Transport Assessment

East Hill, Hempstead Valley

17-035-005 Rev C
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Charles & Associates

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1 Introduction

1.1 Overview

1.1.1 This Transport Assessment has been prepared by Charles & Associates Consulting Engineers, as instructed by Hulme Planning, to support the proposed residential development of land at East Hill located in the Hempstead Valley, Medway.

1.1.2 This report has been prepared in accordance with the National Planning Practice Guidance (NPPG) for Travel Plans, Transport Assessments and Statements, March 2014. Due consideration has also been given to the prevailing government policy on transport as set out in the revised National Planning Policy Framework 2019 (NPPF).

1.1.3 The majority of the highway network surrounding the site is under the control of Medway Council (MC) who act as the local highway authority for the region, with the exception of the M2 motorway which is the responsibility of Highways England (HE). Pre-application discussions have been conducted with MC and HE.

1.1.4 A fundamental outcome of this early scoping with MC was the preference for this assessment to make full use of Medway's recently validated Strategic AIMSUM transport model. Further details of the use of this model are set out later in this report. However, to summarise, the model has been used as the basis for this assessment, in order to allow the full benefits of the supporting infrastructure to be reflected, to allow the cumulative impacts of the emerging Local Plan to be reflected and to maintain consistency with that process.

1.1.5 This TA has been prepared in order to consider the travel implications of the proposed development, in particular; its accessibility to surrounding facilities and sustainable forms of transport, its potential impact on the existing highway network; and the highway improvements required to accommodate the development.

1.2 Planning History

1.2.1 The application site is currently agricultural land in the main and has no planning status although it has been identified in the Development Options stage of the Local Plan.

1.3 Report Structure

1.3.1 The following chapters of this TA are structured as follows:

- Chapter 2 - Policy Context;
- Chapter 3 - Existing Conditions;
- Chapter 4 - Development Proposals;
- Chapter 5 - Trip Generation and Distribution;
- Chapter 6 - Traffic Impact Assessment;
- Chapter 7 – Proposed Mitigation Measures;
- Chapter 8 – Summary and Conclusions;

2 Policy Context

2.1 Overview

2.1.1 This section of the TA reviews the development proposals in the context of relevant planning policy relating to transport and appropriate design guidance.

2.2 National Policy

Revised National Planning Policy Framework 2019

2.2.2 The revised National Planning Policy Framework (NPPF), published in February 2019, recognises the need to pursue sustainable development in a positive way, summarised in NPPF paragraph 9 which states *"Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area."*

2.2.3 The NPPF indicates in paragraph 102 that *"Transport issues should be considered from the earliest stages of plan-making and development proposals".* In NPPF paragraph 103 the active management of patterns of growth is advocated as it can *"help reduce congestion and emissions and improve air quality and public health"* whilst recognising that *"opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."*

2.2.4 In considering development proposals, NPPF recommends in paragraph 110 that applications for development should "give priority first to pedestrian and cycle movements" and "create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles".

2.2.5 This document addresses the requirement in Paragraph 111 of the NPPF that "All developments that will generate significant amounts of movement should be required to provide a travel plan and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed."

2.2.6 The NPPF paragraph 112 highlights that *"Advanced, high quality and reliable communications infrastructure is essential for economic growth and social well-being."* Providing this within the development proposals will potentially encourage home working for new residents and reduce business mileage for new businesses on the site.

2.2.7 The NPPF is supported by Planning Practice Guidance, including one on the topic of Travel Plans and Transport Assessments, released in March 2014. The following TA has been written in accordance with that guidance.

2.3 Local Policy

2.3.1 The site falls within the highway authority domain of Medway Council (MC) and therefore the policy provided by MC is applicable to the site. This includes Medway's third Local Transport Plan for the period of 2011-2026, the Medway Local Plan 2003, and the emerging Medway Local Plan (2012 to 2035).

Medway Local Transport Plan 3 (LTP3)

2.3.2 MC's current third Local Transport Plan (LTP3), which covers the period 2011-2026, sets out the key strategic policy for sustainable transport throughout Medway.

2.3.3 The LTP3 seeks to address wider social, economic and environmental challenges for the area. The ambition of the transport strategy, which is closely aligned to Medway's Sustainable Communities Strategy, is to deliver transport interventions that contribute to five overarching priorities that focus on:

- Supporting Medway's regeneration, economic competitiveness and growth by securing a reliable and efficient local transport network;
- Supporting a healthier natural environment by contributing to tackling climate change and improving air quality;
- Ensuring Medway has good quality transport connections to key markets and major conurbations in Kent and London;
- Supporting equality of opportunity to employment, education, goods and services for all residents in Medway; and
- Supporting a safer, healthier and more secure community in Medway by promoting active lifestyles and by reducing the risk of death, injury or ill health or being the victim of crime.

2.3.4 Section 3 of the LTP3 details Medway's framework for delivery, which includes their long-term transport objectives spanning over the period of the plan. Each of these objectives has a specific focus and seeks to deliver improvements towards the plan's priorities, together with contributing to other agendas of Medway Council and its partner organisations.

2.3.5 The key transport objectives for Medway and underlying principle of each objective as set out in the plan are provided below:

- Highway maintenance – "To undertake enhanced maintenance of the highway network in the most sustainable way practical."

- Improving transport infrastructure capacity – "To respond to regeneration by efficiently and safely managing and improving Medway's road network, including improving road freight movements through Medway."
- Improving public transport -"To respond to the regeneration of Medway by encouraging travel by public transport including improving the quality, reliability, punctuality and efficiency of services."
- Encouraging active travel and improving health -"To contribute to improving health by promoting and developing transport corridors that encourage personal movement and by improving air quality."
- Improving travel safety -"To reduce casualties on Medway's roads and to encourage changes to travel habits by the implementation of Safer Routes to School projects."

2.3.6 Section 5 of LTP3 sets out the actions that are planned to deliver the above objectives and how the success of the plan will be measured. LTP3 states, "*to allow funding for large one-off projects to be effectively targeted during the 15-year period of the strategy, some interventions are prioritised for short, medium and long-term delivery"*. These delivery periods are defined as:

- Short term: April 2011 to March 2016
- Medium term: April 2016 to March 2021
- Long term: April 2021 to March 2026

Medway Local Plan 2003

2.3.7 The Medway Local Plan was adopted in May 2003, replacing the Medway Towns Local Plan 1992 and Medway Local Plan Deposit Version 1999.

2.3.8 There are 23 policies related to transport enlisted as T1 to T23 and are discussed within Chapter 8 of the Medway Local Plan 2003. The policies which are considered relevant to the site are outlined below.

2.3.9 Policy T1: Impact of Development; this policy states that development proposals will be permitted provided that;

- The highway network has adequate capacity to cater for the traffic generated from the development;
- The development will not significantly increase the risk of road traffic accidents;
- The development will not generate significant HGV movements on residential roads; and
- The development will not result in traffic movements at unsociable hours in residential roads.

2.3.10 Policy T2: Access to the Highway; this policy states that development proposals requiring formation of a new access, or an intensification in the use of an existing access will only be permitted where:

- The access is not detrimental to the safety of vehicle occupants, cyclists and pedestrians; or
- Can, alternatively, be improved to a standard acceptable to the council as Highway Authority.

2.3.11 Policy T3: Provision for Pedestrians; this policy states that development proposals shall provide attractive and safe pedestrian access which are accessible by people with disabilities, as well as, maintain or improve pedestrian routes related to the site.

2.3.12 Policy T4: Cycle Facilities; this policy states that development proposals should include cycle facilities related to the site.

2.3.13 Policy T6: Provision for Public Transport; this policy states, where of sufficient scale, new developments will be expected to make provision for access by public transport.

2.3.14 Policy T11: Development Funded Transport Improvements; this policy states legal agreements with development would be sought to secure off-site improvements to transport infrastructure, public transport services and improved accessibility by all modes of transport.

2.3.15 Policy T12: Traffic Management; this policy states road layouts within new developments will need to be designed with appropriate traffic management measures to help limit vehicle speeds and improve safety for all road users.

2.3.16 Policy T13: Vehicle Parking Standards; this policy states that development proposals will be expected to make vehicle parking provision in accordance with the adopted standard.

2.3.17 Policy T22: Provision for people with disabilities; this policy states that facilities to be used by public included within the development proposals should be suitable for people with disabilities.

Future Medway Local Plan

2.3.18 Medway's new Local Plan, which is at an early stage of preparation and is afforded limited weight, covering the period up to 2035 is currently being developed and once finalised, will replace the 2003 Medway Local Plan. It is understood that the consultation for the plan finished on 25 June 2018 and the publication of the draft plan is expected Summer 2019, with examination in 2020.

2.4 Design Standards/Guidance

Design Manual for Roads and Bridges

2.4.2 The Design Manual for Roads and Bridges (DMRB) is a suite of documents which contains requirements and advice relating to works on motorway and all-purpose trunk roads. The DMRB has been applied to the design of mitigation measures, in particular with regards to proposals for M2 J4 which are detailed later within this report.

2.4.3 Of particular relevance to this assessment is DMRB Volume 6 Section 3 – TD 51/17 which relates the design of segregated left turn lanes and subsidiary deflection islands at roundabouts. Table 2.2 within this document provides minimum nearside kerb radii and carriageway width standards for this type of feature.

Traffic Signs Manual

2.4.4 The Traffic Signs Manual published by the Department for Transport provides guidance on the use of traffic signs and road markings. Chapter 5 specifically deals with road markings and Table 10.3 provides standards relating to taper distances for slip road lane reduction at grade-separated roundabouts.

Manual for Streets

2.4.5 Manual for Streets (MfS) produced by the Department for Transport sets out the principles to be used for the design, construction adoption and maintenance of new residential streets.

2.4.6 Of particular relevance to this assessment is Chapter 7 which details the visibility requirements for junctions. Paragraph 7.5.1 states that, *"This section* provides *guidance on stopping site distances (SSDs) for streets where 85th percentile speeds are up to 60km/h. At speeds above this, the recommended SSDs in the Design Manual for roads and Bridges may be more appropriate"*

2.4.7 Paragraph 7.5.2 states "The stopping sight distance (SSD) is the distance within which drivers need to be able to see ahead and stop from a given speed. It is calculated from the speed of the vehicle, the time required for a driver to identify a hazard and then begin to brake (the perception–reaction time), and the vehicle's rate of deceleration. For new streets, the design speed is set by the designer. For existing streets, the 85th percentile wet-weather speed is used".

2.4.8 In addition to this, MfS section 6.6 discusses how highway design should cater for emergency and service vehicles.

2.4.9 MfS also covers the adoption of highways and it states that "Section 38 of the Highways Act 1980 gives highway authorities the power to adopt new highways by agreement and this is the usual way of creating new highways that are maintainable at the public expense. The Act places a duty on highway authorities to maintain adopted highways at public expense under section 41."

Medway Council Parking Standards Second Edition, September 2004

2.4.10 Medway Council parking standards was adopted in May 2001 and revised in September 2004. It provides guidance on the car and cycle parking requirements for land use classes A1, B1, C3, D1 and D2. It also provides Medway Council's minimum and optimum dimensions for parking spaces and aisle widths.

2.4.11 Parking standards for C3 Residential dwellings are provided within guidance document "Medway Council Residential Parking Standards, March 2010".

2.5 Response to Policy

2.5.1 The development proposals improve the sustainable modes available by enhancing the pedestrian connection via the old Pear Tree Lane (to the west) through to Capstone Road, providing a route through to the existing footway network and the local bus stop which enables access to/from Chatham – further detail is provided in chapter 4.0.

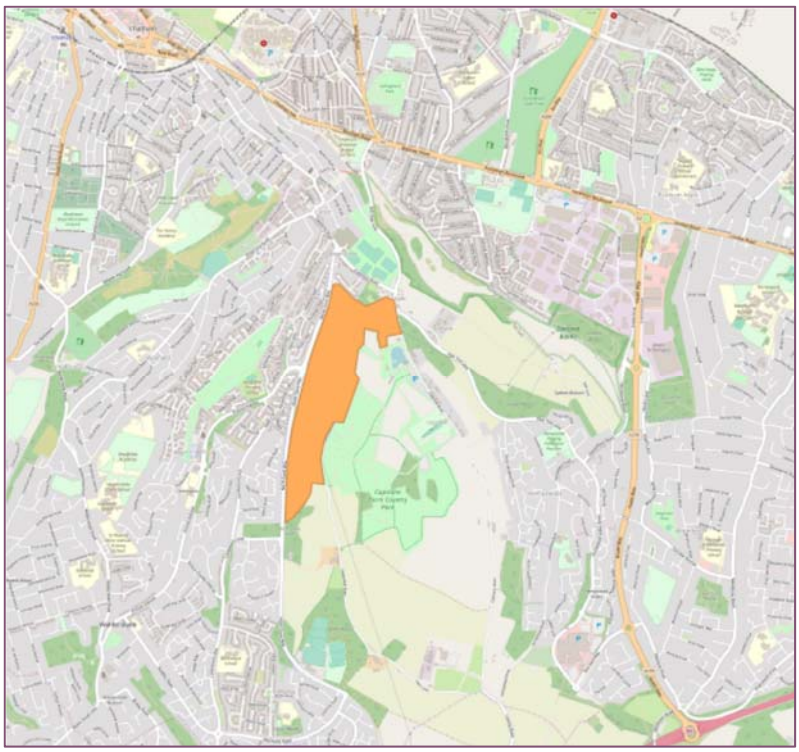
2.5.2 The nearest primary schools are Luton Infants School and Kingfisher Primary School, both of which are within a 20 minute walk of the site. The proposed primary school as part of this application will also be within walking distance of proposed residents. Local shops to serve everyday needs are located in Luton at less than a 20 minute walk of the site. Further afield, retail/leisure/commercial facilities are available in Gillingham and Chatham (around a 15 minute cycle of the site). The train station at Gillingham provides regular services to London and east Kent and is within a reasonable cycling distance of the site. Further detail on the existing transport network and local amenities in the area is provided in chapter 3.0 of this report.

3 Existing Conditions

3.1 Site Location and Access

3.1.1 The site, as illustrated in Figure 3-1**,** is located south of Gillingham, between the Darland Banks nature reserve (to the north of the site) and Capstone Farm Country Park (to the southwest of the site). The site is mainly agricultural land with a small expanse of woodlands. The western part of the site, between North Dane Way and Capstone Road, can currently be accessed either from Shawstead Road to the southwest, a minor road that primarily serves as an access to the Capstone Household Waste site, or from Capstone Road, between the roundabouts with Ash Tree Lane and Pear Tree Lane.

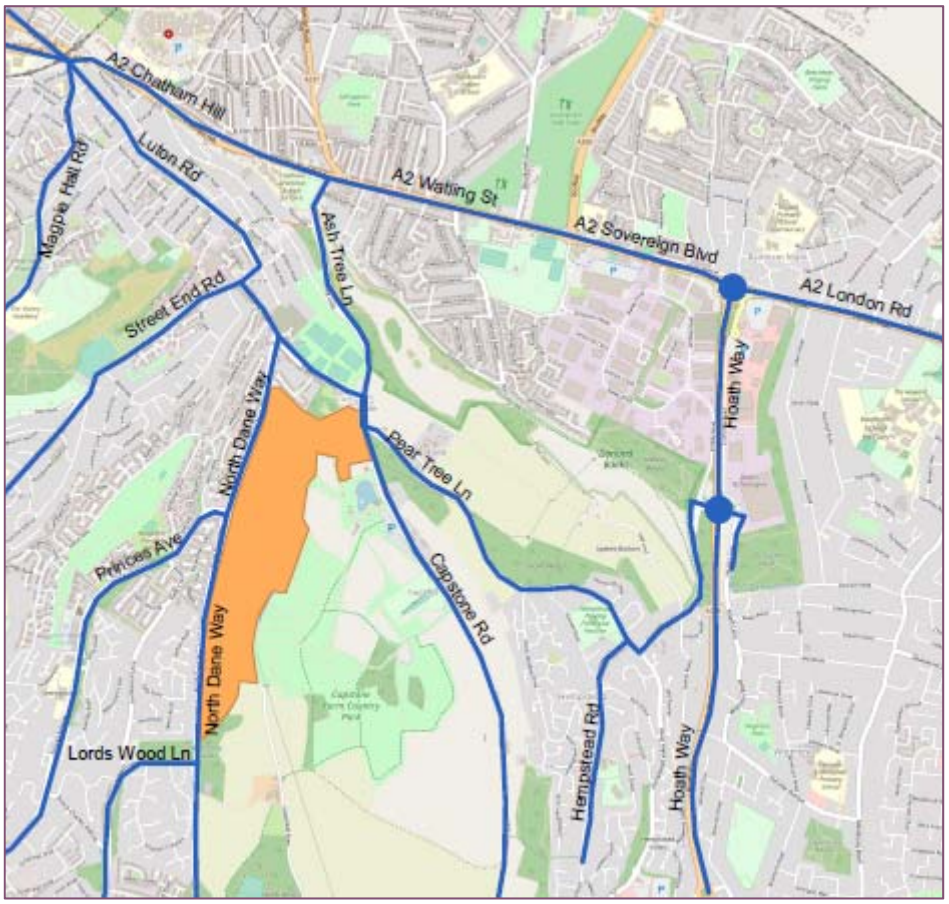
Figure 3-1 Site Location



3.2 Local Highway Network

3.2.1 The following section of the report describes the local highway network in relation to the proposed site. The local highway network is shown in Figure 3.2.

Figure 3-2 Local Highway Network



North Dane Way

3.2.2 North Dane Way is a two-way single carriageway which serves as a distributor road connecting Lordswood to the south with Chatham to the north. North Dane Way runs along the western side of the site from the roundabout with Capstone Road to the junction with Albemarle Road at Lordswood.

3.2.3 This route is subject to a 40mph speed limit, reducing to 30mph on the approach to the roundabout junction with Capstone Road. The route is lit, has central hatching between just north of the junction with Lordswood Lane and south of the Capstone roundabout junction and grass verges to both sides..

3.2.4 There is a footway on the western side of North Dane Way, between Capstone Road roundabout and Princes Avenue roundabout, separated from the road by a hedge/vegetation for most of the way. There is a shared walk and cycle way along North Dane Way, between Princes Avenue and Albermarle Road, again largely separated from the road by a hedge/vegetation.

Capstone Road

3.2.5 Capstone Road is a two-way carriageway orientated in a northwest-southeast direction between North Dane Way and Ash Tree Lane roundabout junctions. From the Ash Tree Lane junction Capstone Road continues southward to another roundabout junction with Pear Tree lane and subsequently to meet with Ham Lane and become Lidsing Road.

3.2.6 Capstone Road, between North Dane Way and Pear Tree Lane junctions is a two-way carriageway approximately 7.5 to 8m in width which is lit and subject to a 30mph speed limit. There is residential frontage to the southern side, between the North Dane Way and Ash Tree Lane junctions, with some marked parking bays and a footway.

3.2.7 Between the Pear Tree Lane and Ham Lane junctions Capstone Road is a two-way carriage, limited in width to less than 5m. This section of road is not lit, has no formal footway and is subject to a 30mph speed limit between the Pear Tree Lane junction and the access to the Capstone Farm Country Park. Between the country park and Ham Lane the speed limit is 40mph.

Pear Tree Lane

3.2.8 Pear Tree Lane is a two-way carriageway which runs northwest-southeast linking to Capstone Road to the northwest via a roundabout, and Hempstead Road/Hempstead Valley Drive via a mini roundabout to the southeast.

3.2.9 Pear Tree Lane is tree lined with narrow verges either side and is around 7.5m wide. It is subject to a speed limit of 50mph, reducing to 30mph as it reaches the junction with Capstone Road to the northwest and as it enters the area of Hempstead to the southeast. There is no active frontage along Pear Tree Lane until the junction with Dukes Meadow Drive from where Capstone Road becomes a more residential street with individual private driveways and cul-de-sacs.

Shawstead Road

3.2.10 Shawstead Road joins North Dane Way at a priority junction, just to the south of the Princes Avenue roundabout. Shawstead Road, at the junction with North Dane Way, is a two-way carriageway of approximately 7m in width, with no street lighting and a short section of footway on the northern side linking to a footpath. Within a short distance the road is reduced to approximately 3.5m width and no footway up to the access to the household waste site. To the south of the household waste site the road width is reduced to around 3m in places.

3.2.11 Shawstead Road is subject to access restrictions for heavy vehicles and buses.

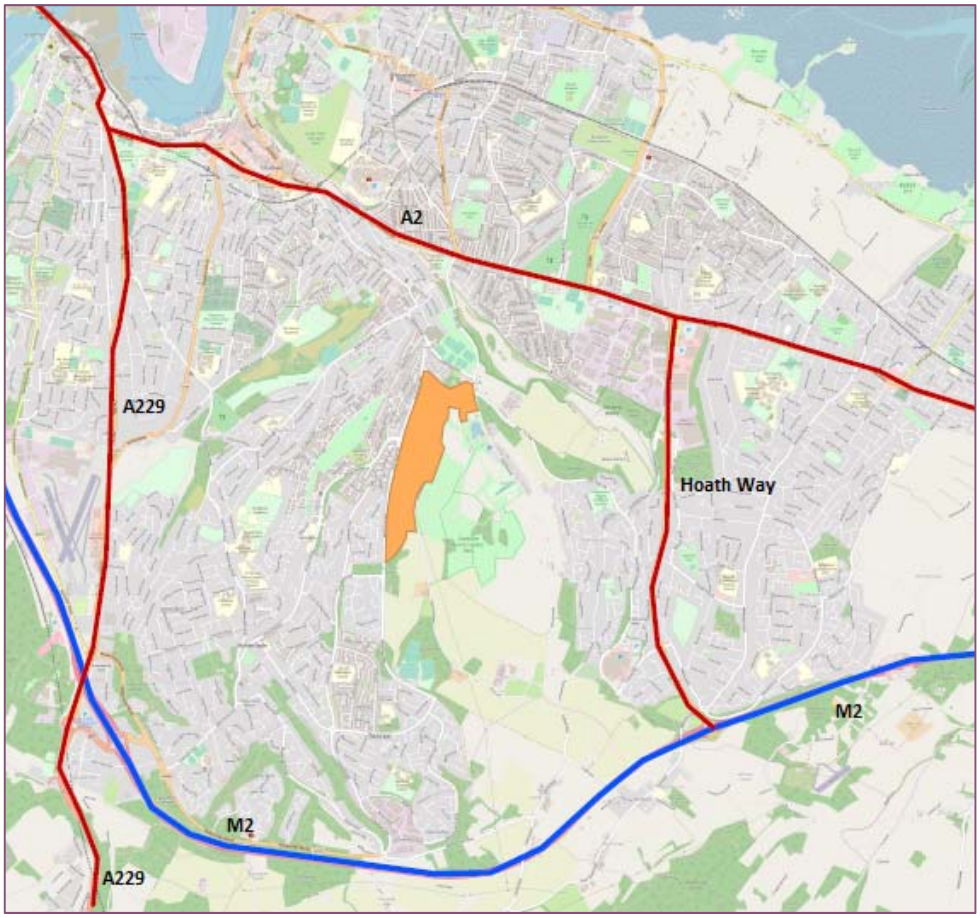
3.3 Strategic Highway Network

3.3.1 North Dane Way and Princes Avenue provide access to M2 at Junction 3. Pear Tree Lane leads, via Hempstead Road and Hempstead Valley Drive, to Hoath Way and the M2 at Junction 4. The M2 is a strategic trunk road, managed by Highways England (HE), which runs east-west to the south of the site and across Kent connecting the A2 at either end. The M2/A2 corridor leads to London to the west, and Dover to the east.

3.3.2 To the north of the site Capstone Road and Ash Tree Lane both link to the A2. This route runs roughly parallel to the M2 and provides an alternative to the motorway through the local residential areas. It links towns in Kent such as Canterbury, Faversham, Sittingbourne, Rainham, Chatham and Rochester.

3.3.3 The following plan illustrates the strategic highway network:

Figure 3-3 Strategic Network



3.4 Walking and Cycling

3.4.1 Walking and cycling have the potential to substitute short car trips, particularly those less than 1.6km (walk) and 5km (cycle) respectively and to form a part of a longer journey on public transport. As such, facilities catering for these are crucial to encourage shorter journeys to be undertaken by sustainable modes rather than the private car.

3.4.2 The site is situated to the south of the residential settlement in Hale and to the southeast of the residential area around Luton. The majority of the existing residential roads have well established pedestrian networks with footway provision along with street lighting on both sides of the carriageway, thereby, providing useful routes for pedestrians.

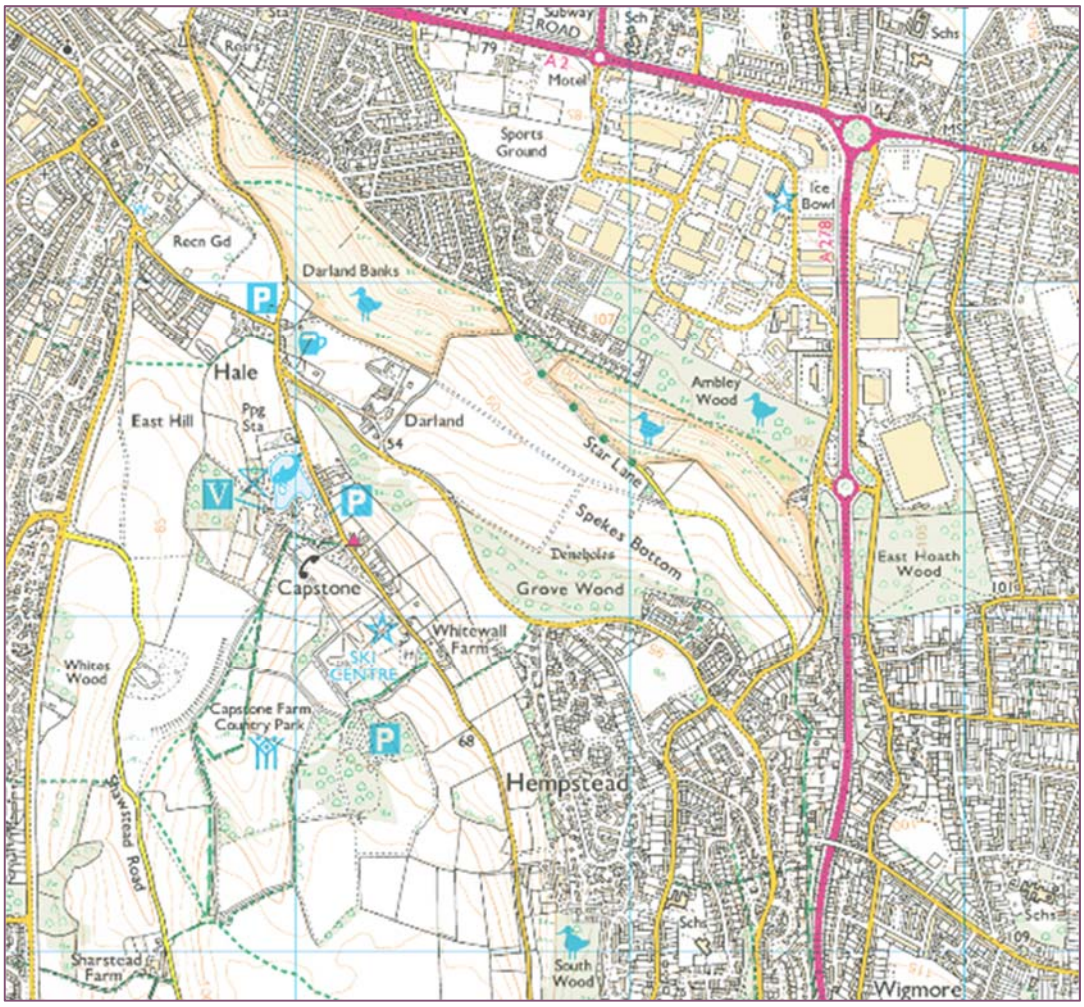
3.4.3 The pedestrian network surrounding the site involves mainly North Dane Way and Capstone Road and can be accessed from the eastern part of the development from the junction of Capstone Road/Pear Tree Lane and from the western part of the development from footpath access or the site access on North Dane Way. North Dane Way provides good pedestrian connectivity throughout, as described previously.

3.4.4 The provision on Capstone Road is on the western side of the carriageway and is around 1/1.1m over a short section (approximately 6m) then widens slightly to 1.2/1.3m. A standard width footway is located on the eastern side of Capstone Road (N) fronting the relatively new properties to the north of the Waggon at Hale public house. The eastern footway continues through the junction of Capstone Road/Ash Tree Lane onto Capstone Road (W) which would be the pedestrian route towards Luton, Gillingham and Chatham.

3.4.5 There are no footways available along Pear Tree Lane, while Ash Tree Lane provides pedestrian access only for a small section in order to connect to Luton Recreation Ground.

3.4.6 Figure 3-4 is an extract from the Explore Kent websites (Kent County Council) and shows the Public Rights of Ways (PROWs) available within the vicinity of the site as a broken green line.

Figure 3-4: Public Rights of Way



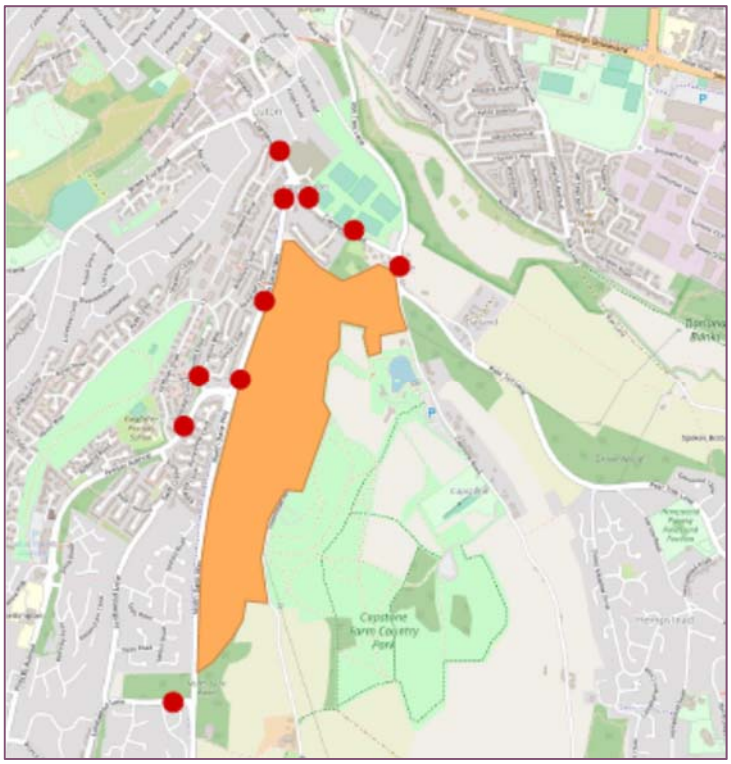
3.4.7 There is off-road cycle route provision within the vicinity of the site. To the west, off-road cycle routes are available along the length of North Dane Way and Albemarle Road and the majority of Lords Wood Lane as well as the north western boundary of the site. Further to the east, off-road cycle routes are available to the north along Hoath Way from its junction with Sharsted Way and further north. These serve as useful cycle routes for commuters as they lead to Lordswood Industrial Estate to the south west and Gillingham Business Park to the north east. The Medway cycle routes plan is provided within **Appendix A**.

3.4.8 There are no cycle routes shown around Pear Tree Lane or Capstone Road but there is a traffic free leisure route through Capstone Farm Country Park as well as a mountain bike track.

3.5 Bus Services

3.5.1 The proposed site is served through a number of bus stops that are located within walking distance from the site accesses, as illustrated in Figure 3-5. There are a number of stops along North Dane Way, Capstone Road and Princes Avenue.

Figure 3-5: Nearest Bus Stops



3.5.2 The key bus services serving this area are summarised in Table 3.1 below.

Table 3.1: Existing bus services and frequency

Route		Mon-Fri	Saturday	Sunday
166	(Chatham Rail Station) - Chatham - Luton – Princes Avenue - Lords Wood - Gleaming Wood Drive	Up to 7 per hour	Up to 5 per hour	Up to 2 per hour
169	Chatham - Luton - Heron Way- Princes Park - Walderslade - Alexandra Hospital	8 per day	8 per day	N/A
113	Chatham- Luton- Waggon at Hale- Hempstead Post Office- Hempstead Valley Shopping Centre- Wigmore	8 per day	8 per day	N/A
B150	Princes Park - Lordswood - Walderslade - Blue Bell Hill – Maidstone with school journeys to Aylesford	6 per day	6 per day	N/A
M1	Lordswood, Walderslade, Wayfield, Luton, Darland, Rainham, Wigmore, Hempstead Valley	N/A	3 services	N/A
658/9	Gillingham to Rochester schools Via Rainham, Parkwood, Hempstead Valley, Luton, Lords Wood and Walderslade	School days only	N/A	N/A
716	Darland - Luton - Lordswood - Walderslade - Bridgewood - London	3 per day	N/A	N/A
719	Hempstead Valley - Lordswood - Walderslade - Bridgewood - London	5 per day	N/A	N/A
723	London - Bean - Bridgewood - Walderslade - Lordswood - Parkwood - Rainham	1 per day	N/A	N/A

3.5.3 Full timetables and route maps of the above discussed bus services are provided within Appendix B along with the Medway Bus Network Plan.

3.5.4 The 113 runs hourly on Monday to Saturday between Chatham and Wigmore, via Luton and Hempstead. The 166 provides a regular service, both on weekdays and weekends accommodating trips to Chatham and Lordswood via Luton, while the 169, a less frequent service operating Monday to Saturday, complements the 166 by connecting Chatham to Walderslade. The 658/9 is a school bus providing one service in the morning and a return journey in the afternoon to/from the Rochester Grammar Schools.

3.5.5 In addition, there are coach services to London (namely the 716, the 719 and the 723) that stop on North Dane Way close to the roundabout with Princes Avenue. The services are provided by Kings Ferry and operate Monday to Friday for commuter travel. The journey time is around 2 hours to/from the site to London.

3.5.6 An additional service (M1) operating on Saturdays connects the Kestrel Shopping Centre with Hempstead Valley Shopping Centre via Capstone Road, near the roundabout with North Dane Way.

3.5.7 In combination, it is evident that the site has access to a very broad and extensive range of bus services, providing for high quality connections to the wider area.

3.6 Rail Access

3.6.1 The nearest railway station is at Gillingham located approximately 3.0 km from the site (measured from the Capstone Road/ Pear Tree Lane), a 12 minute cycle ride. The line runs to London Victoria, Charing Cross and Cannon Street via a number of towns/villages in between such as Chatham, Rochester, and Bromley South. It takes between around 54 minutes and 1 hour 29 minutes to get to London depending on the destination station. In the opposite direction the line provides access to Kent towns including Rainham, Sittingbourne, Faversham, and Dover as well as the city of Canterbury. The services to London operate every 5 to 15 minutes in both directions on Monday - Friday, and 5 to 30 minutes at a weekend. There are two services an hour to the east (i.e. towards Rainham etc) on Monday – Saturday and hourly services on a Sunday.

3.6.2 There is also access to the High Speed 1 service which runs to London St Pancras via Chatham, Rochester, Strood, Ebbsfleet International and Stratford. The services run every half an hour in both directions on Monday – Sunday.

3.6.3 Gillingham train station is CCTV operated, has a ticket office that is open every day from morning to afternoon, toilet facilities and parking space for up to 140 cars and 34 bicycles. Full accessibility is provided to platform 1 and ticket machines while ramps for train access can be located on site.

3.6.4 Chatham railway station is approximately 3.5km from the Capstone road / Pear Tree Lane access to the site, an 18 minute cycle ride. Services from Gillingham to London make their first stop here.

3.7 Local Facilities

3.7.1 Planning guidance emphasises the integration of land use, transport and planning decisions. To ensure developments are sustainable, they should be accessible to local facilities, employment opportunities and public transport services.

3.7.2 Therefore, consideration has given to various local facilities including shops, education, employment and public transport that are available within easy walking and cycling distance from the proposed development site. **Table 3.2** below provides a list of these facilities and their location in relation to the site is illustrated in Figure 3-6.

Figure 3-6 Local Facilities

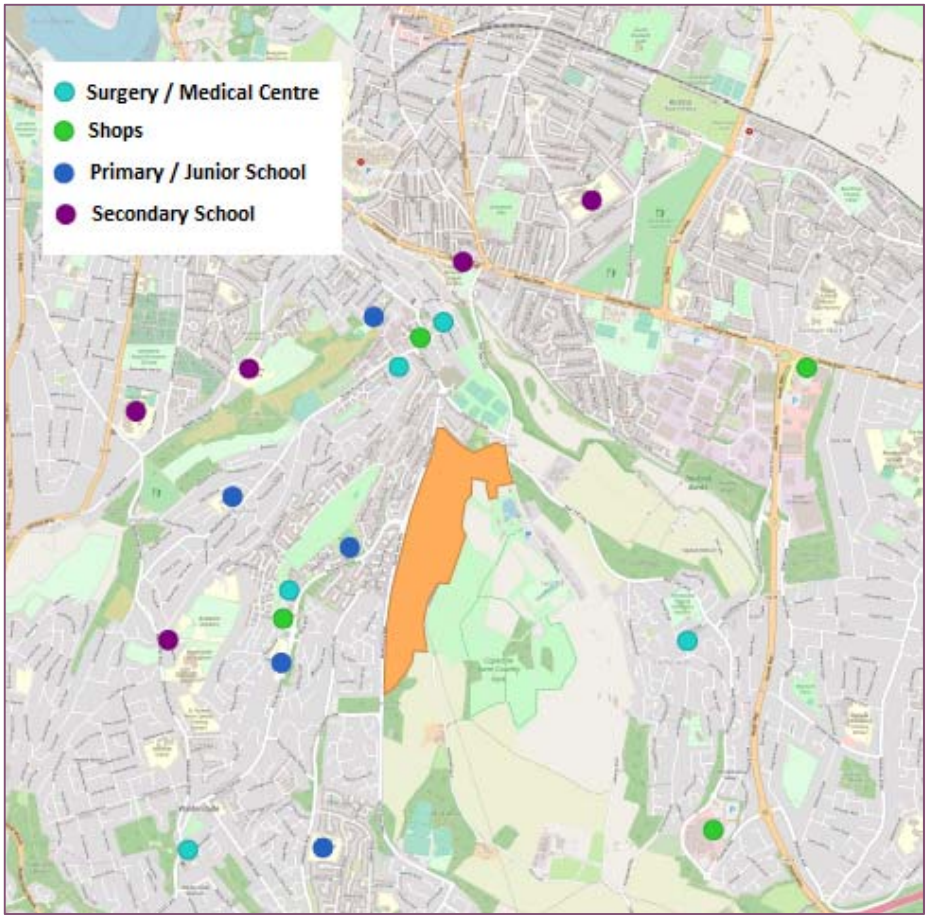


Table 3.2: Local Facilities in Vicinity of Development Site

	Facilities
Primary / Junior Schools	Kingfisher Primary School
	Maundene School
	Lordswood School
	Luton Infants School
	Luton Junior School
	Wayfield Primary School
Secondary Schools	Chatham Grammar
	The Robert Napier School
	The Victory Academy
	Walderslade Girls' School
	Greenacre Academy
	Holcombe Grammar
Health	Princes Park Medical Centre
	Hempstead Medical Centre
	Luton Medical Centre
	The Stone Cross Surgery
	Medway Medical Centre
Employment	Lordswood Industrial Estate
	Elm Court Industrial Estate
	Gillingham Business Park
Leisure	Lordswood Leisure Centre
	Lordswood Bowling Centre
	Lordswood Library
	Capstone Farm Country Park
	Chatham Snowsports Centre
Shopping	Luton
	Morrisons Foodstore
	Hempstead Valley Shopping Centre

3.7.3 In summary, as described in detail above, it is considered that the site is within range of a wide variety of facilities within both walking and cycling distance. It is therefore conveniently located to encourage sustainable and active forms of travel; as well as providing access to public transport for longer journeys.

3.8 Travel Modes

3.8.1 Census 2011 "Travel to Work" data has been reviewed to understand the existing travel modes in the area. Travel data for the Medway middle layer output area 031 have been obtained as it is situated close to the development site. Whilst it is acknowledged that not all trips are travel to work, a large proportion of weekday morning and evening peak hour is comprised of people travelling to work by car and van. As such, this travel to work data gives an indication of the modes of travel that might be expected from the development site. Other more local trips, such as to education, are likely to have a greater propensity for non-car modes and therefore the overall mode split would likely include more non-car modes.

3.8.2 Table 3.3 below provides the existing travel modes percentages for Medway 031. It is anticipated that this mode share is also applicable to the development site.

Table 3.3: Travel Mode Share

Travel Mode	Mode Share
Car Driver	75%
Car Passenger	8%
Public Transport	10%
Motorcycle	1%
Walking	5%
Cycling	1%

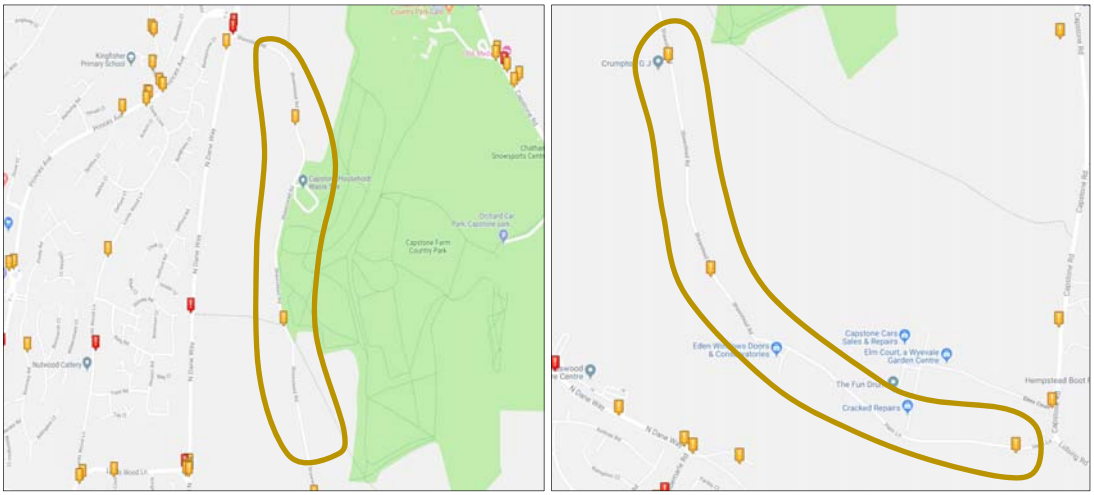
3.9 Highway Conditions

3.9.1 The existing traffic conditions on the local highway network have been established through the analysis of traffic surveys, junction observations and historic highway safety records.

Highway Safety

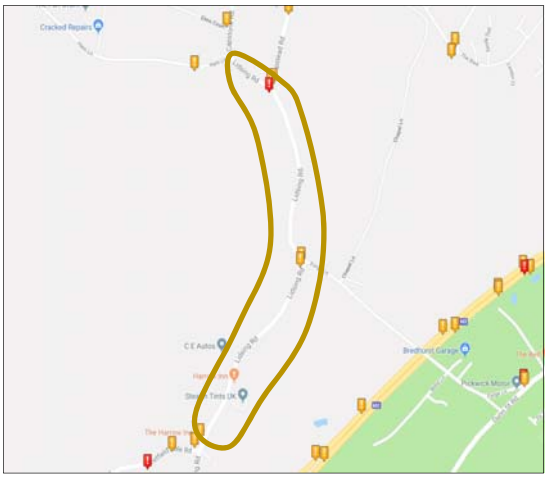
3.9.2 Crash analysis has been undertaken on the roads surrounding the site for five years; data was available between 2013 and 2017. Data was downloaded from www.crashmap.co.uk on 21st November 2018. The full crash reports are contained within **Appendix D** The crashes are summarised by road in the following sections.

Ham Lane/ Shawstead



3.9.3 There have been a total 5 slight collisions along Ham Lane and Shawstead Road between 2013 and 2017. All four on Shawstead Road were head on/ side collisions, one was a single vehicle collision and of these four occurred in wet/ damp conditions. The one crash on Ham Lane was caused by a reversing van/ goods vehicle which hit a motorcycle.

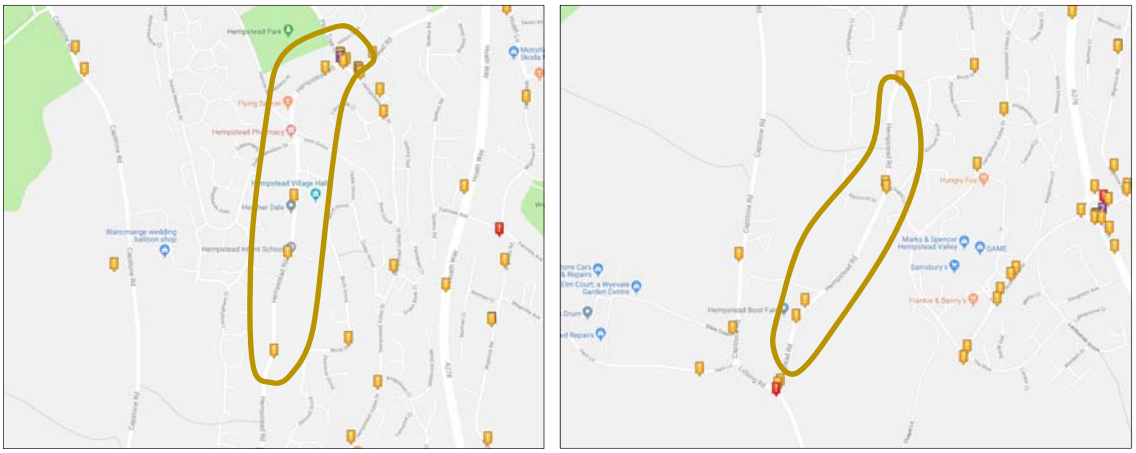
Lidsing Road



3.9.4 Five crashes were recorded on Lidsing Road during the 5 year assessment period. Of these, four occurred at a junction and one was a single vehicle collision involving a motorcyclist. One serious crash occurred at the Hempstead Road junction in wet/ damp conditions caused by a right turning motorcyclist colliding with an oncoming vehicle and the other collision at this location involved a motorcyclist and a car turned right across its path.

3.9.5 One of the two crashes at the Forge Lane junction involved a right turning vehicle colliding with a pedal cycle and the other was a rear shunt to a vehicle waiting to turn.

Hempstead Road



3.9.6 There have been 21 crashes along Hempstead Road, between the junctions of Lidsing Road and Hempstead Valley Drive, during the five-year period analysed. All were slight in severity and four involved pedestrians.

3.9.7 One crash occurred at the junction with Lidsing Road and was a rear shunt in wet/ damp conditions. Two crashes occurred at the junction with Chapel Lane, one was a head on collision with a right turning vehicle and the other was caused by a vehicle hitting a parked car and pedestrian.

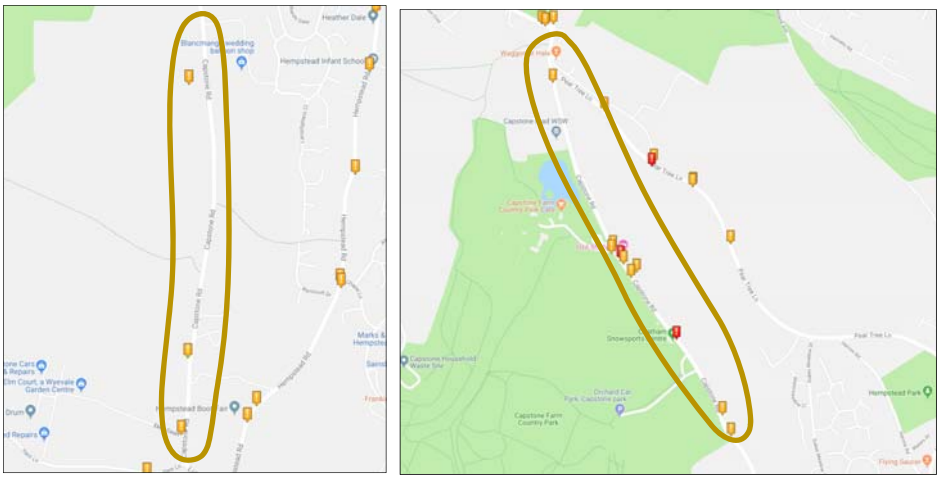
3.9.8 At the mini roundabout junction with Pear Tree Lane, eight crashes occurred between 2013 and 2017. Four of these were collisions on the roundabout and three were rear shunts. The remaining crash involved a pedestrian crossing the junction.

3.9.9 Of the four crashes at the Hempstead Valley Drive mini roundabout, three were collisions and one was a rear shunt.

3.9.10 There have been six crashes along the length of Hempstead Road between 2013 and 2017. Two of these were single vehicle collisions, one was a head on collision and one a rear shunt due to a right turning vehicle. The remaining two involved pedestrians; one was caused by a vehicle hitting a parked car and pedestrian and one involved a pedestrian walking in the road with their back to the oncoming traffic.

3.9.11 Whilst this crash analysis has been undertaken for the most recent data available, this does not include a serious crash which occurred more recently (September 2018) along this road, involving a young cyclist and a vehicle. C&A were made aware of this occurrence during a public consultation event and through newspaper articles and has been considered within this TA.

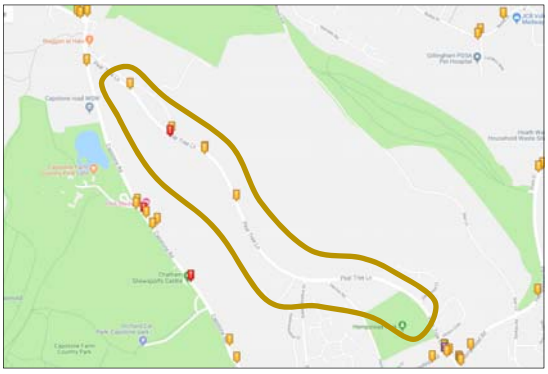
Capstone Road



3.9.12 Thirteen crashes have occurred on Capstone Road between the Lidsing Road junction and the Pear Tree Lane junction. Of these, two were serious where one involved a pedestrian walking in the road and the other was a head on collision with a motorcycle. The one crash recorded at the junction with Pear Tree Lane was described as a vehicle hitting a parked car, however, a parked vehicle so close to a roundabout junction and rural lanes seems unusual.

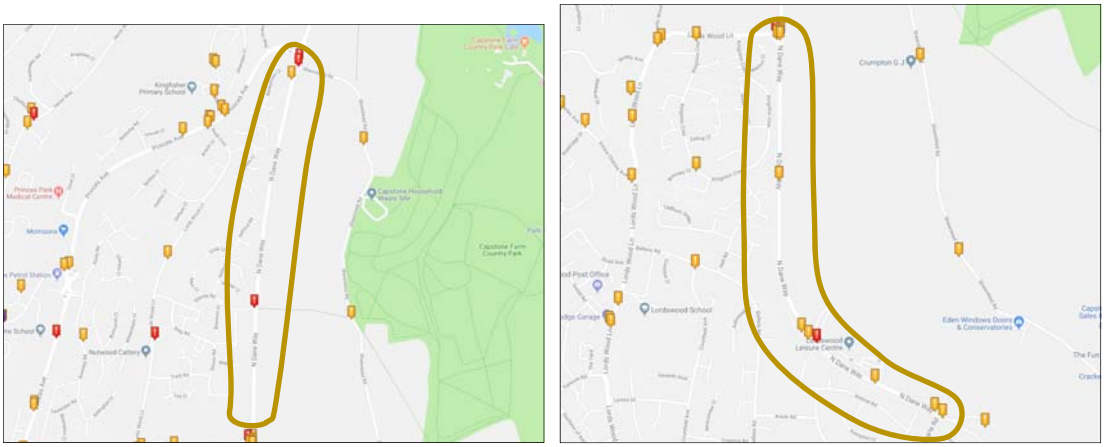
3.9.13 Of the remaining 10 crashes, three were rear shunts (one during an overtaking manoeuvre, one whilst a vehicle was turning into a private driveway and one for unknown reasons), two were head on collisions (one in frost/ice conditions), two were single vehicle collisions (one involving a motorcycle and one involving a pedal cycle), one involved two motorcycles, one was caused by a vehicle hitting a parked vehicle and the remaining involved a motorcyclist hitting a left turning HGV.

Pear Tree Lane



3.9.14 There were six crashes on Pear Tree Lane within the five-year period analysed and one of these was serious. It was caused by a head on collision due to a left turning vehicle. Of the remaining five crashes, two were single vehicle collisions (one hit a kerb and the other hit a tree), two were rear shunts and the remaining crash was a head on collision.

North Dane Way



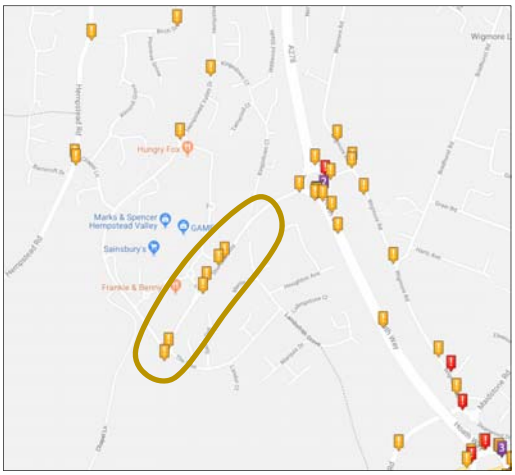
3.9.15 There were 18 crashes along North Dane Way between 2013 and 2017. Of these, six were serious where three occurred at junctions. The serious collision at the Shawstead Road junction was a single motorcycle collision. Of the two serious collisions at the Lords Wood Lane junction, both occurred in wet/ damp conditions and one involved a motorcycle and right turn manoeuvre and the other was a rear shunt during a left turn. Of the three remaining serious collisions, two were single motorcycle collisions, and one was a head on collision.

3.9.16 There were two crashes at the junction with Albermarle Road, one a head on collision whilst turning and the other a single vehicle collision with a bollard.

3.9.17 Of the five remaining crashes at Lords Wood Lane, four were head on collisions as a result of right turns, one of which occurred in wet/ damp conditions. The remaining collision was a rear shunt in wet/ damp conditions.

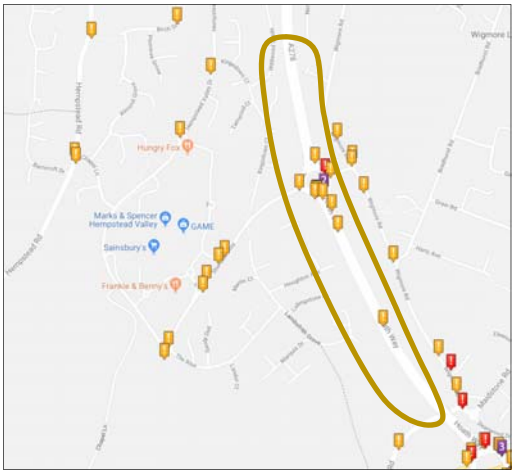
3.9.18 Of the remaining five crashes to have occurred on North Dane Way, four occurred in wet/ damp conditions, two were rear shunts and two hit road signs/ lampposts (one due to an animal in the road). The remaining was a collision.

Sharsted Way



3.9.19 A total of six crashes occurred on Sharsted Way within the five-year period analysed. Two of these occurred at the Hempstead Valley Drive junction and were rear shunts. One collision occurred at the exit slip road of the shopping centre due to filtering into oncoming traffic. The remaining collisions along Sharsted Road involved; a collision with a motorcycle performing a U-turn, a rear shunt and colliding with a pedestrian at the controlled crossing in wet/ damp conditions.

Hoath Way



3.9.20 Of the 15 crashes along this section of Hoath Way between 2013 and 2017, 12 occurred at the roundabout junction with Sharsted Road. One of these was serious and involved a collision with a cyclist at the junction. Another collision with a cyclist at this junction was slight in severity and occurred in wet/ damp conditions. Eight of these collisions were caused by rear shunts. The remaining two collisions involved motorcyclists; one a single vehicle collision in wet/ damp conditions and one a collision with another vehicle.

3.9.21 Of the remaining three crashes, two occurred in wet/ damp conditions with one a single vehicle collision hitting a road sign and another where a vehicle hit a parked car (this may be an unclear description, unusual location for a parked vehicle). The remaining crash was a rear collision in the aftermath of a previous crash.

4 Development Proposals

4.1 Overview

4.1.1 The current development proposals are for an outline application (with all matters reserved except access) for the erection of up-to 800 dwellings with primary school, supporting retail space of up-to 150sqm and local GP surgery, with associated road link between North Dane Way and Pear Tree Lane and other road infrastructure, open space and landscaping.

4.1.2 The primary school is proposed as a two form entry whilst the GP surgery is proposed to support two GP's.

4.2 Proposed Transport Infrastructure

4.2.1 The site is proposed to be accessed from three locations, two of which are served from a new link road which is proposed through the site connecting North Dane Way to the west of the valley with Capstone Road to the east. A further access is proposed to a separate parcel of development to the south of the overall development site.

4.2.2 The latest site masterplan can be found in **Appendix D**.

Proposed Link Road

4.2.3 The overarching objectives of the new link are to provide an east-west link through the valley which does not currently exist thereby providing a more direct route and facilitating reassignment of traffic from other roads in the area. The road will allow traffic to route between Princes Ave/North Dane Way and Pear Tree Lane, without routing via Capstone Road (N) and the Luton area.

4.2.4 The principles for the design of the internal link road are summarised below:

- The new link road facilitates improved roundabout junctions on the existing highway network further to discussion with MC;
- The section of Capstone Road to the north of the site would become a secondary route which the majority of traffic using the new link road;
- The new link would provide a high specification of road with 7.3 metre carriageway width and adjacent 2 metre footway plus a 3.5 metre cycleway set back behind a 1.5 metre verge;
- The alignment of the link road has been set to provide a maximum gradient of 8% or less and to minimise impact on woodland and badger setts;

4.2.5 The link road proposals are shown on **Drawing No. 17-035-013.**

Site Accesses

4.2.6 The proposed development will have two access points from North Dane Way to the west and a further two from Capstone Road to the east. The two access from North Dane Way are proposed to be standard roundabouts as agreed with MC during pre-app discussions. The junction to the north will form a four-arm arrangement with North Dane Way and Princes Avenue. The site access arm will connect with Shawstead Road via a new priority junction within the site and therefore the proposed roundabout replaces the existing adjacent roundabout and priority junctions.

4.2.7 The southern access junction on North Dane Way is formed of a three-arm roundabout providing access to a separate parcel of development.

4.2.8 A new roundabout junction is proposed at the eastern end of the link road which will form a four-arm arrangement with Capstone Road as the northern arm and Pear Tree Lane as the eastern arm. The western arm is proposed as an access spur to a separate parcel of development. The southern arm is formed of the proposed link road which connects with Capstone Road (S) via a priority junction further south. The latter junction with Capstone Road (S) is intended to form a constraint to demand utilising this route to and from the south.

4.2.9 The site access proposals are shown on **Drawing No. 17-035-013** and the southern access on North Dane Way is shown on **Drawing No. 17-035-016 Rev A**.

4.3 Wider Sustainable Travel Proposals

4.3.1 As described above, the development proposes new pedestrian and cycle infrastructure within the site which will provide connectivity between the site and the surrounding area.

4.3.2 In addition, it is anticipated that bus services will be able to access the development site. The proposed link road has been designed to accommodate buses with the intention of facilitating a bus service between the Walderslade area and destinations to the north east such as the Gillingham Business Park.

4.4 Parking Provision

4.4.1 Car and cycle parking on the site will be provided to meet the standards set out in Medway Council's Residential Parking Standards.

5 Trip Generation and Distribution

5.1 Introduction

5.1.1 In order to assess the impact of the proposed development on the local highway network, it is first necessary to forecast the travel demand. The forecast vehicle trips were in this case inserted in the AIMSUN model as an addition to the 2035 Do Minimum flows to form the 2035 development forecast.

5.1.2 This section discusses the methodology applied to forecast the vehicle trip generation of the proposed development and provides a brief overview of the AIMSUN model and approach to distribution/assignment of forecast trips.

5.2 Trip Generation

5.2.1 Vehicle trip rates for the proposed development (privately owned houses, primary school and GP surgery) have been derived from the TRICS version 7.5.2 and are presented in **Table 5.1** below.

5.2.2 TRICS is a database of surveys of development across the country that provides an empirical source of evidence of typical trip generation from developments. The database can be used to select a range of sites considered to be comparable to that being proposed. This survey data is then used to derive a statistical estimate of the number of trips to be applied to the proposals. This 'trip rate' is a combination of all trips, regardless of purpose, and can derived specifically for the busiest or 'peak' hour (in the morning and afternoon periods). This approach reflects the fact that while car ownership can be in contributing factor in the propensity for driving – not all vehicle trips take place at the same time. Trip rates for the peak hours are derived in order to inform an assessment of the local highway network in the busiest period.

Table 5.1: Vehicle Trip Rates Per Category

Development Type	Trip Rate Sub-category	AM Peak Hour		PM Peak Hour	
		Arrivals	Departures	Arrivals	Departures
Residential	Houses Privately Owned (per dwelling)	0.132	0.376	0.318	0.154
Education	Primary School (per pupil)	0.315	0.239	0.024	0.036
Health	GP Surgery (per 100m^2)	2.715	1.24	3.373	3.135

5.2.3 The estimated number of trips to be generated from the proposed development based on the above trip rates are provided in **Table 5.2** below. It should be noted that although a proportion of affordable houses is proposed, for the purposes of the current assessment trip rates for houses privately owned have been applied to the whole of the residential development (up to 800 dwellings) as a more robust approach.

5.2.4 As far as the school trip generation is concerned, a number of 30 pupils per class and 7 classes per form entry (FE) (total of 420 pupils) were considered, with 57.3% of them (241 pupils – 1.1 FE's) deriving from demand external to the development. The remaining 42.6% (179 pupils) were assumed to be internal demand that either will not generate vehicular trips, or the trips generated will be accounted for within the residential generation.

Table 5.2: Proposed Development Trips

House Type	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
Houses Privately Owned	106	301	254	123
Primary School	76	58	6	9
GP Surgery	15	7	19	18
Total	197	366	279	150

5.2.5 The expected two-way vehicle trip generation from the proposed development site in the AM and PM peak hours are 563 and 429 respectively. It should be noted that the retail element of the development proposals is not anticipated to generate any external vehicular trips but instead would serve the residential properties in the development.

5.3 Trip Distribution and Assignment

5.3.1 To inform the assessment of traffic impact, it is necessary to distribute the forecast traffic generation onto the highway network, making reasonable and appropriate assumptions of assignment of traffic to particular routes.

5.3.2 This function has been performed in this instance by Medway Council's strategic transport model. Following pre-application discussions with MC officers it was agreed to use the model, which was developed in the AIMSUN software platform for the purposes of assessing both the emerging Local Plan and to act as a unified framework for assessing all future large scale development proposals which are consistent with the Local Plan or otherwise.

5.3.3 The transport model covers the whole of the Medway area and performs both a strategic and micro-simulation function. The specific forecast model used as the basis for this assessment is the 2035 'Do Minimum' scenario test which has been provided by MC and incorporates growth associated with a potential LP spatial strategy for Medway. No transport infrastructure intended to mitigate the LP growth is included in the Do Minimum model.

5.3.4 A forecast 'With Development' scenario has been developed for the purposes of this TA which is based upon the 2035 Do Minimum scenario but adds the trips associated with the proposed development (as set out above) and the proposed new link road through the site connecting North Dane Way and Capstone Road.

5.3.5 The model dynamically assigns vehicle trips to the network on the most appropriate route between origin/destination points taking into consideration available routes and network delays. Significantly in regards this development, the model enables the reassignment of traffic to quicker routes in response to new infrastructure.

5.3.6 The significant benefit of adopting this model framework for the assessment of the development in this case are as follows:

- It allows the full cumulative implications of the emerging Local Plan to be accounted for as part of the assessment, in advance of publication of the strategy and without a need for potentially differing manual assumptions of this;
- It provides a consistent and agreed model framework, minimising the need for further interrogation by the authorities;
- The assignment model allows changes to the network, such as the proposed link road, to be modelled effectively again within an agreement framework.

5.4 Committed Development

5.4.1 As set out above the anticipated trip generation from the development proposals has been incorporated into a 2035 forecast model scenario which is based upon MC's 2035 Do Minimum model scenario, as agreed with MC during pre-app scoping. As such it is understood that any committed development in the surrounding area has been accounted for within MC's 2035 Do Minimum model scenario.

6 Traffic Impact Assessment

6.1 Overview

6.1.1 New development will inevitably lead to a level of additional vehicular traffic on the local and wider road networks. It is therefore necessary to examine the impact of the development traffic on the local highway network.

6.1.2 An assessment of the traffic impact of the development proposals on the surrounding highway network has been undertaken, by MC's consultant Sweco UK Ltd on behalf of the applicant, using comparative outputs from MC's AIMSUN traffic model. Sweco UK Ltd were instructed by the applicant to undertake the modelling work to ensure independence in the process and in order to take advantage of their experience in the modelling work being undertaken on behalf of MC. The forecast scenarios for the horizon year 2035 which have been used for this assessment are set out below:

- Do Minimum – incorporates growth associated with a potential LP strategy and no transport infrastructure;
- With Development – as per the Do Minimum scenario above + the East Hill development proposals and associated link road and access junction improvements;

6.1.3 The relative impact of the development proposals has been determined based upon a holistic, network-wide comparison of the performance of the network between the above scenarios.

6.1.4 Forecast junction capacity assessments have been undertaken at the main site accesses for the 2035 With Development scenario. In addition, the relative traffic impact of the development proposals has also been assessed through forecast junction assessments at key junctions on the surrounding highway network using turning movement outputs from the 2035 Do Minimum and With Development AIMSUN model scenarios as the demand inputs to the individual junction models. This approach allows for individual junctions to be analysed, assessed in the context of the relative impact test appropriate for this assessment and considered for mitigation where appropriate. Whilst the Medway model provides a means for assessing the network as a whole, which is presented here, it is more conventional and understandable to review junctions on an individual basis. It also provides a more easily understood summary of the performance than the more abstract, network wide performance outputs.

6.1.5 The geographic scope of the assessment of junction has been derived through consideration of all probable routes to and from the site by development generated traffic. Routes to the north, north east and north west as far as the A2 have been considered, along with all junctions in between. To the south, all junctions on the apparent routes up to and including J3 and J4 of the M2 have been included.

6.1.6 This gives rise to a total of 21 off-site junctions being subject to individual analysis. Junctions have been included for assessment, irrespective of the net overall traffic increases in order to provide the fullest possible picture of the conditions and in order to allow assessment of the changes in traffic patterns which could derive impact despite overall reductions. The geographic scope of assessment covers the following junction locations:

1. A2/Magpie Hall Rd;
2. A2/Luton Rd;
3. A2/Ash Tree Ln;
4. A2/Courteney Rd/Hoath Way/Twydall Ln;
5. Luton High St/Capstone Rd/Street End Rd;
6. Capstone Rd/North Dane Way;
7. Ash Tree Ln/Beacon Rd;
8. Ash Tree Ln/Capstone Rd;
9. Pear Tree Ln/Hempstead Rd/Hempstead Valley Dr (double mini-rdbt);
10. Hoath Way/Ambley Rd/Hempstead Rd/Courteney Rd/Hoath Ln;
11. North Dane Way/Lords Wood Ln;
12. Albemarle Rd/Clandon Rd;
13. Lords Wood Lane/Albemarle Rd/Dargets Rd;
14. Walderslade Rd/Princess Ave;
15. Walderslade Rd/Robin Hood Ln;
16. A2045 Walderslade Woods/Boxley Rd/Lords Wood Ln/Westfield Sole Rd;
17. A2045 Walderslade Woods/Fostington Way;
18. A229 Maidstone Rd/A2045 Walderslade Woods/Rochester Rd;
19. M2 J3;
20. Hoath Way/Sharsted Way/Wigmore Rd;
21. M2 J4;

6.2 Forecast Overall Network Performance

6.2.1 Key network performance indicators have been extracted from both of the forecast model scenarios in order to provide a comparison and derive the overall impact of the development proposals. The model covers the whole of the Medway unitary authority area and the overall network performance indicators represent the whole of the modelled area.

6.2.2 The network performance indicators used in this assessment are the travel demand, total travel time and total travel distance. The travel demand indicates the level of traffic within the modelled area and responds to the additional development and associated traffic generation in the With Development scenario. The total travel time and total travel distance metrics provide an indication of the level of congestion and delay on the network. As the network becomes congested delays to vehicles result in increased travel times or alternatively vehicles may seek alternative routes to avoid delays which result in increased travel distance.

6.2.3 A summary of network performance indicators is provided in Table 6.1 and Table 6.2 below for the AM and PM peaks respectively.

Table 6.1: Network Performance Indicators – AM Peak

Scenario	Traffic Demand (veh)	Total travel Time (hrs)	Total Travel Distance (km)
Do Minimum	41,590	7,626	240,736
With Development	42,206	7,544	239,529

Table 6.2: Network Performance Indicators – PM Peak

Scenario	Traffic Demand (veh)	Total travel Time (hrs)	Total Travel Distance (km)
Do Minimum	46,844	8,460	275,753
With Development	47,260	8,431	272,543

6.2.1 The above outputs indicate that, when compared with the Do Minimum scenario, the With Development scenarios, both in the AM and PM peak period, observe a relative increase in traffic demand. This is to be expected as the with development scenario includes additional traffic generating development. The scale of increase is in proportion to the additional development and is relatively small when considering the overall volumes.

6.2.2 However, the with development scenario also includes the proposed highway infrastructure in the form of a link road between North Dane Way and Capstone Road/Pear Tree Lane. This was anticipated and proposed to provide improvements to the operation of the local network, and this is reflected in the overall model performance outputs. In both the AM and PM peaks, a small decrease in total travel time and travel distance is noted, despite the net increase in travel demand. This demonstrates that the infrastructure is providing betterment to the operation of the network that, in overall terms, compensates or mitigates the impact of the development with residual benefits.

6.2.3 The improvements can be assumed to be achieved by vehicles being able to negotiate the network overall more efficiently, travelling less distance and with less time (and therefore less delay).

6.3 Junction Capacity Assessments

6.3.1 As noted above and despite the above outputs, it remains appropriate to assess the performance on the more immediately local network on a junction by junction basis. This is particularly important where the new infrastructure (with the development) may give rise to more apparent local impacts, which while deriving network wide benefits, may be appropriate for mitigation to support these objectives and to operate with no relative severe detriment. Junction capacity assessments have therefore been undertaken using industry standard modelling software PICADY for priority junctions, ARCADY for roundabouts, and LinSig for signalised junctions. Appropriate geometry measurements for each of the junctions have been taken from ordnance survey mapping and traffic signal data has been obtained from MC.

6.3.2 The key output from PICADY and ARCADY assessments is the 'ratio of flow to capacity' (RFC). A junction is operating at full capacity when the RFC on one or more arms is 1.0 or greater. A RFC value of 0.85 or less is a general preferred level and indicates that the approach in question is operating within theoretical capacity and has some practical reserve to account for normal fluctuations in traffic conditions and any margins within the assessment method. LinSig provides a similar output for each approach known as the 'Degree of Saturation' and expressed as a percentage.

6.3.3 All of the software packages also provide outputs of delay and queuing on each approach to a junction. When reviewing these results, care needs to be taken in comparing this to anecdotal observations. Queues at junction are particularly difficult to compare as there is not one clear definition of what constitutes a queue. The models take hourly demand data and, based on the parameters used in this TA, apply an element of peaking within the peak hour by assuming a 'statistical normal distribution profile' to the hourly demand. For junctions where there is a very flat profile over the hour, this can slightly overstate queueing. However, similarly, this statistical assumption will not represent very acute periods of high demand – or surging. This can lead to a situation where anecdotal evidence of 'queuing' does not fully correlate with the modelling. Considering these factors, queuing and delay are results best applied to the comparison of scenarios within the model, where these variables are the same, rather than seeking to fully compare to anecdotal observations.

6.3.4 As noted earlier in this report, the analysis of the network is based on the Medway-wide AIMSUM model framework. This has allowed a comprehensive geographic study area that is not limited to the practicality and viability of an associated data collection exercise. The focus of this assessment is on the relative impact of the development scenario to the forecast Do Minimum and as such current year base modelling is not relevant. More significantly, it should be reiterated that both the Do Minimum and development scenario models include the full Local Plan growth but exclude any assumptions of transport strategy and mitigation for that growth. In this respect, the forecast traffic scenario is very much a worst case and care should be taken in reviewing the 'absolute' performance of these junctions and in general only the relative assessment of the two scenarios is invited.

6.3.5 In reviewing the results, it should also be noted that the development includes mitigating infrastructure in the form of the proposed link road. In many cases, this leads to net improvements in the performance of junctions, which is to be expected.

6.3.6 The peak hour flows used within the 2035 Do Minimum scenario are shown in **Figure 6.1** and **Figure 6.2**, while the 2035 With Development scenario flows are presented in **Figure 6.3** and **Figure 6.4**.

6.3.7 The summary results of the capacity assessments for each junction are detailed below. Full output results of both of the scenarios are provided in **Appendix E.**

6.3.8 Based on these results, improvement measures are proposed at a number of junctions. These are discussed in detail in **Section 7** together with capacity assessment results of the proposed junction arrangements.

Site Accesses

6.3.9 The proposed development access junctions have been assessed under the 2035 Do Something (With Development) scenario.

6.3.10 The summary results of these capacity assessments for each junction are detailed below. Full output results from the ARCADY assessments are provided in Appendix E.

Eastern Site Access - Capstone Road/ Pear Tree Lane/ New Link Road

6.3.11 The proposed Eastern Site Access will be located to the north east of the site and it will upgrade the existing Capstone Road/ Pear Tree Lane 3-arm roundabout to a 4-arm roundabout. The southern arm will become the new link road (with Capstone Road south forming a priority junction with the new link road further south of this new junction) and the western arm forms an access to a separate parcel of the development.

6.3.12 The capacity assessment results for this junction for the 2035 With Development scenario are summarised in Table 6.3 below.

Table 6.3: Eastern Site Access – 2035 With Dev Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Development Access	0	0	0	0
Capstone Road (N)	0.61	2	0.86	6
Pear Tree Lane	0.75	3	0.69	2
New Link Road (S)	0.91	9	0.87	6

6.3.13 The results shown confirm that the proposed eastern site access roundabout junction will operate within capacity under the Do Something (with development) scenario. The southern New Link Road arm of this junction does exceed the 0.85 preferred level of RFC however it is below theoretical capacity and resultant queuing is minimal. Given that this scenario reflects the cumulative Local Plan scenario with no transport strategy, the performance is considered to be acceptable.

Western Site Access – North Dane Way/ Princes Avenue/ New Link Road

6.3.14 The proposed Western Site Access will be located to the west of the site and it will be a 4-arm roundabout junction incorporating North Dane Way, Princes Avenue and the western extent of the new link road. The existing North Dane Way/ Shawstead Road priority junction will be removed, and the new link road arm of this proposed junction will provide access to the northern end of Shawstead Road further east of this junction in the form of a roundabout junction.

6.3.15 The capacity assessment results for this junction for the 2035 With Development scenario are summarised in Table 6.4 below.

Table 6.4: Western Site Access – 2035 With Dev Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
New Link Road (E)	0.45	1	0.57	1
North Dane Way (S)	0.36	1	0.34	1
Princes Avenue	0.56	1	0.37	1
North Dane Way (N)	0.24	0	0.54	1

6.3.16 The results above show that the junction operates well within capacity on all arms of the junction and during both peak periods.

Southern Site Access – North Dane Way/ Site Access Road

6.3.17 The proposed southern site access is a 3-arm roundabout on North Dane Way south of Princes Avenue.

6.3.18 The capacity assessment results for this junction for the 2035 With Development scenario are summarised in Table 6.5 below.

Table 6.5: Southern Site Access – 2035 With Dev Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
N Dane Way (N)	0.35	1	0.50	1
Southern Access Rd	0.37	1	0.67	2
N Dane Way (S)	0.77	3	0.56	2

6.3.19 The results above show that the junction operates well within capacity on all arms of the junction and during both peak periods.

Off-Site Junctions

J1 – A2/Magpie Hall Road

6.3.20 This junction is a four-arm roundabout between High Street, Chatham Hill, Magpie Hall Road and New Road. All arms except Magpie Hall Road has two entry and exit lanes. Magpie Hall Road is exit only arm with one lane.

6.3.21 The capacity assessment results of this junction without and with development are summarised in Table 6.6 and Table 6.7 respectively below.

Table 6.6: J1 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
High Street	0.77	4	1.48	133
A2 Chatham Hill	1.51	451	1.47	444
Magpie Hall Rd	Exit Only			
A2 New Road	0.53	1	0.78	3

Table 6.7: J1 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
High Street	0.70	3	1.10	39
A2 Chatham Hill	1.43	371	1.31	238
Magpie Hall Rd	Exit Only			
A2 New Road	0.54	1	0.71	3

6.3.22 The assessment outputs indicate that the development proposals and associated infrastructure will result in a reduction in queueing and delay when compared with the Do Minimum scenario.

J2 - A2/Luton Road

6.3.23 The junction is a three arm traffic signal controlled arrangement and is located in very close proximity to the east of J1 above. The Luton Rd arm allows left-turn movements only with eastbound traffic permitted to perform a U-turn at the adjacent roundabout.

6.3.24 The capacity assessment results of this junction without and with development are summarised in Table 6.8 and Table 6.9 respectively below.

Table 6.8: J2 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	DoS	Queue (pcu)	DoS	Queue (pcu)
A2 Chatham Hill (E)	66.6%	13	76.2%	14
A2 Chatham Hill (W)	65.4%	8	75.6%	12
Luton Road	66.2%	7	62.4%	7

Table 6.9: J2 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	DoS	Queue (pcu)	DoS	Queue (pcu)
A2 Chatham Hill (E)	65.6%	12	67.0%	12
A2 Chatham Hill (W)	63.6%	8	66.0%	9
Luton Road	64.1%	7	54.7%	6

6.3.25 The assessment outputs indicate that the development proposals and associated infrastructure will result in a reduction in queueing and delay when compared with the Do Minimum scenario. Furthermore, the junction is anticipated to operate comfortably within capacity in both forecast scenarios.

J3 - A2/Ash Tree Lane/Canterbury Street

6.3.26 The junction is a staggered crossroads arrangement with traffic signal control on all approaches.

6.3.27 The capacity assessment results of this junction without and with development are summarised in Table 6.10 and Table 6.11 respectively below.

Table 6.10: J3 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	DoS	Queue (pcu)	DoS	Queue (pcu)
Ash Tree Ln	121.2%	64	101.3%	22
A2 Rainham Rd	39.6%	8	44.1%	10
Canterbury St	45.5%	7	71.1%	13
A2 Watling St	94.9%	16	96.2%	18

Table 6.11: J3 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	DoS	Queue (pcu)	DoS	Queue (pcu)
Ash Tree Ln	118.9%	62	88.0%	15
A2 Rainham Rd	41.5%	9	44.0%	10
Canterbury St	43.5%	6	70.3%	14
A2 Watling St	94.2%	16	95.6%	16

6.3.28 The assessment outputs indicate that the development proposals and associated infrastructure will result in a reduction in queueing and delay when compared with the Do Minimum scenario. In the PM peak this begins to bring the junction within operational capacity.

J4 - A2/Courteney Road/Hoath Way/Twydall Lane

6.3.29 The junction is a five-arm signalised roundabout arrangement. Both the A2 and the Hoath Way arms have multiple lanes on approach to the junction whilst the Twydall Lane and Courteney Road arms have single-lane entries.

6.3.30 It should be noted that the methodology adopted to optimise the traffic signals within the LinSig assessments sought to minimise queuing within the circulatory lanes of the junction to below the physical capacity where possible thereby pushing any delay onto the approaches to the junction. A consistent methodology was adopted between both scenarios to provide a fair comparison.

6.3.31 The capacity assessment results of this junction without and with development are summarised in Table 6.12 and Table 6.13 respectively below.

Table 6.12: J4 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	DoS	Queue (pcu)	DoS	Queue (pcu)
A2 Sovereign Blvd	88.2%	14	105.6%	65
Twydall Ln	173.7%	108	114.5%	28
A2 London Rd	150.4%	142	138.2%	111
Courteney Rd	48.6%	3	139.7%	62
Hoath Way	148.1%	238	161.7%	374

Table 6.13: J4 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	DoS	Queue (pcu)	DoS	Queue (pcu)
A2 Sovereign Blvd	87.9%	14	105.4%	62
Twydall Ln	159.9%	89	115.3%	28
A2 London Rd	149.2%	139	138.6%	110
Courteney Rd	53.3%	3	140.5%	61
Hoath Way	145.9%	223	181.0%	351

6.3.32 The assessment outputs indicate that the development proposals and associated infrastructure will result in a small reduction in queueing and delay when compared with the Do Minimum scenario.

J5 – Luton High Street/Capstone Road/Street End Road

6.3.33 This is a three-arm mini-roundabout comprising of single-entry lanes on each arm.

6.3.34 The capacity assessment results of this junction without and with development are summarised in Table 6.14 and Table 6.15 respectively below.

Table 6.14: J5 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Luton High Street	0.75	3	1.21	88
Capstone Rd (SE)	0.55	1	0.38	1
Street End Road	0.81	4	0.93	10

Table 6.15: J5 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Luton High Street	0.76	3	1.26	107
Capstone Rd (SE)	0.56	1	0.45	1
Street End Road	0.80	4	1.03	25

6.3.35 The assessment outputs indicate that the development proposals result in an increase in queueing and delay at the junction during the PM peak period. As such improvement measures to mitigate the development impact may be merited. The details of any mitigation proposals and associated capacity assessment results for this improved junction are discussed in **Section 7.0**.

J6 - Capstone Road/North Dane Way

6.3.36 This is a four-arm roundabout comprising of two entry lanes on each arm if the junction with the exception of Capstone Green which has one entry lane.

6.3.37 The capacity assessment results of this junction without and with development are summarised in Table 6.16 and Table 6.17 respectively below.

Table 6.16: J6 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Capstone Rd (SE)	0.86	6	0.93	10
North Dane Way	0.78	4	0.53	1
Capstone Rd (NW)	0.26	0	0.61	2
Capstone Green	0.14	0	0.33	1

Table 6.17: J6 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Capstone Rd (SE)	0.42	1	0.65	2
North Dane Way	0.45	1	0.28	0
Capstone Rd (NW)	0.21	0	0.56	1
Capstone Green	0.08	0	0.24	0

6.3.38 The assessment outputs indicate that the development proposals and associated infrastructure will result in a very significant reduction in queueing and delay when compared with the Do Minimum scenario, bringing the junction well within operational capacity. These results reflect the very apparent localised traffic reassignment benefits of the proposed link road, which allows traffic to avoid these areas more than mitigating the net impact of additional development traffic.

J7 - Ash Tree Lane/ Beacon Road Junction

6.3.39 This is a priority junction between Ash Tree Lane (major road) and Beacon Road (minor road).

6.3.40 The capacity assessment results of this junction without and with development are summarised in Table 6.18 and Table 6.19 respectively below.

Table 6.18: J7 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Beacon Road	0.83	4	1.16	26
Ash Tree Lane	0.66	4	0.17	1

Table 6.19: J7 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Beacon Road	0.56	1	0.94	8
Ash Tree Lane	0.56	3	0.25	1

6.3.41 As above, the assessment outputs indicate that the development proposals and associated infrastructure will again result in a significant improvement in the operation of the junction when compared with the Do Minimum scenario. Again, the link road provides these benefits, bringing the junction within the theoretical operational capacity.

J8 – Ash Tree Lane/Capstone Road

6.3.42 This is a four arm mini-roundabout comprising of one entry lane on each arm. Arm 1 of this junction provides access to Darland Farm private road.

6.3.43 The capacity assessment results of this junction without and with development are summarised in Table 6.20 and Table 6.21 respectively below.

Table 6.20: J8 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak (0800 – 0900)		PM Peak (1700 –1800)	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Darland Farm Private Rd	0	0	0	0
Capstone Rd (S)	1.51	323	1.51	325
Capstone Rd (W)	1.22	110	1.21	104
Ash Tree Lane	1.31	104	2.49	773

Table 6.21: J8 – 2035 With Development Capacity Assessment

Arm	AM Peak (0800 – 0900)		PM Peak (1700 –1800)	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Darland Farm Private Rd	0	0	0	0
Capstone Rd (S)	0.97	14	0.81	4
Capstone Rd (W)	0.72	3	0.83	4
Ash Tree Lane	0.97	15	1.61	340

6.3.44 The assessment outputs indicate that the infrastructure proposals as part of the development once again result in significant improvement in junction operation compared to Do Minimum scenario.

J9 - Pear Tree Lane/Hempstead Rd/Hempstead Valley Drive

6.3.45 This is a double mini roundabout junction between Hempstead Road, Hempstead Valley Drive and Pear Tree Lane.

6.3.46 The capacity assessment results of this junction without and with development are summarised in Table 6.22 and Table 6.23 respectively below.

Table 6.22: J9 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
North Roundabout				
Hempstead Valley Drive	0.73	3	0.75	3
Hempstead Road	1.07	11	1.71	114
Pear Tree Lane	1.09	33	1.20	67
South Roundabout				
Hempstead Valley Drive S	0.12	0	0.09	0
Hempstead Valley Drive N	0.93	9	0.93	9
Hempstead Road	0.73	3	0.82	4

Table 6.23: J9 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
North Roundabout				
Hempstead Valley Drive	0.71	2	0.78	3
Hempstead Road	1.22	23	1.58	80
Pear Tree Lane	1.15	50	1.16	56
South Roundabout				
Hempstead Valley Drive S	0.10	0	0.10	0
Hempstead Valley Drive N	0.93	9	0.92	9
Hempstead Road	0.74	3	0.86	6

6.3.47 The assessment outputs indicate that the development proposals will have both a negative and positive impact at the junction when compared with the Do Minimum scenario, depending on the time period considered. Some arms are predicted to observe a reduction in queueing and delay while others, particularly in the AM peak period, are predicted to observe a significant increase in queues.

6.3.48 As such improvement measures to mitigate the development impact may be merited at this junction. The details of any mitigation proposals and associated capacity assessment results for this improved junction are discussed in **Section 7.0**.

J10 - Hoath Way/Ambley Rd/Hempstead Rd/Courteney Rd/Hoath Ln

6.3.49 This junction consists of a complex of three roundabouts – a mini-roundabout and a compact roundabout on either side of a large roundabout in proximity of each other and therefore queues blocking back between the junctions.

6.3.50 The capacity assessments have therefore been carried out in ARCADY in lane simulation mode which is the recommended way of modelling linked junctions due to the interaction between. Given the layout of the junction, the exiting traffic from the centre roundabout would experience two exit restrictions to the east and the west due to queues blocking back from the other two roundabouts. There is a model limitation of one exit restriction per junction in normal ARCADY.

6.3.51 The model outputs do not provide RFC values for each arms rather values of queue and delay are provided.

6.3.52 The capacity assessment results of this junction without and with development are summarised in Table 6.24 and Table 6.25 respectively below.

Table 6.24: J10 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	Queue (pcu)	Delay (s)	Queue (pcu)	Delay (s)
Hoath Way/Hempstead Road/Ambley Road Mini-Roundabout				
Hoath Way	1	3	0	3
Hempstead Road	1	5	2	10
Ambley Road	0	3	1	5
Hoath Way Roundabout				
Hoath Way E	1	10	0	5
Hoath Way S	2	5	3	5
Hoath Way W	1	6	3	14
Hoath Way N	2	3	1	3
Hoath Lane/Hoath Way/Courteney Road Roundabout				
Hoath Lane	1	5	0	4
Hoath Way	0	5	1	6
Courteney Road	0	3	0	4

Table 6.25: J10 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	Queue (pcu)	Delay (s)	Queue (pcu)	Delay (s)
Hoath Way/Hempstead Road/Ambley Road Mini-Roundabout				
Hoath Way	1	3	0	3
Hempstead Road	1	4	1	5
Ambley Road	0	3	0	4
Hoath Way Roundabout				
Hoath Way E	1	9	0	5
Hoath Way S	2	4	2	4
Hoath Way W	1	5	2	10
Hoath Way N	1	3	1	3
Hoath Lane/Hoath Way/Courteney Road Roundabout				
Hoath Lane	1	5	0	4
Hoath Way	0	4	1	6
Courteney Road	0	3	0	4

6.3.53 The assessment outputs indicate that the development proposals and associated infrastructure will result in a reduction in queueing and delay when compared with the Do Minimum scenario.

J11 - North Dane Way/Lords Wood Lane Junction

6.3.54 This is a priority junction between N Dane Way (major road) and Lords Wood Lane (minor road) with a provision of right turn lane for major road traffic and off-slip for traffic entering Lords Wood Lane from North Dane Way South. Given the comparably low level of traffic entering Lords Wood Lane from N Dane Way South, this separate movement (off-slip) has not been modelled in isolation.

6.3.55 The capacity assessment results of this junction without and with development are summarised in Table 6.26 and Table 6.27 respectively below.

Table 6.26: J11 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Lords Wood Lane Left Turn	0.37	1	0.27	0
Lords Wood Lane Right Turn	0.31	0	0.13	0
N Dane Way	0.28	0	0.38	1

Table 6.27: J11 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Lords Wood Lane Left Turn	0.63	2	0.42	1
Lords Wood Lane Right Turn	0.35	1	0.17	0
N Dane Way	0.38	1	0.65	2

6.3.56 The assessment outputs indicate that the development proposals and associated infrastructure will result in some small increases in queueing and delay when compared with the Do Minimum scenario. However, the junction is anticipated to operate comfortably within capacity in both forecast scenarios.

J12 - Albemarle Road/Clandon Road

6.3.57 This is a priority junction between Albemarle Road (major road) and Clandon Road (minor road).

6.3.58 The capacity assessment results of this junction without and with development are summarised in Table 6.28 and Table 6.29 respectively below.

Table 6.28: J12 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Clandon Road	0.51	1	0.35	1
Albemarle Road	0.22	1	0.20	1

Table 6.29: J12 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Clandon Road	0.58	1	0.39	1
Albemarle Road	0.22	1	0.20	1

6.3.59 The assessment outputs indicate that the development proposals will result in a small increase in queueing and delay when compared with the Do Minimum scenario. The impact is considered to be negligible and non-severe, particularly as the junction is anticipated to operate comfortably within capacity in both forecast scenarios.

J13 - Lords Wood Lane/Albemarle Road/Dargets Road

6.3.60 The junction is a four-arm roundabout between Lords Wood Lane, Albemarle Road and Dargets Road.

6.3.61 The capacity assessment results of this junction without and with development are summarised in Table 6.30 and Table 6.31 respectively below.

Table 6.30: J13 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Lords Wood Ln N	0.31	1	0.06	0
Albemarle Road	0.36	1	0.03	0
Lords Wood Ln S	0.35	1	0.31	1
Dargets Road	0.30	0	0.06	0

Table 6.31: J13 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Lords Wood Ln N	0.33	1	0.05	0
Albemarle Road	0.34	1	0.04	0
Lords Wood Ln S	0.32	1	0.23	0
Dargets Road	0.28	0	0.05	0

6.3.62 The assessment outputs indicate that the development proposals and associated infrastructure will result in a reduction in queueing and delay when compared with the Do Minimum scenario. Furthermore, the junction is anticipated to operate comfortably within capacity in both forecast scenarios.

J14 - Walderslade Road/Princes Avenue

6.3.63 The junction is formed of a three-arm compact roundabout arrangement.

6.3.64 The capacity assessment results of this junction without and with development are summarised in the Table 6.32 and Table 6.32 below.

Table 6.32: J14 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Princes Avenue	0.96	14	0.69	2
Walderslade Road S	0.67	2	0.99	22
Walderslade Road N	0.67	2	0.82	4

Table 6.33: J14 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Princes Avenue	0.96	15	0.76	3
Walderslade Road S	0.67	2	1.04	36
Walderslade Road N	0.71	2	0.87	6

6.3.65 The assessment outputs indicate that the development proposals result in an increase in queueing and delay at the junction during both peak periods. As such improvement measures to mitigate the impact of development are to be considered proposed at this junction. The details of the mitigation proposals and associated capacity assessment results for this improved junction are discussed in **Section 7.0**

J15 - Walderslade Road/Robin Hood Lane

6.3.66 This is a three-arm priority junction between Robin Hook Lane (S and E) and Walderslade Village Bypass. The junction has provision of right turn lane for major road traffic and two entry lanes from the minor arm.

6.3.67 The capacity assessment results of this junction without and with development are summarised in Table 6.34 and Table 6.35 respectively below.

Table 6.34: J15 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Robin Hood Ln Left Turn	0.41	1	1.03	11
Robin Hood Ln Right Turn	0.59	2	1.01	9
Walderslade Rd	0.31	0	0.70	3

Table 6.35: J15 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Robin Hood Ln Left Turn	0.40	1	1.14	19
Robin Hood Ln Right Turn	0.57	1	1.13	16
Walderslade Rd	0.34	1	0.66	2

6.3.68 The assessment outputs indicate that the development proposals will result in a small increase in queueing and delay during the PM peak when compared with the Do Minimum scenario.

6.3.69 The impact is observed to occur on the minor Robin Hood Lane arm of the junction due to a small increase in flow on the major arm resulting in decreased opportunity to exit the junction. Although the approach has an RFC of over 1.0, the level of queueing traffic is relatively low indicating that traffic flows on this arm are also low. As such the impact of the development at this junction is considered to be minor and non-severe.

J16 - A2045 Walderslade Woods/Boxley Road/Lords Wood Lane/Westfield Sole Road

6.3.70 This is a five-arm roundabout between Boxley Road, Lords Wood Lane, Westfield Sole Road, Harp Farm Road and the A2045 Walderslade Woods.

6.3.71 The capacity assessment results of this junction without and with development are summarised in Table 6.36 and Table 6.37 respectively below.

Table 6.36: J16 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Boxley Road	0.29	0	0.81	4
Lords Wood Ln	1.13	74	0.98	18
Westfield Sole Rd	0.43	1	0.55	1
Harp Farm Rd	0.30	1	0.45	1
A2045	0.89	7	1.52	360

Table 6.37: J16 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Boxley Road	0.31	1	0.64	2
Lords Wood Ln	1.10	60	0.89	7
Westfield Sole Rd	0.45	1	0.40	1
Harp Farm Rd	0.36	1	0.32	1
A2045	0.88	7	1.34	235

6.3.72 The assessment outputs indicate that the development proposals and associated infrastructure will result in a reduction in queueing and delay when compared with the Do Minimum scenario.

J17 - A2045/Fostington Way Roundabout

6.3.73 This is a three-arm roundabout between A2045 and Fostington Way with provision of two entry lanes on all arms.

6.3.74 The capacity assessment results of this junction without and with development are summarised in Table 6.38 and Table 6.39 respectively below.

Table 6.38: J17 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
A2045 S	0.88	7	0.52	1
A2045 N	0.82	5	1.43	619
Fostington Way	1.15	97	1.21	133

Table 6.39: J17 – 2035 With Development Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
A2045 S	0.91	9	0.53	1
A2045 N	0.80	4	1.42	588
Fostington Way	1.12	79	1.22	143

6.3.75 The assessment outputs indicate that the development proposals will have both a negative and positive impact at the junction when compared with the Do Minimum scenario. On balance the overall impact is considered to be negligible and non-severe.

J18 - A229 Maidstone Road/A2045 Walderslade Woods/Rochester Road

6.3.76 The junction is a four arm signalised roundabout arrangement located to the south west of the development site.

6.3.77 It should be noted that the methodology adopted to optimise the traffic signals within the LinSig assessments sought to minimise queuing within the circulatory lanes of the junction to below the physical capacity where possible, thereby, pushing any delay onto the approaches to the junction. A consistent methodology was adopted between both scenarios to provide a fair comparison.

6.3.78 The capacity assessment results of this junction without and with development are summarised in Table 6.40 and Table 6.41 respectively below.

Table 6.40: J18 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	DoS	Queue (pcu)	DoS	Queue (pcu)
A229 SB Off-Slip	83.9%	9	222.1%	135
A2045 Walderslade Woods	120.1%	157	70.9%	16
A2045	122.5%	74	199.9%	189
Rochester Rd	253.2%	523	182.9%	452

Table 6.41: J18 – 2035 Do Something Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
A229 SB Off-Slip	94.7%	12	213.2%	142
A2045 Walderslade Woods	119.0%	145	89.0%	23
A2045	119.3%	65	200.8%	192
Rochester Rd	247.8%	497	181.9%	460

6.3.79 The assessment outputs indicate that the development proposals and associated infrastructure will result in a reduction in queueing and delay when compared with the Do Minimum scenario.

J19 – M2 J3

6.3.80 This comprises a complex of junctions formed of two large signalised roundabouts and an adjacent three-arm signalised junction. The 'Taddington Roundabout' forms the main junction which connects into the M2 motorway. To the west is the 'Lord Lees' roundabout which connects to the Taddington roundabout via the A229 which continues north to Chatham and south to Maidstone. To the west the Taddington connects to the A2045 Walderslade Woods via a short section of the A2045.

6.3.81 The AIMSUN modelling outputs indicate that the proposed development is anticipated to have a negligible impact at this junction. It is considered that the infrastructure provided as part of the development proposals, i.e. the link road, has a significant impact in terms of the reassignment of traffic in the wider area that derives an effective betterment, which mitigates much of the development generated traffic.

6.3.82 As such no assessment of the junction(s) have been undertaken as the proposals are predicted to have a non-severe impact.

J20 – Hoath Way/Sharsted Way Roundabout

6.3.83 The junction is a four-arm roundabout with two entry lanes on each arm between Hoath Way, Wigmore Road and Sharsted Way.

6.3.84 This junction was identified for mitigation as part of the revised Gibraltar Farm application. Neither the revised application nor its mitigation feature in the do-minimum model scenario, rather the model will respond to the consented scenario. This is appropriate given that the other scheme remains unchanged. However, in pre-app discussions with MC it was requested that the cumulative impact of this development and the Gibraltar Farm application be considered, when evaluating the impact and mitigation at this junction. In short, Medway requested that it be shown that the mitigation can address the cumulative impact of both junctions. As such the assessment of this junction has been undertaken based upon a comparison between the 2035 Do Minimum scenario and a 2035 With Development which also includes the traffic generation and proposed mitigation scheme associated with the recently submitted Gibraltar Farm application (ref: MC/19/0336).

6.3.85 The purpose of this assessment is to determine the suitability of the mitigation proposed as part of the yet to be determined Gibraltar Farm application to accommodate the cumulative traffic impacts of the Gibraltar Farm and East Hill development proposals.

6.3.86 The capacity assessment results for this junction without and with the development are summarised in Table 6.42 and Table 6.43 respectively below.

Table 6.42: J20 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Hoath Way (N)	0.86	6	0.82	4
Wigmore Road	0.77	3	0.68	2
Hoath Way (S)	1.16	183	1.50	752
Sharsted Way	1.60	295	1.61	327

Table 6.43: J20 - 2035 With Cumulative Development + Mitigation (From Gibraltar Farm) Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Hoath Way (N)	0.98	20	0.91	9
Wigmore Road	0.95	13	0.74	3
Hoath Way (S)	0.90	9	1.16	220
Sharsted Way	1.30	140	1.27	135

6.3.87 The assessment outputs indicate that the cumulative impact of the East Hill and Gibraltar Farm development proposals and associated infrastructure will result in a significant reduction in queueing and delay when compared with the Do Minimum scenario with the existing junction arrangement.

J21 – M2 Junction 4 Roundabout

6.3.88 This is a three-arm motorway roundabout between M2 and Hoath Way. The existing layout of the junction consists of one dedicated left turn lanes each for M2 eastbound traffic from Hoath Way and Hoath Way bound traffic from M2 west. Additionally, the circulating carriageway has provision of two lanes for traffic exiting Hoath Way which narrows down to one lane to the western side of the roundabout after the westbound M2 on-slip exit.

6.3.89 It is understood from historical information and site observations that extensive queuing occurs on the westbound off-slip as it is blocked by oncoming traffic from Hoath Way that is turning on to the westbound M2 on-slip. Due to the single lane circulating carriageway leading to Hoath Way, uneven lane usage has been observed with the majority of traffic making use of the offside lane. Given the above it was considered appropriate to run this junction model in lane simulation mode as this would allow the allocation of trips between the two entry lanes which otherwise would have been allocated equally which is not representative. The base model was calibrated to ensure the baseline queueing is replicated. It was identified that an 85/15 split between the offside and nearside lanes respectively would result in the most accurate representation of baseline situation.

6.3.90 As with J20, MC sought the same cumulative considerations be given to the assessment of mitigation at this junction. As such the assessment of this junction has been undertaken based upon a comparison between the 2035 Do Minimum scenario and a 2035 With Development which also includes the traffic generation and proposed mitigation scheme associated with the recently submitted Gibraltar Farm application (ref: MC/19/0336).

6.3.91 The purpose of this assessment is to determine the suitability of the mitigation proposed as part of the yet to be determined Gibraltar Farm application to accommodate the cumulative traffic impacts of the Gibraltar Farm and East Hill development proposals.

6.3.92 The capacity assessment results for this junction without and with the development are summarised in Table 6.42 and Table 6.43 respectively below.

Table 6.44: J21 – 2035 Do Minimum Capacity Assessment

Arm	AM Peak (0800 – 0900)		PM Peak (1700 –1800)	
	Queue (pcu)	Delay (s)	Queue (pcu)	Delay (s)
M2 Southbound Off-Slip	184	740	21	87
M2 Northbound Off-Slip	0	4	0	6
Hoath Way	4	7	2	5

Table 6.45: J20 - 2035 With Cumulative Development + Mitigation (From Gibraltar Farm) Capacity Assessment

Arm	AM Peak (0800 – 0900)		PM Peak (1700 –1800)	
	Queue (pcu)	Delay (s)	Queue (pcu)	Delay (s)
M2 Southbound Off-Slip	17	53	3	12
M2 Northbound Off-Slip	0	4	1	6
Hoath Way	4	6	2	5

6.3.93 The assessment outputs indicate that the cumulative impact of the East Hill and Gibraltar Farm development proposals and associated infrastructure will result in a significant reduction in queueing and delay when compared with the Do Minimum scenario with the existing junction arrangement.

7 Proposed Mitigation Measures

7.1 Overview

7.1.1 The development proposals include improvements to a number of existing junctions, roads and routes on the surrounding highway network to mitigate the impact of the proposed development. It should be noted that the level of mitigation identified at specific locations is considered proportionate to the level of traffic impact arising from the proposed development.

7.1.2 As set out in Section 4 there are some proposals which are intended to be delivered on-site or through s278 agreement such as the new link road through the site and reconfigured access junctions. The following section deals with off-site mitigation proposals.

7.2 Junction Improvements

7.2.1 The junctions for which mitigation is considered to be required as a result of the development are as follows:

- J5 - Luton High St/Capstone Rd/Street End Rd;
- J9 - Pear Tree Ln/Hempstead Rd/Hempstead Valley Drive;
- J14 - Walderslade Rd/Princess Ave;

7.2.2 The above listed junctions have been reassessed to determine if these junctions with the proposed improvements will operate within capacity for the 2035 With Development scenario or at least offset the impact of the development.

7.2.3 The traffic flows used to reassess the junctions remain unchanged from the ones that have been used in the previous section to assess the junctions in theirs existing layout. The mitigation proposals and capacity assessment results of the mitigated junctions are summarised below. Full junction assessment output reports are provided within Appendix F.

J5 - Luton High St/Capstone Rd/Street End Rd

7.2.4 The proposals comprise a reconfigured mini-roundabout designed in accordance with DMRB TD 54/07. The proposed roundabout has been shifted approximately 3m west from its existing position, this helps to give increased entry widths on the arms located along both Street End Road and Luton High Street. The entry width has been increased from 4-5m in width to 6m and therefore accommodates two lanes of queueing traffic before entering the roundabout.

7.2.5 To accommodate the roundabout proposals, changes have been made to the road markings, pedestrian refuge islands, vehicle cross overs, verges and footways. The proposals all sit within land controlled by Medway Council and the proposals do not affect visibility splays. The proposals are shown within Drawing 17-035-022.

7.2.6 The capacity assessment results of this junction with development and mitigation measures in place are summarised in Table 7.1 below.

Table 7.1: J5 – 2035 With Development + Mitigation Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Luton High Street	0.59	2	0.94	11
Capstone Rd (SE)	0.82	4	0.77	3
Street End Road	0.59	2	0.76	3

7.2.1 As can be seen from the results, the proposed junction will operate within capacity during both peaks in 2035 with the development in place with a maximum RFC of 0.94 and minor queuing. This represents a significant improvement over the operating conditions of this junction in its existing layout in 2035 without the development.

J9 - Pear Tree Ln/Hempstead Rd/Hempstead Valley Drive

7.2.2 Minor mitigation proposals to the southern arm of the mini roundabout to help deal with added traffic generated by the development and increase the overall capacity of the mini-roundabout are required.

7.2.3 Drawing 17-035-021 shows the entry width of the southern arm increased from 5.5m to 7.1m therefore providing enough space for more cars to queue before entering the roundabout and therefore Increasing the capacity

7.2.4 Small amendments have also been made to the centreline markings, footway and vehicle crossovers. A visibility splay situated 9m back from the give way markings and measuring 35m to the kerb edge in accordance with DMRB TD 54-07 provides no obstructions. The proposals all sit within the public highway.

7.2.5 The capacity assessment results of this junction with development and mitigation measures in place are summarised in Table 7.2 below.

Table 7.2: J9 – 2035 With Development + Mitigation Capacity Assessment

Arm	AM Peak		PM Peak	
	DoS	Queue (pcu)	DoS	Queue (pcu)
Pear Tree Lane	77.7%	17	78.1%	15
Hempstead Rd (W)	79.1%	8	84.1%	11
Hempstead Valley Drive	38.9%	2	22.8%	2
Hempstead Rd (W)	64.1%	11	83.1%	16

7.2.6 The assessment outputs indicate that the proposed junction will operate within capacity during both peaks in 2035 with the development in place with a maximum DoS of 84.1% and moderate queuing. This represents a significant improvement over the operating conditions of this junction in its existing layout in 2035 without the development.

J14 - Pear Tree Ln/Hempstead Rd/Hempstead Valley Drive

7.2.7 Drawing 17-035-020 shows proposals to replace the mini-roundabouts with a signalised junction arrangement with two full lanes in each direction along Hempstead Valley Drive and right turn facilities for vehicles accessing Hempstead road to the North/South.

7.2.8 The signalised junction proposal has been designed in accordance with DMRB TD 50/04 and sits within the public highway. The junction provides clear indications for vehicle movements and lane allocation. The proposed scheme connects into existing pedestrian footways along Hempstead Valley Drive and Hempstead Road with staggered pedestrian crossings and refuge islands incorporated into the design, aiding safe pedestrian movements.

7.2.1 Junction visibility, junction inter-visibility zone and stopping sight distances have been analysed during the design and match the speed limit of Hempstead Valley Drive with no obstructions or reductions required.

7.2.2 The capacity assessment results of this junction with development and mitigation measures in place are summarised in Table 7.3 below.

Table 7.3: J14 – 2035 With Development + Mitigation Capacity Assessment

Arm	AM Peak		PM Peak	
	RFC	Queue (pcu)	RFC	Queue (pcu)
Princes Avenue	0.96	15	0.76	3
Walderslade Rd (S)	0.56	1	0.85	6
Walderslade Rd (N)	0.71	2	0.89	7

7.2.3 The assessment outputs indicate that the proposed junction will operate within capacity during both peaks in 2035 with the development in place with a maximum RFC of 0.96 and moderate queuing. In particular, the Walderslade Rd arm, which was predicted to be operating over capacity, observes the most significant improvement over the operating conditions of this junction in its existing layout in 2035 without the development.

8 Summary and Conclusions

8.1 Summary

8.1.1 This Transport Assessment (TA) has been prepared to support an outline planning application for a proposed residential development of up to 800 dwellings (including affordable homes) with primary school, supporting retail space of up-to 150sqm and local GP surgery on land at East Hill, located in Hempstead Valley, Medway.

8.1.2 The report has been prepared in a manner consistent with current policy including that set out in the Revised National Planning Policy published in February 2019 and in accordance with Medway local policies. From a transport perspective, the proposed development complies with the requirements of transport related planning policies. The application has also drawn from relevant national and local design guidance found in MfS and DMRB.

8.1.3 The report considers the existing conditions relating to the site in terms of the nature of the local highway network, accessibility by sustainable transport modes and to local facilities, and an overview of existing traffic and highway safety conditions. This TA demonstrates that effective accesses can be established for sustainable modes as well as private cars.

8.1.4 Three vehicular access points are proposed as part of the development in addition to a new link road connecting North Dane Way to the west and Capstone Road to the east. Two site access are proposed on North Dane Way in the form of standard roundabout arrangements. A further access is proposed at the eastern end of the link road in the form of a roundabout junction with Capstone Road and Pear Tree Lane. Appropriate access for deliveries and emergency vehicles has also been provided for within the design of the link road and site accesses.

8.1.5 The traffic impact of the development has been assessed on the surrounding highway network using MC's strategic transport model. The forecast assessment indicates that the development proposals would result in a betterment in the performance of the wider network compared with the forecast Do Minimum baseline; with benefit arising from the proposed new link road infrastructure. In overall network terms, this infrastructure offsets the impact of the development generated traffic whilst also delivering a residual betterment.

8.1.6 The key junctions on the surrounding network have been assessed for capacity to represent the forecast year 2035 with the development and associated infrastructure in place. In addition, the Hoath Way/Sharsted Way junction (J20) and M2 J4 (J21) have been assessed to show the cumulative impact of the development together with the development traffic and mitigation proposals associated with the recently submitted application at Gibraltar Farm (ref: MC/19/0336).

8.1.7 The junction assessments indicated which junctions would require mitigation in order to accommodate the additional traffic arising from the development proposals. Mitigation proposals have been identified for the following junctions:

- J5 - Luton High St/Capstone Rd/Street End Rd;
- J9 - Pear Tree Ln/Hempstead Rd/Hempstead Valley Drive;
- J14 - Walderslade Rd/Princess Ave;

8.1.8 Junction capacity assessments of the proposed mitigation schemes indicate that the proposals would accommodate the impact of the development in 2035.

8.2 Conclusion

8.2.1 It is considered that the development site is located in a sustainable location in terms of access to local facilities and its accessibility by all forms of transport.

8.2.2 The development proposals include new transport infrastructure in the form of a new link road and junction improvements, which the outputs from MC's traffic model indicate will provide relief to existing roads and junctions surrounding the site.

8.2.3 An appropriate and comprehensive package of mitigation measures have been identified which offset the traffic impact of the development proposals and result in a minimal residual impact on the surrounding highway network.

8.2.4 Given the above it is concluded that there are no sound reasons for refusal of the proposed development on highways and transportation grounds.

Appendix A Medway Cycle Plan

Appendix B Bus Timetables and Route Maps

Appendix C Crash Data

Appendix D Masterplan

Appendix E Junction Capacity Assessment Reports

Appendix F Proposed Mitigation Junction Capacity Assessment Reports

Figures

Drawings