

## 9 Transport and Access

### 9.1 Introduction

- 9.1.1 This chapter reports the assessment of the likely significant environmental effect of the Proposed Development on the transport network and people.
- 9.1.2 It describes: the policy context, the assessment methodology and the baseline conditions for the application site and the relevant surrounding area and junctions; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects and the residual effects after these measures have been employed. The Chapter has been prepared by Charles & Associates Consulting Engineers Ltd (C&A).
- 9.1.3 A full Transport Assessment (TA) has been produced and this is provided as Appendix 9.1 to this ES. This provides the base data, analysis, design and conclusions which subsequently inform this chapter. The TA has been produced in accordance with the guidance set out in the 'Planning Practice Guidance' (Department for Communities and Local Government). In addition, a Full Travel Plan for the first phase of development and a Framework Travel Plan for the remainder of the development are provided as appendices within the TA.
- 9.1.4 The environmental impact of the road traffic generated by the development proposal also requires an assessment against the criteria set out in the Institute of Environmental Management and Assessment's '*Guidelines for the Environmental Assessment of Road Traffic*'.

### 9.2 Planning Policy and Guidance

- 9.2.1 The assessment has been undertaken within the context of relevant planning policies and guidance documents.

#### ***Planning Policy Context***

##### *National Planning Policy*

##### The National Planning Policy Framework (July 2018)

- 9.2.2 The National Planning Policy Framework (NPPF) sets out the Government's planning policies and how they are expected to be applied.

9.2.3 Chapter 9 details the measures which should be taken to promote sustainable transport, with paragraph 102 stating that "Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- *the potential impacts of development on transport networks can be addressed;*
- *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;*
- *opportunities to promote walking, cycling and public transport use are identified and pursued;*
- *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*
- *patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places."*

- 9.2.4

Paragraph 109 states that development should only be 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.”

Planning Practice Guidance

9.2.5 The Planning Practice Guidance (PPG) provides advice on when transport assessments, transport statements and travel plans are required and, what they should contain. Details regarding the overarching principles and information relating to each document are provided within the PPG.

*Regional Planning Policy*

Hertfordshire's Local Transport Plan 2011-2031<sup>2</sup>

9.2.6 Hertfordshire County Council's Local Transport Plan (LTP3) provides a framework for transport policy within Hertfordshire. Its purpose is to set out the county council's vision and strategy for the long-term development of transport in the county.

9.2.7 The LTP3 is comprised of series of volumes as follows:

- The Strategy, Volume 1 – vision, goals and challenges
- Policy Document, Volume 2 – setting out the council's transport policies
- Implementation Plan, Volume 3 – setting out intended short term and longer-term interventions (actions)
- Daughter Documents – detailed strategies

LTP3 Volume 1 states Hertfordshire's Transport Vision as '*to provide a safe, efficient and resilient transport system that serves the needs of business and residents across Hertfordshire and minimises its impact on the environment*'.

9.2.8 Five goals support the vision of the plan. They are:

- Support economic development and planned dwelling growth;
- Improve transport opportunities for all and achieve behavioural change in mode choice;
- Enhance quality of life, health and the natural, built and historic environment for all Hertfordshire residents;
- Improve the safety and security of residents and other road users;
- Reduce transport's contribution to greenhouse gas emissions and improve its resilience.

9.2.9 The Volume 2 of LTP3 contains a compendium of the county's transport policies also known as tactical policies which the county intends will lead to achieving the challenges of the strategy set out in Volume 1 of the plan.

*Local Planning Policy*

Dacorum's Borough Council's Core Strategy 2006-2031<sup>3</sup>

9.2.10 The Core Strategy 2006-2031 is the first of the documents that make up the borough's new local plan. It sets out the planning framework for developments within the borough over the next 20 years. It will be used to determine the planning applications and as a starting point for more detailed policies.

9.2.11 Policy CS8 sets out key strategies to achieve sustainable transport. It states that all new

development will contribute to a well-connected and accessible transport system whose principles are to:

- *'Give priority to the needs of other road and passenger transport users over the private car in the following order:*
  - *Pedestrians*
  - *Cyclists*
  - *Passenger transport (buses, trains and taxis)*
  - *Powered two wheeled vehicles*
  - *Other motor vehicles;*
- *Ensure good access for people with disabilities;*
- *Ensure passenger transport is integrated with movement on roads, footways and cycleways;*
- *Create safer and continuous footpath and cycle networks, particularly in the towns;*
- *Maintain and extend the rural rights of way network;*
- *Improve road safety and air quality;*
- *Strengthen links to and between key facilities (bus and railway stations, hospitals, main employers and town centres); and*
- *Provide sufficient, safe and convenient parking based on car parking standards.'*

9.2.12 Policy CS9 relates to management of roads and states all new development will be directed to the appropriate category of road in the road hierarchy based on its scale, traffic generation, safety impact, and environmental effect.

#### Dacorum Borough Council's Local Plan 1991-2011<sup>4</sup>

9.2.13 The Local Plan 1991-2011 was adopted by the Council in April 2004 and covered the period up to 2011. By direction of the Secretary of State all of the policies in the Adopted Local Plan (except Policy 27, Gypsy Sites) were saved, i.e. continued to apply.

9.2.14 Following the adoption of the Core Strategy in 2013, many of the policies from the Local Plan 1991-2011 have been saved and will continue to form part of the Development Plan for Dacorum Borough until they are formally superseded or cancelled, although their compatibility with the provisions of the more recent NPPF would need to be taken into consideration.

9.2.15 Saved Policy 51 of the Local Plan states that all development proposals will be assessed against the resulting highway and traffic impacts whilst the proposals should have no significant impact upon:

- *'The nature, capacity and use of the highway network and its ability to accommodate the traffic generated by the development;*
- *The provision of routes and facilities for pedestrians, cyclists and passenger transport users, including links to existing networks;*
- *The design and effectiveness of existing and proposed traffic management measures, including traffic calming features;*
- *The design and capacity of parking areas and the implications for on-street parking;*
- *The environmental and safety implications of the traffic generated by the development.'*

#### Hemel Hempstead Urban Transport Plan (UTP) 2009<sup>5</sup>

9.2.16 Hemel Hempstead Urban Transport Plan 2009 is an overarching strategy document. Its purpose is to identify short, medium and long-term strategies to shape travel patterns and provide a transport framework for negotiations associated with development control.

9.2.17 Paragraph 5.7 of the UTP summarises the aims of the plan. Relevant provisions include:

- *'Locate developments to reduce travel needs, travel distances and encourage public transport, walking and cycling use to improve accessibility;*

- *Provide opportunities to reduce car use through providing sustainable transport choices, for example through new development;*
- *Promote modal shift towards sustainable transport and active travel;*
- *Improve road safety, especially for non-car modes;*
- *Support 'smarter choices' travel demand management measures;*
- *Reduce the negative impacts of transport on the environment; and*
- *Improve traffic management, including directing traffic onto suitable routes.'*

### 9.3 Assessment Methodology

#### **Scope of the Assessment**

- 9.3.1 The assessment has been prepared in accordance with the proposed technical scope set out in the EIA Scoping Report (Appendix 4.1) and EIA Scoping Opinion (Appendix 4.1).
- 9.3.2 The Institute of Environmental Assessment (IEA) has prepared '*Guidelines for the Environmental Assessment of Road Traffic*' 2003 (Guidance Note No. 1). These have been used as the basis for the method of assessment of the environmental effects of traffic in this Chapter. The method for each effect assessed is set out below.
- 9.3.3 The IEA guidance identifies a number of environmental effects that could arise from changes in vehicular demand. The following paragraphs provide a narrative of the assessment method for each of these indicators and identify those which are assessed in this chapter.

#### **Severance**

- 9.3.4 Severance is used to describe '*...a complex series of factors that separate people from places and other people*'. This can occur due to difficulty crossing a heavily trafficked road or relate to minor traffic flows if they impede pedestrian access to essential facilities. Factors which have been considered in the assessment include road width, traffic flow and composition, traffic speeds, availability of crossing facilities and the number of movements that are likely to cross the affected route.
- 9.3.5 In accordance with the IEA guidelines the assessment uses a range of indicators including changes in traffic flows of 30%, 60% and 90% which are regarded as 'slight', 'moderate' and 'substantial' changes in severance, respectively. Furthermore, consideration has been given to the local conditions such as whether crossing facilities are available and traffic signal settings.

#### **Driver Delay**

- 9.3.6 Traffic delays to non-development traffic can occur:
- At the site entrances where there will be additional turning movements;
  - On the highways passing the site where there may be additional flow; and
  - At key junctions on the nearby highway network.
- 9.3.7 Micro-simulation models are used for complex study areas covering a number of junctions over a wide geographical area. In this case traffic delays have been determined using ARCADY, PICADY and VISSIM microsimulation.

#### **Pedestrian Delay**

- 9.3.8 The Proposed Development will bring about increases in the number of vehicle and pedestrian movements. The volume, composition or speed of traffic have the potential to affect the ability of people to cross roads. Increases in traffic levels are likely to lead to greater increases in delay;

and the extent of the delay will be dependent on the level of pedestrian activity, visibility and general physical conditions of the Application Site. The assessment of pedestrian delay has been carried out using professional judgement in accordance with the IEA guidelines to determine whether there will be a significant impact on pedestrian delay.

**Pedestrian Amenity**

9.3.9 Pedestrian amenity is defined as ‘*the relative pleasantness of a journey*’ and is affected by traffic flow, traffic composition, footway width and the pedestrian separation from traffic. The assessment of the impact magnitude relating to pedestrian amenity has been carried out in accordance with the IEA guidance which states a tentative threshold for changes in pedestrian amenity is when traffic flow (or lorry component) is halved or doubled.

**Fear and Intimidation**

9.3.10 A further effect that traffic may have on pedestrians is fear and intimidation. This is dependent on the volumes of traffic, the HGV composition, the proximity to people or the lack of protection (such as narrow footway widths). The assessment has taken into account the suggested IEA guideline thresholds as summarised in Table 9.1 below.

**Table 9.1: Thresholds for Fear & Intimidation**

Degree of hazard	Average 18-hour traffic flow (vehicle/hour)	Total 18-hour HGV flow	Average speed over 18 hr day (mph)
Extreme	1800+	3000+	20+
Great	1200-1800	2000-3000	15-20
Moderate	600-1200	1000-2000	10-15

**Accidents and Safety**

9.3.11 The effect of additional traffic from the Proposed Development is discussed in terms of magnitude of increase, the existing accident record and the effect of off-site highway and transportation works.

**Hazardous Loads**

9.3.12 The IEA Guidelines acknowledge that most developments will not result in increases in the number of movements of hazardous / dangerous loads. The publication ‘*The Carriage of Dangerous Goods in the UK*’ lists materials which can represent a hazard when in transit, and provides guidance in relation to the safe carriage of these goods. The Proposed Development has been evaluated against this list.

**Dirt on the highway**

9.3.13 Dirt created by traffic can be a problem arising from the operations of certain types of development, notably quarrying and the transport of quarried materials. The impact of dirt will depend on the management practices undertaken on site. The assessment has been undertaken on the basis of the number of HGV movements and the proximity of nearby properties. An assessment of dust is provided in Chapter 11 Air Quality.

**Extent of the Study Area**

9.3.14 The extent of the study area has been agreed with Dacorum Borough Council (DBC) and Hertfordshire County Council (HCC). It comprises the main highway network to the west of Hemel Hempstead and covers the following areas:

- Long Chaulden.
- Boxted Road.
- The Avenue.
- Northridge Way.
- Hollybush Lane.
- Warners End Road.
- Leighton Buzzard Road.
- Fishery Road.
- A4251.

### **Modal Shift**

9.3.15 The impact of the introduction of the Travel Plan is anticipated to have a beneficial effect of reducing the volume of traffic. The Framework Travel Plan identifies a number of measures to encourage travel by sustainable modes (i.e. reduce the number of single occupancy car journeys and encourage the uptake of travel by walking, cycling and public transport) for future residents and employees of the site.

9.3.16 The hybrid planning application seeks permission for 1,100 new dwellings together with associated infrastructure and a community hub. The full application component seeks permission for the creation of the first 350 new dwellings, access and a foul drainage pumping station and other associated works and infrastructure. The outline application component relates to the remainder of the site, with the proposed development comprising 750 new dwellings and the other uses described in Chapter 3, and is submitted with all matters reserved save for means of access.

9.3.17 Whilst the Framework Travel Plan provides details of the overall approach, it does not set targets for mode change for the full development at this stage. This will rather be considered in further reserved matters submissions as they come forward for the relevant remaining phases.

9.3.18 The targets set in the Phase 1 travel Plan dealing with the first phase of 350 dwellings comprise:

- Reduction in single occupancy car journeys by 5%;
- Increase in the total annual bus journeys per year by 2% by the end of year 3;
- Increase in walk and cycle journeys by 3%; and,
- Ensure that 90% of households are aware of the Travel Plan and its initiatives and services on offer.

9.3.19 The initial mode share cannot be determined at this time. Therefore an actual survey will be undertaken as suggested by HCC when occupation reaches 50% of the first phase or when the first 175 Dwellings are occupied. Following this trigger targets will be reviewed and agreed with HCC.

9.3.20 Although not quantifiable at this time the beneficial impact of the expected mode shift to more sustainable modes is clearly expected to provide a reduction in development traffic.

### **Assessment Year**

9.3.21 In accordance with the requirements of the NPPF for future year assessments to be agreed with

the Highways Authority, C&A and HCC have formally agreed the future assessment year to be 5 years post application. With the application being submitted in 2017 the future year of 2022 has been formally agreed for assessment of both the first phase and the Total Development. This assessment takes account of appropriate background traffic growth and relevant committed development traffic and this has been conducted in accordance with the methodology agreed with HCC.

9.3.22 The 2022 assessment year enables the full environmental impact of the development traffic to be assessed against background growth to an appropriate future year. Extending background traffic growth beyond this would ultimately dilute the impact of the development in percentage terms, therefore, the assessment year of 2022 provides the most appropriate future year.

### **Consultation**

9.3.23 C&A conducted a formal pre-application process with HCC highways through the submission of a scoping note and subsequent technical notes. During this process, the base data and methodology have been agreed with HCC and their consultants. An EIA scoping opinion was also obtained as described in Chapter 4.

9.3.24 The specific consultation process is summarised below:

- Formal Highways Pre-application process with HCC Highways with regards to the Road Hierarchy, TA, TP, Junction improvements, Pedestrian and Cycle provision and numerous other matters.
- Formal Consultation with Highways England regarding the impact of the development on the strategic highway network.
- Consultation with Dacorum Borough Council as Planning Authority with regards to PROW, Cycle Routes, Public Transport and Ecology relating to the internal highway layout.
- Consultation with the public at multiple consultation events during which the public were able to make verbal and written representations to the full range of specialisms represented by the design team.
- Several multidisciplinary meetings between the developer's consultants, officers from both HCC and Dacorum have been conducted to facilitate full range of discussion and input on all aspects of the development.

## **METHOD OF BASELINE DATA COLLECTION**

### **Site visit/Desk Study**

9.3.25 A series of site visits during a variety of different periods, including weekday morning, and evening peak periods and off-peak periods, have been undertaken since 2016 to inform the assessment that has been undertaken. This has been supplemented by desktop studies where appropriate.

### **Traffic Surveys**

9.3.26 A comprehensive data collection exercise and the post-survey enumerating were conducted by independent survey contractors, Tracsis plc (on 15 June 2016) and Nationwide Data Collection, NDC (on 19 October 2016).

9.3.27 The data collected using the survey are as follows:

- Classified junction turning counts including queue surveys
- ATC Surveys over 7-day period.

9.3.28 Classified junction turning counts and queues were collected for the periods:

- 0700-1000
- 1600-1900

9.3.29 The peak hour observed traffic flows in 2016 are provided in Appendix U of the TA (Appendix 9.1). This also includes the calculated figures showing the 2016 18 hour Annual Average Week Traffic (AAWT) and 2016 24hour Annual Average Daily Traffic (AADT).

**Identification of sensitive receptors**

9.3.30 In order to determine the extent of the local highway network to be assessed within the chapter the following thresholds have been applied in accordance with IEA guidelines. Any highway links which fall outside of the two rules listed below are not considered to be assessed within the EIA:

- Rule 1: Include in the EIA highway links where traffic flows will increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%); and,
- Rule 2: Include in the EIA any other especially sensitive areas where traffic flows will increase by 10% or more.

9.3.31 Paragraph 3.20 of the IEA guidelines also set out that ‘sensitive’ locations include:

*‘accident blackspots, conservation areas, hospitals, links with high pedestrian flows, etc. Normally it would not be appropriate to consider links where traffic flows have changed by less than 10% unless there are significant changes in the composition of traffic, e.g. a large increase in the number of Heavy Goods Vehicles.’*

9.3.32 Having regard to the above, in transport terms locations which are considered to be sensitive receptors include:

- Accident blackspots;
- Conservation Areas;
- Schools;
- Health facilities (such as GP surgeries / Dental Practices etc.); and
- Community facilities (such as parks, community centres etc).
- Other locations where high numbers of pedestrians or cyclists pass through or congregate particularly where vulnerable users such as children, the elderly, infirm or disabled people are present.

9.3.33 Of the above, the relevant sensitive receptors are identified in bold in the Table 9.2 below.

**Table 9.2 Sensitive receptors**

<b>Receptor Ref:</b>	<b>Location and Receptor</b>
1	Junction 2 to 8 Increased Traffic Levels resulting in increased Queues and Delays impacting on <b>motorists</b>
2	Junction 2 to 8 Increased Traffic Levels resulting in increased Queues and Delays impacting on <b>Cyclists</b> (on road routes)
3	Junction 2 to 8 Increased Traffic Levels resulting in increased <b>pedestrian</b> delays crossing roads at junctions assuming the use of the existing pedestrian facilities
4	Long Chaulden / Warners End Road Increased Traffic may impact on <b>pedestrians</b> crossing road along the route to the Cavendish <b>School</b>
5	Long Chaulden / Warners End Road Increased Traffic may impact on <b>cyclists</b> along on road route to the <b>Cavendish School</b>



6	Long Chaulden Increased Traffic Levels may impact <b>pedestrians</b> heading to <b>Chaulden Infants School</b>
7	Junction 4 & 5 Increased Traffic Levels in the vicinity of Warners End Shops, Public House and St Albans Church. Where <b>Concentrated Pedestrian activity</b> takes place at various times of the day and on different days of the week
8	Long Chaulden Traffic Levels in the vicinity of Chaulden Shops and Where <b>Concentrated Pedestrian activity</b> takes place
9	Long Chaulden Traffic Levels on route to <b>Chaulden Infants, Nursery and Junior School</b> Where <b>Concentrated Pedestrian activity</b> takes place

### SIGNIFICANCE CRITERIA

9.3.34 The assessment of environmental effects as a result of the Proposed Development take into account both the construction phase and the operational phase. The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor to these changes. The magnitude of change and the sensitivity of the affected receptor are both assessed on a scale of major, moderate, minor and negligible. The following paragraphs provide further details.

9.3.35 To arrive at a judgement on the significance of effect on transport, the assessment considers the relative importance of the receptors and how these are likely to be affected as described below. The impact assessment for the Cumulative Development considers a comparison between the AM and PM Peak Hour, 2022 With-Development; and the AM and PM Peak Hour, 2022 with committed development scenarios.

#### Ranking of Sensitivity/Value

9.3.36 The significance level attributed to each effect has been assessed based on the magnitude of change due to the development proposals, and the sensitivity of the affected receptor to these changes.

9.3.37 The sensitivity of a receptor is based on the relative importance of the receptor or resource. The assessment has been carried out in accordance with the IEA guidance which highlights that it is useful to identify particular groups of people or locations which may be sensitive to change in traffic conditions. The guidance sets out the groups of people and special interests to be considered (described as receptors), in addition people as drivers are also included and all are included in Table 9.3 below.

**Table 9.3: Receptor Classifications of Sensitivity**

Value (sensitivity)	Receptors
High	Sensitive groups including children, elderly and disabled; sensitive locations e.g. hospitals, churches, schools and historical buildings Locations where large groups of people gather such as shopping areas or tourist/visitor attraction
Medium	People walking; people cycling; sites of ecological/nature conservation value; people driving
Low	open spaces, recreational sites, shopping areas;
Negligible	No receptors

- 9.3.38 The magnitude of change and the sensitivity of the affected receptor are both assessed on a scale of major, moderate, minor and negligible.
- 9.3.39 The magnitude of an impact is described as major, moderate, minor, negligible or no change. Impacts are either beneficial or adverse in nature. Such terms are relative to the receptor affected by the impact (i.e. a particular impact can result in a beneficial effect on one receptor and an adverse effect on another), and the criteria associated with them are summarised in Table 9.4.

**Table 9.4: Magnitude of Impact and Typical Descriptors**

Magnitude of Impact	Typical Criteria Descriptors
High	<ul style="list-style-type: none"> <li>Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).</li> <li>Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).</li> </ul>
Medium	<ul style="list-style-type: none"> <li>Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).</li> <li>Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).</li> </ul>
Low	<ul style="list-style-type: none"> <li>Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).</li> <li>Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).</li> </ul>
Negligible	<ul style="list-style-type: none"> <li>Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).</li> <li>Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).</li> </ul>

**Assessment of Significance of Effect**

- 9.3.40 The relative significance of an effect is largely a product of the sensitivity of the identified receptor and the magnitude and duration of the impact, but the assessment is moderated by professional judgement and takes into account the considerations described above. The significance of effect matrix is provided in Table 9.5 below. It is assumed for the purposes of this assessment that any effects of moderate significance or greater will be significant in EIA terms.

**Table 9.5: Matrix for Determining the Significance of Effects**

Magnitude of change/effect	Sensitivity of receptor/receiving environment to change/effect			
	High	Medium	Low	Negligible

	High	Major	Moderate to Major	Minor to Moderate	Negligible
	Medium	Moderate to Major	Moderate	Minor	Negligible
	Low	Minor to Moderate	Minor	Negligible to Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

9.3.41 The following bullets provide a description of the terms, used in Table 9.5 to define the significance of the effects identified:

- Major effect: where the Proposed Development could be expected to have a very significant effect (either positive or negative) on traffic volumes on the surrounding highway network;
- Medium effect: where the Proposed Development could be expected to have a noticeable effect (either positive or negative) on traffic volumes on the surrounding highway network;
- Low effect: where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) on traffic volumes on the surrounding highway network; and
- Negligible: where no discernible effect is expected as a result of the Proposed Development on traffic volumes on the surrounding highway network.

9.3.42 For the purposes of the assessment reported in this chapter, the receptor is the highway user (pedestrians, cyclists, motorists. etc.). Given that the receptor here are people the sensitivity of the receptor to change can vary significantly depending on the type of user and the situation. The sensitivity level for each receptor identified has been assessed based upon the descriptions in Table 9.4.

9.3.43 The significance assessment will also consider whether effects are direct or indirect; temporary or permanent; and short, medium or long-term. Effects that are predicted to be moderate or greater are considered to be significant for the purpose of this assessment.

## 9.4 Baseline Conditions

9.4.1 Baseline conditions relating to the existing transport conditions in the local area are outlined below. The Transport Assessment also sets out details on local travel characteristics and a detailed review of existing transport conditions in the local area.

### Local Highway Network

9.4.2 The site abuts Long Chaulden to the east, Chaulden Lane to the south as well as Pouchen End Lane to both the west and north west. In addition to these frontages, the site also adjoins The Avenue which provides further opportunities for vehicle, cycle and pedestrian access to connect to the surrounding highway network.

9.4.3 Long Chaulden connects to Northridge Way at its northern and southern ends forming a loop between Warners End Road to the north and St. Johns Road to the south. St. Johns Road and Warners End Road provide routes to Hemel Hempstead town centre and through to Hemel

- Hempstead industrial estate. Boxted Road and Berkhamsted Road provides routes to the north and west.
- 9.4.4 Long Chaulden is subject to a 30mph speed limit and is approximately 6.75 m wide with 1.8 m footway on its western side and a 3m shared footway/cycleway on its eastern side. Street Lighting is also provided. Long Chaulden provides both direct access to frontage properties as well as serving a local distributor function.
- 9.4.5 Along the site frontage, no parking restrictions or traffic calming measures exist. Beyond the site frontage the verges along Long Chaulden have been paved providing space for vehicles to park whilst retaining the existing 1.8 m footways. These spaces include a number of marked bays for disabled drivers. Consequently, the full carriageway width remains clear of parked cars.
- 9.4.6 Towards the south east of Long Chaulden, a school safety zone is in place, which covers the area between Honeycross and Cuttsfield Terrace. Chaulden Infant's and Nursery School and Chaulden Primary School are located to the north east and Pixies Hill Primary School is located to the south. This zone includes 1 m wide centre white ladder markings with red surfacing and associated centre refuges, an uncontrolled crossing and double yellow lines.
- 9.4.7 Various residential roads connect to Long Chaulden along its length via simple priority junctions. These include Green End Lane, Hollybush Lane, Roseheath and Newlands Lane to the north and Middle Hill, Jocketts Road, Honeycross Road, Lindlings, Hazeldell and Pixies Hill Road to the south.
- 9.4.8 The junction of Long Chaulden and Warners End Road to the north east of the site is a mini roundabout, which also connects with Northridge Way which runs to the south.
- 9.4.9 Short distance westward from this junction, a further mini roundabout is in place, which connects to the southern end of Boxted Road. A controlled pedestrian crossing is located just to the west of this mini roundabout. The junction of Long Chaulden with Northridge Way to the south east of the site is also a mini roundabout.
- 9.4.10 Northridge Way runs north to south, effectively connecting between the two ends of Long Chaulden. This is a 6.75 m wide road, of a very similar configuration to Long Chaulden, with residents' car parking on hard, off-road verges with footways behind. However, some verges are grassed and some constructed of grass-crete, and several mini roundabouts are in place at junctions as well as priority junctions.
- 9.4.11 There are a series of traffic calming features along this road, including mini roundabouts, central white ladder markings, 1 m wide red strips which abut both road channels on the carriageway and white lines adjacent to the channels at some locations.
- 9.4.12 Towards the south end of Northridge Way, south east of Long Chaulden, a mini roundabout junction with Old Fishery Lane is present, which connects with Chaulden Lane. This road runs to the west, past the site south boundary and connects with Pouchen End Lane further to the west.
- 9.4.13 The section of Chaulden Lane to the south east of the existing housing has a country lane feel, with hedges and trees immediately adjacent to both sides. The width varies between 4 m to 4.8 m. Passing places are present to the west of this section, and forward visibility is poor for drivers in places.
- 9.4.14 This section of road is subject to the national speed limit. The western section of Chaulden Lane south of the development site as it approaches Pouchen End Lane becomes markedly more

country lane in nature, with significant narrowing, dense shrubbery and trees present, poor visibility and passing places. The road has banks on the north side and is subject to national speed limit.

- 9.4.15 Pouchen End Lane is a very narrow single tract country lane, abutting the western boundary of the site. To the south west, it runs under the railway via a 4.3 m wide bridge. It then runs over a canal via a narrow bridge, and joins the A4251 to the south at a priority junction before joining the A41.

#### **Existing Highway Conditions (2016)**

- 9.4.16 The standard Rule 1 30% change or Rule 2 10% change in traffic flows criteria are applied based primarily on the sensitivity of the road or junction approach in question. The most accurate method to determine the sensitivity of a junction approach of individual traffic movement is to undertake a junction capacity assessment for each junction within the study area so as to identify the capacity, delays and queuing associated with the existing junction geometry and traffic flows. This assessment has been carried out in the Transport Assessment for the proposed development and as such the results from this assessment are highly relevant to assessing the sensitivity of the junctions to additional traffic demand.
- 9.4.17 TA (Appendix 9.1) Chapter 7 details the RFC's Queues and Delays experienced for each turning movement. These are provided for the observed 2016, 2022 + Committed, 2022+Committed + 350 Dwellings and 2022+Committed + Total Development (1100 Dwellings). The assessed junctions are shown geographically in Figure 6 of the TA (Appendix 9.1).

#### **Accident Analysis**

- 9.4.18 Accident data from HCC has been considered in detail in the TA. The complete accident analysis, summary table and accidents location plan are provided in Appendix E of the TA (Appendix 9.1).
- 9.4.19 Overall, there were a total of 53 personal injury accidents across the study area. These include 9 serious injury accidents and 44 slight injury accidents.
- 9.4.20 Following detailed examination of the 5-year accident records, it has been concluded that there is no indication of any unusual levels of accident risks generally; nor is there any localised pattern of accidents that might indicate a highway safety issue for which remedial actions would be required.

#### **Walking and cycling**

- 9.4.21 Various amenities lie within walking distances of 1km and 2km and cycling distance of 5km from the proposed development site. These includes nurseries, primary and secondary schools, GPs and local centres. A plan showing various amenities and distances with respect to the site is provided in Figure 5 of the TA (Appendix 9.1)
- 9.4.22 There are two local centres within proximity of the site these are, Chaulden Local Centre and Stoneycraft Local Centre, each with shops and post offices. They are located within walking distances of 650m (7-minute) and 900m (11-minute) respectively from the primary site access on Long Chaulden.
- 9.4.23 The nearest primary school is Micklem Primary School in Boked Road which is at a distance of 1.0km, and the nearest secondary school is at a distance of 1.6km in Warner End Road from the primary site access on Long Chaulden.

- 9.4.24 Hemel Hempstead town centre is also located within a reasonable cycling distance of 2.5-3km (36-minute walk) from the primary site access as well as being accessible by bus services. The town centre houses many high-street retail and other businesses and offers potential for employment opportunities.
- 9.4.25 The surrounding residential roads to the east of the proposed development provide an established network of good quality walking routes with suitable footways as well as street lighting.
- 9.4.26 Hemel Hempstead Bikeability study produced by AECOM in April 2016 shows that majority of the cycle routes in Hemel Hempstead are on carriageway routes including all cycle routes within the locality of the site. Following site visits and in light of the AECOM's Bikeability study, it is considered that the existing residential roads are suitable for cyclists.
- 9.4.27 Additionally, the development site benefits from a number of public rights of way. A map illustrating these routes is provided in Figure 3 of the TA (Appendix 9.1).
- Footpath 20 which runs along the eastern side of the site providing a connection to Shrub Hill Common to the south and leading to Fields End Lane to the north.
  - Footpath 21 runs along the northern boundary of the site and connects to route 20 and 22.
  - Route 22 provides a connection to The Avenue leading past John F Kennedy Catholic School through to Roseheath.
  - Footpath 91 runs west – east across the site between Pouchen End Lane just north of Pouchen End and Honeycross Road.

#### **Bus Access**

- 9.4.28 There are currently two bus services running in close proximity to the site. These are Service 3 and ML1. Service 3 is currently operated by Arriva while ML1 is operated by Red Eagle. These are commercial services and are subject to change.
- 9.4.29 These bus services are accessible from bus stops on Long Chaulden and on Boxted Road. The north bound stop on Long Chaulden is about 80m north of the site frontage with the south bound stop located on the opposite side of the road along the site frontage. The Boxted Road bus stop is about 530m from The Avenue Access.
- 9.4.30 Service 3 is accessible from the north bound stops on Long Chaulden and also from Boxted Road.
- 9.4.31 Service 3 Hemel Hempstead Town Centre – Chaulden Circular operates a daily service with between 3-4 buses per hour throughout the day Monday to Friday. Services operate between 05:45 – 22:59 with slightly reduced duration on Saturday and Sunday. The service operates along a circular route originating from Hemel Hempstead town centre and north to Gadebridge. The route then passes through Warners End making a clockwise loop around Northridge Way and Long Chaulden.
- 9.4.32 ML1 is served by the south bound stop on Long Chaulden opposite the site as well as by a second stop located about 105 m south of the site frontage.
- 9.4.33 Service ML1 Hemel Hempstead railway station – Maylands Avenue Circular operates a Monday to Friday service between 06:32 and 19:19 with 2 services per hour. The service operates a circular route originating at Hemel Hempstead railway station where it heads north to Warners End and then to The Avenue. From here it leads south to Long Chaulden where it takes an anti-clock wise route along Long Chaulden leading to the rail station. The route then travels via St. Albans Road to Hemel Hempstead Industrial Estate providing a valuable commuter route. It is

further noted that this circular route is reversed in the PM peak hour as shown in the timetable. The existing bus service routing is shown graphically in relation to the site at Figure 4 of the TA (Appendix 9.1).

### Rail Access

- 9.4.34 Hemel Hempstead railway station is approximately 1.9km walk from the Long Chaulden access providing Commuter routes to London as well as a number of other locations.
- 9.4.35 The following Table 9.6 identifies typical journey times to relevant destinations

**Table 9.6: Rail Journey Times**

Destination	Travel Times
Milton Keynes	30-36 min
Watford Junction	7-11 min
London Euston	26-35 min
Clapham Junction	47-59 min

## 9.5 Future Baseline

- 9.5.1 In the absence of the Proposed Development, the highway network will continue to operate on a similar basis as the existing situation; albeit subjected to increased traffic demand associated with general forecast traffic growth. The future baseline year of 2022 has been used in the transport assessment and for the ES to provide a baseline for comparison both with and without the development.

### Committed Development

- 9.5.2 HCC has provided information relating to the committed developments that they consider need to be taken into account in the transport assessment to derive design year traffic flows.
- 9.5.3 For the purpose of this analysis, the development commitments are those commitments that benefit from a planning permission but were not built/occupied at the time of the baseline traffic surveys.
- 9.5.4 A summary of the committed developments which have been taken into account are summarised in Table 9.7 below.

**Table 9.7 Committed Developments**

Planning Application Reference	Site	Description
4/03355/14/MFA 21/11/2014	Library and adjacent land, Combe street, Hemel Hempstead, HP1	Demolition of library and construction of public service quarter building and associated infrastructure
4/03624/14/MOA 10/12/2014	Land off Dacorum Way between Marlowes, Combe Street and River Gade, Hemel Hempstead, HP1 1HL	Residential development (up to 207 units) and ancillary retail unit (up to 375 sqm) - outline application with all matters reserved except for the strategic access onto combe street

### Committed Transport Infrastructure Improvements

- 9.5.5 For the purpose of this analysis, the committed transport infrastructure improvements are those 'hard' commitments that are associated with a consented development (or have secured 100% public funding for its delivery) and had not been constructed at the time of the baseline traffic

surveys.

9.5.6 C&A have not been informed of any committed infrastructure improvements which require consideration in the ES chapter.

#### Forecast Flows

9.5.7 As set out above, IEA guidelines specify the following thresholds to determine the extent of the local highway network to be assessed within this chapter:

- Rule 1: Include in the EIA highway links where traffic flows will increase by more than 30% (or the number of Heavy Goods Vehicles (HGVs) will increase by more than 30%); and
- Rule 2: Include in the EIA any other especially sensitive areas where traffic flows will increase by 10% or more

9.5.8 In order to identify Junctions and Links to which the IEA Rule 1 or 2 (See 9.3.30 above) would apply the following tabulation (Table 9.8) considers all junctions which were required to be assessed by the Local Highways Authority and Highways England for inclusion in the Transport Assessment.

9.5.9 This table provides the 2-way traffic flows on each arm of each junction and the % increase in traffic flows has been provided for the AM and PM peak hours for comparison with the Rule 1 and 2 Criteria.

9.5.10 The location of each junction is identified in Figure 6 of the TA (Appendix 9.1) for junction 1 – 8. The Traffic impact of the development on the Strategic road network represents a very small % change and as such it is not considered to be significant. During the preparation of the TA Highways England confirmed that no assessment of these junctions would be required.

**Table 9.8: Rule 1 and 2 assessment table for the AM and PM peak hours.**

Two Way Traffic Flows		AM Peak Hour			PM Peak Hour		
		1100 Dwellings + School	2022 + Committed	% Change	1100 Dwellings + School	2022 + Committed	% Change
<b>Junction 1</b>	(N) Long Chaulden	183	587	31%	136	539	25%
	(S) Long Chaulden	173	587	29%	134	539	25%
<b>Junction 2</b>	(N) Warmark Rd	0	31	0%	0	18	0%
	(E) Boxted Rd	251	967	26%	230	1017	23%
	(S) The Avenue	283	231	123%	257	246	104%
	(W) Boxted Road	31	850	4%	27	869	3%
<b>Junction 3</b>	(N) Northridge Way	19	962	2%	41	990	4%
	(S) Northridge Way	196	611	32%	120	1370	9%
	(W) Long Chaulden	132	1322	10%	183	583	31%



<b>Junction 4</b>	(N) Boxted Rd	159	986	<b>16%</b>	148	1152	<b>13%</b>
	(E) Warners End Rd	312	1435	<b>22%</b>	283	1471	<b>19%</b>
	(W) Long Chaulden	162	752	<b>22%</b>	136	816	<b>17%</b>
<b>Junction 5</b>	(E) Warners End Rd	223	1243	<b>18%</b>	220	1299	<b>17%</b>
	(S) Northridge Way	73	1074	7%	63	1119	6%
	(W) Long Chaulden	312	1435	<b>22%</b>	283	1471	<b>19%</b>
<b>Junction 6</b>	(N) Leighton Buzzard Rd	26	2015	1%	24	2117	1%
	(E) B487	50	1972	3%	49	1931	3%
	(S) Leighton Buzzard Rd	152	1625	9%	146	1819	8%
	(W) Warners End Rd	233	1722	<b>14%</b>	219	1753	<b>12%</b>
<b>Junction 7</b>	(N) Green End Rd	0	193	0%	0	255	0%
	(E) St Johns Rd	18	669	3%	17	707	2%
	(S) Leighton Buzzard Rd	178	1322	<b>13%</b>	166	1463	<b>11%</b>
	(W) Fishery Rd	196	1338	<b>15%</b>	183	1368	<b>13%</b>
<b>Junction 8</b>	(N) Fishery Rd	126	1180	<b>11%</b>	161	1420	<b>11%</b>
	(E) A4251	106	1754	6%	99	1867	5%
	(S) Carpark Exit	0	313	0%	0	388	0%
	(W) A4251	71	1806	4%	67	1711	4%

9.5.11 The AM and PM peak hour traffic flows as well as the future year 2022+Committed Development Flows are provided as Traffic Figures 01-33 in the TA (Appendix 9.1) as these provide the source data for the above table.

9.5.12 In addition, the forecast two-way 24-hour Annual Average Daily Traffic (24h AADT) and 18-hour Annual Average Weekday Traffic (18h AAWT) figures are provided in Appendix U of the TA (Appendix 9.1) as these inform the following table.

9.5.13 Following the Rule 1 approach few roads will be subject to a 30% increase in traffic although quite a number would be expected to have a 10% or greater increase in traffic.

9.5.14 For the purposes of this report all roads with 30% or greater impact will be considered in accordance with rule 1. In addition, where the likely receptors are identified with high sensitivity then the roads and junctions will be considered where a 10%+ increase is expected in accordance with rule 2.

9.5.15 Regardless of whether rule 1 or 2 applies, each junction will also be examined in terms of junction capacity to identify likely delays for motorists firstly without junction improvements and then with junction improvements / mitigations.

### Summary of Sensitivity

9.5.16 The links and junctions within the study area have been considered as to which receptors may be present at various locations. For each the corresponding sensitivity level has been entered based upon the description of these in Table 9.4. The geographical locations of the junctions

are confirmed in TA Figure 6.

9.5.17 Table 9.9 below identifies each receptor in **bold** and its corresponding sensitivity level.

**Table 9.9: Receptor Description and Sensitivity.**

<b>Receptor Ref:</b>	<b>Location and Receptor</b>	<b>Sensitivity Level</b>
1	Junction 2 to 8 Increased Traffic Levels resulting in increased Queues and Delays impacting on <b>motorists</b>	Medium
2	Junction 2 to 8 Increased Traffic Levels resulting in increased Queues and Delays impacting on <b>Cyclists</b> (on road routes)	Medium
3	Junction 2 to 8 Increased Traffic Levels resulting in increased <b>pedestrian</b> delays crossing roads at junctions assuming the sue of the existing pedestrian facilities	Medium
4	Long Chaulden / Warners End Road Increased Traffic may impact on <b>pedestrians</b> crossing road along the route to the Cavendish <b>School</b>	High
5	Long Chaulden / Warners End Road Increased Traffic may impact on <b>cyclists</b> along on road route to the <b>Cavendish School</b>	High
6	Long Chaulden Increased Traffic Levels may impact on <b>pedestrians</b> heading to <b>Chaulden Infants School</b>	High
7	Junction 4 & 5 Increased Traffic Levels in the vicinity of Warners End Shops, Public House and St Albans Church. Where <b>Concentrated Pedestrian activity</b> takes place at various times of the day and on different days of the week	High
8	Long Chaulden Traffic Levels in the vicinity of Chaulden Shops and Where <b>Concentrated Pedestrian activity</b> takes place	High
9	Long Chaulden Traffic Levels on route to <b>Chaulden Infants, Nursery and Junior School</b> Where <b>Concentrated Pedestrian activity</b> takes place	High

## 9.6 Potential effects

9.6.1 This section identifies the sensitive receptors and outlines the potential significant effects of the Proposed Development in the absence of mitigation.

9.6.2 These effects have been considered for the construction phase, and the operational phase comprising Phase 1 (350 Dwellings) and the Total Development (1100 Dwellings + Other Uses).

### Construction Phase Effects

9.6.3 A development of this scale will be built out over a number of years with construction activity varying depending upon the intensity of construction taking place at any particular stage and the differing buildings under construction at that time. The first phase of 350 dwellings (Phase 1) has been submitted in full detail, with the remaining 750 dwellings and other uses submitted in outline, and this phased approach is likely to result in some fluctuation in annual completions over the project lifetime.

9.6.4 During the construction phase, vehicles accessing the development site will include a mixture of specialist construction vehicles including cranes and bulldozers which will be delivered to site and then stay on site for as long as they are required. Traffic relating to these will be minimal

and short lived generally arriving to site at the commencement of the development and leaving once their role is no longer required.

- 9.6.5 In addition, trips by cars/LGVs associated with the workers at the construction site are relevant to this assessment, as are HGVs delivering and picking up materials (including excavated materials being removed from site).
- 9.6.6 The movement of HGV's and other large vehicles will be limited to appropriate day time hours, and deliveries can also be scheduled and routed to avoid the peak hours and other sensitive times of the day or parts of the network. This will minimise their impact on sensitive receptors.

#### ESTIMATION OF CONSTRUCTION TRAFFIC FROM FIRST PRINCIPLES

- 9.6.7 The impact of construction traffic generated by the proposed development on the highway network needs to be considered in relation to the proposed routes for construction traffic to and from the site, prevailing traffic flows, and an estimate of the numbers of trips likely to be generated.
- 9.6.8 Construction traffic is temporary in nature however for a site of this scale it will have an impact over a number of years. Although the proposed development will involve works on a large construction site, the level of traffic delivering to the site will benefit from bulk deliveries of materials using HGV's. This resulting in far less trips than would be the case on a small scale site. For example, a typical 4-bedroom house would require in the order of 7,500 to 9,000 bricks. A typical large articulated lorry can easily deliver this quantity of bricks and therefore at the expected maximum build rates the number of brick deliveries to the site is unlikely to exceed one per day. The same argument corresponds to other material being delivered to site in bulk.
- 9.6.9 There would be a multitude of other materials to be delivered to the Site during the course of the development and a quantity of waste material will also need to be removed.
- 9.6.10 However, the design of infrastructure would aim to minimise earthworks, and it is not expected at this time that there would be substantial quantities of soil being removed from the site. This will be verified once a full detailed cut and fill exercise has been completed during the detailed design process.
- 9.6.11 The likely number of construction vehicles is dependent on the rate of construction which in turn is affected by prevailing market forces which may well vary. It is expected that the annual build rate during the first phase for 350 dwellings could reach 145 units / annum with the remaining phases of the development for 750 dwellings reaching 170 dwellings / annum based upon a fast paced 8-year program. Although this could extend to a 10-year program depending on market demand.
- 9.6.12 To achieve the maximum expected build rate of 170 dwelling per annum during the later phases would require about 100 operatives with an additional 15 site staff.
- 9.6.13 This would result in a demand for up to 115 trips to and from site in the morning and evening. Assuming that 10% of these trips would either be as a passenger in a colleague's car or van as teams of subcontractors may well travel to site together these operatives and site staff would generate up to **103** vehicle movements in the morning as well as in the evening depending on the shift pattern established for the site.
- 9.6.14 In the construction industry, it is common practice for operatives and other site staff to work a 7:30am -4:30pm shift rather than the traditional 9am-5pm shift common in other industries. Due to this only a residual proportion of these trips would take place during the 8-9am and 5-6pm peak hours which are associated with peak traffic flows. There would of course be some daytime

traffic associated with lunch breaks and general activity during the day.

- 9.6.15 This traffic would arrive and depart to or from the site via either the Long Chaulden or the Avenue Access depending on the area of the site they are working in which would further distribute this traffic on to the local highway network and beyond.
- 9.6.16 In terms of HGV movements, typically, each house would generate up to **6 HGV** trips for the delivery of materials, and road and drainage construction would add a further **6 HGV** trips. Based on 250 working days per year, deliveries would as a maximum be expected to give rise to 170 dwellings x (6HGV per dwelling +6HGV R&D) / (250days) = **8HGV** trips per day. Where possible, excavated material would be re-used on-site to reduce the amount of material that needs to be taken off-site which could reduce this number.
- 9.6.17 Based on average quantities, the excavation of house foundations, roads and drainage could generate around (1100 dwellings x 80) 88,000m<sup>3</sup> of excavated material based on an average of 80m<sup>3</sup>per dwelling.
- 9.6.18 Assuming an HGV has a capacity of 8m<sup>3</sup> the excavation activities could generate on average 88,000m<sup>3</sup> / (8m<sup>3</sup> per HGV x 8 years x 250 days) = 5-6HGV trips per day.
- 9.6.19 Therefore, the overall HGV movements would on average be 8+6 = 14 HGV trips per day, and hence on average 28 two-way HGV movements would take place per day. This is equivalent to around 3-4 HGV movements per hour over the working day.
- 9.6.20 The effects of construction traffic on the capacity of the highway network during the network peak hours would be substantially less than the operational phase of the development, which has been assessed in detail in the TA and again in this ES Chapter. However the choice of HGV delivery routes will need further consideration in the CEMP which is discussed in the mitigation section of this chapter.
- 9.6.21 The IEA Guidelines for the Environmental Assessment of Road Traffic sets out that 'highway links should be assessed when traffic flows have increased by more than 30% or other sensitive areas are affected by traffic increases of at least 10%'. The predicted increase in flow due to construction traffic is well below these threshold values over both the AADT for the AM and the PM peak hours when compared against the 2021 traffic flows on any one particular link on the local highway network. It is therefore expected that during the construction period the effect of the proposed development would be as follows.
- 9.6.22 The increase in traffic anticipated due to construction activities is summarised in Table 9.10 below these are average values.

**Table 9.10: Increase in traffic due to construction**

Time of day	Cars and LGV		HGV	
	Arrivals	Departures	Arrivals	Departures
7-8am	103	*	2	2
8-9am	*	*	0	0
9am-3pm	*	*	10 2/hour	10 2/hour
3-4pm	*	*	0	0
4-5pm	*	103	2	2
5pm -	*	*	*	*

*Note \* identifies periods when an immaterial level of activity may well take place. 0 Indicates that this activity would be expected to be prohibited in order to avoid sensitive times of the day such as the start and end of the school day.*

- 9.6.23 The precise timings of this may change following the preparation of the CEMP and conditions which may be imposed as part of the planning conditions imposed by the local authority.
- 9.6.24 The arrivals and departures tabulated above would be distributed between both the Long Chaulden Access and The Avenue access and as such it would be expected that around half of the Car and LGV trips would be distributed evenly between the two access locations. The access routes for HGV's will be determined in consultation with the Highways Authority in due course and will be agreed through the CEMP.
- 9.6.25 Considering the above Construction Traffic, the following areas have been examined with the above traffic flows in mind and in light of the peak hour AADT and AAWT which are provided at Appendix U of the TA (Appendix 9.1).
- 9.6.26 Based upon this the proposed construction traffic would have a negligible impact on severance, Pedestrian Delay, Pedestrian Amenity, Fear/ Intimidation and Accident and Safety Risk.
- 9.6.27 The additional car and LGV traffic expected before the morning peak hour and also from 4:30pm would without mitigation result in an increase in traffic on the local highway network during these times.
- 9.6.28 There is the potential for a combined minor negative effect, without mitigation, in terms of driver delay during these off-peak times however the effect of this is considered to be minor.
- 9.6.29 In terms of Dirt transferred onto roads, without mitigation there is the potential for a Minor Negative effect caused by construction HGV movements increasing the amount of dirt picked up by the wheels of vehicles within the site being transferred onto the local highway network.
- 9.6.30 None of the impacts are considered significant.

### Operational Phase Effects

#### ACCESS ARRANGEMENTS

- 9.6.31 As described in Chapter 3, and shown in Figure 3.1 Movement Parameter Plan and the detailed access and layout drawings for the first phase (Figures 3.6, 3.8-3.10), the principal access points to the Site would be from Long Chaulden to the east; and, The Avenue to the north east, between which would be a primary road loop. The former will also provide a bus route into the Site leading to the community hub. From this primary road loop would be a secondary road leading to the south-east corner of the Site to facilitate a future connection to an adjoining land parcel. In addition, an emergency access would be provided in the south-east corner of the Site with Chaulden Lane. A network of pedestrian and leisure routes would also be provided across the Site, including connections to the adjoining residential streets to the east, and the country lanes and footpaths to the north, south and west.
- 9.6.32 There will be no vehicular access from Pouchen End Lane to the west. Access from Chaulden Lane to the south will be restricted to emergency vehicles only, together with an access for the self-contained travellers site and foul pumping station.

#### SEVERANCE

- 9.6.33 As described above, two main points of access to the site are based on Long Chaulden and The Avenue. During operation, all of the traffic flows from/to the Proposed Development would make use of either one of these. Hence, there will be a perceptible increase in traffic flows on these roads compared to the baseline 2022 traffic flows.
- 9.6.34 Additionally, roads within the study area would also be subject to increased traffic flow. However,

the increase would not be as perceptible as in Long Chaulden and in The Avenue as the traffic would disperse with distance from the proposed site.

- 9.6.35 The percentage increases in traffic for the full development are identified in Traffic Figures 12, 13, 18 and 24 in the TA (Appendix 9.1) and this is also tabulated above in Table 9.8 for the peak hours. From these the following three roads would experience some increase in severance during the AM and PM peak hours. These are Long Chaulden 31%, The Avenue 123% and Northridge Way 32%.
- 9.6.36 Long Chaulden and Northridge Way are expected to experience a slight increase in severance during the peak hours.
- 9.6.37 The Avenue would be subject to a large percentage increase in traffic which could indicate a substantial increase in severance however this is based upon very low existing traffic volumes currently using this route of 231vhp in the AM peak hour and 246vph in the PM peak hour compared to with development traffic flows of 514vph in the AM peak hour and 503vph in the PM peak hour.
- 9.6.38 Considering the low level of two way trips under consideration the level of significance of this increase cannot therefore be based upon a percentage increase alone. Total traffic levels will remain relatively low at just over 500vph two-way in both the AM and PM peak hours. Based on this more detailed analysis it is predicted The Avenue would therefore only experience a slight increase in severance.
- 9.6.39 When considering times outside of the peak hours it is relevant to look at the daily traffic flows as well to this aim, Appendix U of the TA (Appendix 9.1) provides an indication of the daily and week day impact of the Proposed Development in terms of the percentage increase in 2-way traffic on all roads within the study area. This clearly demonstrates that the 18h AAWT traffic levels would increase by up to a maximum of 23% on Long Chaulden. Again, the percentage increase on The Avenue is 107%, however the AAWT traffic flows over the day are again relatively low. This reconfirms that The Avenue would only experience a slight increase in severance.
- 9.6.40 On this basis, the magnitude of impact for severance will for the majority of roads be a permanent negligible adverse impact. For Long Chaulden, the Avenue and Northridge Way a permanent minor adverse impact is predicted. This impact is not significant.

#### DRIVER DELAY

- 9.6.41 Driver delays are identified in Junction capacity assessments. Detailed result summaries of these junction capacity assessments are provided in Appendix P, Q and S of the TA (Appendix 9.1). The following tables identify the maximum driver delays experienced for each junction on the worst operating movement.
- 9.6.42 Table 9.11 shows the driver delays and queues for the base 2022+Committed Development Case. Table 9.12 identifies the expected delays and queues that would occur with the development in place but without any junction mitigation being implemented. In addition, the Magnitude of impact this represents is listed.

**Table 9.11: Maximum Driver Delay 2022 + Committed Development**

Junctions	Delay (Seconds) rounded values	Queue (PCUs) rounded values
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	AM	PM	AM	PM
J2 The Avenue / Boxted Road	7	7	1	1
J3 Long Chaulden / Northridge Way	67	122	11	32
J4&5 Long Chaulden – Boxted Road – Warners End Road – Northridge Way	25	29	Av 4 Max 28	Av 5 Max 40
J6 Warners End Road / Leighton Buzzard Road	84	25	27	9
J7 Northridge Way / Fishery Road	17	36	4	9
J8 Fishery Road / A4251	65	89	16	22

**Table 9.12: Maximum Driver Delay 2022 + Committed Development + Development No Junction Improvements.**

Junctions	Delay (Seconds)		Queue (PCUs)		Magnitude of Impact Delays and Queues
	AM	PM	AM	PM	
J2 The Avenue / Boxted Road	9 (+2)	11 (+4)	1 (+0)	2 (+1)	Negligible adverse
J3 Long Chaulden / Northridge Way	157 (+90)	373 (+251)	29 (+18)	93 (+61)	High Adverse
J4&5 Long Chaulden – Boxted Road – Warners End Road – Northridge Way	81 (+56)	86 (+27)	Av 56 Max 63 (+52) (+35)	Av 35 Max 63 (+30) (+23)	High Adverse
J6 Warners End Road / Leighton Buzzard Road	129 (+45)	49 (+24)	107 (+80)	18 (+9)	High Adverse
J7 Northridge Way / Fishery Road	35 (+18)	108 (+72)	10 (+6)	34 (+25)	Medium Adverse
J8 Fishery Road / A4251	205 (+140)	190 (+101)	65 (+49)	55 (+33)	High Adverse

9.6.43 Considering that drivers are a medium sensitivity receptor and that the magnitude of the impact ranges from Negligible to High adverse. The significance of the effect is a permanent Moderate to Major Significance, and is significant.

9.6.44 This strongly suggests that mitigation is necessary for those junctions where both the Medium and High magnitude impacts occur.

#### PEDESTRIAN DELAY AND AMENITY

9.6.45 Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads.

9.6.46 As described above, traffic levels will increase particularly on Long Chaulden and The Avenue and the need for pedestrians to cross these roads will increase as the development progresses. Pedestrians range from school children who are considered a high sensitivity receptor to the public who are considered a medium sensitive receptor. The presence of existing informal crossing points as well as zebra crossing and signalised crossing points does mitigate the impact experienced along links. This would therefore be considered a permanent Minor adverse impact, which is not significant.

- 9.6.47 Increases in traffic levels at the existing junctions will also have an impact on pedestrian delays as crossing times will increase with higher traffic volumes. Due to the significant capacity issues associated with the existing junctions J3, J4 and 5, J6, J7 and J8 it is considered that Permanent Minor adverse impact on pedestrian delay and amenity would occur at these junctions without mitigation works taking place. This impact is not significant.

#### FEAR AND INTIMIDATION

- 9.6.48 The development traffic would result in increased traffic flows as described above. On the existing roads, this is not seen to be a significant issue given the existing pedestrian crossing facilities provided. However, crossing at junction will become more difficult with the perceivable increases in the level of traffic as well as increased queuing and delays at junctions.
- 9.6.49 Some locations include groups and children and as such these represent a sensitive receptor. The Magnitude of the impact is however considered Low. This is in part due to the existing pedestrian provision being to a reasonable standard with adequate footway with as well as a range of crossing types provided locally. As such this is a permanent minor adverse impact, which is not significant.

#### ACCIDENTS AND SAFETY

- 9.6.50 The accident data considered for the highway network in C&A technical note 7 illustrates that there is no common causation factor attributed to the personal injury accidents that occurred and no accident blackspots have been identified. Therefore, the magnitude of impact will be no change for all receptors considered in Table 9.2 resulting in a permanent neutral effect which is not significant.

#### HAZARDOUS LOADS

- 9.6.51 There are not predicted to be hazardous loads associated with the proposed development and therefore the effect of the proposed development will be negligible.

#### DIRT ON THE HIGHWAY

- 9.6.52 The internal street network of the development proposal will have a formal surface and the vast majority of traffic generated by the development proposal will be cars. On this basis, the development proposal will have a negligible effect in terms of dirt. An assessment of dust is provided in the Air Quality chapter.

### 9.7 Mitigation and enhancement

#### Construction

##### CEMP

- 9.7.1 Overall, construction impacts would be managed through a Construction Environmental Management Plan (CEMP) to include measures to control the volume and routes of construction traffic, which would be prepared and submitted prior to commencement of construction.
- 9.7.2 The Potential impacts of construction traffic include noise, vehicle exhaust emissions, dust, and mud and debris on roads, as well as possible road safety issues. Mitigation of these impacts would be achieved through strict adherence to the agreed construction traffic routes and permitted hours of operation, as well as by controls under health and safety legislation and good



construction site practices. Appropriate management of construction traffic will be undertaken, as follows:

- The use of appropriate and approved routes for HGV deliveries and for staff;
- The management of working hours and delivery times to minimise disturbance caused by traffic (e.g. avoiding deliveries during the peak hours and school peaks);
- Covering loads coming to and leaving the development;
- Provision of wheel washing / vehicle cleaning facilities on site; and
- Inspection of local highway network and cleaning as necessary.

9.7.3 The above measures will be included within a Construction and Environmental Management Plan (CEMP), which will be agreed with the relevant bodies (including DBC and HCC) and secured by planning condition. The CEMP will also incorporate construction traffic routing and management plans.

## Operation

### SUSTAINABLE TRANSPORT STRATEGY

9.7.4 To mitigate the transport related effects of the completed development, a comprehensive sustainable transport strategy is proposed as set out in the TA at Appendix 9.1. This strategy complies with the aims of national, regional and local transport policy guidance to deliver sustainable new development. Benefitting both the development and existing residents in the area.

9.7.5 The main objectives of the sustainable transport strategy for the proposed development at land west of Hemel Hempstead are to provide:

- The opportunity for many day to day journeys to be contained within the site without impacting on the existing external highway network;
- Development layouts which maximise the potential for 'walkable' neighbourhoods where walking, cycling and public transport are the first choice as a mode of transport;
- Integration between the site and the remainder of Hemel Hempstead and key destinations through improved linkages and connectivity
- Contributions to Public transport improvements payable to Dacorum to serve the site, and provide access to key local destinations such as the Rail Station and Town Centre;
- The opportunity for future residents, employees and visitors to the site to travel to a range of destinations by a choice of modes;
- A benefit to existing residents through the transport improvements being brought forward by the development;
- Opportunities for the effective promotion and delivery of sustainable transport initiatives e.g. walking, cycling, public transport and tele-commuting, in connection with the proposed and existing developments in Hemel and through this to reduce the demand for travel by less sustainable modes resulting in a modal shift away from the car.
- The proposed junction improvements have been through a Stage 1 Road Safety Audits with subsequent designer's response and further consultation with the highways authority to address solutions to any issues raised.

9.7.6 The sustainable transport strategy recognises that despite the opportunities provided for

sustainable travel that some future residents / employees will still choose or need to use their car for journeys and thus it is important to provide suitable and appropriate capacity improvements within the local highway network.

- 9.7.7 The provision of a primary school, retail / local convenience, health centre, community hall, and leisure / sport uses and open space in addition to the proposed residential development provides the opportunity for many journeys to be contained within the site without impacting on the external local transport network. This directly accords with the first part of paragraph 38 of the NPPF which states that for larger scale residential developments in particular, a mix of uses should be promoted in order to provide opportunities to undertake day-to-day activities including work on site.
- 9.7.8 Indeed, the provision of this mix of uses ensures walkable neighbourhoods with these facilities being within an 800m “comfortable” walk distance of many residential areas and within a 2km “reasonable” walking distance of all residential areas. This directly accords with the second part of paragraph 38 of the NPPF which states that where practical, particularly within large-scale developments, key facilities such as primary schools and local shops should be located within walking distance of most properties.
- 9.7.9 The site, the adjoining existing neighbourhoods of Warners End, Chaulden and Hemel Hempstead town centre and industrial areas combined provide a wide range of leisure, retail, employment and education facilities for existing and future residents. The vast majority of these facilities are situated to the east of the site. Many key destinations are within a reasonable walk distance of the site providing the opportunity for many future residents to make these journeys on foot. All of Hemel Hempstead is within a reasonable cycle distance of the site meaning that there is the opportunity for many future residents to make these journeys on cycle. This is illustrated in Figure 5 of the TA at Appendix 9.1
- 9.7.10 A fundamental element of the access strategy is to achieve integration between the site and the remainder of Hemel and key destinations through improved linkages and connectivity. This is to be achieved through walking and cycling improvements on the links into Hemel town centre as part of the junction improvements both new and renewed pedestrian infrastructure is provided as well as new cycle infrastructure at key locations.

#### SITE ACCESS JUNCTION WITH LONG CHAULDEN

- 9.7.11 The Long Chaulden access has been designed to provide access to the site for pedestrians, cyclists, bus services as well as the private car. The proposed design is laid out as a simple priority junction with right turning facility which has been demonstrated in the TA to provide ample junction capacity with minimal queuing. The design incorporates as a minimum 2 metre footways on both sides of the access road with a 3 metre wide shared pedestrian cycle route north of the site access crossing to the south of the access and continuing south west in to the site. Both pedestrian and cycle refuges are provided on the access road as well as two pedestrian refuges on Long Chaulden to the north and south of the access. The proposed design provides a new north bound bus stop and a relocated south bound bus stop on Long Chaulden. The layout incorporates a pedestrian refuge between the two stops to the rear of each bus stop position. This follows established safety principles to provide a safe and appropriate arrangement which has been subject to an independent Stage 1 Road Safety Audit and all recommended measures from that audit have been incorporated in to the submitted design. Drawing 16-021-071 Rev D is provided in the TA at Appendix 9.1 and at ES figure 3.8 illustrating this arrangement.

#### SITE ACCESS JUNCTION WITH THE AVENUE

- 9.7.12 The access proposals include the extension of the Avenue in to the site which will be constructed to the standard required for a primary bus route to enable future access by bus services in case this is required in the future.
- 9.7.13 The Avenue has a carriageway width of about 6.7m wide with verges and footways on both sides of the road. The proposed extension of the avenue will tie in to the internal primary road which will be 6.75m wide with 2m footways.
- 9.7.14 Drawing 16-021-149 is provided in the Transport Assessment and at ES figure 3.9 illustrating this arrangement. The proposals retain the path of the existing PROW which crosses over the proposed primary road. To facilitate this dropped kerb with tactile paving area to be provided.

#### OFF-SITE JUNCTION IMPROVEMENT MEASURES

- 9.7.15 The following section highlights mitigation measures that are proposed in the design of the development scheme to reduce traffic induced impacts and improve provision for pedestrians and cyclists. Additionally, it also includes details on how the mitigation will be delivered, with whom the responsibility for delivery lies and indicates the likely effectiveness of the mitigation proposed.

##### Junction 2- The Avenue / Boxted Road Roundabout

- 9.7.16 The capacity assessment results for 2022 with the Proposed Development and Committed Developments show that the impact from the traffic generated from the Proposed Development is not detrimental. Hence, improvement measures are not proposed for this junction. Pedestrian provision is also considered to be adequate.

##### Junction 3 - Long Chaulden / Northridge Way Mini Roundabout

- 9.7.17 The capacity assessment results for 2022 with the Full Proposed Development and Committed Developments show that there would be significant delays and queues at the existing junction. The proposals provide widening to the existing entry lanes which is achieved by revising the near side kerbs on the western entry and southern entry as well as widening on the eastern side of Northridge Way. The proposals also include the renewal of the Zebra Crossing on the southern approach. This incorporates a standard Tactile paving layout improving upon the existing non-standard layout. On the western arm, the existing dropped kerbs are to be replaced with dropped kerbs incorporate tactile paving. The proposed Layout has been subject to a Stage 1 Road Safety Audit and all recommendations have been applied to the proposed layout.
- 9.7.18 The proposed junction improvement measures are illustrated in drawing No. 16-021-072 Rev F provided in the TA at Appendix 9.1 illustrating this arrangement.

##### Junctions 4&5 - Long Chaulden / Boxted Road / Warners End Road / Northridge Way Mini Roundabouts

- 9.7.19 The junction capacity assessment identifies that increased queuing and delays would take place at this junction. The main capacity issue here is caused by the proximity of the two mini roundabouts and the lack of queue storage afforded by the single lane in each direction between the two junctions.
- 9.7.20 The proposals retain a double mini roundabout arrangement with the following amendments including two lane entries from the north and south, and two lanes in each direction between the two mini roundabouts. Following These measures provide greater entry capacity as well as increased storage capacity between the two mini roundabouts.
- 9.7.21 To provide for pedestrians the existing pedestrian crossings to the west will be retained and renewed to match the revised carriageway width. The existing dropped kerb with tactile paving

is retained to the north and the pedestrian refuge to the south will be enlarged to meet current minimum design requirements replacing the current substandard refuge.

- 9.7.22 The proposed layout has been subject to a Stage 1 Safety audit and following review by the Highway's Authority amendments have been made and these have been submitted a second time for a Stage 1 safety audit. The now proposed junction incorporates all suggested measures suggested in both safety audits. Appendix 9.1, drawing No. 16-021-067 Rev G illustrates the proposed junction improvement measures for the above junction.

Junction 6 - Warners End Road / Leighton Buzzard Road Roundabout

- 9.7.23 The junction capacity assessments in the TA indicate that the proposed development would have an adverse impact on junction capacity. It is also worth noting that remedial measures have recently been implemented in the form of circulatory lane marking. In addition, the existing dropped kerbs on the west north and eastern arms lack tactile paving.
- 9.7.24 In order to address the needs for pedestrians the proposals provide tactile paving on all pedestrian crossing points in accordance with current design requirements.
- 9.7.25 To address the Junction capacity issues the give way position has been brought forwards and the existing hatched areas on the circulatory carriageway are replaced with physical islands incorporating dropped kerbs and tactile paving. The central island kerb is renewed and the recently introduced circulatory lane markings are retained.
- 9.7.26 The proposed layout now provides dedicated lanes for all three movements which provide greater junction capacity junction capacity modelling in the TA shows that the proposals provide suitable mitigation for the development.
- 9.7.27 The proposed pedestrian infrastructure improvements will be of benefit primarily to existing users and also to any one walking from the site to the town centre. The existing signalised pedestrian crossing to the south is retained in its existing form.
- 9.7.28 The proposals have been subject to an independent Stage 1 Road Safety Audit which did not raise any concerns with the proposed layout.
- 9.7.29 Drawing No. 16-021-069 Rev A illustrates the proposed junction improvement measures for the above junction

Junction 7 - Northridge Way / Fishery Road Roundabout

- 9.7.30 The TA junction Capacity assessment identifies a minor capacity issue at this junction
- 9.7.31 The improvements include revisions to the give way markings providing increased entry width on all approaches. In addition, on the western approach a retaining wall is provided to support the existing footway and to enable a revised kerb alignment. The existing pedestrian refuges on each arm of the junction remain unaltered.
- 9.7.32 Drawing No. 16-021-073 Rev A illustrates the proposed junction improvement measures for the above junction

Junction 8 - Fishery Road / A4251 Roundabout

- 9.7.33 The TA junction Capacity assessment identifies a capacity issue at this junction
- 9.7.34 The improvements include increase length of two lane approach from the north with a revised kerb line from the northern to the eastern arm to provide greater entry width for two lanes. The existing single-entry lane to the west is replaced with two lane entry.
- 9.7.35 The existing pedestrian refuge on the northern arm is enlarged with some revised kerbs on each

entry reducing the ICD. Cyclists are also provided for with a one way west to east cycle lane taking cyclists travelling from the north to the east off carriageway and connecting in to the existing cycle route heading east. The roundabout geometry has been designed to DMRB compact roundabout design standards which provide a far safer roundabout design than a standard or non-standard layout. The existing central island is retained as it is.

- 9.7.36 The proposed layout was submitted for a Stage 1 RSA and all suggested measures have been implemented.
- 9.7.37 Drawing No. 16-021-068 Rev B illustrates the proposed junction improvement measures for the above junction.

#### MITIGATION DELIVERY

- 9.7.38 The proposed works delivery schedule is provided in the Table 9.13 below against the expected year and the trigger levels. Following examination of the capacity assessments made in the Transport Assessment it is considered that this schedule of works would fully mitigate for the proposed development and would provide benefits to the existing residents in particular pedestrians and cyclists at key locations.

**Table 9.13: Mitigation Delivery Schedule**

<b>Junction Improvement</b>	<b>Trigger Level</b>	<b>Approximate Implementation Year</b>
<b>Junction 1a</b> Long Chaulden Access	Phase 1 1 <sup>st</sup> Occupation	1
<b>Junction 1b</b> the extension of The Avenue in to the site	Phase 1 As required for construction access or by 350 <sup>th</sup> Occupation	2-3
<b>Junction 3</b> Long Chaulden / Northridge Way	Phase 2 375 Dwelling	4
<b>Junction 4</b> Long Chaulden / Boxted Road	Phase 1 350 Dwelling	3
<b>Junction 5</b> Warners End Road / Northridge Way	Phase 1 350 Dwelling	3
<b>Junction 6</b> Warners End Road / Leighton Buzzard Road	Phase 1 100 Dwelling	2
<b>Junction 7</b> Northridge Way / Fishery Road	Phase 1 350 Dwelling	3
<b>Junction 8</b> Fishery Road / A4251	Phase 1 100 Dwelling	2

- 9.7.39 The developer will liaise with the Highways and planning authorities to identify appropriate trigger levels for the proposed works. This will be based upon the number of occupied dwellings and it is expected that this will form a condition within the planning consent. The first phase (Phase 1) represents the first 350 Dwellings build with Phase 2 representing an additional 750 dwellings in addition to the other site uses i.e. the total development.

#### PUBLIC TRANSPORT STRATEGY

- 9.7.40 During the first phase (Phase 1) access to public transport will be provided through the relocation of the south bound bus stop at the Long Chaulden access and the provision of a new

north bound bus stop on Long Chaulden. Details of these are provided in Drawing 16-021-071 Rev D. The area within the desirable 400m walking distance from the Long Chaulden bus stops is identified in TA Figure 10 as the areas shaded red. The first phase boundary is also identified.

- 9.7.41 During the remaining phases (Phase 2) it is proposed that bus ML1 would be diverted this is considered in detail in C&A TN 006 which is provided as Appendix A to the TA (Appendix 9.1). The diversion of this service would be funded through developer contributions payable to Dacorum Borough Council to provide greater flexibility in provision

#### TRAVEL PLAN

- 9.7.42 The application includes a Framework Travel Plan covering the whole site with a detailed first phase (Phase 1) Travel Plan. The measures within these documents aim to encourage the use of more sustainable modes of travel such as walking, cycling and the use of public transport. This is achieved through the provision of physical infrastructure within the development in terms of hard measures. Soft measures are also to be implemented to encourage a mode change away from the private car and especially away from single car occupancy.
- 9.7.43 It should however be noted that the beneficial effect of a mode change due to travel plan measures has not been accounted for in the Traffic Levels being considered in the TA and as such the proposed mitigations and their beneficial impact do not require the Travel Plan measures.

#### Effectiveness of the mitigation proposed

- 9.7.44 Table 9.14 below illustrates the maximum delays (seconds) per vehicle and queues (PCU's) in different junctions within the study area during the operation in future year 2022 including the Proposed Development and the Committed Developments. These results include the proposed junction measures are in place. The full junction capacity assessment summaries for each movement are provided in Appendix 9.1 TA Appendices P, Q and S and include each turning movement.

**Table 9.14: Maximum Driver Delay 2022 + Committed Development with Junction Mitigation Measures**

Junctions	Delay (Seconds)		Queue (PCUs)		Magnitude of Impact Delays and Queues
	AM	PM	AM	PM	
Junction 1 Long Chaulden Junction Access	13	10	<1	<1	Negligible adverse to through traffic
J2 The Avenue / Boxted Road	9 (+2)	11 (+4)	1 (0)	2 (+1)	Negligible adverse
J3 Long Chaulden / Northridge Way	34 (-33)	80 (-42)	6 (-5)	23 (-9)	Medium Beneficial
J4&5 Long Chaulden – Boxted Road – Warners End Road – Northridge Way	21 (-4)	22 (-7)	Av 1 Max 15 (-3) (-13)	Av 1 Max 29 (-4) (-17)	Medium Beneficial
J6 Warners End Road / Leighton Buzzard Road	43 (-86)	32 (+7)	15 (-12)	9 (+0)	High Beneficial

J7 Northridge Way / Fishery Road	11 (-6)	53 (-17)	3 (-1)	15 (-6)	Medium Beneficial
J8 Fishery Road / A4251	40 (-25)	10 (-79)	11 (-15)	3 (-19)	High Beneficial

*Note Values in Bracket (01) represent the change from table 9.11 Maximum Driver Delay 2022+Committed Development. + Values in red represent increased Queues and Delays – Values in Green represent reduced queues and delays over the without mitigation scenario*

- 9.7.45 Comparing Table 9.11 and 9.12 against table 9.14 the following conclusions can be reached the development with the proposed mitigation measures provides an overall permanent medium to high beneficial impact to the majority of the highway network, which is significant.
- 9.7.46 The proposed junction improvements result in an overall benefit in capacity and reductions in queues and delays. The proposed pedestrian infrastructure especially as part of the Long Chaulden Access arrangements provides a substantial improvement to both pedestrian and cycle accessibility.

## 9.8 Residual effects

### Construction

- 9.8.1 Construction activities would be controlled as previously set out, with mitigation of the effects of construction traffic secured as part of the planning consent through a Construction Environmental Management Plan CEMP to include HGV routing, so that any residual effects would remain negligible.
- 9.8.2 The potential impact in terms of the tracking of dirt will also be mitigated by the CEMP, which will include measures to manage construction traffic activities, cover loads and provide vehicle and highway network cleaning as appropriate. It is therefore considered that there will be a negligible residual impact.

### Operational

- 9.8.3 As detailed in the previous section, a number of mitigation measures have been identified in response to the predicted effects. The mitigation measures would have a positive effect particularly upon severance, driver delay, pedestrian amenity, fear and intimidation and safety.
- 9.8.4 The Avenue will experience an increase in traffic with 123% and 104% increases in the AM and PM peak hours respectively. The high percentage increase is however of less concern than would generally be the case as the total two-way trips expected would be around 500vph in both peak hours. This represents a low level of traffic well below the range that would be expected to cause unacceptable levels of severance, driver delay, pedestrian delay together with impacts on pedestrian amenity, fear or Intimidation.
- 9.8.5 In addition, Junction 2 The Avenue with Boxted Road will continue to operate well within capacity and suitable pedestrian facilities are already in place. The Avenue will remain a suitable cycling route and some will benefit from shorter routes to some destinations to the south via the proposed development.
- 9.8.6 The Proposed Long Chaulden access is predicted to operate with very low levels of queues and delays. The proposals also provide two new bus stops as well as additional pedestrian and cycle facilities which will significantly improve pedestrian and cycle accessibility in the vicinity.
- 9.8.7 Following mitigation, the off-site junctions 3-8 will all operate with reduced queues and delays post development than would be the case without the development in 2022. Considering this

and the proposed renewal of pedestrian facilities at various junctions and the addition of cycle facilities at Junction 8, it is considered that the proposed mitigation measures with the development in place would overall be expected to give rise to a permanent medium net positive impact, which is significant.

## 9.9 Cumulative effects

9.9.1 All committed developments required by HCC Highways have been included in the base line assessment. The cumulative impact of the committed development in the area has therefore been allowed for in the assessments.

9.9.2 The cumulative effects of the construction traffic in addition to the operational traffic would not combine to result in a greater overall impact than the operational traffic by itself. This is due to construction phasing and because the anticipated operational times of site construction activity will be outside of peak hours, with most operatives and staff working a 07:30- 16:30 shift. HGV traffic will also be managed through the CEMP.

### Cumulative Effects Update

9.9.3 Following further consultation with DBC the following applications were identified as candidates for further consideration within the ES terms of their cumulative impact.

**Table 9.15: Cumulative Sites**

Planning Application Reference	Site	Description
4/00925/14/MOA February 2015 4/01630/17/MFA October 2017	Residential Development on former Martindale School	43 Dwellings approved in February 2015 Amended scheme for 65 Dwellings approved in October 2017.
4/00493/16/FUL	St Marys Dominican convent	Change of use of existing buildings from class C2 to class C3 dwelling house, alterations and refurbishment of listed buildings granted in June 2016. This will provide 20 additional residential units and the refurbishment of one existing residential unit.

9.9.4 The former Martindale School site gained permission for 43 dwellings in February 2015 subsequently in October 2017 permission was granted for an additional 22 dwellings giving a total of 65 dwellings.

9.9.5 The St Marys Dominican convent gained planning consent for 20 additional residential units in June 2016.

9.9.6 In addition to the above planning consents, there are circa 1.32 hectares of land to the south east of the proposed Site. This area whilst in separate ownership does form part of the same allocation confirmed in the Dacorum Site Allocations DPD LA3 – West Hemel. However, as there are no detailed planning application proposals to assess at the time this ES was compiled,



a CEA of this possible future development site is not directly possible given the quantum of development has not been established. To estimate the sites likely highways, impact the following assumptions have been made. The developable area of this parcel, once a gas pipeline buffer has been taken into account, would be about 0.62 hectares which at an estimated density of 35 dwellings per hectare could provide about 22 residential units.

9.9.7 The above sites relate to a total of (22+20+22) =64 additional dwellings each taking access from different parts of the Local Highway Network. This quantum of development would be expected to generate the following additional trips relating to each site

**Table 9.16: Martindale School Additional Trips 22 Dwellings**

	Arrivals	Departures	Total
08:00-09:00	3	8	11
17:00-18:00	7	4	11

9.9.8 The additional development would have a negligible impact on Junction 2,4 & 5 with the additional trips dissipating beyond this.

**Table 9.17: St Marys Dominican convent Additional Trips 20 Dwellings**

	Arrivals	Departures	Total
08:00-09:00	3	7	10
17:00-18:00	6	4	10

9.9.9 The additional development would have a negligible impact on Junction 3,7 & 8 with these additional trips dissipating beyond this.

**Table 9.18: LA3 Additional Trips 22 Dwellings**

	Arrivals	Departures	Total
08:00-09:00	3	8	11
17:00-18:00	7	4	11

9.9.10 The additional development would have a negligible impact on Junction 2,3,4,5,6,7 & 8 with the additional trips dissipating beyond this.

9.9.11 Given the location of these sites; the small scale of these developments and the resulting low levels of additional vehicular trips on the local highway network it can be concluded that these would have a negligible impact on the operation of the junctions under consideration in both the TA and within this ES Chapter. Similarly, it is concluded that these additional candidate sites are highly unlikely to result in a significant cumulative impact on severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, accidents and safety or hazardous loads.

## 9.10 Conclusion

9.10.1 This chapter has assessed the impacts arising from the predicted increases in traffic during the construction and operational stages of the proposed development on the transport network and people. The assessments have focused on the operational stage when the predicted increases in traffic are greatest.

- 9.10.2 Overall, with mitigation in place, the impacts are predicted to be negligible with the increases in traffic generally below the threshold at which effects such as pedestrian delay and fear and intimidation are likely to arise.
- 9.10.3 The proposals incorporate improvements to the highways network in the vicinity of the Site which would benefit to road users, pedestrians and cyclists and reduce driver delays compared to the existing and future baselines.
- 9.10.4 A summary of the assessment is tabulated overleaf in Table 9.15 for the Construction Impact and Table 9.16 for the Operational Impact. None of the residual impacts are predicted to be significant, other than the reduction to driver delay which is predicted as a moderate beneficial impact and therefore significant.
- 9.10.5 Following consultation with DBC a number of additional sites were identified as candidates for further consideration in terms of the potential cumulative effects within the ES. Following this C&A have reviewed the quantum of additional development proposed and the anticipated number of vehicular trips that would be generated. Subsequently the likely impact of these developments on the local highway network and junctions have been carefully considered.
- 9.10.6 Following this review, it is concluded that these additional candidate sites are highly unlikely to result in a significant cumulative impact on severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, accidents and safety or hazardous loads

## 9.11 Summary

The receptors which have been identified in this chapter, the potentials impact of the proposed development on this receptor, mitigation and resulting residual impacts are summarised in Table 9.15 and 9.16 below.

**Table 9.15 Summary of Potential Construction Impact of the proposed development on the receptors, mitigation and resulting residual impacts**

Potential impact	Nature of impact	Significance prior to mitigation	Mitigation / Enhancement measures	Residual effect
<b>Construction Impact</b>				
Severance	Direct	Negligible	<ul style="list-style-type: none"> <li>Construction and Environmental Management Plan and Construction Traffic Management Plan.</li> </ul>	Negligible
Driver Delay	Direct	Minor		Negligible
Pedestrian Delay	Direct	Negligible		Negligible
Pedestrian Amenity	Direct	Negligible		Negligible
Fear and Intimidation	Direct	Negligible		Negligible
Accidents and Safety	Direct	Negligible		Negligible
Hazardous Loads	Direct	Negligible		Negligible

**Table 9.16 Summary of Potential Operational Impact of the proposed development on the receptors, mitigation and resulting residual impacts**

Potential impact	Nature of impact	Significance prior to mitigation	Mitigation / Enhancement measures	Residual effect
<b>Operational Impact</b>				
Severance	Direct	Minor /adverse	<ul style="list-style-type: none"> <li>• Long Chaulden Site Access with New Bus Stops, Pedestrian and Cycle infrastructure</li> <li>• The Avenue accesses providing two all-purpose routes in to the site thus distributing the traffic more appropriately on to the highway network</li> <li>• Phased programme of Junction Improvements primarily during first phase (Phase 1) providing junction capacity and minimising queues and delays.</li> <li>• Cycle provision J1 J8</li> <li>• Renewal / improvement of pedestrian infrastructure multiple junctions J1, J3, J4&amp;5, J6, J8</li> <li>• Travel Plan Phase 1 &amp; Phase 2</li> <li>• Bus contributions in phase 2</li> </ul>	Negligible
Driver Delay	Direct	Moderate - High adverse impact		Moderate Beneficial Impact, Significant.
Pedestrian Delay	Direct	Moderate/minor adverse		Negligible
Pedestrian Amenity	Direct	Moderate/minor adverse		Negligible
Fear and Intimidation	Direct	Minor adverse		Negligible
Accidents and Safety	Direct	Minor Adverse		Minor Beneficial
Hazardous Loads	Direct	Negligible		Neutral

## References

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