

# 10. Transport

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## **Appendix 10.1**

# **TRANSPORT ASSESSMENT**



now part of



## Fort Halstead Transport Assessment

On behalf of **Merseyside Pension Fund**



Project Ref: 49210 | Rev: 2 | Date: August 2019

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# 1 Introduction

## 1.1 Overview

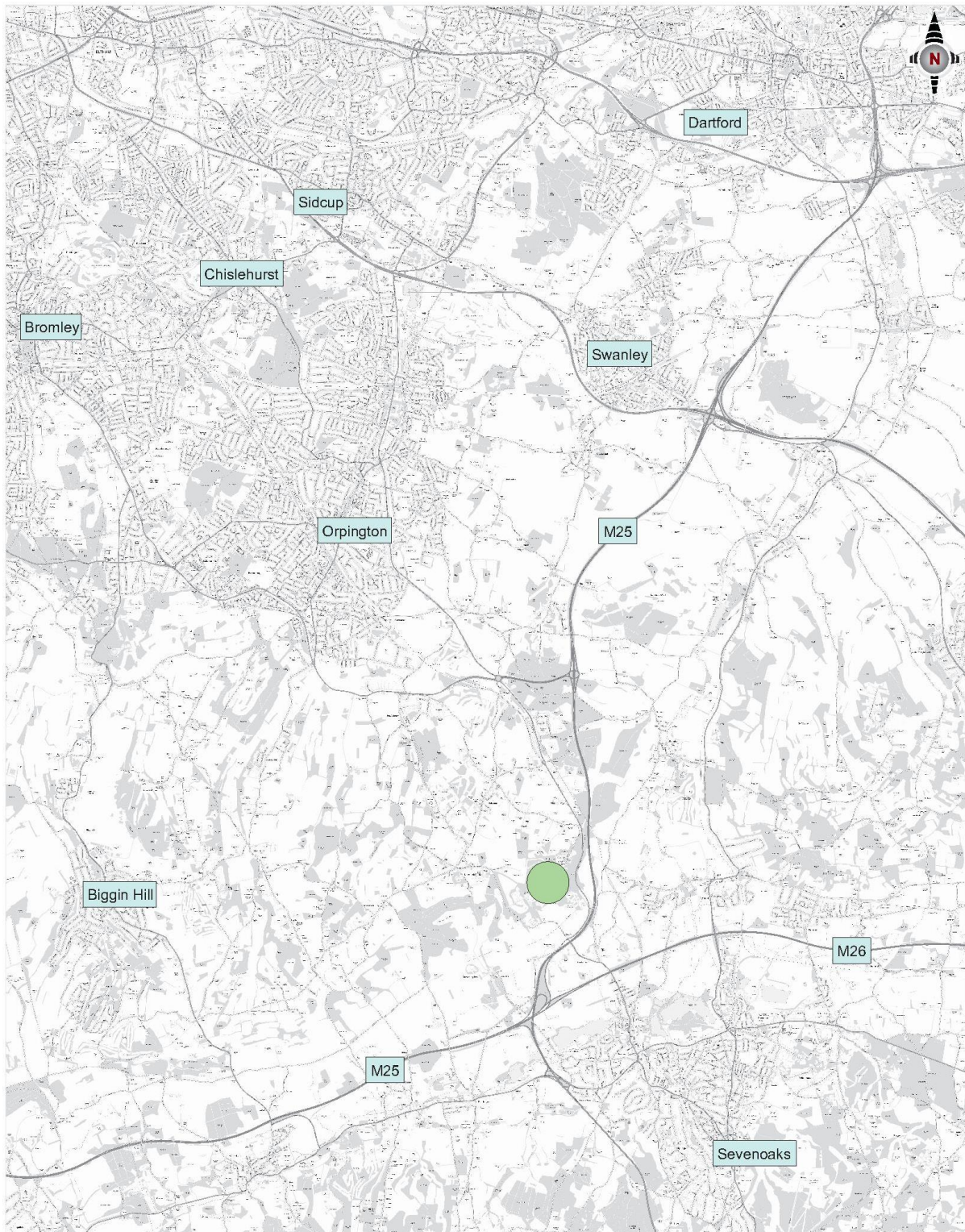
- 1.1.1 Peter Brett Associates LLP, now part of Stantec (PBA) has been commissioned by Merseyside Pension Fund (MPF) to provide transport planning and highways advice in support of a Hybrid Planning Application (HPA) for the redevelopment of Fort Halstead, with a total site area of circa 130 hectares (ha), in the District of Sevenoaks.
- 1.1.2 In December 2015 Sevenoaks District Council (SDC) granted outline planning permission (subsequently referred to as the 'OPP') for the regeneration of the Site by an employment led, mixed use development with up to 27,000 sqm of B1/B2 employment uses, up to 450 houses and a hotel. This application has since been implemented by way of demolition, but no development has so far been built out or occupied pursuant to reserved matters application. The reference for the OPP is SE/15/00628/OUT.
- 1.1.3 It is now recognised that the site has the capacity to accommodate some additional residential development. This Transport Assessment (TA) supports a new application which will allow up to an additional 300 homes as well as potentially a one form entry primary school to be accommodated on the Site.
- 1.1.4 The new application will be a hybrid application (HPA). Whilst the majority of the development will still be in outline, based upon parameters including an Access and Movement Parameter Plan, a small area within the centre of the site, which includes key listed buildings is subject to a full detailed application.

## 1.2 Site Location and Uses

- 1.2.1 The Site is located within the Metropolitan Green Belt and the Kent Downs Area of Outstanding Natural Beauty (AONB). Whilst it is situated in a predominantly rural area, it is just 5 km to the north west of Sevenoaks and 7.5 km south east of Orpington. The villages of Halstead and Knockholt Pound are located respectively approximately 2 km to the north and 1.5 km to the north west of the site.
- 1.2.2 The Site is predominantly surrounded by woodlands, which in the east and south-east border the A224 Polhill and M25 corridors. Star Hill Road runs to the south and west of the site. Figure 1-1 shows the site location in relation to the wider surrounding area.
- 1.2.3 The Site is currently occupied by the Ministry of Defence (MoD) and operated as a major centre for defence research and science. As such, the site is occupied by both the Defence Science and Technology Laboratory (Dstl) and QinetiQ, a private sector defence research organisation. At its peak during the 1970s, at least 4,000 people were employed on site.
- 1.2.4 Immediately adjacent to the Site and accessed from the A224 Polhill, is a small residential development of 72 homes, which is not in the ownership of MPF.
- 1.2.5 In 2011, Dstl announced it would be vacating Fort Halstead and since then, has been undergoing phased relocation to Portsdown West and Porton Down. QinetiQ has remained on site and the development proposals within this application have allowed for retention and potential future expansion of the QinetiQ research facility. Further details on how QinetiQ facilities will be incorporated into the new development is detailed within Chapter 4.
- 1.2.6 It is understood that at the time of the OPP submission there were approximately 1,200 people on-site and historically, more than 4,000 people were based at the establishment. A Certificate of Lawfulness of Existing Use or Development (CLEUD) was issued in 2004 for 82,168 sqm of employment space for the site. As such, the site is capable of accommodating a much higher

number of employees and consequently a significantly higher demand on the transport network than present levels. The approved development anticipates that total future employment levels on-site would be maintained at around 1,483 (1,322 Full-time Equivalent (FTE)) positions.

Figure 1-1: Strategic Site Location



## 1.3 Application Proposals

- 1.3.1 Since the OPP was granted for the site, MPF has acquired the site and took the decision to review the planning position with regard to the masterplanning of the site, alongside the emerging Sevenoaks District Local Plan as well as changes to the National Planning Policy Framework. MPF is seeking to optimise the site's future development and provide a deliverable and viable development.
- 1.3.2 Following extensive consultations with the local community and Sevenoaks District Council (SDC), an initial development plan for the site was established.
- 1.3.3 This plan allows for QinetiQ to remain on site in a secure enclave. It also provides sufficient serviced land and accommodation to allow a substantial level of employment to be maintained (and enhanced) on site (around 1,400 jobs) and also allows for a residential development of 750 homes, a primary school and other community uses including a village centre with shops / cafés, early years facilities and some B1a, b and c space, and a historic interpretation centre within the existing scheduled monument. There will be an element of D1, D2, A1 and A3 use classes associated with the Village Centre.
- 1.3.4 This TA has therefore been commissioned to evaluate the impacts of the new proposed development, detailed within Chapter 4 of this TA, which include the removal of B2 uses, proposed as part of the OPP, that would generate significant volumes of HGV vehicles.

## 1.4 Pre-Application Discussions

- 1.4.1 A series of pre-application meetings have been held with Kent County Council (KCC) and SDC during which the scope of work, main principles of assessment and design were discussed and subsequently agreed. The meetings minutes and subsequent correspondence with KCC have been included within Appendix A.
- 1.4.2 A summary of the previous work undertaken at the proposed site has been collated within the Transport Scoping Report, prepared by PBA and submitted to KCC in September 2018. The Transport Scoping Report (2018) is contained within Appendix A of this report in order to provide an understanding of the extensive background data previously collated and to outline previous in-principle agreements with SDC, KCC, London Borough of Bromley (LBB) and Highways England (HE) relating to trip rates, extent of impacts, traffic surveys and mitigation measures.
- 1.4.3 Throughout the pre-application discussions with KCC and SDC, it was made evident that the focus of assessments for the HPA TA should be on highway impacts. Furthermore, KCC and SDC have at no point raised concerns over, or requested an assessment of, the impacts on the public realm, public transport network and pedestrian and cycle routes.
- 1.4.4 Regarding the impacts of the development on the public realm, public transport network and pedestrian and cycle routes, this TA sets out the existing transport conditions and their relevance to the development in Chapter 2 and also uses information and work undertaken as part of the OPP TA, including an audit of pedestrian and cycle networks (included within Appendix B of this TA), for the development of the mitigation strategy and the proposed improvement measures.

## 1.5 Report Scope and Structure

- 1.5.1 This Transport Assessment (TA) sets out the anticipated transport impacts of the proposed development, and forms part of a collection of documents accompanying the planning application. It has been prepared in accordance with Kent County Council's Guidance on Transport Assessments and Travel Plans dated 2008.

- 1.5.2 Since the site is located within the Kent Downs Area of Outstanding Natural Beauty (AONB), the traffic impacts of the proposed development have also been considered in the context of the statutory purposes of the Kent Downs AONB.
- 1.5.3 The remainder of the report is structured as follows:
- Chapter 2 describes the existing transport conditions;
  - Chapter 3 reviews the relevant transport policies;
  - Chapter 4 presents the development proposals;
  - Chapter 5 outlines the calculations of the trips generated by the proposed development and their distribution on the local transport network;
  - Chapter 6 describes the impact of the proposed development on the local highway network;
  - Chapter 7 addresses the impacts of the proposed development during construction;
  - Chapter 8 outlines the strategy for sustainable transport; and
  - Chapter 9 summarises and concludes the Transport Assessment.

## 2 Existing Transport Conditions

### 2.1 Introduction

- 2.1.1 This chapter provides a detailed review of the predominant transport conditions within the vicinity of the site. This will include the existing use of the site, the local and strategic networks providing access to the site and a personal injury collision review.
- 2.1.2 As such it provides the context for the detailed assessment of the likely impact of the proposed development and of the potential enhancements that may be required in order to deliver a development that is sustainable in transport terms.
- 2.1.3 This chapter considers the following elements:
- Site Location and Current Use;
  - Local amenities;
  - Site access arrangements;
  - Pedestrian and cycle facilities;
  - Public transport provision;
  - Local highway network performance; and
  - Personal Injury Collision Review;

### 2.2 Site Location

- 2.2.1 The site is located in Kent, approximately 2km south of the village of Halstead, within the Metropolitan Green Belt and the Kent Downs Area of Outstanding Natural Beauty (AONB). Whilst the development site is located within a predominantly rural area, Sevenoaks is located approximately 5km south-east of the site and Orpington is located 7.5km to the north-west.
- 2.2.2 The site is predominantly surrounded by woodlands, which in the east and south-east border the A224 Polhill and M25 corridors. Star Hill Road runs to the south and west of the site.
- 2.2.3 Figure 2-1 shows the site location in relation to the wider surrounding area.

### 2.3 Existing Site Uses

- 2.3.1 The existing site has comprised some 97,600 sqm of defence-related research space and currently accommodates 750 jobs on site, across Dstl and QinetiQ. The existing uses already generate a substantial transport demand on the local transport network. There is a Certificate of Lawfulness for an Existing Use and Development (CLEUD) for 82,168 sqm (footprint area) of employment space of which approximately 66,150 sqm relates to B1 Use Class and 8,650 sqm relates to B8 Use Class. The remainder of the footprint area mostly relates to ancillary uses to B1 and B8 Use Classes.
- 2.3.2 Adjacent to the site but outside the application boundary, there are 72 homes, which also generate some traffic along Crow Drive. The traffic generated by this residential development is inevitably captured in the traffic surveys but has been subtracted to provide an assessment based solely on the site within the application boundary.

- 2.3.3 In June 2011, when Dstl announced that they were to vacate the site by early 2018, there were some 1,200 employees located on the site. At the time of the OPP submission, it was understood that there were some 1,000 jobs onsite.
- 2.3.4 Historically, many more people worked at the site and at its peak during the 1970s it is understood that more than 4,000 people were based at the establishment. Over the last 20 years numbers have fluctuated but, based upon information provided by Dstl, are understood to have been as high as 2,000.

Figure 2-1: Site Location



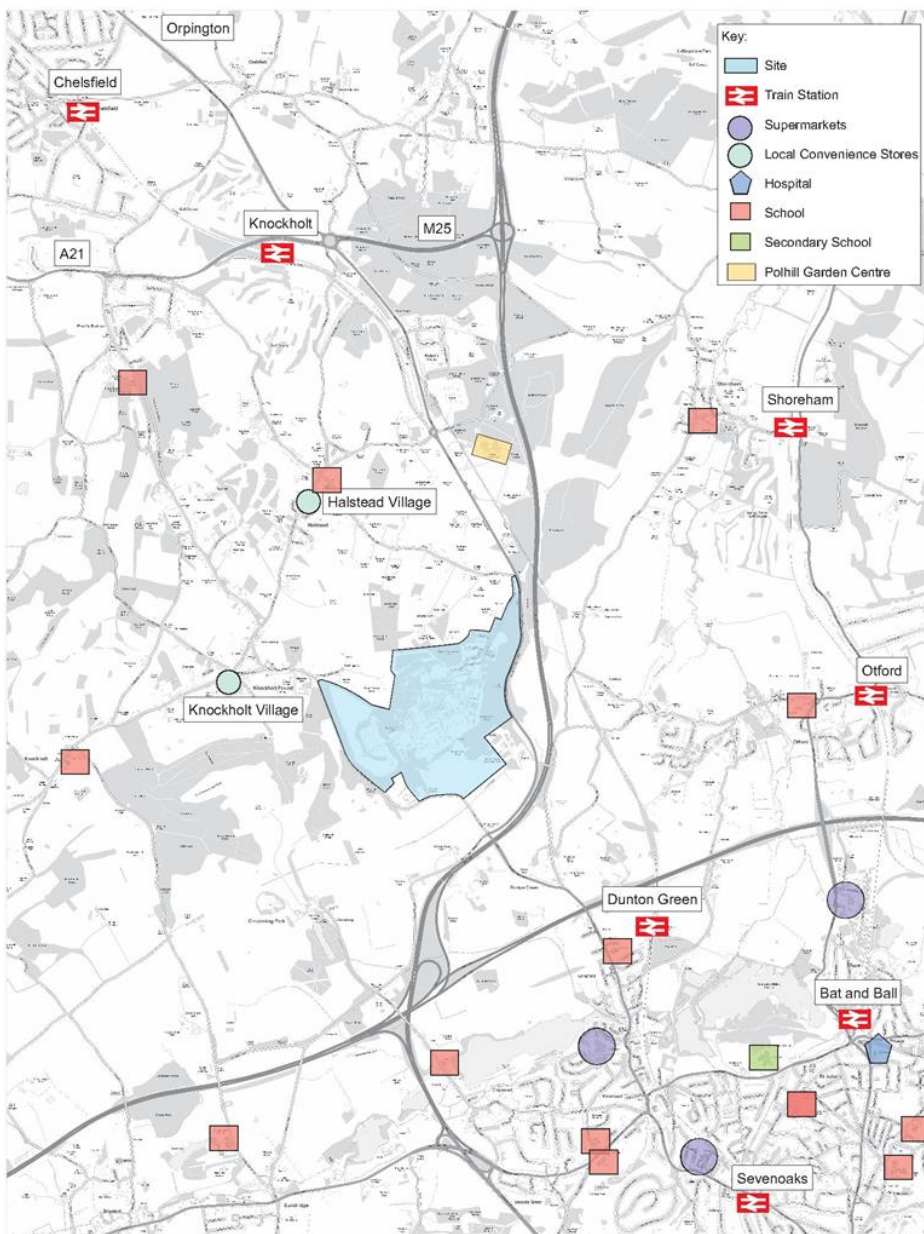
## 2.4 Local Amenities

- 2.4.1 The two established villages closest to the site are Halstead to the north, accessed via Otford Lane, and Knockholt Pound to the west, accessed via Star Hill Road. The following lists the local facilities, by location, in close proximity to the site:
- Knockholt: provides a convenience store, a pub, community facilities, Coolings Garden Centre, shop and café and a place of worship. There is also a primary school to the west of the village.
  - Halstead: primary school, local shop/post office, pub, places of worship;
  - Otford: local shops, public houses/restaurants, primary school, medical facilities, and a large Sainsbury's food store plus small retail park; and
  - Dunton Green/Riverhead: local shops, including a Tesco superstore, nursery and primary schools.
- 2.4.2 Figure 2-2 provides an overview of local facilities within the vicinity of Fort Halstead.

2.4.3 The two established villages closest to the site are Halstead to the north, accessed via Otford Lane, and Knockholt Pound to the west, accessed via Star Hill Road. The following lists the local facilities, by location, in close proximity to the site:

- Knockholt: provides a convenience store, a pub, community facilities, Coolings Garden Centre, shop and café and a place of worship. There is also a primary school to the west of the village.
- Halstead: primary school, local shop/post office, pub, places of worship;
- Otford: local shops, public houses/restaurants, primary school, medical facilities, and a large Sainsbury's food store plus small retail park; and
- Dunton Green/Riverhead: local shops, including a Tesco superstore, nursery and primary schools.

Figure 2-2: Location of Existing Facilities within the Vicinity

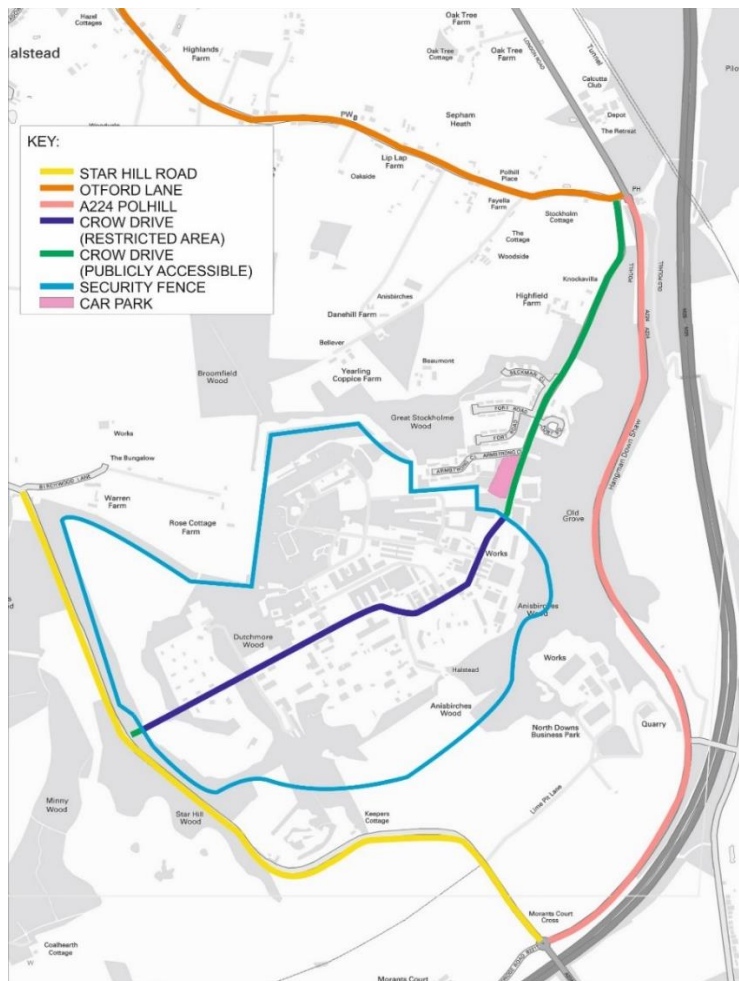


- 2.4.4 The nearest towns are Sevenoaks to the south east and Orpington to the north west of the site. The towns provide a wider range of facilities and services including retail, leisure, employment and education opportunities. Orpington's offer includes another large Tesco superstore.
- 2.4.5 In addition to the above, Polhill Garden Centre, which is situated approximately 2 km to the north of the site, offers a wide range of retail facilities as well as local employment.
- 2.4.6 Secondary education facilities are mainly offered to the south at the Knole Academy, Trinity School and Weald of Kent Grammar school in Sevenoaks. There are additional grammar schools within Tonbridge and Tunbridge Wells. Currently, school buses provide access to schools in Sevenoaks, Tonbridge and Tunbridge Wells. It is anticipated, that in the future a higher proportion of secondary school children will attend schools in Sevenoaks. This is due to the recently established Trinity school and Weald of Kent Grammar school, both of which are intended to be located on the site of the former Wilderness School in Sevenoaks.
- 2.4.7 A proportion of children will also attend private schools. There are junior schools in Otford, Sevenoaks, Sundridge and Orpington; and senior schools in Sevenoaks, Sundridge and Tonbridge.

## 2.5 Site Access

- 2.5.1 The site comprises two established points of vehicular access, as shown in Figure 2-3.

Figure 2-3: Vehicular Access in to Proposed Site





- 2.5.2 The site has two established points of highway access. Figure 2-4 shows the main access is from the A224 London Road / Polhill via Otford Lane and Crow Drive (Polhill access). This is a priority junction with a right-turn lane facility on the A224. Currently Crow Drive, the main site access road, which is a private road, is marked as two lanes out and one lane inbound to the site, gives way to Otford Lane also at a priority junction. The speed limit on the A224 has recently been reduced to 50 mph. Crow Drive is signed as 30 mph. There are limited pedestrian facilities at this junction: there is a pedestrian refuge on the A224 that assists pedestrians to cross the road and that links the footway on the east side of Polhill with one on the south east side of Crow Drive;
- 2.5.3 Figure 2-5 shows the secondary access is onto Star Hill Road (Star Hill access). This is also a priority junction. Star Hill Road is an unlit rural lane with no pedestrian facilities and is subject to the national speed limit. The access is currently used only during the morning and evening peak periods. The priority access onto Star Hill Road has limited visibility on exit, approximately 43 metres by 2.4 metres to the left and 74 meters by 2.4 metres to the right. Mirrors are provided on Star Hill Road to provide for safer exit and the junction is lit from a lighting column within the site. There are also signs warning of a concealed entrance to the south on Star Hill Road.

Figure 2-4: Main Access onto A224 Polhill from Otford Lane



Figure 2-5: Star Hill Site Access

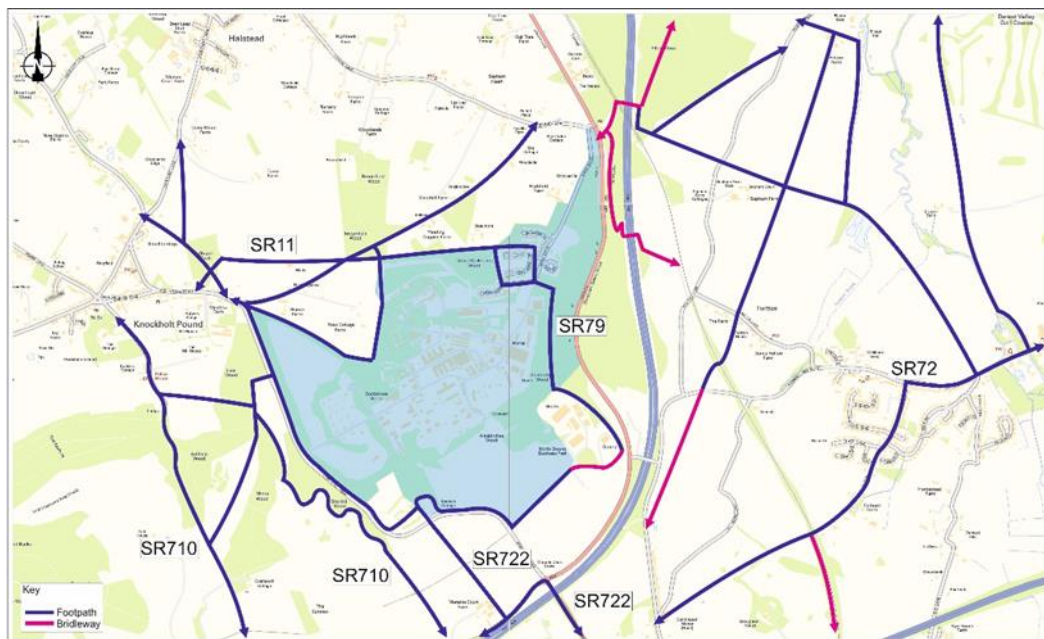


- 2.5.4 The Star Hill access is currently used solely during the morning and evening weekday peak periods. Since the defence uses are still present on site, the access remains strictly controlled, resulting in no unrestricted movement between these two access points. Although employees of Dstl and QinetiQ are able to use either access point to enter/leave the site, visitors are restricted to use the Polhill access. A visitor car park is provided outside of the security barrier of the access point via the A224.
- 2.5.5 A review of the two access points has shown that the majority of the traffic uses Polhill access, and most of the traffic turns in and out to/from the north, whereas at the Star Hill access most of the traffic enters to/from the south. As of 2018 when it is understood that 750 people were employed across the site, traffic surveys undertaken at both site access points (which also capture the traffic generated by the 72 homes within the wider area but outside the application boundary), showed that approximately 90% of the traffic to/from the site used the Polhill access during both the AM and PM peak hours.

## 2.6 Pedestrian and Cycle Network Public

- 2.6.1 The current level of pedestrian and cycle provisions surrounding the site are relatively poor. There are a number of footpath links and rights of way in the vicinity of the site, providing a good network of leisure routes, but they are generally unsurfaced and unlit and therefore not suitable as commuter/school access routes.
- 2.6.2 Figure 2-6 identifies the existing pedestrian routes by type.

Figure 2-6: Pedestrian Routes in The Vicinity of The Site



- 2.6.3 The pedestrian site access routes are as follows below.
- 2.6.4 Access to Knockholt Pound is via Star Hill Road. This is a relatively narrow country lane with no dedicated footways or lighting. There are, however, existing footpath links on the east side of Star Hill Road, between the road and the site boundary. There is also a footpath along the northern boundary of the site linking this to Star Hill Road at its junction with Birchwood Lane. Both footpaths are unlit and unsurfaced and therefore as currently laid out suitable as leisure routes only.

- 2.6.5 Access to Halstead is via Otford Lane. This is also a narrow and unlit country lane. Otford Lane is either accessed from Crow Drive or there is also a public footpath that runs alongside the ancient woodland and which connects to Otford Lane to the west of Crow Lane. This is not a particularly direct footpath link and is again only considered suitable as a leisure route.
- 2.6.6 The A224 London Road, to the north of Otford Lane, provides a footway on its east side and this provides a safe pedestrian access to the existing restaurant facilities that are located along that road and to the Polhill Garden Centre further north.
- 2.6.7 There are various other footpath and bridleway links to the site as shown on the plan Figure 2-6, all of which can be considered as providing a good range of leisure opportunities rather than connections for day to day use to local facilities. These include existing bridleways accessed from the junction of A224 Polhill/Otford Lane.
- 2.6.8 There are limited existing cycle facilities in the area. Since the site is located on top of a chalk escarpment, there is a steep hill to negotiate in order to access the site from Sevenoaks. However, the cycle route to Knockholt station, approximately a 4km ride, is relatively flat and there are advisory cycle lanes on Old London Road, one of the few existing cycle facilities within the district. In addition, existing cycle parking facilities are available at Knockholt station.
- 2.6.9 Within the site, Crow Drive has a footway on either side and there is a short cycle lane alongside the visitor car park. Currently, there is also a zebra crossing on Crow Drive, close to the junction with Fort Road, which provides access between the two existing small residential communities on either side of Crow Drive.
- 2.6.10 A photographic audit of the various pedestrian and cycle facilities which provide access to the site was undertaken as part of the OPP TA and included within Appendix B of the report.

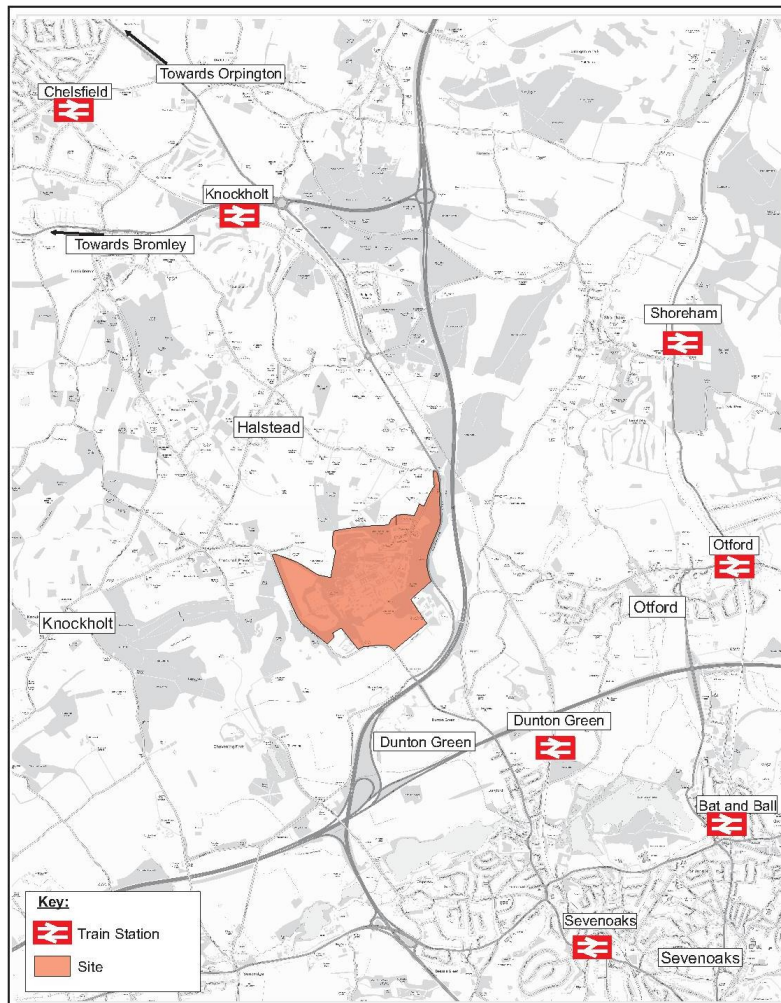
## 2.7 Public Transport Network

- 2.7.1 Overall, the site is currently poorly connected to public transport services and facilities. This section details the available railway and bus services within the vicinity of the site.

### Rail

- 2.7.2 The nearest railway stations are Dunton Green to the south (approximately 5 km from the site) and Knockholt to the north (approximately 4 km from the site). Both stations are on the Sevenoaks to London Charing Cross/Cannon Street line and are served by trains providing direct connections to London Bridge, Lewisham, Bromley and Orpington.
- 2.7.3 There are a number of other stations in the vicinity of the site that could potentially be attractive to people living or working on site. These are shown in Figure 2-7 and include:
- Shoreham (7km)
  - Otford (6km)
  - Bat and Ball (8km)
  - Sevenoaks (7km)
  - Chelsfield (7km)
  - Eynsford (8km)
  - Orpington (9km)

Figure 2-7: Railway Stations in the Vicinity of Fort Halstead.



- 2.7.4 Within the villages surrounding Fort Halstead, the majority of people commuting to central London by train are likely to drive to one of the local stations due to the lack of adequate public transport connections and long walking distances. The choice of station will vary depending on personal preferences reflecting a variety of factors, including the ultimate destination within central London, price, and speed/frequency of service.
- 2.7.5 There are existing rail car parks at all the relevant stations, all subject to a charge. Parking at Chelsfield is at a premium and at Knockholt the small station car park is supplemented by on-street parking for which there is also a daily charge.
- 2.7.6 As part of the 2015 OPP, surveys were undertaken of parking usage at Knockholt station and these confirmed that there was sufficient capacity remaining to accommodate the likely increase in demand that would be generated by the proposed Fort Halstead development.
- 2.7.7 Table 2-1 summarises the services (and season ticket prices) to and from London available from the main stations during the morning and evening peak periods.

Table 2-1: Summary of Railway Services Near Fort Halstead

Station	Parking spaces <sup>1</sup>	Distance <sup>2</sup>	Annual season ticket	Annual parking charge	Number of direct trains to London and journey time <sup>3</sup>	Number of direct trains from London and journey time <sup>3</sup>
Knockholt	39	3.2 km	£2080	£693.50	AM – 6 (32-37 min) PM – 4 (33-38 min)	AM – 4 (33-36 min) PM – 5 (35-41 min)
Dunton Green	26	4.6 km	£2996	£579.50	AM – 6 (37-44 min) PM – 4 (37-43 min)	AM – 4 (38-41 min) PM – 5 (40-46 min)
Sevenoaks	528	6.3 km	£3608	£1367.60	AM – 23 (24-45 min) PM – 17 (24-46 min)	AM – 15 (23-41 min) PM – 20 (23-47 min)
Otford	178	4.6 km	£3608	£780.10	AM – 11 (38-64 min) PM – 7 (42-60 min)	AM – 8 (33-64 min) PM – 11 (33-62 min)
Orpington	319	8.2 km	£2080	£1197.60	AM – 25 (28-59 min) PM – 24 (26-55 min)	AM – 21 (25-60 min) PM – 24 (24-61 min)
Chelsfield	37	6.0 km	£2080	£893.80	AM – 11 (30-44 min) PM – 4 (42 min)	AM – 5 (31-42 min) PM – 8 (27-43 min)

<sup>1</sup> Excluding on-street parking

<sup>2</sup> Drive distance from Polhill access

<sup>3</sup> AM peak from 06:30 to 08:30, PM peak from 17:30 to 19:30

- 2.7.8 Shoreham station only provides 10 car parking spaces, Eynsford only 15 and Bat and Ball only 21, and it is unlikely that these stations could accommodate any additional parking. As a result, it is considered very unlikely that commuters would risk driving to stations more than 7 km away from the site if they may not be able to find a parking space.
- 2.7.9 At Knockholt station, on-street parking is provided in the form of pay and display bays (£3.50 per day). These are located along London Road for a length of approximately 280 m to the south and 280 m to the north of the station access. Based upon 6 m per car parking space, this gives approximately 92 on-street spaces.
- 2.7.10 At Chelsfield, free on-street parking is available close to the station. However, this is already well utilised.
- 2.7.11 At the main morning commuter travel times (for trains to London), based on journey time surveys, site visits and queue data from key junctions, there is little evidence of congestion on any routes from the site to any of the aforementioned stations. At certain times of the day, mainly during the school run periods and during the evening peak, there is modest congestion on the routes to and from Sevenoaks and Orpington stations.
- 2.7.12 Based upon costs of travel, parking availability and convenience, it is considered that Knockholt and Orpington stations are likely to be the most attractive stations for those commuting to London. Whilst Sevenoaks has an excellent service, it is considered to be less attractive due to costs, parking availability and the fact that it is further away from central London.
- 2.7.13 For those cycling, Knockholt station is likely to be the most attractive station to use since it is the closest to the site and also the route is relatively flat and there are cycle lanes along part of the route. Furthermore, the station has some sheltered cycle parking provided within a secured compound (see Figure 2-8) although the capacity is quite limited.

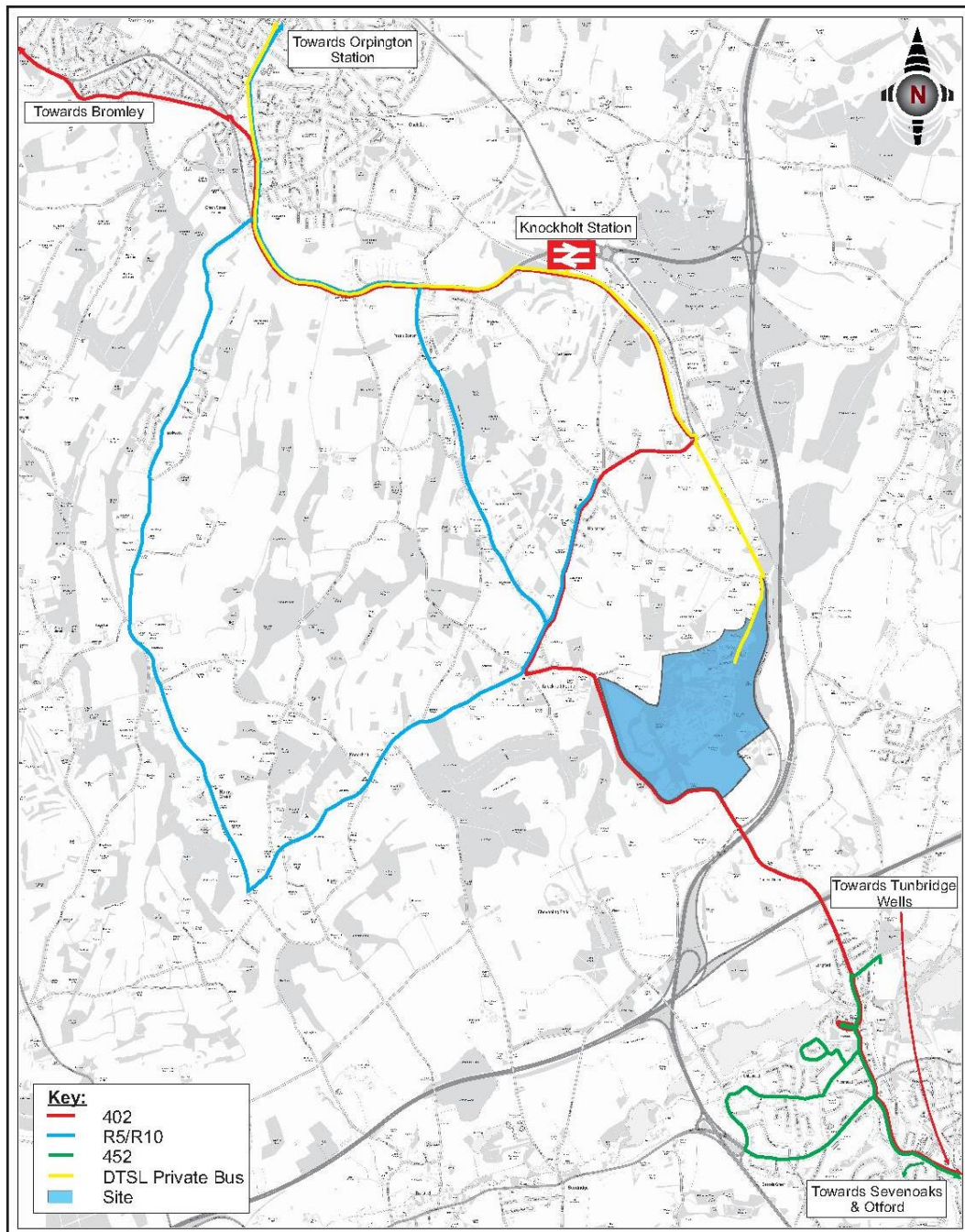
Figure 2-8: Cycle Parking at Knockholt Station



## Bus

- 2.7.14 During its heyday, workers at Fort Halstead were bussed into the site from the surrounding area. More recently the majority of people travelling to and from the site have done so using a private car.
- 2.7.15 Currently, there are no bus stops within the site. However, Dstl run a private peak period shuttle bus between the site, and, Knockholt and Orpington Stations. There are three buses during the morning peak and three during the evening peak, with the service operated by Go Coach.
- 2.7.16 At the time of the OPP application, the 402 bus service operated between Bromley and Tunbridge Wells via Sevenoaks. Since the application was approved, the 402 bus service has been withdrawn and the 431 bus service introduced which operates between Orpington to Sevenoaks via Star Hill Road and Knockholt Rail Station. It provides 3 - 4 services daily, Monday to Friday.
- 2.7.17 The R5/R10 service is a circular bus service providing access to Orpington Station with the nearest stop to the Fort Halstead site being at Knockholt Pound. Additionally, there are various school services (542 and TW6) operating one return trip on schooldays only.
- 2.7.18 A map of the services in the vicinity of the site is provided in Figure 2-9.

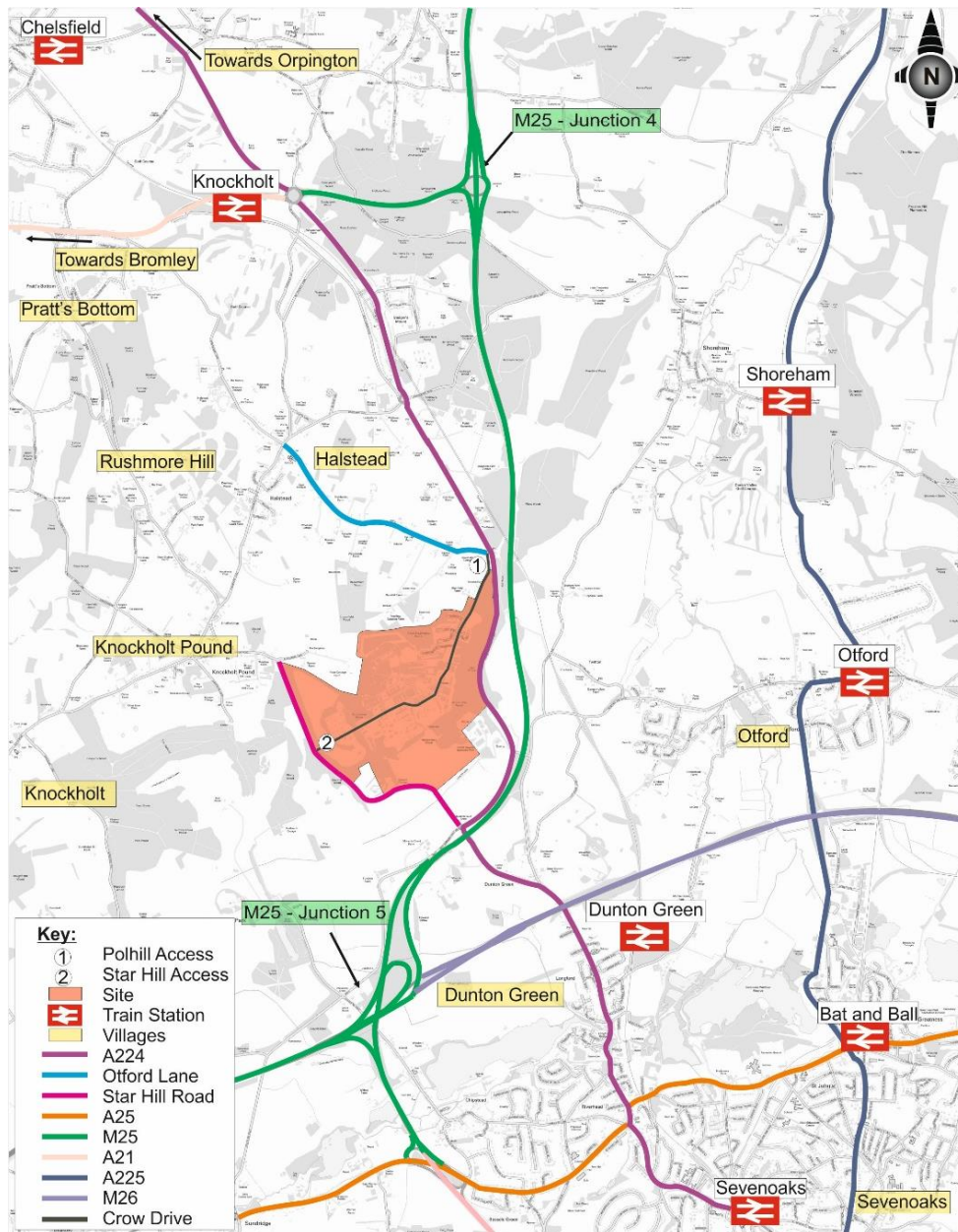
Figure 2-9: Bus Routes in the Vicinity of Fort Halstead.



## 2.8 Local Highway Network

- 2.8.1 Figure 2-10 illustrates the site's location in relation to its surrounding local highway network, to which it is well connected, including easy access to the National Motorway Network via the M25, junction 4.

Figure 2-10: Site Location in the Local Highway Network Context



2.8.2 The characteristics of the immediate surrounding highway network are as follows:

- The A224 is a single carriageway road which, to the north, provides access to the M25 (junction 4), Orpington (via Badgers Mount), Bromley (via Old London Road), and the A21. To the south, it provides the main access route into Sevenoaks. Within the vicinity of the site, the A224 is subject to a 50 mph speed limit. Although the road is provided with lighting columns, the street lighting along the A224 corridor has recently been switched off as part of an energy saving experiment. Nonetheless, the lighting remains switched on at the main junctions, including the site access junction. The road has limited footway provision: to the north of the site there is a footway on the east side of the carriageway only; and to the south along Polhill there are no footways.
- Star Hill Road provides a convenient means of access to the local villages of Knockholt and Halstead and an alternative route towards Dunton Green and Sevenoaks. It is a



relatively narrow rural lane with no footway or street lighting and subject to the national speed limit of 60 mph. It is part of the route of the 431 bus service.

- Otford Lane is a narrow rural lane with no lighting or footways and also subject to the national speed limit. It links the site and the village of Halstead.
- Crow Drive is a private road which provides access into the site from the A224. It has a speed limit of 30 mph. Whilst it generally has one single lane in each direction, at the junction with Otford Lane, for approximately 100 m, the northbound carriageway has two lanes, one for each turning movement onto the A224. The road has a footway on its south side. On the north side there is also a footway and also a short length of cycleway. The last section of the road as it approaches Otford Lane has no footway provision.

2.8.3 The main traffic hotspots in the area have been highlighted by the Sevenoaks District Strategy for Transport 2010-2026 (dated July 2010), and are:

- A224 Dunton Green to Riverhead (2.4 miles/3.9 km drive distance from the site);
- A224/A25 Riverhead roundabouts (3.1 miles/5.0 km drive distance from the site); and
- A25 Bat and Ball traffic lights (4.2 miles/6.8 km drive distance from the site)

2.8.4 All these hotspots are all situated some distance away from the Fort Halstead site. The Transport Strategy also notes that congestion at the two A25 junctions is restricted to the peak hours, with no spreading of congestion to other time periods, and furthermore that traffic congestion at these junctions is, at least in part, related to the lack of east facing slip roads connecting the A21 and the M26.

2.8.5 As part of the 2015 submissions and earlier work at the site, extensive traffic surveys have been undertaken between 2008 to 2014 at a number of key junctions and routes to the site. At the pre-application meeting with KCC Highways, KCC requested that surveys undertaken before 2014 should not be used for the junction modelling assessments in the TA.

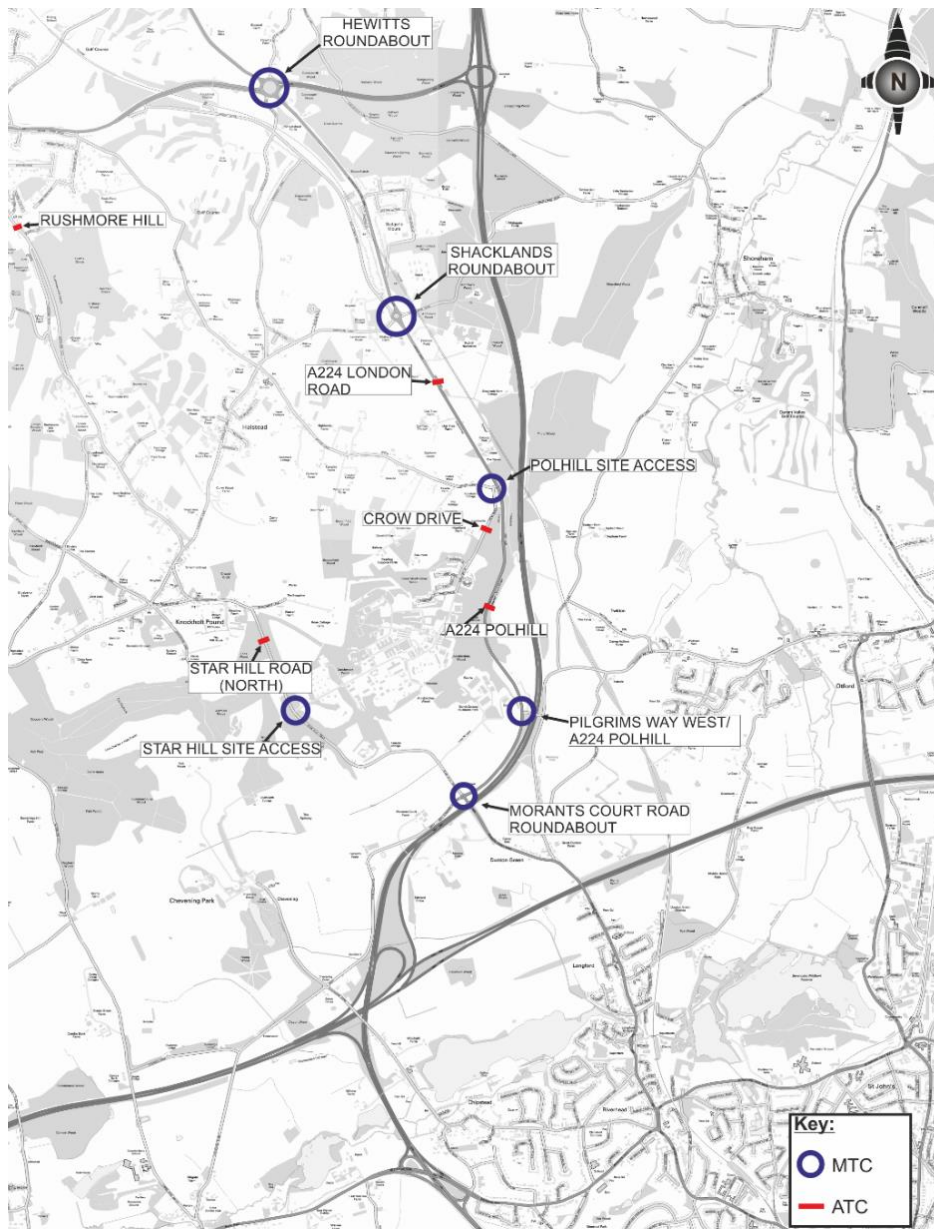
2.8.6 Additionally, new traffic surveys have been conducted in 2017 and 2018 as part of the current proposals. A summary of the traffic surveys undertaken post-2014 is presented in Table 2-2. The latest traffic surveys undertaken in 2018 are shown in Figure 2-11 below.

Table 2-2: Summary of Traffic Surveys

Location	Type	Survey year(s)
A21 (west of Hewitts roundabout)	ATC	2014
A224 Court Road	ATC	2014
Old London Road	ATC	2017
A224 Orpington By-Pass	ATC	2014, 2017
Crow Drive	ATC	2018
A224 London Road	ATC	2014 (Jun and Oct), 2017, 2018
A224 Polhill (south of Polhill Site access)	ATC	2014, 2017, 2018
Otford High Street	ATC	2014
Star Hill Road (south of Site access)	ATC	2014 (Jun and 2 locations in Oct), 2017
Star Hill Road (north of Site access)	ATC	2014, 2018
Rushmore Hill	ATC	2014, 2017, 2018
Knockholt Main Road	ATC	2014
A224 London Road (north of Station Road)	ATC	2014, 2017

Location	Type	Survey year(s)
A224 London Road (south of Aisher Way)	ATC	2014
A21/London Road	Junction count	2014
Hewitts roundabout	Junction count	2014, 2018
Junction 4 on the M25	Junction count	2014
Shacklands roundabout	Junction count	2014, 2018
Otford Lane/A224 Site access	Junction count	2014, 2018
Pilgrims Way West/A224 Polhill	Junction count	2014, 2017, 2018
Morants Court Road roundabout	Junction count	2014, 2018
Star Hill Site Access	Junction count	2018
A25/Chevening Road	Junction count	2014

Figure 2-11: Traffic Survey Locations



- 2.8.7 In addition to classified automatic traffic counts (ATCs) and turning counts at the main junctions, queue length counts were also undertaken at the main intersections, the results are summarised in Table C1 within Appendix C. Overall, aside from short term queuing observed at Hewitts Roundabout and the Pilgrims Way West (link road) junction, no queueing issues were observed at the junctions within proximity to the site.
- 2.8.8 The traffic surveys served to establish a 2018 baseline of peak hour flows on the network, which is based on the most recent 2018 surveys or older data where necessary. When older data have been used, they have been scaled up with traffic growth factors derived from the Trip End Model Presentation Program (TEMPRO), which is the industry standard for estimating local traffic growth factors.
- 2.8.9 Baseline flows for the main links, identified on the map in Figure 2-12, are presented in Table 2-3. Complete network diagrams can be found in Appendix D.

Figure 2-12: Main Assessed Links

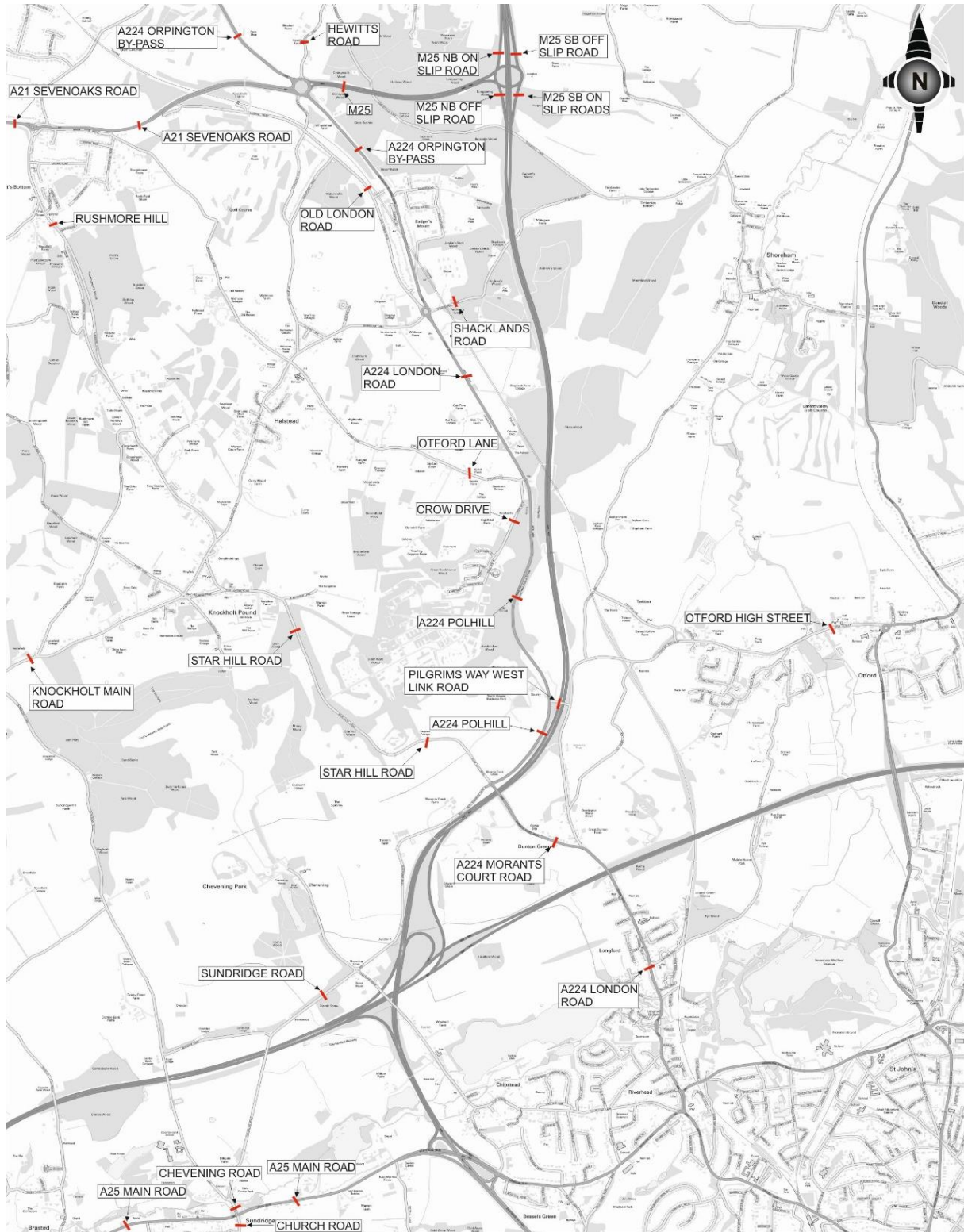


Table 2-3: Baseline Peak Hour Flows on the Main Links in the Local Transport Network

Link and Survey Date	AM peak (veh/h)	PM peak (veh/h)
A21 Sevenoaks Road (west of Rushmore Hill) - 2014	2697	2783
Rushmore Hill - 2018	272	283
A21 Sevenoaks Road (east of Rushmore Hill, west of Old London Road) - 2014	2356	2553
A224 Orpington By-Pass (north of Hewitts roundabout) - 2014	1877	1746
Hewitts Road - 2014	107	93
M25 approach on Hewitts roundabout -2014	3480	3120
A224 Orpington By-Pass (north of Shacklands Rd roundabout) -2017	918	837
M25 northbound on slip road -2014	933	1229
M25 northbound off slip road -2014	585	467
M25 southbound on slip road -2014	471	519
M25 southbound off slip road -2014	1451	974
Old London Road -2017	443	480
Shacklands Road -2014	122	56
A224 London Road -2018	1144	1151
Otford Lane -2014	75	57
Crow Drive -2018	224	159
A224 Polhill (south of site access) -2018	1071	1078
Pilgrims Way West link road to A224 Polhill -2014	690	638
A224 Polhill (south of Pilgrims Way West link road) -2014	1082	1016
Otford High Street -2014	835	874
A224 Morants Court Road -2014	837	793
A224 London Road (at Station Road in Dunton Green) -2017	1042	1083
Sundridge Road -2014	726	539
Chevening Road -2014	563	435
A25 Main Road (east of Chevening Road) -2014	1389	1526
A25 Main Road (west of Chevening Road) -2014	1523	1605
Church Road -2014	249	210
Star Hill Road (south of site access) -2017	317	279
Star Hill Road (north of site access) -2018	255	245
Knockholt Main Road -2014	331	204

## 2.9 Personal Injury Collisions

- 2.9.1 Personal Injury Collision (PIC) data for the five-year period up to September 2017 has been obtained from KCC. This includes the most up-to-date data available at the time of request. Additionally, five-year PIC data up to June 2018 has been obtained from TfL covering the immediate area surrounding Hewitts Roundabout within the London Borough of Bromley. Appendix E contains maps showing the location and severity for each recorded accident.

### Fatal Personal Injury Collisions

- 2.9.2 Excluding the M25, there was 1 fatal collision within the local area. This collision occurred on 06/08/2015 along Old London Road is the result of the driver not being able to follow the left-turn bend and colliding with a tree across the other side of the carriageway. The vehicle speed at the road bend appears to have been a contributing factor in this collision.

### Personal Injury Collision Clusters

- 2.9.3 The accident clusters that have been identified are as follows:
- M25 Junction 4 and Hewitts Roundabout: There are small clusters of accidents recorded on the M25 Junction 4 slip roads and on Hewitts Roundabout. However, the accident rates are not excessive given the high flow of traffic through the junctions.
  - Star Hill Road / Morants Court Road Roundabout: There were three recorded injury accidents over the five-year period, of which, two were of slight severity and one was of serious. All collisions involved motorists pulling out and hitting cyclists. Therefore, all accidents were resultant of driver failure to pay attention to other traffic/ road users.
  - Star Hill Road: Five accidents have been recorded on Star Hill Road and within close proximity to the junction between Star Hill/ Birchwood Lane/ Old London Road. Three of the five collisions have been recorded at the bend near the junction between Star Hill Road and Birchwood Lane. Of the three collisions, two appear to be speed related and both occur in the northwest-bound direction. The remaining two collision have occurred to the south of the site access at the bend where a number of cottages are located. It is evident from the description of both these accidents that speed was a contributing factor.
  - Polhill Road / Otford Lane Junction: Three recorded collisions occurred adjacent to the Polhill Road / Otford Lane junction, all of a slight severity. All accidents appear to be associated with loss of control or drivers not paying attention to other traffic.
  - Main Road / Harrow Road / Chevening Lane Junction: These junctions are located northwest of the development site. A total of five injury accidents were recorded over the four-year period from 2013-2017. All collisions were of a slight severity and resultant of drivers failing to pay attention to other traffic on the road.
- 2.9.4 There are no recorded injury accidents at either of the two site access junctions that can be directly attributed to traffic travelling through the junction. On Star Hill Road, there are no accidents in close proximity to the site access. At the A224 Polhill/Otford Lane junction there are only three collisions, all of slight severity and resultant of driver error.
- 2.9.5 Junction 5 of the M25 also has a significant record of accidents but is considered to be too remote from the site for the development to have a material bearing on future accident rates.
- 2.9.6 Overall a clear correlation between accident rates and road surface/ lighting/ weather conditions was not observed.

## Pedestrian and Cyclist Collisions

- 2.9.7 Of the 345 PICs recorded, 32 involved cyclists and 20 involved pedestrians. There were no obvious clusters of collisions at any particular location. The cause of collisions were mostly attributed to pedestrian/ cyclist error or errors made by drivers of vehicles were also involved in collisions.

### 2.10 Summary

- 2.10.1 This chapter has presented the existing transport and access conditions in and around the Fort Halstead site.
- 2.10.2 Although the site currently has poor accessibility by public transport Dstl has provided a private shuttle bus that operates during the morning and evening peak periods, providing a link for Dstl and QinetiQ staff to and from Knockholt and Orpington stations.
- 2.10.3 The site is well connected to the local and strategic road networks, with easy access to the M25 and also to the A21 for access towards Bromley.
- 2.10.4 There appear to be no major highway capacity issues on the immediate network serving the site. Some minor queueing has been recorded at the Hewitts roundabout on the A224 to the north of the site, and at the A224/Pilgrims Way junction to the south. The other main hotspots that have been identified in the area (A25 Riverhead roundabouts, A25 Bat and Ball junction and M25/A21/A25 junction) are considered to be too remote from the site for to be significantly impacted by the development.
- 2.10.5 There do not appear to be any major road safety issues on the local highway network. Small accident clusters have been identified at M25 Junction 5 and at Hewitts roundabout which are at some distance to the north of the Site. Locally, there are no identifiable accident clusters or themes indicating a need to consider safety improvements as a result of the development.

## 3 Policy Review

### 3.1 Introduction

3.1.1 The proposed development has been progressed taking account of policy and guidance at the national, regional and local level as set out under the headings below.

#### National Policy and Guidance

- National Planning Policy Framework (NPPF)
- National Planning Practice Guidance (NPPG)

#### Regional Policy and Guidance

- Kent County Council Local Transport Plan 4
- Kent Downs AONB Management Plan
- Kent Design Guide Review: Interim Guidance Note 3 on Residential Parking
- Kent and Medway Structure Plan 2006: Mapping out the future – Supplementary Planning Guidance SPG4: Kent Vehicle Parking Standards

#### Local Policy and Guidance

- Sevenoaks District Council – Local Development Framework: Core Strategy
- Sevenoaks District Council – Allocations and Development Management Plan
- Sevenoaks District Strategy for Transport
- Sevenoaks District Council – Submission Draft Local Plan (2018)

#### National Planning Policy Framework (2019)

3.1.2 The NPPF aims to enable local people and their councils to produce their own distinctive local and neighbourhood plans, which should be interpreted and applied in order to meet the needs and priorities of their communities.

3.1.3 Section 9: Promoting Sustainable Transport, of the NPPF, paragraph 102 states that;

3.1.4 “transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- a. the potential impacts of development on transport networks can be addressed;
- b. opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;
- c. opportunities to promote walking, cycling and public transport use are identified and pursued;



- d. the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for mitigation and for net gains in environmental quality; and
- e. patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places.”

3.1.5 With regards to sites that may be allocated for development in plans, or specific applications for development, paragraph 108 states that;

“...it should be ensured that:

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

3.1.6 Paragraph 109-110 goes on to state that;

“Development should only be prevented or refused on highways grounds if the residual cumulative impacts on the road network or road safety would be severe.

3.1.7 Within this context, applications for development should:

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

3.1.8 Paragraph 111 states 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.”

### **National Planning Practice Guidance, 2018**

3.1.9 The Planning Practice Guidance was launched in July 2018 and provides additional guidance to the Government’s strategic policies outlined within the NPPF in a web-based resource. This is updated regularly.

- 3.1.10 Matters of relevance to the transport assessment include guidance on Transport Assessments (TAs) and Transport Statements (TS) and what they should contain. Local planning authorities must make a judgement as to whether a development proposal would generate significant amounts of movement on a case by case basis (i.e. significance may be considered at a lower threshold where road capacity is already stretched or a higher threshold for a development in an area of high public transport accessibility).

## 3.2 Regional Policy and Guidance

### Kent County Council Local Transport Plan 4: Delivering Growth Without Gridlock 2016-2031

- 3.2.1 The Local Transport Plan (LTP) for Kent, covering a period from 2016 to 2031, is the County Council's fourth LTP and was adopted by KCC on 19th January 2017. It sets out a 15-year plan for the area and consists of five overarching policies that are targeted at delivering specific outcomes.

- 3.2.2 The outcomes are as follows:

Outcome 1: Economic growth and minimised congestion

- Policy: Deliver resilient transport infrastructure and schemes that reduce congestion and improve journey time reliability to enable economic growth and appropriate development, meeting demand from a growing population.

Outcome 2: Affordable and accessible door-to-door journeys

- Policy: Promote affordable, accessible and connected transport to enable access for all to jobs, education, health and other services.

Outcome 3: Safer Travel

- Policy: Provide a safer road, footway and cycleway network to reduce the likelihood of casualties, and encourage other transport providers to improve safety on their networks.

Outcome 4: Enhanced environment

- Policy: Deliver schemes to reduce the environmental footprint of transport, and enhance the historic and natural environment.

Outcome 5: Better health and wellbeing

- Policy: Provide and promote active travel choices for all members of the community to encourage good health and wellbeing, and implement measures to improve local air quality.

### Kent Downs AONB Management Plan (2014)

- 3.2.3 The development site is situated within the Kent Downs Area of Outstanding Natural Beauty; although the main access to the site from the A224 lies outside the AONB boundary. The A224 to the north (London Road) lies outside the AONB, whilst to the south (Polhill) it is included within the AONB.
- 3.2.4 The Management Plan sets out a vision and clear aims and policies. The policies provided in the plan recognise and reflect the pressure from growth and development in the Kent Downs AONB. This includes securing mitigation measures to take advantage of the opportunities generated by this growth and to prevent a harmful impact on the AONB.

- 3.2.5 The Management Plan recognises the impact of all transport infrastructures on the quality of the landscape and the tranquillity of the area, but also acknowledges the key role of public transport connections to promote tourism in the area.
- 3.2.6 There is a chapter dedicated to access, which identifies the main issues with regard to transport. They include, among others:
- Estimated day visitor numbers are high and probably increasing. Pressure on the special characteristics and qualities of the AONB as well as particular countryside routes, sites and areas can be very high but unevenly distributed.
  - Urban and growth areas in close proximity to the AONB will generate new opportunities for enjoyment, health and well-being but also pressure for travel and access.
  - Differences in requirements and uses between rightful Public Rights of Way (PRoW) users (horse riders, cyclists, motorbikes walkers, and those with dogs) can result in conflicts.
  - Conflicts between rightful PRoW users and illegal users, fly-tipping, dumping and path obstruction.
  - The increasing popularity of horse riding and off-road cycling which is focused particularly on the AONB, putting pressure on the rights of way network. The need to enhance, extend, connect and improve fragmented bridleway links and secure higher rights on PRoW without harming the characteristics and qualities of the AONB.
  - Need to ensure that the PRoW network is well signposted, way-marked and maintained using materials and equipment appropriate in design and sustainably sourced.
  - Improving the rural road network for its landscape quality and to promote quiet countryside recreation by managing traffic pressures to provide quiet and safe access.
  - The opportunity to promote the availability and use of safe non car-based countryside transport and recreation opportunities and seek integrated public transport initiatives.
- 3.2.7 Among the stated aims for a sustainable access there are:
- A legally defined, well maintained, connected and promoted Rights of Way network that provides safe, well designed and satisfying routes for walkers, cyclists and horse riders where conflicts between rightful uses are minimised.
  - New routes and connections between public rights of way and a highway network which is increasingly available and safe for walkers, cyclists and horse riders.
  - Access where illegal or damaging recreational activities are actively controlled.
- 3.2.8 Specific policies from the Management Plan that relate to transport are:
- SD 12: 'Transport and infrastructure schemes are expected to avoid the Kent Downs AONB as far as practicable. Essential developments will be expected to fit unobtrusively into the landscape, respect landscape character, be mitigated by sympathetic landscape and design measures and provide environmental compensation by benefits to natural beauty elsewhere in the AONB.'
  - AEU2: 'Diversions and stopping up of PRoWs will be resisted unless it can be demonstrated that they will not have a detrimental impact on opportunities for access and quiet enjoyment of the AONB landscape and historic character.'

- AEU3: 'Investment to secure sustainable, high quality, low impact and easy access, multiuser routes from towns and growth areas to the AONB will be pursued.'
- AEU4: 'The sustainable and enhanced management and promotion of open access sites will be pursued.'
- AEU5: 'Mechanisms will be supported to resolve conflicts between rightful users of Public Rights of Way. Where there are irreconcilable conflicts from legal but damaging activities, quiet recreation will be supported above other activities.'
- AEU7: 'Improvements to the Rights of Way Network to provide and improve countryside access, health and well-being opportunities, including way-marking, signposting and maintenance, new routes and establishment of higher rights which conforms with AONB policies and design guidance, will be supported.'
- AEU11: 'A reduction in the need to travel by car will be supported through new and improved measures to provide integrated, attractive and affordable public transport in the Kent Downs. New business, community and other initiatives in support of the vision, aims and policies of the Management Plan will seek to relate to existing public transport links.'
- AEU12: 'Sustainable solutions to problems of rural traffic will be supported, particularly in rural settlements or where there is a conflict with landscape quality or walkers, cyclists and horse riders.'
- AEU13: 'A strategic approach to the use of road signage, furniture, design and maintenance that conserves and enhances the local character and distinctiveness and encourages non-motorised access will be pursued through the adoption and implementation of the AONB Rural Streets and Lanes Design Handbook.'

### **Kent Design Guide Review: Interim Guidance Note 3 on Residential Parking (2008)**

- 3.2.9 This Guidance Note reviews the factors to be considered when deciding an appropriate parking provision for residential areas and sets minimum and maximum numbers of parking spaces for different locations (city/town centre, edge of town, suburban, and suburban edge/village/rural) and different types of residential units.

### **Kent and Medway Structure Plan 2006: Mapping out the future – Supplementary Planning Guidance SPG4: Kent Vehicle Parking Standards (2006)**

- 3.2.10 This Supplementary Planning Guidance provides standards for vehicle and cycle parking in Kent for those land uses that have not been superseded by the Kent Design Guide.

## **3.3 Local Policy and Guidance**

### **Sevenoaks District Council – Local Development Framework: Core Strategy (2011)**

- 3.3.1 The Core Strategy is a key part of the Sevenoaks District Council's (SDC) Local Development Framework (LDF) and was adopted on 22 February 2011. It sets out the council's objectives and overarching principles which will deliver necessary development needs of the district up to 2026.
- 3.3.2 The key objectives of the Transport Strategy have been developed into the following set of priorities in the Sevenoaks urban area:

- Improve public transport interchange facilities;
- Maintain and improve capacity on peak train services;
- Manage parking issues in the town centre and around train stations;
- Bring forward measures to alleviate congestion and tackle air quality issues at Riverhead, Bat & Ball and Sevenoaks Town Centre; and
- Improve facilities for walking and cycling.

3.3.3 For rural areas the priorities are defined as follows:

- Maintain and improve accessibility to jobs, shops and services by non-car means, including walking, cycling, public transport and community transport; and
- Bring forward measures to alleviate congestion and tackle air quality issues, including those along the A25 corridor, at Seal and Westerham, and on the Strategic Network.

3.3.4 The LDF notes that the dispersed rural nature leads to bus operators finding it difficult to run commercially viable bus services, resulting in many being subsidised by KCC. It suggests that limited development in rural areas is unlikely to provide a catalyst for improved bus services and therefore innovative public and community transport solutions are necessary, including dial-a-ride and car-pooling.

3.3.5 It goes on to state that loss of services and facilities from rural areas will be resisted where possible, but exceptions will be made where equivalent replacement facilities are provided or where it can be demonstrated that the continued operation of the service or facility is no longer financially viable.

### **Sevenoaks District Council – Allocations and Development Management Plan (2015)**

3.3.6 The Allocations and Development Management Plan (ADMP), forms part of Sevenoaks District Local Development Framework (LDF) and was adopted in February 2015. The ADMP comprises proposals for the development of strategic sites and provides development management policies which are used, in combination with adopted core strategy policies, to determine planning applications.

3.3.7 The relevant policies for this assessment are:

- Policy EN1 – Design Principles, which in relation to transport infrastructure states that:  

‘Where appropriate, new developments should include infrastructure that complements modern communication and technology needs and restricts the need for future retrofitting. Such infrastructure should include (...) provision of a power supply that would support green technology initiatives such as in-home electric car charging points.’
- Policy EMP3 - Redevelopment of Fort Halstead, which in relation to transport states that:  

‘Redevelopment proposals (...) would be expected to:

  - o Be sustainable in respect of the location, uses and quantum of development and be accompanied by a Travel Plan incorporating binding measures to reduce dependency of future occupants on car use;

- o Provide accessibility to jobs, shops and services by public transport, cycling or walking, including proposals for onsite provision proportionate to the proposed development; (...)
  - o Confirm, by way of a Transport Assessment, that the development would not have an unacceptable adverse impact on the local and strategic road networks;
  - o Improve the provision and connectivity of green infrastructure, including the protection, enhancement and management of biodiversity and the provision of improvements to the Public Right of Way network.'
- Policy T1 - Mitigating Travel Impact

'New developments will be required to mitigate any adverse travel impacts, including their impact on congestion and safety, environmental impact, such as noise and tranquillity, pollution and impact on amenity and health. This may mean ensuring adequate provision is made for integrated and improved transport infrastructure or other appropriate mitigation measures, through direct improvements and/or developer contributions'
  - Policy T2 - Vehicle Parking states that:

'Vehicle parking provision, including cycle parking, in new residential developments should be made in accordance with the current KCC vehicle parking standards in Interim Guidance Note 3 to the Kent Design Guide (or any subsequent replacement) (...)

Vehicle parking provision, including cycle parking, in new non-residential developments should be made in accordance with advice by Kent County Council as Local Highway Authority or until such time as non-residential standards are adopted.'

Notwithstanding the Council may depart from established maxima or minima standards in order to:

    - a. take account of specific local circumstances that may require a higher or lower level of parking provision, including as a result of the development site's accessibility to public transport, shops and services, highway safety concerns and local on-street parking problems;
    - b. ensure the successful restoration, refurbishment and re-use of listed buildings or buildings affecting the character of a conservation area;
    - c. allow the appropriate re-use of the upper floors of buildings in town centres or above shop units;
    - d. account for the existing parking provision (whether provided on or off-site) already attributed to the building's existing use when a redevelopment or change of use is proposed and for the use of existing public car parks outside of normal working/trading hours by restaurants and leisure uses.'
  - Policy T3 - Provision of Electrical Vehicle Charging Points

'For all major non-residential development proposals, the applicant should set out within their Transport Assessment a scheme for the inclusion of electric vehicle charging infrastructure.

In considering whether a publicly accessible charging point is appropriate the Council will have regard to:

- a. The accessibility of the location;
- b. The suitability of the site as a long stay destination during charging;
- c. The number of existing and proposed publicly accessible charging points in the surrounding area;
- d. The potential impact of providing electric vehicle charging points on development viability.

Within new residential developments all new houses with a garage or vehicular accesses should include an electrical socket with suitable voltage and wiring for the safe charging of electric vehicles.

Schemes for new apartments and houses with separate parking areas should include a scheme for at least one communal charging point.

In non-residential developments where it is not appropriate to provide electric vehicle charging points, new development should be designed to include the electrical infrastructure in order to minimise the cost and disturbance of retrofitting at a later date.'

### **Sevenoaks District Strategy for Transport, 2010**

3.3.8 The Sevenoaks District Strategy for Transport (SDST) was prepared by KCC with support from SDC and covers a period of 16 years from 2010 to 2026. It sets out following key initiative objectives:

- improve accessibility;
- tackle congestion;
- provide safer roads; and
- improve air quality

3.3.9 The impact of unsustainable transportation is acknowledged, including both the environmental and social issues, and a desire to promote 'green transport' is identified. Furthermore, the A25 is identified as a route experiencing issues with congestion.

3.3.10 The SDST states its vision for villages is for smaller scale development consistent with the size and relative sustainability of the settlement concerned.

3.3.11 The SDST sets out the aims of promoting an integrated transport network that:

- Improves accessibility to jobs and services for all sections of the community;
- Reduces congestion;
- Improves safety;
- Reduces the impact of transport on the natural and built environment; and
- Protects and enhances the district's position as an attractive location for business and investment.

3.3.12 In order to achieve these aims the following objectives have been set:

- Reduce the need to travel and the distance people need to travel
- Where there is a need to travel, enable people to be less dependent on cars for their travel needs
- Maximise the efficient use of existing infrastructure
- Divert traffic away from sensitive areas
- Encourage the integration of transport modes
- Reduce the effects of traffic and transport on air quality
- Improve road safety for all users
- Improve safety and security for all public transport users

### **3.4 Emerging Sevenoaks District Local Plan**

3.4.1 The emerging Local Plan for Sevenoaks is currently under review within Regulation 19. The submitted report was proposed in December 2018 and was in consultation until 3rd February 2019. The examination library for the emerging Local Plan will be open between 2nd July 2019 to 30th April 2020.

3.4.2 There is one policy (T1) within the Proposed Local Plan in relation to Transport. The policy states that the Local Plan will work with KCC and HE to ensure that adverse travel impacts created by new developments are mitigated. The policy also promotes safe and convenient cycle routes which may include new routes, enhancements to existing routes or integrating new routes into PROW network.

3.4.3 The policy states that parking is to be in line with advice provided by KCC and the current KCC parking standards which are set out in the Interim Guidance Note 3 (as detailed above).

3.4.4 The policy also outlines the view on EV charging points in both residential and non-residential developments. For all non-residential development proposals there must be EV charging for use of employees and customers plus additional accessible rapid EV charging points where possible. For new residential schemes all houses with a garage or off-street parking must include an external electrical socket for EV charging. Communal parking must have communal charging points

### **3.5 Implications for Fort Halstead**

3.5.1 The key policy implications for the transport strategy at Fort Halstead are as follows:

- There is a need to promote more sustainable travel patterns to/from the site. Any public transport strategy needs to take account of the difficulty of providing traditional, commercially viable solutions in a rural environment and therefore there is a need to look at more innovative solutions;
- Where practical, there will be a need for the strategy to facilitate improvements to the pedestrian and cycle network which provide access to the site;
- There is a need to try to increase the integration of Fort Halstead with the existing village communities;



- The highway impacts on rural roads need to be minimised so there is no adverse impact on the tranquillity of the AONB;
- The highway impacts of the development need to be minimised, particularly in relation to existing congestion and air quality hotspots along the A25 corridor; and
- The strategy needs to take account of existing concerns regarding parking pressures at station car parks.

## 4 Development Proposals

### 4.1 Introduction

4.1.1 This chapter sets out the development proposals in terms of the development quantum, parking provision, phasing of the development and the access strategy.

4.1.2 The proposed application is for a Hybrid Planning Application (HPA).

#### **The detailed element of the application will comprise:**

- Demolition of existing buildings;
- Change of use and works to buildings Q13 and Q14 (including landscaping and public realm);
- Primary and secondary accesses.

#### **The outline element of the application will comprise:**

- Development of up to 750 residential dwellings;
  - Development of business areas (use classes B1a/b/c) of up to 27,659 sqm GEA;
  - Development of a one form entry primary school;
  - Development of a mixed-use village centre (use classes A1/A3/A4/A5/B1a/D1/D2);
  - Works within the 'X' enclave relating to energetic testing operations, including fencing, access, car parking;
  - Change of use of Fort Area and bunkers to Historic Interpretation Centre (use class D1) with workshop space;
  - Roads, pedestrian and cycle routes, public transport infrastructure, car parking, utilities infrastructure, drainage;
  - Landscaping, land forming and ecological mitigation works.
- 4.1.3 In comparison to the OPP, the proposed development would result in an increase of 300 residential units over the consented figure of 450 units. The total employment numbers across the site remain similar, with the OPP having a figure of 1,483 jobs and the proposed development having a figure of 1,438 jobs. The proposed development includes a primary school on site which was not included as part of the OPP. Lastly, the hotel as part of the OPP is no longer proposed.

### 4.2 Development Quantum

#### **Residential Development**

4.2.1 The proposed development allows for the provision 750 new residential units which will comprise a range of unit types and sizes. The residential development will include affordable accommodation.

4.2.2 The Indicative Masterplan included within Appendix F sets out the overall layout of the site. An Indicative Density Plan has also been included within Appendix F which highlights the location of the different residential parcels of the development and the respective indicative densities.

### Commercial Development

4.2.3 The commercial element of the development will comprise a mix of B1a, b and c land uses and the retention of the existing QinetiQ facilities and jobs. There will also be an element of D1, D2, A1 and A3 use classes associated with the Village Centre.

4.2.4 The proposed mix of uses and floor spaces for the commercial element is summarised in Table 4-1:.

Table 4-1: Commercial Development Use Classes

Land Use	Gross External Area (sqm)
B1a/B1b	14,230
B1c	7,413
Retained QinetiQ	6,016
<b>Total</b>	<b>27,659</b>

4.2.5 The proposed commercial element of the development is expected to support approximately 1,438 total jobs onsite.

### Primary School

4.2.6 The development proposals include a one form entry primary school as part of the outline element of the HPA. The primary school will comprise a gross external area of 1,345sqm which will be of use class D1.

## 4.3 Access Strategy and Masterplan

4.3.1 The primary access point to the site is via Crow Drive and A224 Polhill to the north of the site. Additionally, the development proposals seek to utilise the access point from Star Hill Road to the south-western boundary of the site as a secondary vehicular access point.

4.3.2 The use of the Star Hill access is in line both national (Manual for Streets) and local guidance (Kent Design Guide) which seek to ensure developments are permeable and linked effectively to the surrounding transport networks for all users and also for resilience. Furthermore, as part of the pre-application discussions, KCC highways officers have repeatedly stated that the proposed development would require two access points to be in line Kent Design policies.

4.3.3 Based on the work undertaken as part of the 2015 OPP, it is understood that both the local community and KCC councillors have expressed concern regarding the use of the access point from Star Hill which is perceived to generate a significant level of traffic on Star Hill Road. The development proposals and masterplan of the site have responded to such concerns by ensuring traffic flows at the Star Hill access are kept to minimum through the following measures:

- Locating the new commercial development away from the Star Hill access point and orientated more towards the Polhill access point;

- Designing the internal highway network such that the route to the Star Hill access point is more convoluted and hence journey times to the Star Hill access point would be slower and less desirable;
  - Whilst retaining much of the Crow Drive/ Crow Road alignment, part of the route will be pedestrianised removing the direct vehicular through route;
  - The stretch of road from the Star Hill access to the centre of the site would be re-designed to include multiple deviations from the current geometry which would result in traffic calming and longer journey times to the Star Hill access.
- 4.3.4 In addition to the above, the design of the internal highway network will be compatible with the requirements for designation as a 20mph zone. This has resulted in a number of traffic calming features within the internal site which have been agreed with KCC. The internal highway network drawings have been included in Appendix G.
- 4.3.5 At the centre of the site, a new village centre would be created serving new and existing residents and including a range of mixed uses such as a shop, café, community use and early years provision.
- 4.3.6 The indicative masterplan seeks to prioritise the movement of pedestrians and cycles both by controlling traffic speeds and providing more direct routes for these modes for internal movements within the site. In addition, the masterplan seeks to create an attractive environment that will encourage people to walk and cycle.
- 4.3.7 The Access and Movement Parameter Plan, which has been included in Appendix F, identifies a number of key new pedestrian/cycle routes. These include a new east – west cycle route across the site linking the A224 Polhill and Star Hill Road, as well as a cycle route from the centre of the site to the north west corner which will provide a convenient access route between the site and Knockholt Pound.
- 4.3.8 The Access and Movement Parameter Plan also identifies the primary access road within the site which would be designed to allow for bus and heavy vehicle movements within the site.

## 4.4 Parking Provision

- 4.4.1 The level of on-site vehicle and cycle parking in connection to the proposed development will reflect the current parking standards. Kent and Medway Structure Plan 2006 provides the Supplementary Planning Guidance 4 – Vehicle Parking Standards dated July 2006 for a range of land uses. More up to date parking standards are contained in the Kent Design Review: Interim Guidance Note 3, Residential Parking, dated November 2009. These detail the parking standards for the corresponding land uses.
- 4.4.2 At this stage the masterplan is indicative only and so the detailed layout of the various phases of the development including the layout of parking will be agreed at the appropriate time.

## 4.5 Agreed OPP Mitigation Taken Forward

- 4.5.1 As part of the 2015 OPP, Various mitigation measures were agreed in order to manage the transport related impacts of the development and to minimise the environmental impacts and adverse effects on the local community. The list of agreed mitigation measures along with their relevance to the proposed development have been set out below.

### Highway Mitigation

- 4.5.2 The mitigation measures were agreed in principle as part of the OPP on the highway network and the applicability to the current application have been set out below:

### **Star Hill Road Access**

4.5.3 The agreed OPP improvement scheme included narrowing of the Crow Drive access carriageway to 6.0 meters and a considerable improvement to the existing visibility splays. It was also proposed to include anti-skid surfacing on the approaches in order to further enhance safety. The visibility splays on the exit from the access junction were improved to the following level:

- 2.4 x 90 metres to the left; and
- 2.4 x 90 metres to the right.

4.5.4 The visibility splay improvements were in line for residential access roads as set out in Manual for Streets based on vehicle speed surveys undertaken at the time.

For the current application, the following improvements are proposed:

- Improvement to the visibility splays compared to the OPP scheme;
- New warning signs on the northern and southern approaches to the junction;
- The addition of anti-skid surfacing on Star Hill Road to assist vehicle stopping; performance;
- Tapers on the junction corner radii to help large vehicles to turn without overrunning the centreline of the major carriageway;
- An enlarged splitter island to separate inbound and outbound movements by large vehicles to remove the potential for conflicts; and
- Trimming back of foliage and raising of tree crowns to improve visibility splays in each direction.

4.5.5 The proposed junction improvement scheme is shown in Drawing 41290/5501/044 within Appendix H and the corresponding swept path analysis has been shown in Drawing 41290/5501/045 within Appendix H.

### **Otford Lane/A224 Junction**

4.5.6 Various options for an improvement scheme at this junction were considered as part of the OPP including minor improvements, signalisation and reconfiguring the junction into a priority roundabout junction. The roundabout options was agreed with KCC which included provisions for pedestrians and cyclists.

4.5.7 For the current application, it is proposed that the agreed roundabout design which is shown in Drawing 41290/5501/041 within Appendix H is taken forward.

### **Star Hill Traffic Calming**

4.5.8 As part of the OPP, a speed restriction of 40mph was proposed along Star Hill road between Birchwood Lane and where the road enters the village of Knockholt Pound. This was considered to improve the safety of all road users across this stretch of the road. Details of the proposed traffic calming measures which were agreed in principle with KCC were included in Appendix F of the OPP TA.

4.5.9 For the current application, it is proposed that the previously agreed 40mph speed restriction along Star Hill is maintained. It should be noted that as part of the pre-application discussions,

KCC have indicated that a speed restriction along Star Hill road would not be supported based on the existing evidence on vehicle speeds and collision data, although it is of note that the recorded speeds in question do support a reduction in the limit to 40mph based on the approach taken by KCC on other schemes in Kent recently. A technical note has been prepared and included within Appendix O which sets out the correspondence between KCC and provides the rationale as to why the speed reduction should be taken forward as part of the current application.

- 4.5.10 It should be noted that irrespective of the speed restriction along Star Hill Road, signage will be provided on the approaches to the access junction and visibility at the access junction would be significantly improved compared to existing levels. The proposed location of signage on Star Hill Road and the visibility improvements have been shown in Drawing 41290/5501/044 within Appendix H.

#### **Star Hill Road/Rushmore Hill**

- 4.5.11 As part of the OPP, periodic monitoring of traffic flows along this link was proposed to be undertaken by the developer. This could be used, in conjunction with a defined trigger point, to inform if the developer should be required to design additional traffic calming measures.
- 4.5.12 It is proposed that the previously agreed monitoring is taken forward as part of the proposed application.

#### **Pedestrian and Cycle Mitigation**

- 4.5.13 The proposed highway mitigation set out above will in itself provide benefits for cyclists and pedestrians through safety improvements along around the Star Hill Access and improved facilities at the A224/Otford Lane junction.
- 4.5.14 Furthermore, the development would provide enhanced connections to the existing rights of way and the development will also open up new access routes though the site for the benefit of the wider community. The Access and Movement Parameter Plan included in Appendix F, highlights the indicative shared footways/ cycleways which provide connections to existing footways and bridleways. This includes connections to the existing footways which provide access to Knockholt Village.
- 4.5.15 Following discussions with KCC as part of the OPP, it is agreed that the development would upgrade the existing bridleway between Polhill and Twitton. Details of the upgrade works would be submitted and agreed with KCC prior to the occupation of the development.
- 4.5.16 As part of the OPP, it was agreed with KCC that cycle access to the north would be improved through the provision of on-street cycle lanes on London Road to link Otford Lane with the existing advisory cycle lanes on Old London Road which provide access towards the Knockholt Station. It has since been agreed with KCC that this improvement measure will also be provided as part of the current application. The improvement scheme has been shown in Drawing 41290/5501/046 in Appendix I.

#### **Public Transport Improvements**

- 4.5.17 The proposed public transport strategy for the site has been set out in Chapter 8 of this report. This will be in line with the proposals agreed as part of the OPP which include the following main elements:
- Diversion of the existing 431 bus service into the site; and
  - Providing a new community bus service into the site.

4.5.18 Further details of the public transport improvements have been included in Chapter 8.

### **Other Mitigation Measures**

4.5.19 Details regarding the Travel Plan for the site have been included within Chapter 8.

4.5.20 Details regarding mitigation of potential construction and demolition impacts have been included in Chapter 7.

## 5 Trip Generation and Distribution

### 5.1 Introduction

- 5.1.1 This chapter sets out the methodology that has been undertaken to estimate the likely trip generation, mode of travel and distribution of trips associated with the proposed development during the peak hour periods (weekday morning peak from 08:00 to 09:00 and weekday evening peak between 17:00 and 18:00). It subsequently outlines the number of trips generated by each of the development uses, their modal split, and the distribution of the vehicle trips over the local highway network.
- 5.1.2 The trip generation assessment focuses on the proposed new residential and commercial uses together with the proposed primary school, which account for the majority of the trips. The development includes a number of other minor uses that will be located within the small village centre or adjacent to the fort. This comprises local facilities including village shop, community facilities which could include healthcare and a Historic Interpretation Centre of the Fort. However, these are likely to generate only a small number of trips, most of which would be internal within the site, outside of the peak periods or at weekends.
- 5.1.3 The trip generation estimates have been based on a combination of onsite surveys undertaken as part of the Transport Assessment for the OPP and data from the TRICS database. Mode share estimates have been informed by local surveys, TRICS data and Census data for journey to work.
- 5.1.4 The vehicle trips have then been assigned to the local road network. The trip distribution is based on 2011 journey to work Census data, whilst the traffic assignment has been informed by an earlier catchment study and a journey time and routeing analysis that compares journey times to various destinations from either site access.
- 5.1.5 The detailed trip generation and distribution methodology has been set out in the Transport Assessment Scoping Note (05/09/18) and TN01 – Trip Generation Technical Note (18/01/19) and agreed with KCC through the pre-application discussions. Emails from KCC confirming this agreement have been provided in Appendix A.
- 5.1.6 Since there is some uncertainty regarding the delivery of the on-site primary school, only the worst-case “without” school scenario has been assessed for the highway impacts of the proposed development, as agreed with KCC at the pre-application stage.
- 5.1.7 In order to better understand the net impacts associated with the proposed development, the trip generation potential relating to the CLEUD which was issued in 2004 has been considered for comparison.

### 5.2 Overall Methodology

#### Residential Trip Generation

- 5.2.1 The TRICS database has been used to provide trip rates for the residential component of the proposed development. With regard to the previous trip generation assessment undertaken as part of the OPP, it has been agreed with KCC that the TRICS surveys used are likely to be outdated and should be updated to include surveys undertaken up to five years ago.
- 5.2.2 The detailed TRICS site selections and resulting output reports can be found in TN01 – Trip Generation Technical Note (18/01/19) included in Appendix J.
- 5.2.3 The person trip rates based on the agreed TRICS surveys have been set out in Table 5-1.



Table 5-1: Peak Hour Person Trip Rates minus OGV Trip Rates

Time	Trip Rates (per unit)		
	Arrive	Depart	2-way
08:00 – 09:00	0.191	0.827	1.018
17:00 – 18:00	0.637	0.297	0.934

## Commercial Development

- 5.2.4 The commercial vehicle trip generation has been calculated based on traffic surveys undertaken on site as part of the OPP TA work. Trip rates were calculated from the survey results by comparing against the 1,000 employees that were known to be employed at the time of survey. Since the surveys included the traffic associated with the small residential community (72 homes), the traffic associated with that use has been removed in order to provide a more accurate estimate of trips generated by the commercial development only. This was done by reference to appropriate TRICS data for residential sites.
- 5.2.5 A summary of the vehicle trip rates per job for the commercial development is displayed in Table 5-2 below. These are the same trip rates as the consented OPP commercial trip rates.

Table 5-2: Trip Rates for Commercial Development

Commercial Trip Rates based on OPP 2014 Surveys (1,000 Employed on Site)	AM peak (08:00 to 09:00)		PM peak (17:00 to 18:00)	
	In	Out	In	Out
Vehicle trip rate per job	0.295	0.030	0.019	0.230

## Primary School

- 5.2.6 A high-level review of the trip generation associated with the on-site primary school proposals has been undertaken and set out in TN02 – Primary School Impacts (08/05/19), included in Appendix K.
- 5.2.7 Based on the findings which have been presented in TN02, a ‘without-school’ scenario would be the worst-case scenario in terms of trip generation and highway impacts. As such, it has been agreed with KCC that only the ‘without-school’ scenario, but with the maximum level of job provision for the commercial development, is assessed. The email from KCC confirming this agreement has been provided in Appendix A.

## 5.3 Modal Split

- 5.3.1 For the residential element of the proposed development, the modal splits associated with the consented OPP have been adopted. The OPP TA modal splits are based on a combination of ‘journey to work’ 2011 Census data, TRICS survey modal splits and knowledge of the local transport network characteristics. Particular consideration was given to the fact that the site has poor public transport connectivity and that vehicles are likely to be the dominant mode choice in the absence of a transport strategy or travel plan measures. It should be noted that the general level of public transport provision has remained similar compared to 2015.

5.3.2 The proposed modal split to be applied to the TRICS person trip rates has been presented in Table 5-2 below, and, the detailed methodology and assumptions are available in Appendix H of the OPP TA (2015). These mode share rates reflect the development scenario with no primary school on site and do not account for the proposed travel plan measures including the proposed community bus. As such, the mode shares and trip generation provide a worst-case assessment of the impacts associated with the proposed development.

Table 5-3: Proposed Mode Splits to be Applied to Residential Person Trips

Mode	AM		PM	
	In	Out	In	Out
Public transport (bus, coach and all rail)	1%	12%	3%	3%
Private car and taxis	91%	83%	84%	85%
Drivers (% of total mode split)	59%	51%	66%	64%
Passengers (% of total mode split)	32%	32%	18%	21%
Powered two-wheeler	2%	1%	2%	2%
Bicycle	2%	1%	3%	2%
Pedestrians (including 'others')	4%	3%	8%	8%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

## 5.4 Proposed Development Trip Generation

5.4.1 The peak hour total trip generation has been undertaken by applying the relevant trip rates set out in Section 5.2 to the development proposals which comprise:

- 750 Residential Units
- 1,438 Total Jobs
- No primary school provided on-site as a worst case scenario for external trip generation

5.4.2 The peak hour total trip generation for the residential and commercial proposals of the proposed development have been provided within Table 5-4 overleaf.

Table 5-4: Peak Hour Residential Trip Generation Summary

Land Use/ Trip Type	AM (08:00 – 09:00)		PM (17:00 – 18:00)	
	Arr	Dep	Arr	Dep
<b>Residential Use (750 units)</b>				
Person trip rate per unit	0.191	0.827	0.637	0.297
Person trip Generation	143	620	478	223
Car Driver Share	59%	51%	66%	64%
Total Vehicle Trips	85	315	316	143
<b>Commercial Use (1,438 jobs)</b>				
Vehicle trip rate per job	0.295	0.030	0.019	0.230
Vehicle (driver) trips	424	43	28	331
<b>Total Vehicle Trips</b>				
Total Vehicle Trips	509	359	344	474
Uplift From OPP	29	216	174	40

## 5.5 Trip Generation Potential of Existing Site without Development

5.5.1 As set out within Chapter 2 of this report, there is a Certificate of Lawfulness for an Existing Use and Development (CLEUD) for the site and it is known that historically, the site employed approximately 4,000 people onsite during its peak. Therefore, it is evident that the site is capable of generating a significantly higher demand on the transport network than current levels. To explore this further, the following scenarios have been assessed in this section:

- CLEUD Footprint Area: The trip generation of the entire CLEUD footprint area broken down by Use Class;
- 4,000 Employed Onsite: Trip generation associated with having 4,000 people employed onsite similar to historic levels; and
- CLEUD Footprint Area Excluding Demolished and Unavailable Buildings: Trip Generation of CLEUD footprint area excluding buildings that have since been demolished or made unavailable.

5.5.2 The potential trip generation associated with each scenario has been set out below in turn.

### CLEUD Footprint Area

5.5.3 The CLEUD includes the following approximate footprint areas (gross external area):

- B1: 69,675 sqm (of which 3,532sqm are ancillary B1 uses)
- B8: 8,839 sqm

- A3: 17,481 sqm
- Sui Generis: 272 sqm

5.5.4 A trip generation assessment of only the B1 and B8 Use Classes from the footprint areas above has been undertaken and presented in Table 5-5. The trip rates used are from TRICS sites with similar general characteristics. This assessment is based on the scenario where the existing floorspace were to be vacated by the MOD and QinetiQ and occupied by commercial business who would utilise the buildings under their current lawful use class. This approach is deemed reasonable given the existence of the CLEUD.

Table 5-5: CLEUD Footprint Area Trip Generation

Land Use/ Trip Type	AM (08:00 – 09:00)		PM (17:00 – 18:00)	
	Arr	Dep	Arr	Dep
<b>CLEUD B1 Use Class – 69,675 sqm</b>				
Vehicle Trip Rate/100 sqm	1.641	0.209	0.157	1.274
Vehicle Trip Generation	1,143	146	109	888
<b>CLEUD B8 Use Class – 8,839 sqm</b>				
Vehicle Trip Rate/100 sqm	0.09	0.044	0.024	0.064
Vehicle Trip Generation	8	4	2	6
<b>Total Vehicle Trips</b>				
Total CLEUD Vehicle Trips	1,151	150	112	893
= (CLEUD) – (Proposed HPA)	642	-209	-232	419

5.5.5 Based on the above, it is evident that the site could potentially generate significantly higher two-way vehicle trips during both the AM and PM peak hours compared to the proposed development, in the scenario that the floorspace it taken up by other commercial businesses. It should be noted that although the departing trips during the AM peak hour and arriving trips during the PM peak hour are higher in the proposed development due to the provision of residential development, the overall two-way flows are significantly for the proposed development scenario.

### Historic Trip Generation Based on 4,000 Employed Onsite

5.5.6 As set out in Chapter 2, it is known that the site employed 4,000 people onsite at its peak. To understand the approximate level of trip generation associated with this level of employment, trip rates calculated from onsite surveys as part of the OPP (as set out in Paragraph 5.2.4) have been used. The resulting trip generation has been set out in Table 5-6.

5.5.7 As can be seen from below, the level of trip generation based on 4,000 people employed onsite is similar to the trip generation based on the total B1 and B8 CLUED area and significantly higher than the trip generation associated with the proposed development.

Table 5-6: Historic Trip Generation Based on 4,000 Employed Onsite

Land Use/ Trip Type	AM (08:00 – 09:00)		PM (17:00 – 18:00)	
	Arr	Dep	Arr	Dep
<b>Historic Peak Employment of 4,000</b>				
Vehicle Trip Rate/100 sqm	0.295	0.030	0.019	0.230
Vehicle Trip Generation	1,180	120	76	920
= (Historic 4,000 Emp. Flows) - (Proposed HPA)	671	-239	-268	446

### CLEUD Footprint Area Excluding Demolished and Unavailable Buildings

5.5.8 A third trip generation scenario based on the CLEUD footprint area excluding any buildings that have been demolished or made unavailable since, has been assessed in order to ascertain the potential level of trip generation that could materialise should the site be occupied by third party commercial operators under the existing Use Classes. The remaining CLEUD footprint area includes:

- B1: 55,005 sqm
- B8: 5,681 sqm

5.5.9 The trip generation assessment for this scenario has been presented in Table 5-7.

5.5.10 As with the previous scenarios, the remaining CLEUD area would result in a higher level of two-way trip generation during the AM compared to the proposed development. During the PM peak hour, the proposed development would result in 26 additional vehicle movements (two-way) compared to the remaining CLEUD area.

5.5.11 Overall, it is evident that the proposed development would have a very minor level of net impact when compared to the historic levels of trip generation or the potential level of trip generation based on the remaining CLEUD area.

Table 5-7: CLEUD Footprint Area Trip Generation Excluding Demolished and Unavailable Buildings

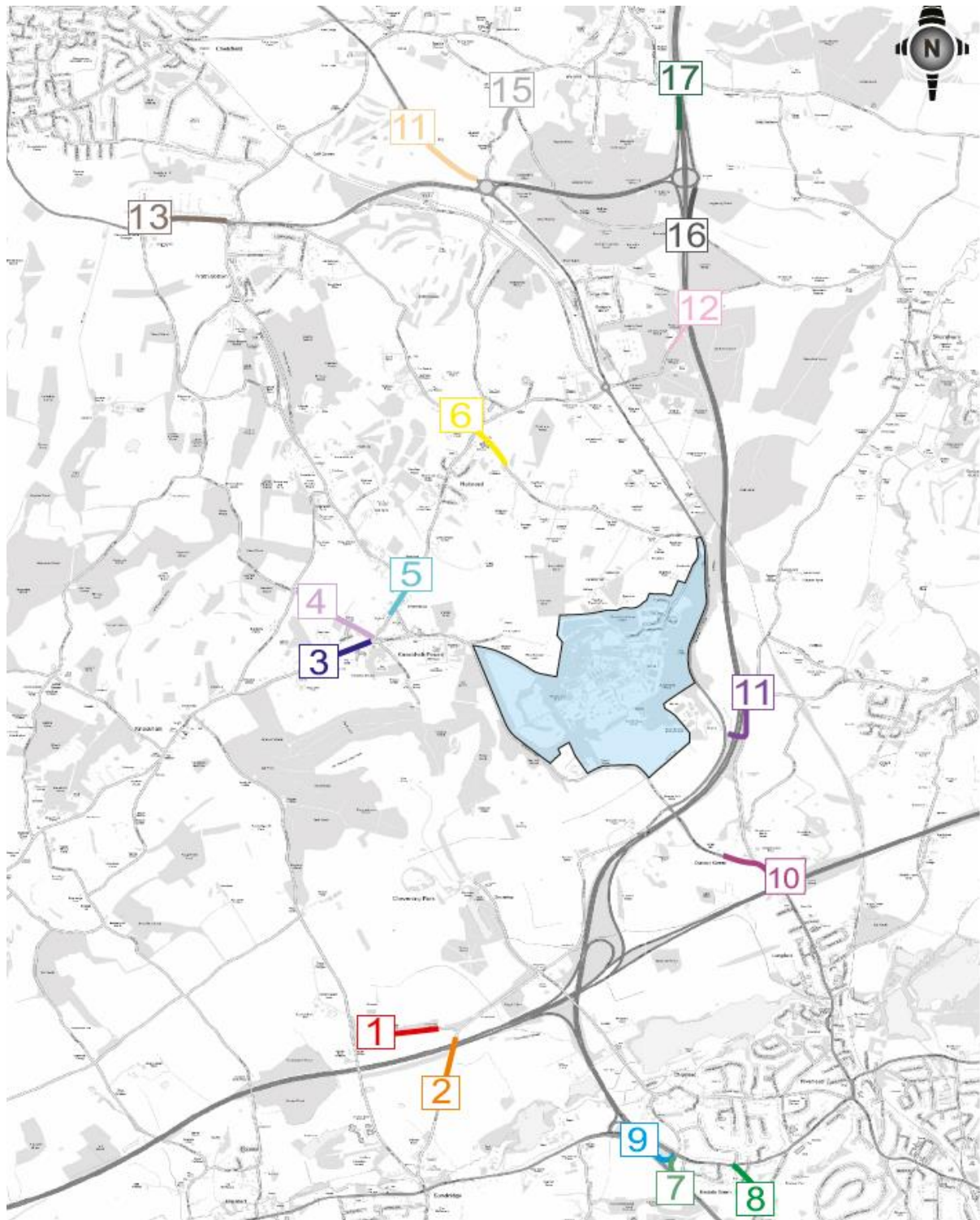
Land Use/ Trip Type	AM (08:00 – 09:00)		PM (17:00 – 18:00)	
	Arr	Dep	Arr	Dep
<b>CLEUD B1 Use Class – 55,005 sqm</b>				
Vehicle Trip Rate/100 sqm	1.641	0.209	0.157	1.274
Vehicle Trip Generation	903	115	86	701
<b>CLEUD B8 Use Class – 5,681 sqm</b>				
Vehicle Trip Rate/100 sqm	0.09	0.044	0.024	0.064

Land Use/ Trip Type	AM (08:00 – 09:00)		PM (17:00 – 18:00)	
	Arr	Dep	Arr	Dep
Vehicle Trip Generation	5	2	1	4
<b>Total Vehicle Trips</b>				
Total CLEUD Vehicle Trips	908	117	88	704
= (CLEUD) – (Proposed HPA)	399	-242	-256	230

## 5.6 Trip Distribution and Assignment

- 5.6.1 A detailed trip distribution and assignment analysis has been undertaken with full details and outcomes provided in TN01 – Trip Generation Technical Note (18/01/19) included within Appendix J. The methodology and key outcomes are summarised below:
- The distribution of the vehicle trips generated by the development during the peak hours has been based on journey to work origin-destination data from the 2011 National Census.
  - Only the car/van driver mode of travel to work has been used to account for the impact on the highway network. Most of the other modes have negligible numbers of trips according to the census with the notable exception of train, which is dominant for commuter trips to/from London. However, such trips will mainly occur outside the morning and evening peak hours.
  - For the residential element, the proportions that apply are those referring to residents in the geographic area of Sevenoaks 008 who work elsewhere. The site boundary in relation to Sevenoaks 008 is presented in Figure A1 of TN01 – Trip Generation Technical Note (18/01/19) included within Appendix J.
- 5.6.2 Seventeen feed points to the highway network were defined to represent the origin/destination of all journeys to/from the site within the surrounding highway network under consideration. The number of trips feeding from each point from/ to each MSOA has been based on journey to work origin-destination data from the 2011 National Census. The location of the feed points has been shown in Figure 5-1.

Figure 5-1: Location of Feed Points used for Traffic Assignment



- 5.6.3 The assignment of vehicle trips to the local highway network, and hence each feed point, has been based on GIS journey time data for the for the AM and PM peak hours to and from the site access points.
- 5.6.4 GIS data is not available for the highway network within the site and so journey times for the internal element of trips has been estimated based on the proposed speed limit for the different links/ proposed traffic calming measures. Given the size of the site, the masterplan area has been disaggregated into 22 zones and journey times have been estimated from each zone's internal access point to each of the two site access points based on the current masterplan.
- 5.6.5 The final assignment of trips to/from each internal zone from/to each feed point is subsequently determined by considering both the journey time from each internal zone to the site access points and the journey time from the site access points to the 17 feed points.
- 5.6.6 It should be noted that this method is likely to under-estimate the number trips using the main Polhill access as it does not consider deterrence factors associated with routing via narrow country lanes other than speed. As such, this method provides a worst-case assessment of traffic on Star Hill.
- 5.6.7 The expected number vehicle trips to/from each feed point and the site access used has been shown in Table 5-8 for the AM peak hour and Table 5-9 for the PM peak hour
- 5.6.8 The distributed vehicle trip generation has been shown within Appendix D for the AM and PM peak hours respectively.

Table 5-8: Total Vehicle Trip Generation to/from Each Feed Point (AM Peak Hour)

Feeder Point	IN		OUT	
	North Access	South Access	North Access	South Access
1	3	5	1	5
2	7	15	4	17
3	0	13	0	9
4	0	4	0	4
5	0	9	0	7
6	4	0	3	0
7	27	52	11	44
8	2	3	1	4
9	10	20	6	23
10	24	14	23	9
11	27	17	21	9
12	13	1	4	0
13	33	3	18	2
14	54	0	34	0
15	5	0	3	0
16	0	0	0	0
17	141	0	96	0
<b>Total</b>	<b>350</b>	<b>159</b>	<b>226</b>	<b>133</b>



Table 5-9: Total Vehicle Trip Generation to/from Each Feed Point (PM Peak Hour)

Feeder Point	IN		OUT	
	North Access	South Access	North Access	South Access
1	1	5	2	5
2	4	17	7	16
3	0	8	0	12
4	0	4	0	4
5	0	7	0	9
6	3	0	4	0
7	10	42	23	51
8	1	4	1	4
9	5	22	9	21
10	22	9	24	13
11	20	8	26	15
12	4	0	11	1
13	16	3	30	3
14	32	0	49	0
15	3	0	5	0
16	0	0	0	0
17	92	0	130	0
<b>Total</b>	<b>215</b>	<b>129</b>	<b>321</b>	<b>153</b>

## 5.7 Star Hill Access Flows

- 5.7.1 Based on the trip generation assessment presented, two-way traffic flows at the Star Hill Access is forecasted to be 292 vehicles during the AM peak hour and 282 in the PM peak hour. This represents a modest increase compared to the 2015 OPP TA flows at the Star Hill Access which were forecasted to be 145 vehicles during the AM peak hour and 175 during the PM peak hour. The level of flow at the Star Hill access equates to less than 5 vehicles per minute in the morning peak.
- 5.7.2 It should be noted that the level of traffic using the Star Hill access outside of the peak hours would be significantly less than the figures provided in Table 5-8 and Table 5-9. This is because the major sources of vehicle trip generation would be peak hour commuter trips associated with residents of the development and those employed within the site.
- 5.7.3 From Table 5-7 it is evident that the proposed development would result in a lower level of two-way trip generation in the AM peak hour when compared to the potential trip generation from the remaining CLEUD footprint area, under the scenario where the existing site floorspace is occupied by general commercial operators. During the PM peak hour, the proposed development only results in 26 additional vehicles compared to the remaining CLEUD footprint area as a whole. Therefore, in assessing the net level of traffic increase at the Star Hill access and surrounding links, it should be noted that the potential level of trip generation from the existing site without any development could match and exceed the levels predicted with a comprehensive development of the site. There should not therefore be any significant intensification in traffic use of the junction compared to the CLEUD base case.

- 5.7.4 As set out in Chapter 6, the forecasted flows at the Star Hill junction will not have any impacts on the link capacity of Star Hill road or the junction capacity of the access junction.
- 5.7.5 Lastly, the trip distribution and highway impact assessments are based on the assumption that no restrictions are placed on the routing of vehicles associated with the commercial elements of the development. In practice, occupiers of the development could place restrictions on the routing of vehicles, in particular heavy goods vehicles, should that be necessary.

## 5.8 Summary

- 5.8.1 A trip generation analysis has been undertaken for the proposed development which will accommodate up to 1,438 jobs as well as 750 homes and modest local support facilities.
- 5.8.2 The trip generation methodology has been agreed with KCC. The residential trip generation has been based on selected data from the TRICS database and the commercial use trip generation has been based on onsite surveys undertaken as part of the TA for the consented OPP.
- 5.8.3 The trip generation assessment provide a worst-case scenario as they reflect a development scenario with no primary school on site and do not account for the proposed travel plan measures including the proposed community bus.
- 5.8.4 Trips have been distributed onto the highway network based on journey to work origin-destination data from the 2011 National Census. The assignment of traffic and hence the choice of site access for each separate trip generated from/ to the site has been based on expected journey times.
- 5.8.5 An assessment of commercial trips that could be generated under the site's existing Certificate of Lawfulness for an Existing Use and Development (CLEUD), assuming the remaining buildings standing on the site, confirms that the development proposals should not lead to a significant increase in vehicle trips onto the highway network or the sites two points of access.

## 6 Highway Impact Assessment

### 6.1 Introduction

- 6.1.1 This section outlines the impact of the forecasted net increase in vehicular trip generation of the site on its surrounding local highway network, during the peak hour periods.
- 6.1.2 This assessment is provided as a worst case that does not account for the traffic offsets available from the existing commercial land uses on the site as confirmed in the Certificate of Lawfulness for an Existing Use and Development (CLEUD). The assessment is therefore considered to be very robust.

### 6.2 Assessment Methodology

- 6.2.1 The overall assessment methodology has been agreed with KCC as part of the pre-application discussions and the TA Scoping Report which have been included within Appendix A.
- 6.2.2 KCC have requested for the highway impact assessment to be undertaken for the 2035 future forecast year in line with the emerging Sevenoaks Local Plan. It is expected that the whole development will be complete and fully occupied by this date.
- 6.2.3 Overall, the agreed assessment scenarios comprise the following:
- 2018 Baseline, which represents the existing conditions. This has been undertaken to ensure that the models adequately reflect observed baseline conditions;
  - 2035 'Future Base', which accounts for background traffic growth and committed developments which include the West Kent Cold Store development and the consented Fort Halstead development; and
  - 2035 'With Development', which takes into account the traffic generated by the proposed development in its completion year.
- 6.2.4 The Future Base scenario has been constructed based on uplifting the 2018 traffic counts (net of the existing development traffic) using DfT's TEMPro software and including the committed developments that are relevant for the present application. The committed developments include the West Kent Cold Store and the consented OPP.
- 6.2.5 The net development flows have been added to the Future Base scenario to obtain the 'With Development' scenario.
- 6.2.6 Net impacts on key links which provide access to the local highway network have been identified based on percentage impacts with respect to the 2035 Future Base scenario.
- 6.2.7 Additionally, it has been agreed that the highway impacts at key junctions would be assessed based on local junction modelling using Junction 9 software. The operation of the following junctions has been assessed as agreed with KCC:
- Hewitts roundabout
  - Shacklands roundabout
  - Oford Lane/A224 junction
  - A224 Polhill junction/ Pilgrims Way West Link road

- Morants Court Road roundabout
- Star Hill Road access junction

6.2.8 In addition, the likely impacts of the proposed development on the M25, Junction 4 have been reviewed.

### 6.3 Net Impact on Links

6.3.1 A percentage impact assessment has been undertaken which provides a comparison between the 2035 With Development flows and the 2035 Future Base flows.

6.3.2 The two-way percentage impacts at key links within proximity of the site has been provided in Table 6-1. The corresponding network diagrams for each of the peak hours are presented in Appendix D.

Table 6-1: Percentage Impact Assessment on the Local Highway Network

Link	AM Peak			PM Peak		
	2035 Base	2035 With Dev.	% Impact	2035 Base	2035 With Dev.	% Impact
Crow Drive	787	639	-18.8%	731	594	-18.8%
Star Hill (North of Access)	340	353	3.6%	334	343	2.6%
Star Hill Road (South of Access)	397	596	50.2%	375	566	50.8%
Oxford Lane	85	90	6.6%	74	84	12.7%
A224 London Road	1688	1665	-1.4%	1760	1734	-1.5%
A224 Polhill	1438	1317	-8.4%	1470	1362	-7.4%
A224 Orpington By-Pass	1413	1381	-2.2%	1359	1326	-2.4%
Rushmore Hill	309	314	1.7%	323	328	1.7%
Old London Road	597	602	0.9%	460	465	1.0%
Main Road / Halstead Lane	402	407	1.2%	267	270	1.1%
Shoreham Lane / Knockholt Road	171	171	0.0%	111	111	0.0%
A21 Sevenoaks Road	2055	2060	0.3%	2379	2383	0.2%
Oxford High Street	1000	1012	1.3%	1073	1091	1.6%
A 224 London Road (Bullfinch Lane)	1934	1945	0.6%	1988	2003	0.7%
A 224 London Road (Station Road)	1479	1490	0.7%	1452	1467	1.0%
M25 Northbound Onslip	1050	1087	3.6%	1450	1464	1.0%
M25 Southbound Onslip	641	605	-5.6%	743	679	-8.6%
M25 Northbound Offslip	761	695	-8.7%	802	765	-4.6%
M25 Southbound Offslip	1677	1691	0.8%	1211	1245	2.8%

- 6.3.3 As can be seen from Table 6-1, the majority of links assessed have negative or very minor percentage impacts across both time periods except for links within the immediate vicinity of the site.
- 6.3.4 Negative percentage impacts denote links where the 2035 With Development flows are lower compared to the 2035 Future Base flows. This is because the 2035 Future Base scenario contains flows from the 2015 OPP consent for the site based on a single access from Polhill whereas the current proposed development includes Star Hill as a secondary access. As such, a single access point results in higher flows across various links and junctions as the flows are not distributed depending on origin and destination and all development flows would have to route via the north of the site. Having a secondary access point from Star Hill results in lower flows across the links shown despite the 2015 consent for the site having a lower quantum of residential development.
- 6.3.5 The highest percentage impacts are on Star Hill Road (south of the site access) which is because the baseline traffic on this link is relatively low and the proposed development utilises the Star Hill access as a secondary access point. The two-way peak hour flows on this link in the 2035 With Development scenario are still under 600 vehicles and within the link capacity of a single carriageway road.
- 6.3.6 Crow Drive which acts as the primary access road to the site is the link with the highest level of development traffic despite the negative percentage impacts recorded. However, for the 'With Development' scenario, peak hour two-way flows on Crow Drive are in the region of 500 - 600 vehicles, which is well within the link capacity of a single carriageway road and which will permit most pedestrians to cross the road quite easily even without the aid of formal pedestrian facilities.
- 6.3.7 Overall, it is evident that almost all of the links assessed have negligible or minor percentage impacts associated with the proposed development and that all links assessed will operate within capacity. Notwithstanding this, local junction modelling has been undertaken at key junctions within close proximity to the site.

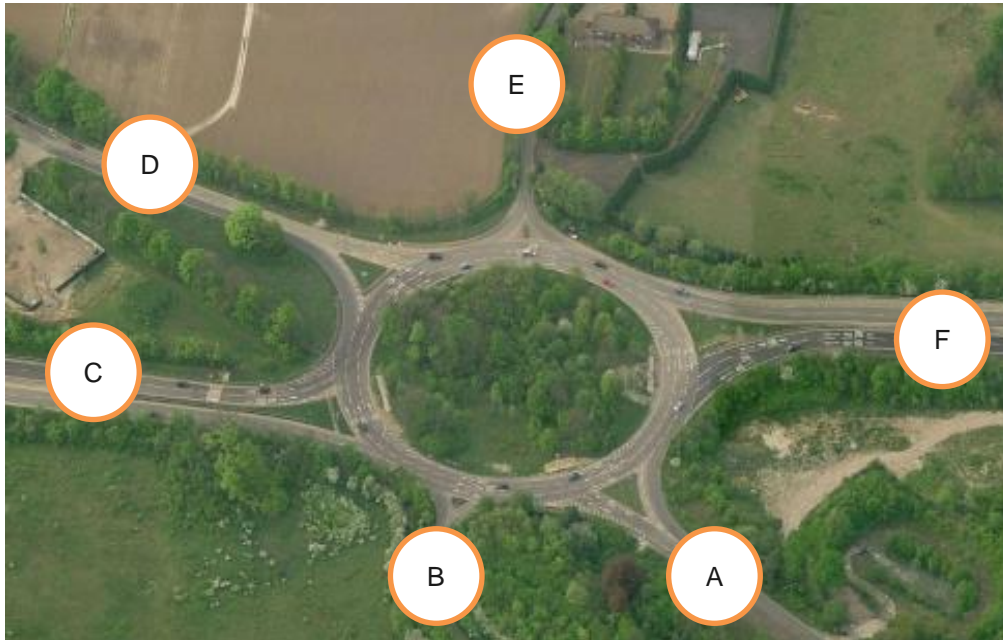
## 6.4 Junction Assessments

- 6.4.1 Local junction models have been set up for the major intersections within close proximity to the site which include the junctions set out in Paragraph 6.2.7 . The scenarios which have been assessed are set out in Paragraph 6.2.3.

DfT approved software has been used to assess the capacity of the various junctions as follows: ARCADY has been used to model the roundabouts, whereas PICADY has been used to model the priority intersections. Full modelling reports for all assessments, including origin and destination matrices with the traffic flows for each scenario, are provided within Appendix L.

## Hewitts Roundabout

Figure 6-1: Hewitts Roundabout



6.4.2 Hewitts Roundabout has six arms and three circulating lanes and is located along the A21 Sevenoaks Road. It provides a link to the M25 in the east, and to Farnborough and then Bromley via the A21 to the west. To the north, the A224 provides access to Orpington town centre.

6.4.3 The various arms have the following characteristics:

- Arm A A224 Orpington By-Pass (south) is a wide single carriageway road but with an extended two lane entry flare. Previously there was further flaring to provide a three lane entry but this has been removed as part of a low cost accident remedial scheme;
- Arm B W heatsheaf Hill is a single carriageway, local access road with very local flaring to provide two lane entry;
- Arm C A21 Sevenoaks Road is a wide single carriageway road but with an extended two lane entry flare. Previously there was further flaring to provide a three lane entry but this has been removed as part of a low cost accident remedial scheme;
- Arm D A224 Orpington by pass (north) is a wide single carriageway road but with an extended two lane entry flare. Previously there was further flaring to provide a three lane entry but this has been removed as part of a low cost accident remedial scheme;
- Arm E Hewitts Road is a single carriageway, local access road with very local flaring to provide two lane entry; and
- Arm F M25 Link Road is a high capacity two-lane dual carriageway which flares to provide a three-lane entry to the roundabout including a dedicated access lane to the A224 south.

6.4.4 Table 6-2 sets out the ARCADY results for the Hewitts Roundabout junction.

Table 6-2: Hewitts Roundabout ARCADY Results

Arm	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
	RFC	Queue (PCU)	Delay (s)	LOS	RFC	Queue (PCU)	Delay (s)	LOS
<b>2018 Baseline</b>								
A – Orpington By-Pass	0.4	0.7	6.18	A	0.37	0.6	4.27	A
B – Wheatsheaf Hill	0.58	1.4	46.03	E	0.21	0.3	11.85	B
C – A21 Sevenoaks Road	0.37	0.6	2.42	A	0.49	1	2.78	A
D – A224 Court Road	0.53	1.2	4.69	A	0.72	2.5	8.54	A
E – Hewitts Road	0.11	0.1	8.32	A	0.25	0.3	18.02	C
F – M25	0.74	3	4.28	A	0.53	1.2	2.29	A
<b>2035 Future Base</b>								
A – Orpington By-Pass	0.75	3	17.89	C	0.72	2.6	11.52	B
B – Wheatsheaf Hill	1E+10	64.2	1667.58	F	0.32	0.5	18.76	C
C – A21 Sevenoaks Road	0.44	0.8	2.89	A	0.58	1.4	3.44	A
D – A224 Court Road	0.66	2	6.92	A	1.08	57.9	145.43	F
E – Hewitts Road	0.19	0.2	12.72	B	1.64	14.6	585.37	F
F – M25	0.93	11.8	14.31	B	0.65	1.9	3.08	A
<b>2035 With Development</b>								
A – Orpington By-Pass	0.77	3.4	19.75	C	0.68	2.2	10.12	B
B – Wheatsheaf Hill	1E+10	64.2	1675.74	F	0.3	0.4	17.27	C
C – A21 Sevenoaks Road	0.44	0.8	2.91	A	0.57	1.3	3.35	A
D – A224 Court Road	0.66	2.1	7.01	A	1.06	51.2	128.73	F
E – Hewitts Road	0.19	0.2	12.89	B	1.34	10.6	430.55	F
F – M25	0.91	9.9	12.09	B	0.65	1.9	3.13	A

6.4.5 The results show that in the 2018 Baseline Scenario, during both AM and PM peak hours, the junction operates well within the desirable capacity threshold which is generally defined as a ratio of flow to capacity (RFC) of 0.85. Except for queuing on Sevenoaks Road during the PM peak hours, the results are in line with the observed queuing data which does not show long term queuing during the AM or PM peak hours. Modest queuing was observed on the A21 Sevenoaks Road during the peak hour which was generally static and likely attributed to platoons of cars arriving at the stop line. During the PM peak hour, both A224 Court Road and Hewitts Road operate over maximum capacity with queues of 58 PCUs and 15 PCUs respectively.

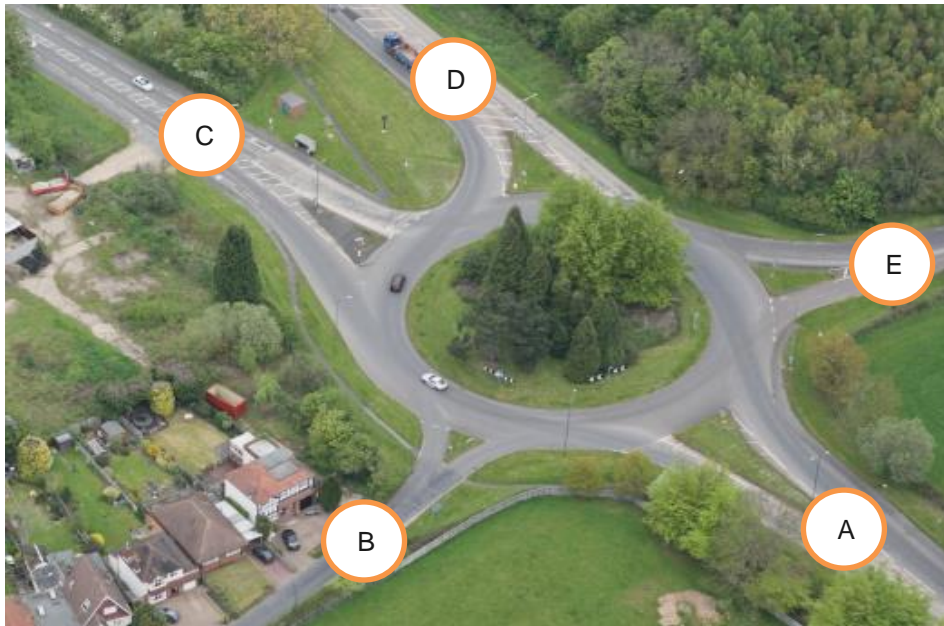
6.4.6 In the 2035 Future Base scenario, the junction operates over maximum capacity during both the AM and PM peak hours. During the AM peak hour, Wheatsheaf Hill operates above capacity with significant delays and queues of 64 PCUs and the M25 operates above the maximum desirable capacity at an RFC of 0.93.

6.4.7 In the 2035 With Development scenario, the junction also operates over maximum capacity across both the AM and PM peak hours with the same arms operating over capacity as those in the 2035 Future Base scenario. However, the maximum RFCs recorded are lower in the 2035 With Development scenario compared to the 2035 Future Base Scenario since the flows

are slightly lower in the former scenario. This is because the 2015 OPP consent for the site (which is included in the 2035 Scenario) is for a single site access from Polhill whereas the proposed development also utilises the Star Hill access as a secondary access point which subsequently results in reduced flows to the north of the site and at Hewitts Roundabout.

### Shacklands Roundabout

Figure 6-2: Shacklands Roundabout



6.4.8 The Shacklands roundabout is a five-arm roundabout providing main links to the A21 (via arm D Orpington By-Pass and arm C Old London Road) and the A224 (arm A). All approaching arms have single lanes which flare on the approach to the give way line, and all contain a central kerbed island which separates entry/exiting vehicles. Arms A A224 London Road and C Old London Road both have central hatched markings which extend quite a long way back from the stop lines.

6.4.9 Table 6-3, summarises the ARCADY model results for the existing traffic conditions, which show that the junction operates well within capacity and with the maximum level of service (LOS) of A on all arms during both peak periods.

6.4.10 Similarly, in the future scenarios, the results show that there are no capacity issues at the Shacklands roundabout with the junction operating at the maximum level of service on all arms during both periods.

Table 6-3: Shacklands Roundabout ARCADY Results

Arm	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
	RFC	Queue (PCU)	Delay (s)	LOS	RFC	Queue (PCU)	Delay (s)	LOS
2018 Baseline								
A – A224 Polhill	0.36	0.6	3.82	A	0.52	1.1	4.85	A
B – Shoreham Lane	0.11	0.1	5.95	A	0.1	0.1	6.48	A
C – Old London Road	0.21	0.3	3.61	A	0.21	0.3	3.61	A



	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
D – Orpington By-Pass	0.37	0.6	3.55	A	0.26	0.4	2.93	A
E – Shacklands Road	0.05	0.1	3.17	A	0.03	0	2.7	A
<b>2035 Future Base</b>								
A – A224 Polhill	0.5	1.1	4.98	A	0.56	1.3	5.32	A
B – Shoreham Lane	0.14	0.2	7.07	A	0.09	0.1	6.87	A
C – Old London Road	0.35	0.6	4.68	A	0.23	0.3	3.88	A
D – Orpington By-Pass	0.71	2.5	8.11	A	0.4	0.7	3.61	A
E – Shacklands Road	0.11	0.1	4.68	A	0.06	0.1	3.12	A
<b>2035 With Development</b>								
A – A224 Polhill	0.52	1.1	5.14	A	0.53	1.1	4.98	A
B – Shoreham Lane	0.14	0.2	7.2	A	0.09	0.1	6.66	A
C – Old London Road	0.35	0.6	4.72	A	0.23	0.3	3.81	A
D – Orpington By-Pass	0.68	2.2	7.31	A	0.41	0.7	3.66	A
E – Shacklands Road	0.11	0.1	4.53	A	0.06	0.1	3.15	A

6.4.11 As shown in Table 6-3, Shacklands Roundabout operates within maximum desirable capacity across all scenarios and time periods tested. There are slight reductions in RFC values on several arms from the 2035 Future Base scenario to the 2035 With Development scenario for the same reason as that set out in Paragraph 6.3.4.

### Otford Lane/A224 Junction

Figure 6-3: Otford Lane priority junction



6.4.12 This is a priority intersection where the major arm is the A224 (Polhill – arm A to the south and London Road – arm C to the north). It is a single carriageway road with a single lane approach and a hatched central reserve stretching over 200 metres to the south along arm A. On arm C, it has also a single lane plus a right turning lane stretching back 150 metres, beyond which a hatched central reserve stretches another 110 metres.

6.4.13 The minor arm B Otford Lane is also a single carriageway with one lane per direction which is flared and contains an extended give way line of around 140 metres.

6.4.14 Table 6-4 below shows the PICADY results for the existing junction.

Table 6-4: Otford Lane/A224 Junction PICADY Results

Movement	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
	RFC	Queue (PCU)	Delay (s)	LOS	RFC	Queue (PCU)	Delay (s)	LOS
<b>2018 Baseline</b>								
Otford Lane – London Road	0.09	0.1	7.14	A	0.11	0.1	7.53	A
Otford Lane – Polhill	0.12	0.1	12.32	B	0.25	0.3	12.39	B
London Road – Otford Lane	0.14	0.2	7.7	A	0.06	0.1	6.44	A
<b>2035 Future Base</b>								
Otford Lane – London Road	0.5	1	17.69	C	1.01	13.1	128.52	F
Otford Lane – Polhill	0.72	2.3	62.61	F	0.98	8.6	161.25	F
London Road – Otford Lane	0.7	2.2	21.66	C	0.42	0.7	11.52	B
<b>2035 With Development</b>								
Otford Lane – London Road	0.43	0.7	11.97	B	0.6	1.5	16.84	C
Otford Lane – Polhill	0.46	0.8	30.9	D	0.42	0.7	26.89	D
London Road – Otford Lane	0.58	1.4	15.15	C	0.45	0.8	12.04	B

6.4.15 The results show that the junction operates well within maximum desirable capacity in the 2018 Baseline scenario, across both AM and PM peak hours, with minimal queuing across all arms. This is in line with the observed queuing data which does not show any queuing issues on any of the arms.

6.4.16 In the 2035 Future Base scenario, the junction operates within maximum desirable capacity during the AM peak hour. During the PM peak hour, the junction operates over maximum capacity with the Otford Lane to London Road movement having an RFC of 1.01 and the Otford Lane to Polhill movement having an RFC of 0.98. This is attributed to the flows associated with 2015 OPP consent which are based on a single access from Polhill.

6.4.17 In the 2035 With Development scenario, the junction operates well within the maximum desirable capacity with minimal queuing and minor delays across all arms during both the AM and PM peak hours. The junction performs significantly better compared to the 2035 Future Base scenario since the proposed application utilises the Star Hill access as a secondary access which results in reduced flows at this junction.

### Proposed Otford Lane/A224 Junction/Crow Drive

6.4.18 As part of the consented OPP, various improvement options were considered for the Otford Lane/ A224 junction which included minor layout changes, signalisation of the junction and a roundabout design. The four-arm roundabout option connecting A224 London Road/ A224 Polhill/ Crow Drive/ Otford Lane was subsequently agreed with KCC. The approved roundabout design which also includes provisions for pedestrians and cyclists has been included in Appendix H.

6.4.19 The 2035 Future Base scenario results show that the junction operates within maximum capacity across both AM and PM peak hours with minimal queuing and delays across all arms except from the A224 London Road arm. During the AM peak hour, the A224 London Road arm operates with an RFC of 0.89 with modest queues of 8 PCUs and delays of 26s.

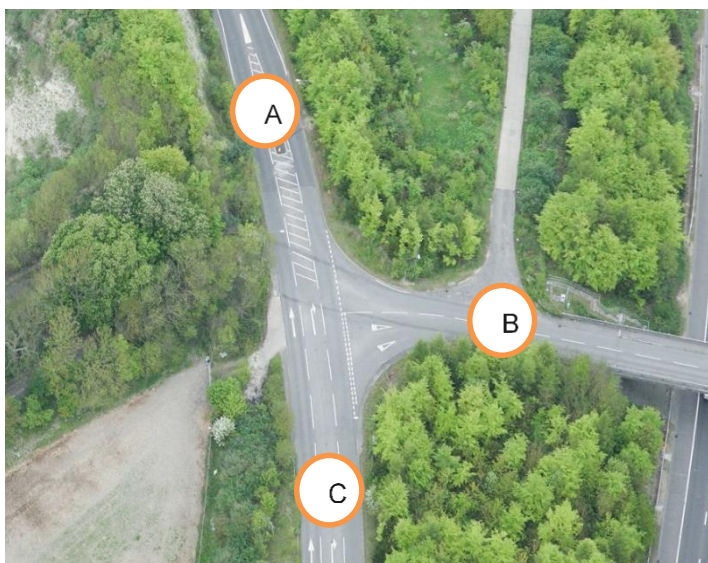
6.4.20 In the 2035 With Development scenario, all arms operate within the maximum desirable capacity except for the A224 London Road arm which operates at an RFC of 0.83 during the AM peak hour. Overall, the junction operates comfortably within capacity across both the AM and PM peak hours and the inclusion of the Star Hill access as a secondary access results in an improvement to the operation of the junction.

Table 6-5: Proposed Otford Lane/A224 Junction/Crow Drive Roundabout ARACDY Results

Movement	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
	RFC	Queue (PCU)	Delay (s)	LOS	RFC	Queue (PCU)	Delay (s)	LOS
<b>2035 Future Base</b>								
A - A224 Polhill	0.61	1.7	7.48	A	0.57	1.5	6.45	A
B - Crow Drive	0.41	0.8	8.55	A	0.73	2.9	19.49	C
C - Otford Ln	0.07	0.1	7.69	A	0.07	0.1	10.7	B
D - A224 London Rd	0.89	7.9	26.05	D	0.69	2.4	9.95	A
<b>2035 With Development</b>								
A - A224 Polhill	0.52	1.2	6.05	A	0.57	1.4	6.39	A
B - Crow Drive	0.39	0.7	8.24	A	0.53	1.2	11.3	B
C - Otford Ln	0.07	0.1	7.53	A	0.06	0.1	8.87	A
D - A224 London Rd	0.83	5.3	17.7	C	0.67	2.2	8.97	A

## A224 Polhill Junction/Pilgrams Way West Link Road Junction

Figure 6-4: Pilgrims Way West/A224 Polhill priority junction



- 6.4.21 In this priority junction, all arms are single carriageway. Arm A A224 Polhill has a hatched central reserve and one lane per direction. Arm C has one lane per direction as well but includes a separate right turning lane of 95 metres.
- 6.4.22 The minor arm B Pilgrims Way has a flared approach where two vehicles can fit comfortably at the give way line, and a single lane on the other direction.
- 6.4.23 Table 6-6 below summarises the PICADY model results for the A224 Polhill junction/ Pilgrims Way West Link Road junction.

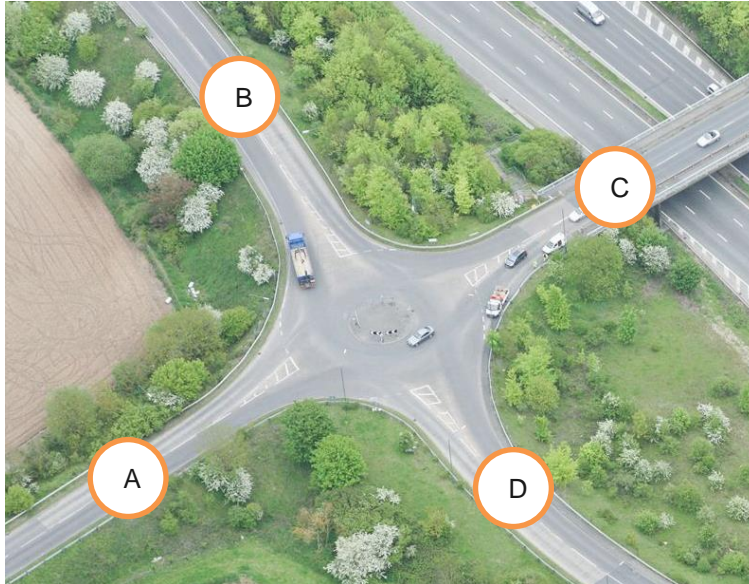
Table 6-6: A224 Polhill Junction/Pilgrims Way West Link Road Junction PICADY Results

Movement	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
	RFC	Queue (PCU)	Delay (s)	LOS	RFC	Queue (PCU)	Delay (s)	LOS
<b>2018 Baseline</b>								
Pilgrims Way –Polhill (south)	0.46	0.9	17.31	C	0.27	0.4	11.7	B
Pilgrims Way – Polhill (north)	0.66	1.9	32.64	D	0.61	1.5	25.11	D
Polhill (south) – Pilgrims Way	0.19	0.2	8.31	A	0.25	0.3	8.41	A
<b>2035 Future Base</b>								
Pilgrims Way –Polhill (south)	1.08	13.4	237.12	F	0.96	5.2	142.87	F
Pilgrims Way – Polhill (north)	1.07	17	220.47	F	0.94	8.1	112.73	F
Polhill (south) – Pilgrims Way	0.24	0.3	9.72	A	0.32	0.5	10.2	B
<b>2035 With Development</b>								
Otford Lane – London Road	1.00	10	164.18	F	0.85	3.5	95.26	F
Otford Lane – Polhill	1.00	11.1	156.89	F	0.91	6.7	92.5	F
London Road – Otford Lane	0.25	0.3	9.7	A	0.34	0.5	9.99	A

- 6.4.24 The results show that in the 2018 Baseline scenario, the junction operates within maximum desirable capacity across both the AM and PM peak hours with minimal queuing and delays except for minor delays on the Pilgrims Way to Polhill (north) movement. This is in line with the observed queuing data which shows short-term queuing on the Pilgrims Way West link road across both the AM and PM peak hours.
- 6.4.25 In the 2035 Future Base scenario, the junction operates over maximum capacity during the AM peak hour with the Pilgrims Way West link road arm having a maximum RFC of 1.08 and maximum queues of 17PCUs. During the PM peak hour, the junction operates within maximum capacity but over the desirable capacity of 0.85 RFC. Similar to the AM peak hour, the worst performing arm is the Pilgrims Way West link road arm with a maximum RFC of 0.96 and maximum queues of 8.1 PCUs.
- 6.4.26 In the 2035 With Development scenario, the junction operates at 100% capacity with the Pilgrims Way West link road arm operating at a maximum RFC of 1.00 and maximum queues of 11 PCUs. During the PM peak hour, the junction operates at a maximum RFC of 0.91 on the Pilgrims Way West link road arm with maximum queues of 7PCUs. As can be seen, there is an improvement in the performance of the junction compared to the 2035 Future Base scenario due to the use of the Star Hill secondary access which results in lower flows at this junction.

## Morants Court Road Roundabout

Figure 6-5: Morants Court Road Roundabout



6.4.27 This roundabout has four single carriageway arms. There is a single lane approach from all arms, each of which contains a 15-metre hatched central island separating the on/off traffic.

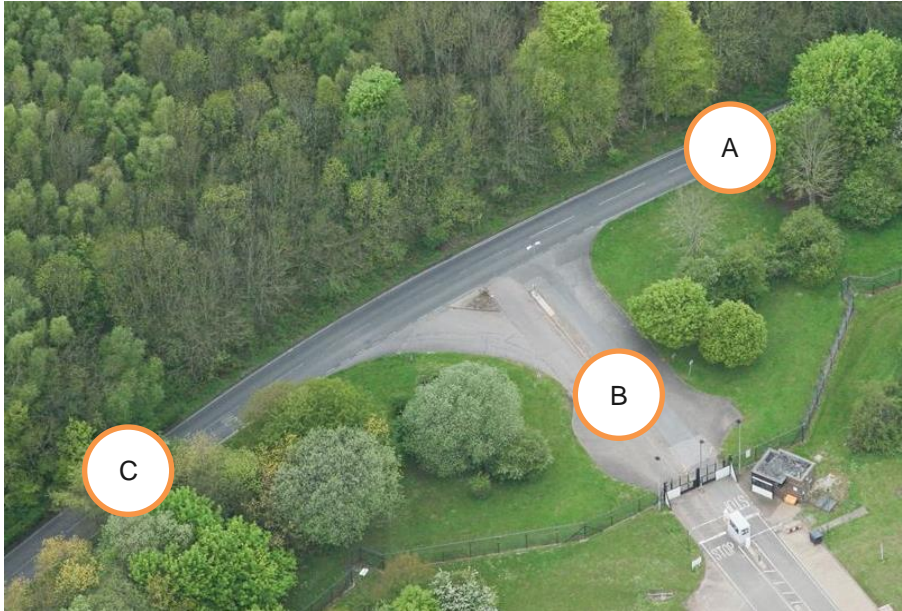
6.4.28 The ARCADY model results for the junction are presented in Table 6-7 and show that the roundabout operates well within capacity and within the desirable RFC of 0.85 across all scenarios and time periods tested.

Table 6-7: Morants Court Road Roundabout ARCADY Results

Movement	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
	RFC	Queue (PCU)	Delay (s)	LOS	RFC	Queue (PCU)	Delay (s)	LOS
<b>2018 Baseline</b>								
A - Star Hill Rd	0.52	1.1	6	A	0.37	0.6	4.57	A
B - A224 Polhill	0.42	0.8	6	A	0.3	0.4	4.4	A
C - A224 Morants Court Rd	0.27	0.4	4.27	A	0.26	0.3	3.98	A
D - Sundridge Rd	0.14	0.2	3.95	A	0.19	0.2	4.17	A
<b>2035 Future Base</b>								
A - Star Hill Rd	0.21	0.3	4.78	A	0.25	0.3	5	A
B - A224 Polhill	0.69	2.3	9.82	A	0.55	1.2	6.72	A
C - A224 Morants Court Rd	0.53	1.2	7.22	A	0.38	0.6	4.87	A
D - Sundridge Rd	0.37	0.6	5.4	A	0.36	0.6	5.11	A
<b>2035 With Development</b>								
A - Star Hill Rd	0.29	0.4	5.21	A	0.38	0.6	5.96	A
B - A224 Polhill	0.71	2.5	10.97	B	0.51	1	6.55	A
C - A224 Morants Court Rd	0.55	1.3	7.94	A	0.4	0.7	5.15	A
D - Sundridge Rd	0.43	0.8	6.06	A	0.43	0.7	5.72	A

## Star Hill Road Access Junction

Figure 6-6: Star Hill Road access junction



- 6.4.29 Star Hill Road is a single carriageway local distributor with one lane per direction and with no turning bays or central reserves.
- 6.4.30 The minor arm B (site access) is flared and provides sufficient room to accommodate at least two vehicles within the left turn flare lane. Exit visibility to the left and to the right is quite restricted and this is reflected in the model.
- 6.4.31 The PICADY model results in Table 6-8 show the junction to be operating well within maximum desirable capacity across all scenarios and time periods tested. No results have been shown for the 2035 Future Base scenario since the 2015 OPP consent was based on a single access point from Polhill with no use of the Star Hill access for general traffic.

Table 6-8: Star Hill Road access junction PICADY Results

Movement	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
	RFC	Queue (PCU)	Delay (s)	LOS	RFC	Queue (PCU)	Delay (s)	LOS
<b>2018 Baseline</b>								
Site – Star Hill Road (south)	0.19	0.2	6.13	A	0.15	0.2	5.82	A
Site– Star Hill Road (north)	0.05	0	7.81	A	0	0	0	A
Star Hill Road (south) – Site	0.2	0.3	7.44	A	0.2	0.3	7.59	A
<b>2035 Future Base – No Star Hill Access Restriction</b>								
Site – Star Hill Road (south)	-	-	-	-	-	-	-	-
Site– Star Hill Road (north)	-	-	-	-	-	-	-	-
Star Hill Road (south) – Site	-	-	-	-	-	-	-	-
<b>2035 With Development</b>								
Site – Star Hill Road (south)	0.17	0.2	6.48	A	0.2	0.3	6.77	A

	AM peak (08:00-09:00)				PM peak (17:00-18:00)			
Site– Star Hill Road (north)	0.06	0.1	9.24	A	0.07	0.1	9.16	A
Star Hill Road (south) – Site	0.27	0.5	7.32	A	0.22	0.4	7.12	A

## 6.5 M25 Slip Road

6.5.1 The net development flows and percentage impacts at the M25 Junction 4 slip roads have been set out in Table 6-9 below.

Table 6-9: Percentage Impacts on the M25 Junction 4 Slip Roads

Link	AM Peak				PM Peak			
	2035 Base	2035 With Dev.	Net Dev. Flows	% Impact	2035 Base	2035 With Dev.	Net Dev. Flows	% Impact
M25 Northbound Onslip	1050	1087	37	3.6%	1450	1464	14	1.0%
M25 Southbound Onslip	641	605	-36	-5.6%	743	679	-64	-8.6%
M25 Northbound Offslip	761	695	-66	-8.7%	802	765	-37	-4.6%
M25 Southbound Offslip	1753	1767	14	0.8%	1211	1245	34	2.8%

## 6.6 Summary

- 6.6.1 A percentage impact assessment of key links within close proximity of the site has been undertaken which has shown that all of the links assessed have negligible or minor percentage impacts associated with the proposed development and that all links assessed will operate within capacity.
- 6.6.2 Local junction modelling of 6 key junctions including both site access junctions have been undertaken which has shown that all junctions except Hewitts Roundabout and the A224 Polhill junction/ Pilgrims Way West Link Road junction would operate comfortably within the maximum desirable capacity.
- 6.6.3 At both Hewitts Roundabout and the A224 Polhill junction/ Pilgrims Way West Link Road junction, the development proposals result in reduced flows and improved junction performance compared to the Without Development scenario. The reduction in flows is due to the use of the Star Hill access as a secondary access point which results in better distribution of flows for the low level of traffic routing via areas to the south of the site. As such, the use of the Star Hill access results in highway capacity improvements even when compared to the Without Development Scenario.
- 6.6.4 The proposed Otford Lane/A224/ Crow Drive roundabout design which was agreed as part of the 2015 OPP has been tested and found to operate within capacity and with minor levels of queuing and delay.
- 6.6.5 It has been shown that the net development flows on the M25 Junction 4 slip roads are low and that the flow increases are within the ranges of daily variation in flows.
- 6.6.6 Lastly, these capacity assessments do not consider the traffic offsets available from a commercial reuse of the existing buildings on the site under the Certificate of Lawfulness for an Existing Use and Development (CLEUD). The approach taken to the assessment is therefore considered very robust.

## 7 Construction Impacts

### 7.1 Introduction

- 7.1.1 This chapter summarises the expected construction programme, how it has informed trip generation, and the distribution and assignment of construction trips onto the local transport networks.
- 7.1.2 Transport impacts related to the demolition and construction phase of the development have been assessed based on previous experience of similar developments and professional judgement. At the time of writing, no contractor has been appointed and there is no detailed construction programme.
- 7.1.3 The assessment presented in this chapter primary focuses on the peak month of construction in terms of vehicle trip generation.

### 7.2 Construction Programme

- 7.2.1 An indicative phasing and construction programme has been developed and presented in Table 7-1 and Table 7-2 respectively.

Table 7-1: Indicative Demolition and Construction Phasing

Phase	Timescale	Description
0	2020-2021	Securing QQ in X-enclave and fence
1	2021	Securing and protecting buildings to be retained and trees/landscape
2	2021-2023	Demolition of existing buildings and asbestos removal
3	2021-2023	Remediation and cut & fill and landscape management
4	2021-2023	Installation of services, roads, footpaths, accesses
5	2023-2024	Village Centre
6	2023-2025	Refurbished Buildings in employment zone (A1, A3, A10, A11, A13, A14)
7	2023-2025	Employment Zone new build and serviced plots (inc. school plot)
8	2024-2026	Residential parcel (c. 200 units)
9	2026-2027	Residential parcel (c. 150 units)
10	2027	Fort refurbishment
11	2028-2029	Employment Zone new build
12	2028-2030	Residential parcel (c. 250 units)
13	2029-2031	Residential Hamlets (c. 100 units) and bunker refurbishment



Table 7-2: Indicative construction schedule

	Infrastructure			Construction		
	Clearance	Utilities	Roads	Commercial	Residential	School
2020 – S1	♦					
2020 – S2	♦					
2021 – S1	♦	♦		♦		
2021 – S2	♦	♦		♦		
2022 – S1	♦					
2022 – S2	♦	♦				
2023 – S1		♦	♦	♦		
2023 – S2			♦	♦	♦	
2024 – S1				♦	♦	♦
2024 – S2				♦	♦	♦
2025 – S1				♦	♦	
2025 – S2				♦	♦	
2026 – S1					♦	
2026 – S2					♦	
2027 – S1				♦	♦	
2027 – S2				♦	♦	
2028 – S1				♦	♦	
2028 – S2				♦	♦	
2029 – S1				♦	♦	
2029 – S2				♦	♦	
2030 – S1					♦	
2030 – S2					♦	

### 7.3 Construction Trip Generation

7.3.1 A first principles spreadsheet model has been developed to provide estimates of likely construction traffic during the peak periods of the demolition and construction phase of the Development. This spreadsheet takes as input data regarding the quantities of material that may need to be taken off the site during the demolition and construction phases, assumptions regarding average lorry loads based on industry norms and assumptions regarding the

number of lorry movements likely to be associated with the different elements of the construction phases.

7.3.2 It is anticipated that the working hours for the demolition and construction phases will be Monday to Friday from 08:00 to 18:00 and Saturday from 08:00 to 14:00, with no work on Sundays or bank holidays.

7.3.3 The likely traffic flows and HGV content have been estimated based upon the following assumptions:

- For the clearance works, it is known that about 87,000 m<sup>3</sup> of contaminated material would need to be removed and some 26,500 m<sup>2</sup> of buildings would need to be demolished.
- The number of HGVs required for demolition has been calculated assuming 1 ton of demolition material per square metre demolished, an average of 17 ton load per HGV, and 15% extra HGVs for other demolition contingency.
- For the 87,000 m<sup>3</sup> of contaminated material, the number of HGVs has been calculated as an average of the calculations made by volume (assuming a bulk factor of 1.3 and 14 m<sup>3</sup> of HGV capacity) and by weight (assuming 1.4 kg/m<sup>3</sup> density and 17 ton load per HGV). It is further assumed that the clearance works progress linearly over the clearance period.
- The number of HGVs required for all other works (utilities, roads, and construction) has been based on rates from previous experience.
- In addition to the HGV movements, there will also be car and light goods vehicles movements during the demolition and construction phases, mainly associated with workers coming onto the site and other deliveries. The number of workers per day at any given time for each of the different works (clearance, utilities, roads, and construction) has again been derived from previous project experience and professional judgement. It has been further assumed that all worker movements are by car/van with an occupancy factor of 1.5.
- All construction-related vehicles have been also assigned two trips a day (outbound and return).
- For the demolition and construction works, 269.5 working days a year have been considered (49 weeks of 5.5 days of work per week).
- Construction of new residential development at a rate of approximately 100 units per annum from 2023.
- Construction of the commercial development would be undertaken over a 6- year period as a worst-case assumption, over the phases identified in Table 7-1.

7.3.4 An analysis of the construction schedule shows that there are two phases, each lasting approximately one year, when traffic associated with construction/demolition is likely to be greatest. These periods have been highlighted in red in Table 7-1 and are as follows:

- 2023, when the utilities' works much of the development would be under way along with the major road works, refurbishment of the retained buildings and construction of new commercial and residential phases. It has been assumed that the retained QinetiQ operations would be occupied along with 50 residential units.
- 2024, when construction of the primary school would take place alongside new commercial and residential phases. In terms of occupation in addition to what has been

stated above for 2023, it has been assumed that there would be an update of 200 jobs and 100 additional residential units would be occupied.

- 7.3.5 The results obtained for these periods under the above assumptions, in terms of annual average weekday traffic (AAWT) and their corresponding HGV content, are summarised in Table 7-3.

Table 7-3: Demolition and construction traffic flows and HGV content

Period	AAWT	HGVs	% HGV
2023	230	109	47%
2024	132	15	12%

- 7.3.6 As can be seen, the highest volume of construction/demolition traffic is generated in 2023, when the most intensive construction works (mainly roads and utilities) take place. A total of 230 construction related vehicle movements are generated per day, of which 109 are HGVs. This represents approximately 11 HGVs per hour on an average weekday if these trips are assumed evenly distributed over the ten working hours (08:00 to 18:00). This represents a negligible impact on the local highway network. Furthermore, the Construction Management Plan will ensure that these trips are spread out and avoid the peak hours.

- 7.3.7 The above analysis is based solely on construction flows. However, if the occupation of completed early phases of the development is taken into account, then the busiest period would be in 2030 just prior to the completed and fully occupied stage of the development. However, the impacts associated with this final phase of construction are not considered to merit further assessment as the majority of traffic generated would relate to the occupied elements of the development and not the construction activity. Additionally, once the development is fully occupied, there will be a higher level of trip generation compared to 2030 just prior to full occupation.

## 7.4 Construction Trip Distribution And Assignment

- 7.4.1 In the absence of more detailed plans, a proposed construction route has been assumed from the M25 (junction 4) along the A224 London Road and into the site through Polhill access. Furthermore, it is considered that no construction traffic will be allowed to use the Star Hill access but would be required to use the main access onto A224 Polhill. The construction phasing programme has taken this likely requirement into account. These arrangements are intended to minimise the impact of HGV traffic during the demolition and construction period on the rural lanes that are served by the Star Hill access (in particular Star Hill Road) and on other local and secondary roads, by ensuring that the construction vehicles use the most direct route to the strategic road network (M25) and A21.

## 7.5 Construction Management Plan

- 7.5.1 A Construction Management Plan (CMP) will be prepared and implemented prior to the construction stages of the development to ensure that construction is undertaken in a way that will minimise its impacts as far as is practical upon the local community. Generally, this can be achieved by:
- Encouraging construction workers to travel by non-car modes to the site;
  - Promoting smarter operations that reduce the need for construction travel overall or that reduce or eliminate trips, particularly those in peak periods;
  - Encouraging greater use of sustainable freight modes;

- Encouraging use of greener vehicles;
- Managing the ongoing development and delivery of the CMP with construction contractors;
- Communication of site servicing/delivery facilities (through dissemination of information) to workers and suppliers; and
- Encouraging the most efficient use of construction freight vehicles.

7.5.2 It is proposed that the following principles that were agreed as part of the OPP are also included as part of the proposed development and incorporated in the CMP:

- In order to reduce the effect of construction traffic, bulk transit trips (such as muck away and steelwork delivery) will be undertaken during off-peak periods only. It is not anticipated at this stage that any lane closures will be required, but if they were to take place, they would be minimised and would not occur during peak periods.
- The hours of work are likely to be 08:00 to 18:00 Monday to Friday, 08:00 to 14:00 on Saturday; and no working on Sundays or bank holidays. Night-time (23:00 - 08:00) or out-of-hours works are not envisaged to be required.
- The principal contractor will co-ordinate all deliveries and collections to/from the site, and ensure that:
  - All delivery and collection vehicles are aware of the proposed routing;
  - Prior to a delivery or collection, hauliers will notify the relevant authorities in accordance with the Road Vehicles Authorisation of Special Types General Order 2003 if required;
  - Liaison will be undertaken with occupants of adjacent buildings to avoid delays to service deliveries due to construction vehicles; and
  - Deliveries will be made on a 'just in time' basis and to designated areas within the site. If for any reason it is necessary to load and unload outside the site boundary, the details and procedure for this will be agreed in advance with the relevant authorities.
- A construction route is proposed along Crow Drive, to the north along the A224 London Road to Hewitts roundabout and then either west towards Bromley along the A21, north towards Orpington along the A224 or east towards the M25. This is designed to minimise the impacts on the rural lanes served by Star Hill Road and to the Kent Downs AONB. No construction vehicles will be permitted to use the Star Hill access.
- A construction staff travel plan will be prepared and implemented prior to commencement of any construction activities on site. This will highlight how construction staff can access the application site by sustainable modes of transport. The aim of the construction staff travel plan is to minimise the need to access the site via private car.

## 7.6 Summary

7.6.1 The indicative construction programme and resulting trip generation during the peak periods of construction have been shown in this section.

7.6.2 Based on the assumptions and methodology adopted, the peak year of construction is expected to be 2023 when 230 (AAWT) vehicles and 109 HGVs are expected daily. This level of traffic is expected to have a negligible impact on the highway network.

- 7.6.3 A Construction Management Plan (CMP) will be prepared and implemented prior to the construction stages of the development to mitigate any potential impact.

## 8 Sustainable Transport Strategy

### 8.1 Introduction

- 8.1.1 Overall, the transport strategy for the site will be in line with key policy objectives and will focus on the following key challenges for the site:
- Limiting the highway impacts of the proposed development
  - Manage the impact of the proposed development on the Kent Downs AONB;
  - Provision of realistic alternatives to private vehicles for a range of journey purposes; and
  - Improving the integration of the site with the surrounding community.

### 8.2 Walking and Cycling

- 8.2.1 The design of the proposed development prioritises the movement of pedestrians and cycles within the site so as to ensure that the majority of internal trips are made on foot or by bicycle.
- 8.2.2 The Access and Movement Parameter Plan included within Appendix F, highlights the key pedestrian and cycle routes through the site. This includes a cycle route through the site to link the two site access points as well as a further cycle route towards Knockholt linking the centre of the site to Birchwood.
- 8.2.3 Local facilities will be provided within the Village Centre which is within easy walking distance to all parts of the development. The maximum walking distance to the centre will be about approximately 5 minutes and therefore it is anticipated that most trips to the centre would be made by foot or by cycle.
- 8.2.4 The detailed design of the site layout will be in accordance with best design principles as set out in Manual for Streets and Kent Design. All roads within the residential parts of the development will be designed to allow the implementation of a 20- mph zone.
- 8.2.5 It will also be important for the developer to work closely with KCC in order to improve external connections, where possible. This includes the provision of on-street cycle lanes on London Road to link Otford Lane with the existing advisory cycle lanes on Old London Road.
- 8.2.6 In addition, cycle use would be encouraged through the provision of excellent cycle parking facilities on site.

### 8.3 Public Transport Strategy

- 8.3.1 The poor public transport connectivity of the existing site has been highlighted in Chapter 2 of this report. Based on the findings presented, it is evident that the key opportunity for the provision of sustainable public transport would be a viable bus service to and from the site which would provide a favourable alternative than using a car to access rail services and other local facilities. It is also important for the strategy to be financially viable in the long term.
- 8.3.2 As part of the OPP, various options for the provision of bus services were considered and it was agreed that the preferred strategy would be to provide the new community with access to the 402-bus service and also provide a new independent community bus service.
- 8.3.3 As part of the current application, further discussions have taken place between KCC's public transport team and Go Coach who are the operators of the existing 431 bus service the

existing shuttle bus link to Fort Halstead. Consequently, it has been agreed by all parties that the best strategy would be:

- Diversion of the existing 431 bus service into the site; and
- Providing a new community bus service into the site.

8.3.4 The diversion of the 431 bus service has been fully supported by both KCC's public transport team and Go Coach. The bus service would route through the internal site via the primary road, as highlighted in the Access and Movement Parameter Plan included within Appendix F.

8.3.5 In relation to the community bus service, the proposed service consists of two minibuses operating on Monday to Friday, providing timetabled links to local railway stations for commuters and a demand responsive flexible service in the inter-peak period. On Saturdays, one minibus would provide a demand responsive service.

8.3.6 Prior to the delivery of a primary school on the site (which will be led by KCC), the service would provide links to local primary schools. Once the school is open, these journeys would no longer be required and the hours of operation of the flexible demand responsive service could be extended.

8.3.7 Initially, during the early stages of build-out, when demand is low the service could be provided by a single minibus.

8.3.8 The proposed indicative timetables are included in Appendix M.

8.3.9 A financial viability assessment of the proposed community bus service has been undertaken and included within Appendix M. This sets out the forecasted demand for the bus service and the total support required to run the bus service until the service is self-sufficient. Overall, it has been forecasted that the service would make a surplus of £24k per year on completion of build out. In terms of funding for the bus service, an appropriate trigger in relation to the level of occupation will be agreed with KCC to ensure that funds are used effectively.

8.3.10 It should be noted that the highway impact assessments undertaken within Chapter 6 do not include the bus mode share uplift associated with the community bus, and is therefore overly robust. In practice, it is expected that the bus service would significantly increase the public transport mode share for the commercial development.

## 8.4 Travel Plan

8.4.1 Travel Plans aim to encourage sustainable forms of transport and minimise reliance on single occupancy car journeys through measures which typically include:

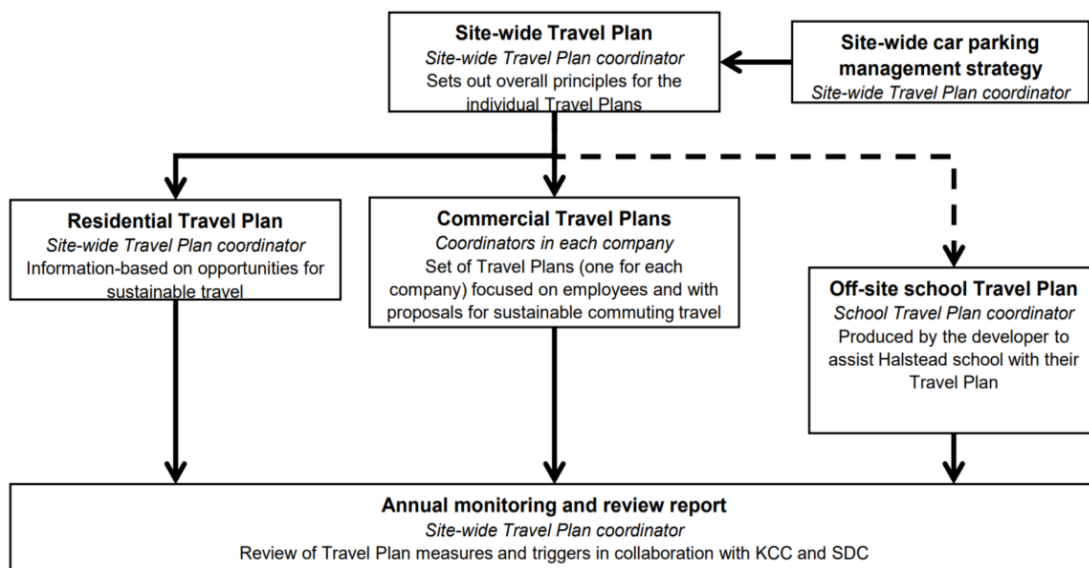
- Public transport initiatives such as the proposed community bus;
- Facilities to encourage walking and cycling;
- Car sharing initiatives; and
- Parking management strategy including initiatives to encourage car sharing.

8.4.2 A site-wide Framework Travel Plan (FTP) was prepared as part of the OPP. This OPP FTP has been updated to reflect the current development proposals and has been included within Appendix N. The FTP sets out the overarching principles that will guide the development of the more detailed Travel Plan that will be provided and agreed with the Planning Authority prior to the occupation of any part of the new development. The overall principles of the FTP have been re-iterated in this section.

8.4.3 The Travel Plan will be managed by the overall site wide Travel Plan Coordinator (TPC). He/she will also be responsible for the management and review of the site wide car park management strategy. This will include the management of any yellow line regulations that may be required within the site and any on-site parking bays. At this stage it is proposed that the majority of streets will be adopted and therefore what role the Highway Authority may have in enforcing any on-street regulations. It is proposed that the whole estate be designed to adoptable standards and it is anticipated that, as a minimum, the main spine road linking the two access points and which will be adopted.

8.4.4 Figure 8-1 below sets out the likely structure of the Travel Plan.

Figure 8-1: Indicative Travel Plan Structure



8.4.5 The site-wide Travel Plan will be based on the following principles:

- The subsequent stages of masterplanning and detailed design would continue to encourage the use of active modes (walking and cycling) and adoption of sustainable travel patterns.
- Within the residential development, the masterplan is designed to meet the criteria of a 20 mph zone. Furthermore, safe and direct walking and cycling routes are provided within the site, including good quality crossings, to ensure pedestrian and cycle permeability and encourage these modes.
- Realistic alternative means of access to the car will be provided. This includes the provision of new bus services which include a community bus through the development and the diversion of the 431 bus service through the site.
- A comprehensive parking management strategy that prioritises and promotes more sustainable vehicles. For instance, cycling parking will be provided at least to the minimum standards and will be conveniently located to promote its use. In terms of car parking, provision would be restricted to maximum standards and electric vehicle charging facilities would be provided.



- Information about sustainable transport options tailored to the occupants for each of the different elements of the development.
  - A firm implementation and monitoring strategy. The developer will appoint an overall site wide Travel Plan Co-ordinator to establish monitoring and review dates, including surveys and data collection where necessary, which should be applied and further detailed on the land use specific travel plans, which also will need a coordinator and interim reviews.
- 8.4.6 Beneath the site wide plan, individual plans will be prepared for the residential element of the development, the primary school on site and by individual businesses which will need to confirm the principles set out in the overarching plan.
- 8.4.7 The site wide TPC will also be responsible for preparing an annual Monitoring and Review Report. This will set out the outcomes of the measures including the actual mode share achieved by each land use against the targets set in the initial Travel Plan. The targets would be agreed with KCC prior to the occupation of the site.

## 9 Summary and Conclusions

### 9.1 Summary

- 9.1.1 PBA has been commissioned by Merseyside Pension Fund to support a Hybrid Planning Application (HPA) for the redevelopment of Fort Halstead, to provide development of up to 750 residential units; 27,659 sqm of commercial space for B1a/b/c uses accommodating approximately 1,438 jobs; a one-form primary school onsite; a mixed-use village centre (use classes A1/A3/A4/A5/B1a/D1/D2); and a Historic Interpretation Centre (use class D1).
- 9.1.2 The existing site has comprised some 97,600 m<sup>2</sup> of defence-related research space and currently accommodates 750 jobs for the Defence Science and Technology Laboratory (Dstl) and QinetiQ. At its peak during the 1970s, at least 4,000 people were employed on site and in more recent times by about 2,000 staff.
- 9.1.3 A Certificate of Lawfulness of Existing Use or Development (CLEUD) was issued in 2004 and based upon this, the development could have accommodated a much higher level of employment than is currently proposed. Furthermore, assessments carried out in this TA show that the existing floorspace, if utilised by commercial operators, could generate significant levels of vehicle trips onto the highway network via the existing access points at Polhill and Star Hill.
- 9.1.4 In December 2015 Sevenoaks District Council (SDC) granted outline permission (subsequently referred to as the OPP) for the regeneration of the Site by an employment led, mixed use development with up to 27,000 sqm of B1/B2 employment uses, up to 450 houses and a hotel. This application has since been implemented by way of demolition, but no development has so far been built out or occupied pursuant to reserved matters application.
- 9.1.5 The site is currently poorly connected to public transport services and facilities. In recent years, Dstl has provided a private shuttle bus service that operates during the morning and evening peak periods only which provides a link to and from Knockholt and Orpington stations. The site is well connected to the local and strategic road networks, with easy access to the M25 at Junction 4 and also to the A21 for access towards Bromley.
- 9.1.6 The scope of works, methodology and principles of assessment for this TA have been determined through ongoing engagement and detailed pre-application discussions with KCC and SDC officers. This approach has ensured that this development scheme accords with relevant national, regional and local guidance and policy.
- 9.1.7 The development proposals have been determined with careful consideration on the extensive public consultation that was undertaken as part of the 2015 OPP. The TA has shown that the impacts of the highway network would be negligible or minor and has identified a proposed a range of mitigation measures to manage any residual minor effects.
- 9.1.8 As part of the 2015 OPP, various mitigation measures were agreed in order to manage the transport related impacts of the development and to minimise the environmental impacts and adverse effects on the local community. These measures have mostly been taken forward for the current application or improved upon. The list of mitigation measures include:
- Star Hill Road Access - This includes improvements to visibility splays, junction geometries and warning signs and anti-skid surfacing placed in appropriate locations;
  - Otford Lane/A224 Junction - The roundabout improvement scheme that was approved as part of the 2015 OPP.

- Star Hill Traffic Calming - It is proposed that the previously agreed 40mph speed restriction along Star Hill is maintained. As stated above, there will be junction warning signage provided on Star Hill Road and there will be an improvement to visibility splays related to the Star Hill access junction.
- Star Hill Road/Rushmore Hill - Periodic monitoring of traffic flows along this link is proposed to inform if the developer should be required to design additional traffic calming measures.
- Pedestrian and Cycle Mitigation - The development would provide enhanced connections to the existing rights of way and will have new access routes through the site for the benefit of the wider community. This includes connections to the existing footways which provide access to Knockholt Village. The development would also upgrade the existing bridleway between Polhill and Twitton. In terms of cycle access, on-street cycle lanes on London Road would be provided to link Otford Lane with the existing advisory cycle lanes on Old London Road which provide access towards the Knockholt Station.
- Public Transport Improvements – The main public transport improvements include the Diversion of the existing 431 bus service into the site and provision of a new community bus service into the site.

9.1.9 A detailed site-wide Travel Plan will be submitted and agreed with the Planning Authority prior to the occupation of any part of the new development. This will aim to encourage sustainable forms of transport and minimise reliance on single occupancy car journeys.

## 9.2 Conclusions

- 9.2.1 The trip generation analysis undertaken for the proposed development highlights that the proposed development would result in a modest increase in the trip generation compared to the consented OPP. However, in comparison to historic levels of trip generation and the potential of the existing site based on the available CLEUD footprint area, the proposed development would not lead to a trip increase during the AM peak hour and would give rise to a net trip generation increase in the order of 26 vehicles during the PM peak hour.
- 9.2.2 Based on the traffic assignment, there will be a modest increase in flows at the Star Hill Access compared to the levels reported within the OPP TA. The traffic assignment method is likely to under-estimate the number of trips using the main Polhill access as it does not consider the deterrence factors associated with routing via narrow country lanes other than speed. Additionally, the trip generation analysis based on the available CLEUD footprint area has shown that the potential level of trip generation from the existing site without any development could match and exceed the levels predicted with a comprehensive development of the site. Under this scenario the effect of the site redevelopment would be considered deminimis.
- 9.2.3 A percentage impact assessment has been undertaken on links on the local highway network. This has shown that almost all of the links assessed have negligible or minor percentage impacts associated with the proposed development and that all links assessed will operate within capacity.
- 9.2.4 Local junction modelling of 6 key junctions including both site access junctions have been undertaken which has shown that all junctions except Hewitts Roundabout and the A224 Polhill junction/ Pilgrims Way West Link Road junction would operate comfortably within the maximum desirable capacity.
- 9.2.5 At both Hewitts Roundabout and the A224 Polhill junction/ Pilgrims Way West Link Road junction, the development proposals result in reduced flows and improved junction performance compared to the Without Development scenario. The reduction in flows is due to

the use of the Star Hill access as a secondary access point which is not used in the without development scenario due to the 2015 OPP restriction. This results in better distribution of flows for the low level of traffic routing via areas to the south of the site. As such, the use of the Star Hill access results in highway capacity improvements when compared to the Without Development Scenario.

- 9.2.6 The proposed Otford Lane/A224/ Crow Drive roundabout design which was agreed as part of the 2015 OPP has been tested and found to operate within capacity and with minor levels of queuing and delay.
- 9.2.7 It has been shown that the net development flows on the M25 Junction 4 slip roads are low and that the flow increases are within the ranges of daily variation in flows.
- 9.2.8 Overall, it has been shown that the proposed development at Fort Halstead would not have significant residual impacts on the transport network during either construction or once the site is fully occupied. Based upon the proposed mix of uses and the improvements measures that have been outlined in this TA, the proposed development would be sustainable in transport terms and in accordance with policy at a national and local level.