.0%	0.0%
18	A289 east of M2	28414	1513	309	200	1.1%	13.2%
19	A2 north of A289	62868	4750	137	100	0.2%	2.1%
20	M2 south of A289	55413	4304	172	100	0.3%	2.3%
21	Pier Road west of Gillingham Gate Road	25778	725	62	0	0.2%	0.0%
22	Pier Road West of Church Street	20196	557	55	0	0.3%	0.0%
23	Pier Road / Gads Hill west of Lower Woodlands Road	17720	346	41	0	0.2%	0.0%
24	Gads Hill to Yokosuka Way	17857	359	34	0	0.2%	0.0%
25	Yokosuka Way	13865	272	27	0	0.2%	0.0%
26	Ito Way	12290	227	21	0	0.2%	0.0%
27	A2 (Will Adams Roundabout to Bowaters Roundabout)	17921	424	21	0	0.1%	0.0%
28	Hoath Way south of Bowaters Roundabout / north of Hoath Way Roundabout	14103	263	14	0	0.1%	0.0%
29	Hoath Way south of Hoath Way Roundabout / north of Wigmore Road Roundabout	12824	220	7	0	0.1%	0.0%
30	Hoath Way Wigmore Road Roundabout to M2 J4	26396	1089	0	0	0.0%	0.0%
31	Ratcliffe Highway	6860	642	75	0	1.1%	0.0%
32	B2108	2853	282	21	0	0.7%	0.0%

10.132 In terms of the impact of total vehicles, this does not exceed 10% on any link.

10.133 The construction phase of the Development is forecast to increase HGVs by more than 10% on several links leading to the A2 and M2 from the Site and along Peninsula Way. Links 1, 3, 4, 5, 13, 15 and 18 are forecast to experience increases in HGV movement above 10%. The impact on all other links is less than 10% and therefore these links have been removed from the assessment of construction traffic.

10.134 There are few sensitive receptors along these links, and these are considered to have low sensitivity to increases in traffic. The exception to this are links close to the Four Elms Roundabout, where the capacity of this junction makes links sensitive to increases in traffic movements.

10.135 In terms of pedestrian amenity, the total vehicle trips associated with the construction of the Development or increases in HGV movements specifically distributed onto this link is not forecast to double in number. The assessment of pedestrian delay is only applicable to links with insufficient or no pedestrian facilities. In respect of severance, the forecast volume of trips would not affect the ability for pedestrian to cross links,

10.136 There are no known highway safety issues within the vicinity of the Site and the adjacent highway network is suitably designed to accommodate HGV traffic. The low HGV movement numbers will ensure that the impact upon driver delay on these links is of minor magnitude.

10.137 The 'peak' combined construction and operational Development trips have been calculated for each year of the construction programme to 2030. These trips peak in 2030, which is the last full year of construction work before the Development is completed and fully operational in 2031. Where around 10 percent of the Development is assumed to be constructed in the final year, the 'peak' construction and operational Development trips are less than that those generated, when the Development is fully operational.

10.138 Increases of 200 HGV movements across a 24-hour period will not significantly affect these links. Therefore, the likely significant effect of the construction phase of the Development is negligible.

Operational Phase

Traffic Flows

10.139 Table 10.14 outlines the 'with the Development' traffic flows, which has been used to identify which links need to be assessed in detail as per the 'Rule 1' and 'Rule 2' criteria set out in the 'Assessment Methodology' section of the chapter. This assessment focuses on comparing the impact of the Development with the 2037 baseline. As set out in the 'Assessment Methodology section, this assessment does not account for traffic generation associated with the historic use of the Site on the network and provides a robust basis for assessment.

Table 10.14: Operational Vehicle Movement Assessment

Ref.	Location	2037		''with the Development'		% change	
		Veh	HGV	Veh	HGV	Veh	HGV
1	Stoke Road east of Ropers Lane	9764	646	8908	2111	91%	327%
2	Stoke Road west of Ropers Lane	2109	131	952	0	45%	0%
3	Ropers Lane north of Stoke Road	7934	535	7956	2111	100%	394%
4	Peninsula Way west of Ropers Lane	13881	1156	7209	2111	52%	183%
5	Peninsula Way west of Bell's Lane	18720	1515	7209	2111	39%	139%
6	Four Elms Hill west of Main Road Hoo	24615	2048	7209	2111	29%	103%
7	Four Elms Hill east of Upchat Road	27491	2193	7209	2111	26%	96%
8	Four Elms Hill east of Four Elms Roundabout	26965	2340	7209	2111	27%	90%
9	A289 south of Four Elms Roundabout	22568	1612	1223	0	5%	0%
10	A228 south of Berwick Way	7945	971	272	0	3%	0%
11	Berick Way south of A228 and A289	26426	1178	884	0	3%	0%
12	A289 east of Berwick Way	25038	536	816	0	3%	0%
13	A289 west of Four Elms Roundabout	22674	1491	5781	2111	25%	142%
14	B2108 west of Four Elms Roundabout	11728	396	0	0	0%	0%
15	A289 east of Gravesend Road	28306	1334	5781	2111	20%	158%
16	Gravesend Road south of A289	4893	56	612	0	13%	0%
17	Lower Rochester Road north of A289	11349	659	0	0	0%	0%
18	A289 east of M2	28414	1513	5170	2111	18%	140%
19	A2 north of A289	62868	4750	2415	1056	4%	22%
20	M2 south of A289	55413	4304	2755	1056	5%	25%
21	Pier Road west of Gillingham Gate Road	25778	725	612	0	2%	0%
22	Pier Road West of Church Street	20196	557	544	0	3%	0%
23	Pier Road / Gads Hill west of Lower Woodlands Road	17720	346	408	0	2%	0%
24	Gads Hill to Yokosuka Way	17857	359	340	0	2%	0%
25	Yokosuka Way	13865	272	272	0	2%	0%
26	Ito Way	12290	227	204	0	2%	0%
27	A2 (Will Adams Roundabout to Bowaters Roundabout)	17921	424	204	0	1%	0%
28	Hoath Way south of Bowaters Roundabout / north of Hoath Way Roundabout	14103	263	136	0	1%	0%
29	Hoath Way south of Hoath Way Roundabout / north of Wigmore Road Roundabout	12824	220	68	0	1%	0%
30	Hoath Way Wigmore Road Roundabout to M2 J4	26396	1089	0	0	0%	0%

Ref.	Location	2037		''with the Development'		% change	
		Veh	HGV	Veh	HGV	Veh	HGV
31	Ratcliffe Highway	6860	642	748	0	11%	0%
32	B2108	2853	282	204	0	7%	0%

10.140 The initial screening process is to identify links where traffic impacts are above 10%. Links 1 to 8, 13, 15, 16, 18 to 20 and 31 are forecast to experience an increase of 10% in total traffic or total HGV as a result of the operational Development. However, some of these links are not in a sensitive location and therefore can be removed from the scope of the assessment provided that the traffic impact (total vehicles and HGVs) is less than 30%.

10.141 Links 19, 20 and 31 are not in a sensitive location and given that the percentage increase in total traffic or HGVs is below 30%, then these links have been removed from further assessment as per the 'Rule 1' and 'Rule 2' approach set out in the 'Assessment Methodology' section of the chapter.

10.142 The study area is therefore defined as the 12 links in Table 10.15.

Table 10.15: Assessed links

Ref.	Location	2037		'with the Development'		% change	
		Veh	HGV	Veh	HGV	Veh	HGV
1	Stoke Road east of Ropers Lane	9764	646	8908	2111	91%	327%
2	Stoke Road west of Ropers Lane	2109	131	952	0	45%	0%
3	Ropers Lane north of Stoke Road	7934	535	7956	2111	100%	394%
4	Peninsula Way west of Ropers Lane	13881	1156	7209	2111	52%	183%
5	Peninsula Way west of Bell's Lane	18720	1515	7209	2111	39%	139%
6	Four Elms Hill west of Main Road Hoo	24615	2048	7209	2111	29%	103%
7	Four Elms Hill east of Upchat Road	27491	2193	7209	2111	26%	96%
8	Four Elms Hill east of Four Elms Roundabout	26965	2340	7209	2111	27%	90%
13	A289 west of Four Elms Roundabout	22674	1491	5781	2111	25%	142%
15	A289 east of Gravesend Road	28306	1334	5781	2111	20%	158%
16	Gravesend Road south of A289	4893	56	612	0	13%	0%
18	A289 east of M2	28414	1513	5170	2111	18%	140%

10.143 The links identified above have been individually assessed using the criteria outlined in the assessment methodology and specific assessment criteria.

Severance

10.144 Table 10.15 outlines the effects of the operational Development on severance on the links identified for the assessment.

Table 10.15: Link Assessment – Severance

Ref.	Location			% change		Magnitude
		Veh	HGV	Veh	HGV	
1	Stoke Road east of Ropers Lane	8908	2111	91%	327%	Major
2	Stoke Road west of Ropers Lane	952	0	45%	0%	Minor
3	Ropers Lane north of Stoke Road	7956	2111	100%	394%	Major
4	Peninsula Way west of Ropers Lane	7209	2111	52%	183%	Major
5	Peninsula Way west of Bell's Lane	7209	2111	39%	139%	Major
6	Four Elms Hill west of Main Road Hoo	7209	2111	29%	103%	Major
7	Four Elms Hill East of Upchat Road	7209	2111	26%	96%	Major
8	Four Elms Hill east of Four Elms Roundabout	7209	2111	27%	90%	Major
13	A289 west of Four Elms Roundabout	5781	2111	25%	142%	Major
15	A289 east of Gravesend Road	5781	2111	20%	158%	Major
18	A289 east of M2	5170	2111	18%	140%	Major

10.145 With the application of the assessment criteria, the operational Development is forecast to impact on severance levels for all links presented in Table 10.14 other than link 2, as it would have a minor magnitude of impact on this link. Professional judgement has been applied to assess the Development's likely significant impacts on these links.

10.146 For links 1, 3, 4 and 5, there are limited receptors along the length of these links for which people may need to cross the road. Formal crossings are provided at junctions both ends of the links for pedestrians and cyclists to cross the road.

10.147 For link 6, a shared use footway/ cycleway is provided on the southern side of the road and a footway along the north side where destinations are available, together with sections of cycleway. The key 'desire line'[1] between Beacon Hill Lane and Chattenden Lane is accommodated for through the provision of a toucan traffic signal controlled crossing for pedestrians and cyclists. Accordingly, suitable provision for people crossing the road is provided.

10.148 A shared-use footway / cycleway is provided on the south side of link 7 and on both sides for link 8. There are few desire lines along the length of this link for people to cross.

10.149 For links 13, 15 and 18, there are no footways along the links or notable desire lines for people to cross which might be affected by increased traffic levels. As such, the effects from the operational Development on these links are negligible.

10.150 Overall, it has been concluded that the likely significant effects of the operational Development on severance is minor adverse.

Pedestrian Delay

10.151 The assessment of pedestrian delay is only applicable to links with insufficient or no pedestrian facilities. Table 10.16 includes an assessment of pedestrian facilities.

Table 10.16: Link Assessment - Pedestrian Delay

Link		Pedestrian Facilities
1	Stoke Road east of Ropers Lane	Separate pedestrian and cycle route on north side of the road. Uncontrolled crossing facilities at either end
2	Stoke Road west of Ropers Lane	Footpath on southern side of the road. Uncontrolled crossing at junction with Ropers Lane
3	Ropers Lane north of Stoke Road	Shared-use footway / cycleway. Uncontrolled crossings at junctions either end
4	Peninsula Way west of Ropers Lane	Shared-use footway / cycleway on the southern side of the road. Uncontrolled crossings at junctions either end
5	Peninsula Way west of Bell's Lane	No dedicated provision.
6	Four Elms Hill west of Main Road Hoo	Shared-use footway / cycleway on the southern side of the road. Footway to the north where required.
7	Four Elms Hill East of Upchat Road	Footway on southern side of the road. No requirement for crossing.
8	Four Elms Hill east of Four Elms Roundabout	Footways on both sides of the road but little requirement to cross.
13	A289 west of Four Elms Roundabout	No pedestrian or cycle facilities
15	A289 east of Gravesend Road	No pedestrian or cycle facilities

[1] A route that a pedestrian may take as part of a journey. Often the most direct or fastest route but will be cognisant of factors such as convenience and safety.

Link		Pedestrian Facilities
18	A289 east of M2	No pedestrian or cycle facilities

10.152 There is sufficient provision for pedestrians to cross links where desire lines exist and therefore no further assessment is required.

10.153 Therefore, the likely significant effects of the Development on pedestrian delay is negligible.

Pedestrian Amenity

10.154 Pedestrian amenity is broadly defined as the relative pleasantness of a journey, which is affected by traffic flow, traffic composition and footway width/separation from traffic.

10.155 Table 10.17 assesses the impacts of the operational Development on pedestrian amenity.

Table 10.17: Link Assessment – Pedestrian Amenity

Ref.	Location			% change	
		Veh	HGV	Veh	HGV
1	Stoke Road east of Ropers Lane	8908	2111	91%	327%
2	Stoke Road west of Ropers Lane	952	0	45%	0%
3	Ropers Lane north of Stoke Road	7956	2111	100%	394%
4	Peninsula Way west of Ropers Lane	7209	2111	52%	183%
5	Peninsula Way west of Bell's Lane	7209	2111	39%	139%
6	Four Elms Hill west of Main Road Hoo	7209	2111	29%	103%
7	Four Elms Hill east of Upchat Road	7209	2111	26%	96%
8	Four Elms Hill east of Four Elms Roundabout	7209	2111	27%	90%
13	A289 west of Four Elms Roundabout	5781	2111	25%	142%
15	A289 east of Gravesend Road	5781	2111	20%	158%
18	A289 east of M2	5170	2111	18%	140%

10.156 An assessment of traffic flow data shows that for total vehicles, link 3 presents forecasts where traffic flows are doubled.

10.157 In respect of HGV movements, Links 1, 3 to 6, 13, 15 and 18 presents forecasts where traffic flows double.

10.158 For links 1, 3, 4 and 5, there are limited receptors along the length of these links for which people may need to travel or cross the road. Formal crossings are provided at junctions both ends of the links for pedestrians and cyclists to cross the road. Movement numbers of pedestrians and cyclists are low and the nature of the road is such that traffic is expected. Adequate footway and cycle provision is also available. On balance, due to the low sensitivity of the links and increased traffic generally associated with HGV movements, the significance of effect is considered to be negligible.

10.159 Link 6 experiences an increase in HGV movements of over 100%. Cycleways and footways are located long this link, alongside destinations with clear desire lines. An increase in traffic may be noticeable due to higher movements in this area, which are generally well accommodated for through the provision of footways and cycleways and a traffic signal-controlled crossing. As such, a minor adverse impact from the Development is expected.

10.160 For links 13, 15 and 18, there are no pedestrian facilities along these links or noticeable desire lines. As such, the effect from the Development is negligible.

Driver Delay

10.161 The IEMA Guidelines note that driver delay can occur at several points on the network, although effects are only likely to be significant when the traffic on the highway network is predicted to be at or close to the capacity of the system.

10.162 The Transport Assessment (Volume 3 of the ES) assesses the transport impacts of the Development, which includes network performance. The modelling indicates that for most junctions, increases in delay are negligible. Some additional driver delay is expected at the Four Elms and Hoo Main Road Junctions. However, the level of delay experienced at these junctions during peak hour commuter periods is not excessive. It is not unreasonable for delay to occur at some junctions during peak periods.

10.163 One indicator of network performance is the average journey times. An increase in congestion would corelate with an increase in journey times.

10.164 During the AM and PM peak commuter hours, the delay in seconds per kilometre across the modelled network is forecast to increase by 5 to 6 seconds. The length of the assessed corridor from the Site through to the M2 is approximately 7km. This equates to an average driver delay of less than one minute.

10.165 Where general traffic on the network and trips associated with the Development will be lower outside of peak commuter periods, the effects on driver delay will be small and of minor magnitude.

10.166 There will be no change to vehicle speeds across the network, which suggests that there is no material increase in delay or congestion. During the PM peak hour, the average vehicle speed increases marginally by 0.1mph, which means that there is likely to be a minor reduction in delay when looking at the network in its entirety.

10.167 Therefore, with consideration of the experience at key junctions where some driver delay and queuing is forecast, the likely significant effects of the operational Development on driver delay is minor adverse.

Accidents and Safety

10.168 There are no known highway safety issues within the vicinity of the Site. Therefore, the likely significant effects of the Development on accidents and road safety is negligible.

Mitigation Measures

10.169 Mitigation is the stage in the EIA process when measures are identified to avoid, minimise or remedy potential impacts.

Construction Phase

10.170 It is proposed that a Construction Environmental Management Plan (CEMP) will be implemented in order to minimise the risk of the likely environmental effects occurring during the construction phase and to effectively reduce the effect associated with construction activities, including the use of defined routes and timing. The type of vehicle that will transport materials to the Site will be determined in advance to ensure safe and efficient delivery taking into consideration local constraints.

10.171 Construction traffic movements will be kept to agreed working hours where practicable and designed to minimise disruption to the highway network and local residents. The measures set out in the CEMP will be implemented and monitored in accordance with best practice construction management processes. It will be secured by a planning condition.

Operational Phase

10.172 The proposed mitigation is set out in detail within the Transport Assessment (Volume 3 of the ES) and summarised below:

- Site-wide Framework Travel Plan;
- Car Sharing scheme;
- Dedicated car share spaces;
- Cycle parking, washing, changing and storage facilities;
- Electric vehicle charging points;
- Cycle route along Eschol Road connecting existing cycle routes to the Site;
- Active travel corridor through the Site, providing pedestrian and cycle access to each building;
- Enhancements to Bus Services and / or dedicated staff shuttle bus services; and
- Sustainable Distribution Plan for larger vehicle movements associated with the Site.

10.173 The Site is allocated in the current Local Plan and also forms an important element of the emerging Local Plan for Medway. As part of the emerging Local Plan, highway improvements on the Hoo Peninsula, a new railway station south of Sharnal Street and the reintroduction of a passenger rail service. Funding is in place to deliver these works which will be in place by spring 2024.

10.174 Of particular relevance to the Development and the traffic modelling for 2028 are improvements to the Four Elms Roundabout, Main Road Hoo Roundabout and Bell's Lane Roundabout form part of the HIF proposals.

10.175 There are pedestrian facilities and enhancements to crossing facilities are planned as part of the HIF scheme. Several junctions and links within the study area will be subject to modification as part of the Hoo Peninsula HIF schemes and this process will incorporate considerations of safety through appropriate road safety audits.

10.176 These improvements will provide additional capacity to the network facilitating the Local Plan growth of which the Development forms a part of, providing jobs for the residents of the new homes that are proposed.

10.177 In the context of the Development, impacts at the Four Elms Roundabout and Hoo Main Road Roundabout will be improved through the proposed schemes that are planned. In the unlikely event that schemes are not implemented, a package of alternative mitigation may be agreed

(via s106, s278 etc) with appropriate parties. Preliminary designs for improvement schemes at these junctions are included within the Transport Assessment.

10.178 The schemes have been developed to facilitate discussions around improvements to the highway network that might be necessary as part of wider development in the area. They can be used to inform discussions with Medway Council which may lead to an appropriate financial contribution in the absence of HIF.

10.179 Should delivery and any improvements be required (in the absence of the HIF scheme coming forward), the trigger point for such improvements would need to be agreed with Medway Council and should consider a range of factors such as the position of the Local Plan, wider improvement schemes, the nature of occupiers at MedwayOne and consideration of changing travel patterns generally associated with the Covid-19 pandemic.

10.180 A suitable planning obligation would be agreed as part of the S106 agreement for the development.

Residual Effects

Construction Phase

10.181 The residual effects of the construction phase of the Development on severance, pedestrian amenity and delay, driver delay, and accidents and road safety, during the construction phase will be negligible following the implementation of mitigation measures.

Operational Phase

10.182 The residual effects of the operational phase of the Development on pedestrian amenity and delay, and accidents and road safety, during the operational phase will be negligible following the implementation of mitigation measures. Minor adverse effects are forecast for pedestrian severance and driver delay.

10.183 The Transport Assessment considers both the delivery of HIF works and alternative improvement schemes for two junctions within the study area. In the unlikely event that HIF schemes are not implemented, the alternative mitigation may be agreed via s106 or s278 agreements with appropriate parties. The residual effects associated with the alternative mitigation scenario would be as set out in paragraph 10.182.

Cumulative Effects

10.184 All cumulative effects have been taken into account in the construction phase and completed Development phase assessments and do not require further consideration.

Summary

10.185 This chapter has been prepared to assess the likely significant effects of the Development with respect to transport and access during both its construction and operational phase. The assessment is on the basis of a 2037 future year, with further assessments in 2028 to consider impacts upon highway capacity.

10.186 It describes the methods used to assess the effects and the mitigation measures that are to be implemented to prevent any significant adverse effects. It is supported by a Transport Assessment that can be found in Volume 3 of the ES.

10.187 Traffic data has been obtained from Medway Council's Aimsun model, which includes committed development and committed highway schemes.

10.188 Various assessment criteria have been investigated including severance, driver delay, pedestrian delay and amenity, fear and intimidation and accidents and road safety. The existing context has been provided through description of the baseline transport network.

10.189 Mitigation measures to help address the likely significant effects arising from the construction and operational phases of the Development have been proposed and includes measures aimed at sustainable travel, such as a cycle connection on Eschol Road and a commitment to car club schemes delivered and managed through a Site-wide Framework Travel Plan. Local highway schemes which are planned for delivery by 2024 will help increase capacity on the local highway network. Alternative schemes that mitigate the impact of the Development have been prepared and may be secured through financial contribution or direct delivery may be agreed with appropriate parties.

10.190 Following the implementation of mitigation measures, the residual transport and access effects of the operational Development are considered to be negligible for the majority of assessed links. However, a minor adverse impact upon pedestrian severance has been identified, associated with the increase in HGV movements. Additionally, where some junctions on the network will experience some driver delay during commuter peak periods, a minor adverse impact is expected once the Development is fully built out and considering a worst case in respect of land use provision and associated traffic attraction. All identified

residual effects from the construction and operational phases of the Development are non-significant.

10.191 Table 10.18 contains a summary of the likely significant effects of the Development.

Table 10.18: Table of Significance – Transport and Access

Potential Effect	**Nature of Effect** (Permanent/ Temporary)	**Significance** (Major/Moderate/ Minor) (Beneficial/Adverse/ Negligible)	**Mitigation / Enhancement Measures**	**Geographical Importance***							**Residual Effects** (Major/Moderate/ Minor) (Beneficial/ Adverse/ Negligible)
				I	UK	E	R	C	B	L	
Construction											
Effects on Severance	Temporary	Negligible	Implementation of a Construction Management Plan to be secured by planning condition.						*		Negligible
Effects on Pedestrian Delay	Temporary	Negligible							*		Negligible
Effects on Pedestrian Amenity, Fear and Intimidation	Temporary	Negligible							*		Negligible
Effects on Accidents and Road Safety	Temporary	Negligible							*		Negligible
Effects on Driver Delay	Temporary	Negligible							*		Negligible

Completed Development											
Effects on Severance	Permanent	Minor Adverse	Travel Implementation of Travel Plan, Active Travel Links and Sustainable Distribution Plan to be secured by planning condition HIF measures or a package of alternative mitigation to be agreed (via s106, s278) with appropriate parties in the unlikely event that the HIF does not come forward.						*		Minor Adverse
Effects on Pedestrian Delay	Permanent	Negligible							*		Negligible
Effects on Pedestrian Amenity, Fear and Intimidation	Permanent	Negligible							*		Negligible
Effects on Accidents and Road Safety	Permanent	Negligible							*		Negligible
Effects on Driver Delay	Permanent	Minor Adverse							*		Minor Adverse

*** Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; B = Borough; L = Local

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