Denis Wilson Partnership

Kent International Gateway
STRATEGIC RAIL FREIGHT INTERCHANGE

KENT INTERNATIONAL GATEWAY
INTER-MODAL FREIGHT TRANSFER FACILITY

Transport Assessment Report

On Behalf of

Kent International Gateway Ltd.

September 2007

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D e n i s W i l s o n P a r t n e r s h i p

KENT INTERNATIONAL GATEWAY
INTER-MODAL FREIGHT TRANSFER FACILITY

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Transportation Planning, Infrastructure Design and Highway Safety

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1 INTRODUCTION

1.1 Preamble

1.1.1 This report considers proposals by Kent International Gateway Ltd. to develop land adjoining Junction 8 of the M20 motorway east of Maidstone, Kent to incorporate an Intermodal freight transfer facility and rail linked warehousing.

1.1.2 The Denis Wilson Partnership (DWP) were appointed in 2004 in respect of highway and transportation matters relating to the development proposals and to support an Outline Planning Application.

1.1.3 The Planning Authority for the development site is Maidstone Borough Council (MBC) and the Local Highway Authority is Kent County Council (KCC).

1.2 Scope and Format of Report

1.2.1 As part of the preparation of this report meetings have been held with key stakeholders including:

- Kent County Council.
- The Highways Agency, though their term consultants.
- Network Rail.
- Arriva Buses.

1.2.2 The notes of these meetings are appended to this report at Appendix A.

1.2.3 At the request of the Highways Agency (HA) a Briefing Note detailing broad proposals for the development and a preliminary overview of traffic implications was submitted to the HA in November 2006. The Briefing Note to the HA is attached as Appendix B to this TAR. To date the HA has declined to meet with DWP (see Appendix C) to discuss the development proposals until such time that the Scope of this TAR had been agreed by all relevant parties. However, a meeting has been held with the HA's term consultant Parsons Brinkerhoff (PB).

1.2.4 A scoping meeting was held with KCC in February 2007 and subsequently a Scoping Study was produced by DWP and submitted to KCC and the HA in April 2007. The structure, format, methodologies and some empirical data contained within this TAR is as proposed in the previously submitted Scoping Study.

1.2.5 The remainder of this report is structured as follows:

- Chapter 2 sets out existing conditions in respect of sustainable travel provision and network traffic conditions.
- Chapter 3 considers road traffic accidents in the vicinity of the site.
- Chapter 4 sets out the policy framework within which this assessment has been undertaken.
- Chapter 5 presents a summary of the proposed development and its proposed means of access.
- Chapter 6 discusses employee numbers and mode split assumptions for journey to work.
- Chapter 7 is concerned with access to the development by sustainable modes.
- Chapter 8 sets out the proposed arrangement for a Travel Plan for the development.
- Chapter 9 identifies the proposed parking provision for the development.
- Chapter 10 considers the traffic impact of the development with sections on:
    - Base traffic data used for this assessment.
    - Background traffic growth.
    - Traffic generation.
    - Traffic distribution.
    - Area of Assessment.
    - Traffic impact.
- Chapter 11 considers the impact of and the strategy for dealing with construction traffic.
- Chapter 12 then presents a summary the overall findings of this Transport Assessment

2 EXISTING SITUATION

2.1 Site Location and Existing Land-Use

2.1.1 The KIG site is located on land east of the village of Bearsted, Kent. The site is bounded to the north by the M20, to the south by the A20, and to the west by Thurnham Lane, Figure 1 refers. As can be seen from this Figure, Crismill Lane and Water Lane also run through the site. The Ashford to Maidstone East railway line also passes through the heart of the site.

2.1.2 The location of the site is such that it is strategically placed to intercept road freight traffic between the UK and mainland Europe and move it onto rail offering the potential to dramatically reduce the number of HGV km's on the UK's Strategic road network. Figure 2 identifies this strategic location, with the port of Dover being approximately 35 miles from the site and the M25 being only approximately 25 miles away.

2.1.3 At present, the site comprises of mainly low-grade agricultural land, sporadic residential development, a small vehicle repair garage and farm buildings. It is located within the Maidstone Borough Council (MBC) administrative area, for which, Kent County Council (KCC) is the acting Highway and Transport authority with the HA being the Motorway executive agency.

2.2 Pedestrian Footways

2.2.1 With regard to the pedestrian accessibility of the site to the wider area, the Institute of Highways and Transportation in their document 'Guidelines for Providing for Journeys on Foot' suggests that the preferred maximum walking distance for commuting journeys is 2km. PPG13 includes specific advice on walking trips, and states that walking *'offers the greatest potential to replace short car trips, particularly under 2 kilometres'*. Figure 3 shows a pedestrian walk isochrone of 2km from the centre of the site.

2.2.2 At present there are footways provided on both sides of the A20 in the vicinity of the KIG site. Inspection shows that the footways have been poorly maintained with a poor surface finish holed and rutted continuously and with extensive vegetation obscuring the footways and hindering their proper use in locations. However, with some basic refurbishment, they could revert to a good level of provision.

2.2.3 The footways that are currently provided are approximately 1.5 m wide and are segregated from the highway by a grass verge of between 1 - 1.5 m in width. There would appear to be plenty of scope for improvement of the footways to enhance accessibility on foot to the KIG area and adjoining transport infrastructure and amenities.

2.2.4 At present there is no provision for the controlled crossing of pedestrians across the A20 within the vicinity of the KIG site.

2.2.5 There are no designated footways associated with Water Lane or Thurnham Lane.

2.3 Public Rights of Way

2.3.1 The routes of all Public Rights of Way across the KIG site are identified in Figure 4 of this TAR. In summary of those routes, KM81, a Bridleway, currently runs through arable fields to the extreme west of the development site between Thurnham Lane and Water Lane and is joined by route KM82 broadly midway along its length. KM82 connects KM81 with Malling's Lane to the south of the railway.

2.3.2 Right of Way reference KH131, a Public Footpath, runs through the site from Roundwell to the south, under the railway and under the motorway and CTRL to the north.

2.3.3 Right of way reference KH135, a Bridleway, runs in an east west direction linking Roundwell with Crismill Lane. Crismill Lane, Right of Way reference KH134, is a Bridleway running between the A20 Ashford Road in the south, over the railway and under the motorway and CTRL connecting with Crismill Lane to the north of the site.

2.3.4 Rights of Way reference KH641 takes the form of the track serving as access to Woodcut Farm from the A20 Ashford Road. Musket Lane, right of way reference KH180 is a Public Footpath that runs between the A20 Ashford Road to bottom of the earthworks forming the motorway junction.

2.4 Cycle Network

2.4.1 Guidance contained within PPG13 (paragraph 78) suggests that cycling is a viable alternative to travel by private car for distances of up to 5 kilometres (a 20 minute cycle time). The topography to the east of the Maidstone area is relatively flat and favourable for cycling, thus the catchment for the development site is defined simply in the form of a radius shown on Figure 5.

2.4.2 At present there is no dedicated provision for cyclists in the immediate vicinity of the KIG site. However, there is sufficient space available both on the carriageway and within the adjoining verge and footways of the A20 to provide cycle lanes if desirable.

2.4.3 Currently there is a signed on road route, Regional Route 19 (RR19), leading south from the A20 approximately 2 kilometres to the west of the site. This route connects with a short section of National Cycle Route 17 (NCR17) which is located approximately 2.5 kilometres from the site and is a traffic free route. The full length of this section of NCR 17 runs from the western fringes of Mote Park to the north eastern fringes of the park. However, it is understood that there is a proposal to continue this route from the east of Mote Park through Leeds to Ashford and also west into Maidstone Town Centre.

2.5 Public Transport – Buses

2.5.1 The KIG site is situated adjacent to the A20 on the outer fringes of Maidstone. At present two bus services run along the A20 in the vicinity of the site, providing a link with destinations including Hollingbourne village, Ashford and Maidstone town centre. Table 2.1 below summarises the details of these two bus services whilst Figure 6 shows their routes illustrated against base mapping.

Bus Service	Destinations	Times of Operation	Frequency
9/19	Maidstone, Vinters Park, Grove Green, the Landway, Bearsted Rail Station	Mon – Fri (09:00 – 18:15) Sat – (09:00 – 18:15) Sun – No Service	Hourly Hourly
13	Hollingbourne – Maidstone Chequers	Mon – Fri (07:30 – 18:15) Sat (09:06 – 17:17) Sun – No Service	5 journeys 4 journeys
510	Maidstone Queens Monument – Ashford Rail Station	Mon – Fri (06:20 – 20:14) Sat (07:10 – 20:14) Sun (08:22 – 19:14)	2 per hour 2 per hour 5 journeys

Table 2.1: Local Bus Services

2.5.2 As can be seen from Table 2.1 above there are presently only three scheduled bus services operating in the vicinity of the KIG site. Service 9/19 is run by Arriva, and runs between Maidstone and Bearsted, stopping at Bearsted rail station. The service operates Monday to Saturday between 09:00 and 18:00.

2.5.3 Service number 510 is run by Stagecoach and operates along the A20 past the KIG site. This service runs between Maidstone town centre and Ashford Railway station passing through Charing, Lenham and Harrietsham. This service currently operates 7 days a week at a 2 hourly frequency. This service is partly supported by Kent County Council.

2.5.4 Service number 13 is run by Nu-Venture and travels from the village of Hollingbourne to Maidstone Chequers via Leeds Castle, Langley and Parkwood. Although this service does not directly pass the site, it stops at the bus stop located just east of the B2163. This service operates at a 2 hour frequency Monday to Saturday with no service currently provided on a Sunday. Some of the journeys are supported by Kent County Council.

2.5.5 Additionally, service number 331 is a Royal Mail postal service bus that operates twice every weekday between Maidstone Town Centre, Platts Heath and Lenham Heath. This service is subsidised by Kent County Council.

2.5.6 There are a number of bus stops along the A20 Ashford Road in the vicinity of KIG. The nearest bus stops are located either side of the A20 at Caring Lane. The facilities provided at these stops are very basic with only a 'post and flag', no shelter or timetable information is available to passengers. Furthermore, the standard of footway provision along this section of the A20 is considered to be poor with poorly maintained surfaces and vegetation overgrowing and obscuring the footway and making their use difficult and maybe undesirable.

2.5.7 Two further bus stops are located to the east and in the vicinity of the junction of the A20 with the B2163. At this location the stop on the south side of the A20 has a shelter with lighting and timetable information. The stop on the north side of the A20 just has a pole and flag.

2.6 Public Transport – Passenger Rail

2.6.1 Figure 7 of this report illustrates local passenger rail infrastructure in relation to the location of KIG.

2.6.2 The KIG site straddles the Ashford to Maidstone East mainline railway. This line runs between London Cannon Street / Victoria and Ashford before splitting for Dover or Canterbury and Ramsgate. Bearsted station is located 2.0 kilometres to the west of the centre of KIG and Hollingbourne station 1.75 kilometres to the east.

2.6.3 The site is also close to the Channel Tunnel Rail Link (CTRL); however the nearest station to KIG serving this route is Ashford (International) approximately 25 kilometres to the south east of Woodcut Farm. Ebbsfleet opens in November 2007 with more frequent services than Ashford.

2.6.4 Discussion with Network Rail, notes attached within Appendix A of this report, has disclosed proposals for the refurbishment of Bearsted station in the near future. Therefore, the following description of provision is likely to change before any staff start work at KIG.

2.6.5 Bearsted station has a ticket office, cycle storage facilities and a car park provided. Services from it in the direction of London Cannon Street / Victoria start at 06:00 and operate at least half-hourly in the peak and half-hourly off-peak on Mondays to Saturdays, finishing at around 22:30. Throughout the day on Sundays, between 08:00 and 22:00, the service operates on an hourly frequency. The majority of these services, particularly in the peak, terminate at London Victoria as opposed to Cannon Street and also call at all local stations.

2.6.6 Services from Bearsted in the Ashford direction operate twice hourly throughout the day on Mondays to Saturdays between 0600 and 0100 and hourly all day on Sundays between 0900 and 0100. The majority of these services call at all local stations and a number of services (particularly in the morning) continue to Canterbury, Ramsgate and Margate.

2.6.7 Bearsted station can not currently be accessed directly from KIG by an existing scheduled bus service. However, a walking distance of approximately 2.5 kilometres would result in a walk time of just over 30 minutes.

2.6.8 Services from Hollingbourne station operate in the Ashford direction at a lower service frequency of half-hourly in the peak and hourly off-peak on Mondays to Fridays between 0600 and 0100. The service operates hourly on Saturdays between 0600 and 0100 and between 0900 and 0100 on Sundays. Services call at all stations and a number of services, particularly in the morning, continue to Canterbury or Ramsgate and Margate.

2.6.9 Services from Hollingbourne in the London Cannon Street / Victoria direction operate at least half-hourly in the peak and off-peak Mondays to Saturdays between 0600 and 2230. On Sundays between 0800 and 2200 services operate hourly. The majority of services, particularly in the peak, terminate at London Victoria as opposed to Cannon Street.

2.6.10 As with Bearsted station, Hollingbourne station can not be accessed from KIG by scheduled bus. Alternatively, the station can be reached on foot from the centre of the KIG area with a walk time of approximately 30 minutes. This station has a car park, but is un-staffed.

2.6.11 Maidstone East station is located approximately 6 kilometres to the west of the KIG area in Maidstone town centre and has the same service levels as Bearsted. The station has a ticket office, ancillary services, car park and a taxi rank.

2.6.12 All of the above stations are within 30 minutes rail journey time of Ashford (International), where passengers can connect onto Eurostar services.

2.7 The Local Highway Network

2.7.1 The provision of the local highway network is illustrated and annotated as Figure 8 of this report. Similarly Figure 9 identifies the strategic transport network and infrastructure in place within and surrounding Kent which is likely to have an influence over travel characteristics associated with development at the KIG site.

2.7.2 The A20 Ashford Road in the vicinity of the proposed development site is a single carriageway road with the 'National Speed Limit' applied. The A20 is a primary route within the Kent highway hierarchy but with a significantly reduced traffic flow as a consequence of the parallel M20 motorway which attracts much of the short and virtually all of the medium and long distance trips. Along the frontage of the site the A20 follows the general contours of the surrounding land resulting in the road being inclined from both the east and west to a trough at a point where it passes the small garages.

2.7.3 The wide carriageway width of between 9 m and 10 m and the relatively lightly trafficked conditions would appear to attract excessive vehicle speeds. This is reflected in the type and severity of accidents identified in Chapter 3 – Road Traffic Accidents of this report.

2.7.4 It is understood that Kent County Council has a long standing scheme of speed reduction and accident remediation works to the A20 Ashford Road in the vicinity of the KIG site, details of which are presented in the Road Traffic Accident chapter of this report.

2.7.5 600 m to the east of the KIG site, the junction of the A20 with the M20 link road is formed by means of a 60 m ICD 3-arm roundabout. The M20 link and A20 east arms of the roundabout take the form of dual 2-lane carriageway roads. Traffic on the A20 heading eastbound has the option to 'by-pass' the roundabout by using a bridged/elevated flyover. This merges with the A20 eastbound again several hundred metres to the east.

2.7.6 Between the M20 link roundabout and the M20 junction 8, the road takes a dual 2-lane carriageway form with considerable informal, and probably illegal, parking occurring on the verges either side. To the east of the M20 link roundabout the A20 takes the form of a dual 2-lane carriageway road with the National Speed limit applied. A 40 m ICD 4-arm roundabout forms the junction of the A20 with the B2163 Eyhorne Street and Hollingbourne Ramada Hotel. Both the B2163 Eyhorne Street and Hotel access roads are single carriageway roads with widths of approximately 7.3 m and 8.5 m respectively.

2.7.7 The B2163 Eyhorne Street runs from the A20 to Hollingbourne village. A height restriction, where the road passes beneath the Ashford – Maidstone East railway line, is in place.

2.7.8 To the east of the A20 junction with the B2163 Eyhorne Street the A20 remains at dual 2-lane carriageway standard. Vehicle lay-bys of approximately 30 metres in length are provided adjacent to both the eastbound and westbound carriageways. The lay-bys also double-up as bus stops with shelters and timetable information provided. Other general travel information is provided for road users at this location.

2.7.9 A 3-arm roundabout junction of approximately 40 m ICD connects the B2163 Penfold Hill with the A20. A 17 tonne weight limit is in place on the B2163 to prohibit the transit of HGV's through the villages of Leeds and Langley Heath to the south. To the east of the roundabout the A20 reverts to single carriageway configuration with the National Speed Limit in place. A height restriction of 4.7 m is in place on the A20 approximately 4.8 kilometres to the east of the roundabout where the road passes under the Ashford – Maidstone East railway.

2.7.10 Roundwell from the A20 begins as a 40 mph road up to the bend where it is reduced to 30 mph, at the Water Lane junction it becomes The Street. At this point there are residential dwellings some of which rely upon on-street parking restricting traffic flow. This continues to be the case as the road proceeds to the west eventually becoming Ware Street at the junction with Thurnham Lane.

2.7.11 The Willington Street junction on the A20 is located approximately 3.5km from the main KIG entrance; it has been considered as a result of a specific request from KCC. The junction takes the form of a 3 arm signalised arrangement. This junction is the first signal controlled junction on the A20 from the KIG site when travelling west and therefore represents the first potential bottleneck to road capacity.

2.8 The Strategic Road Network

2.8.1 The KIG site is located immediately adjacent to junction 8 of the M20 motorway. The M20 serves as one of the two strategic routes serving the channel ports of Dover and Folkestone. It is formed by a 3 lane dual carriageway motorway with hard shoulder provision and grade separated junctions. To the west it connects with the M25 London Orbital motorway which in turn provides further strategic radial motorway routes across the country.

2.8.2 M20 junction 8 takes the form of a grade separated motorway junction with full provision for all on and off movements from the M20 via slip roads. The M20 motorway at this point has provision for 3-lanes in a dual carriageway configuration whilst the grade separated roundabout junction is not signal controlled.

2.8.3 The slip roads are constructed to DMRB volume 6 TD22/06 Type A and B merge and diverge standards with the Type A standard located on the Dover side and Type B on the London side of the junction.

2.8.4 Maidstone Services is accessed off the junction on the northern side of the motorway and is located between the CTRL and Ashford – Maidstone East mainline.

2.9 Existing Traffic Flows

2.9.1 A variety of forms and sources of data have been used in order to determine the existing traffic flows for the highway network in the vicinity of the KIG site. KIG commissioned classified vehicle turn counts for the three A20 roundabouts described in Section 2.7 above plus M20 junction 8. The turning counts were undertaken for the network peak periods of 07:30 to 09:30 in the morning and 16:30 to 18:30 in the early evening on Friday 11th June 2004.

2.9.2 Additional traffic data has been acquired from KCC through their term consultant's, Babtie. The source of the additional data was either KCC's own on-going traffic monitoring programme or Department for Transport (DfT) traffic census data.

2.9.3 Further turning counts were undertaken on 21st March 2007 at A20/Roundwell Priority Junction, the Wear Street,/Thurnham Lane Priority Junction. These have been supplemented by automatic traffic counts at the A20 west of Roundwell, A20 East of Roundwell, The Street west of Water Lane, and at Ware Street west of Thurnham Lane.

2.9.4 The surveys are included in full as Appendix D of this report.

2.10 Traffic Growth

2.10.1 All traffic flow data has been brought up to a 'Base' year of 2007. In order to bring all of the traffic flows up to this Base year, reference has been made to the National Trip End Model (NTEM). In view of the location of the site being in neither an area of trip attraction or generation, but between the two, the average of the trip attraction and generation traffic growth conversion factors for Maidstone up to 2007 have been identified and applied where applicable to the traffic survey data sets.

2.10.2 Figures 10 and 11 illustrate the 2007 peak traffic flows on the local highway network for the peak AM and PM periods respectively.

2.11 2007 Existing Highway Network Conditions

2.11.1 As identified above, the traffic flows on the highway network immediately surrounding the KIG site have been obtained through various sources. Through observation and discussions with KCC it has been concluded that the highway exhibits normal operational characteristics with peak traffic flows being achieved during the traditional morning and evening peaks of 08:00 – 09:00 and 17:00 -18:00. Substantially lower flows are experienced outside of these times.

2007 Junction Capacity Analysis

2.11.2 To identify any potential junction capacity issues, the junctions that have been assessed have been:

- A20 / M20 Link Roundabout Junction.
- A20 / B2163 /Hotel Roundabout Junction.
- A20 / B2163 Penfold Hill Roundabout Junction.
- A20 / Roundwell Priority Junction.
- A20 / Willington Street Signalised Junction.

2.11.3 In assessing these junctions, the peak traffic flows identified in Figures 10 and 11 have been used. Geometric values for each of the roundabouts have been extracted from Ordnance Survey plans supplemented by on-site observations of road and lane markings. The assessment of the junctions has been undertaken using the software programmes, ARCADY, PICADY, TRANSYT and LINSIG.

2.11.4 Tables 2.2 to 2.6 below present a summary of the 'worst case' in terms of capacity for each of the junctions. The full printouts from the assessment are presented in Appendix E

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.373	1	0.06	0.153	0	0.04
Arm B : M20 Link	0.384	1	0.03	0.410	1	0.03
Arm C : A20 East	0.705	2	0.06	0.535	1	0.04
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 2.2 A20-M20 Link Roundabout, 2007 Existing Highway Network Conditions

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.480	1	0.04	0.561	1	0.04
Arm B : B2163	0.527	1	0.14	0.285	0	0.12
Arm C : A20 East	0.640	2	0.05	0.475	1	0.04
Arm D : Hotel Access	0.157	0	0.16	0.060	0	0.09
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 2.3 A20 / B2163 / Hotel Roundabout, 2007 Existing Highway Network Conditions

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 East	0.611	2	0.07	0.445	1	0.05
Arm B : B2163 Penfold Hill	0.334	1	0.03	0.255	0	0.03
Arm C : A20 West	0.476	1	0.04	0.542	1	0.04
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 2.4 A20 / B2163 Penfold Hill 2007 Existing Highway Network Conditions

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm B : Roundwell Left Turn	0.308	0	0.13	0.224	0	0.12
Arm B : Roundwell Right Turn	0.231	0	0.25	0.157	0	0.23
Arm C : A20 East Right turn	0.217	0	0.14	0.222	0	0.14
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 2.5 A20 / Roundwell Junction, 2007 Existing Highway Network Conditions

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	DoS	Max Q (PCU)	Delay (Sec's)	DoS	Max Q (PCU)	Delay (Sec's)
A20 (E) Ahead and Left Turn	92.1%	14	59s	90.5%	13	56s
Willington Street Left Turn	69.4%	8	19s	76.6%	9	21s
Willington Street Right Turn	89.6%	8	86s	92.3%	10	93s
A20 (W) Ahead	19.8%	2	4s	28.1%	3	5s
A20 (W) Right Turn	93.1%	9	36s	90.7%	8	30s
	PRC : -3.4%			PRC : -2.5%		

Table 2.6 A20 / Willington Street Junction, Existing Highway Network Conditions

2.11.5 Tables 2.2 to 2.6 above identify that all of the junctions other than the Willington Street Junction are operating well within their desired operational capacity in 2007. The Willington Street junction has a PRC of -3.4% in the AM peak.

2.11.6 The link roundabout is busiest in the AM peak with a maximum RFC of 0.705. The hotel roundabout is busiest during the AM peak with a maximum RFC of 0.640; the A20 / Penfold hill roundabout is busiest in the AM peak with a maximum RFC of 0.611. The A 20 / Roundwell junction is busiest in the AM peak with a Maximum RFC of 0.308.

2.11.7 From the assessment it can be concluded that other than the Willington Street Junction, the junctions assessed do not show any significant queuing or delay. These findings are in line with site observations. The Willington Street junction has a maximum queue of 14 vehicles in the AM peak, and a maximum of delay of 93 seconds in the PM peak. It is clear from this analysis that the Willington Street Junction is already in need of some improvement.

2007 Link Capacity Analysis

2.11.8 To supplement the junction capacity analysis, the traffic flows observed for the links feeding the junctions in 2007 have been compared to the link capacities identified in DMRB TA79/99. Table 2.7below provides a comparison of observed peak hour traffic flows with TA79/99 typical capacities and identifies the relative level of reserve capacity. As can be seen from this Table, significant reserve capacity of between 49% and 84% exists on the highway network.

Road / Link	TA79/99 Capacity	2007 Base Flow	Reserve
A20 west of KIG access	1860	742	(60%)
Roundwell	1300	210	(84%)
A20 east of KIG access	1860	742	(60%)
A20 / M20 Link Road	3600	1606	(55%)
A20 between B2163	3600	1477	(59%)
A20 East of B2163	1860	953	(49%)

Note: busiest direction flow in either peak hour (vph)

Table 2.7 Comparison of 2007 Base and TA79/99 Link Capacity Flows

2007 Merge & Diverge Capacity Analysis with the M20

2.11.9 In addition to the junction capacity and link capacity analysis, consideration has also been given to the capacity of the merge and diverge slip roads from Junction 8 of the M20, reference has been made to TD22/06. The existing merge and diverge slip roads have been identified as being of Type B on the west side (London) of the junction and Type A on the east side (Dover) of the junction. The two diverge (off) slip roads have single lane provision whilst the two merge (on) slip roads have two lanes provided. Table 2.8below presents a summary of the findings.

	Traffic Flow vph		Configuration	
	Diverge / Merge	Mainstream	Actual Configuration	Required Configuration
Southeast bound off slip (Diverge)				
2007 AM peak	835	1828	Type B 2 Lanes	Type A
2007 PM peak	1010	1626		Type A
Northwest bound on slip (Merge				
2007 AM peak	1412	2339	Type B 1 Lane	Type F
2007 PM peak	819	1365		Type E
Southeast bound on slip (Merge				
2007 AM peak	194	1828	Type A 1 Lane	Type A/D
2007 PM peak	221	1626		Type A/D
Northwest bound off slip (Diverge)				
2007 AM peak	247	2339	Type A 2 Lanes	Type A
2007 PM peak	155	1365		Type A

Table 2.8: Assessment of Merge and Diverge Capacities at M20 Junction 8, 2007 Base

2.11.10 As can be seen from the above table this simple form of assessment has identified that the diverging off slips, both the southeast and northwest bound, and the southeast bound on slip are operating within the design flow parameters of each of the Type designs. The actual configuration of the southeast off slip diverge exceeds that required by one design step, i.e. Type B in place of Type A, therefore significant reserve capacity exists on this slip road.

2.11.11 However the northwest bound on slip is not adequately provided for with the present vehicle flows, with this assessment showing that the northwest on slip merge should be of Type F configuration for the busy AM peak.

3 ROAD TRAFFIC ACCIDENTS

Historic Accident Data Analysis

3.1.1 Accident data was obtained from consultants working on behalf of KCC for a standard 3 year period, in this case between 1st January 2000 and 31st December 2003. This data included Junction 8 of the M20, the M20/A20 link road and a stretch of the A20 passing the site and to the east of the junction with the A20/M20 link road. It should be noted that changes in reporting procedures by Police Authorities and their reluctance to release accident data implicating blame results in the data being of minimal use to any detailed study. Therefore, the following overview of accidents should be taken as being a general one without access to any detail whatsoever.

3.1.2 In total over the 3 year period there were 27 accidents, of which 23 were classed as slight, 2 as serious and 2 as fatal. Due to the brief nature of the data available it is impossible to establish whether there are any trends in the accidents that have occurred. The data does not give details of how the accidents occurred but does show if there are any locations where small clusters of accidents have occurred.

3.1.3 There are 2 concentrations of accidents, the first being at the end of the north-west bound exit slip road off the M20 where 4 accidents occurred at the junction with the roundabout. The other concentration is on the A20 at the roundabout junction with Eyhorne Street (B2163) where 4 accidents have occurred. However, from the brief data obtained it cannot be established whether or not there is a trend in the type of accidents occurring at these locations. Tables 3.1 to 3.6 present a summary of the RTA information.

	Weather Condition		
	Fine	Rain	Other
Number of Accidents	21	4	2

Table 3.1: RTA Weather Conditions

	Road Surface Condition		
	Dry	Wet	Snow
Number of Accidents	19	7	1

Table 3.2: RTA Road Surface Conditions

	Street Lighting			
	Daylight	Dark With Street Lights	Dark with No Street Lights	Dark - Street Lights Unlit
Number of Accidents	19	3	4	1

Table 3.3: RTA Lighting Conditions

	Mode of Transport Involved						
	Not Stated	Peds	Pedal Cycle	Motor Cycle	LGV	HGV	Bus/Coach
Number of Accidents	18	0	0	2	3	4	0

Table 3.4: RTA Modes Involved

	Severity of Accident		
	Slight	Serious	Fatal
Number of Accidents	23	2	2

Table 3.5: RTA Severity

	Accident Factors			
	Not Stated	Right Turn Manoeuvre	Overtaking Manoeuvre	Single Vehicle
Number of Accidents	15	3	2	7

Table 3.6: Stated Factors

3.1.4 In summary of the 27 accidents that took place over the 3 year period 21 accidents occurred during fine weather conditions, 4 in the rain, 1 in the snow and 1 during unknown weather conditions. 19 accidents occurred when the road surface was dry, 7 when wet and 1 occurred when the road surface was affected by snow. 19 of the accidents took place during daylight hours, 3 occurred in the dark but when the carriageway was lit by street lights and 5 occurred when it was dark and the carriageway was unlit. It is most important to note that of the 27 accidents that occurred there were no accidents involving either pedestrians or cyclists.

KCC A20 Accident Remedial Scheme

3.1.5 An accident remedial scheme for the A20 in the vicinity of the KIG site has recently been introduced. The main objective of the scheme was to reduce vehicle speeds and to improve pedestrian facilities. A copy of the preliminary scheme drawings are attached as Appendix F to this report. .

3.1.6 KCC have indicated to us that the proposed use of a site access junction would compliment the scheme in as much as helping to control vehicle speeds.

4 POLICY

4.1 Introduction

4.1.1 In preparing this Transport assessment numerous policy documents have been considered to ensure that the design, layout and transport provisions at the KIG site are consistent with both guidance and policy. The following sections consider National, Regional and Local Policy documents that have been continually referred to in preparing this Transport Assessment.

4.2 National Policy and Guidance

Guidance on Transport Assessments

4.2.1 New guidance published by the DfT and the DCLG in March 2007 provides advice on the content and preparation of Transport Assessments and Transport Statements. It also assists stakeholders to determine whether an assessment may be required and, if so, what the level and scope of assessment should be.

4.2.2 The new guidance brings the approach to the preparation of TA's in line with the step changes in government policy and expands it to address the assessment of the potential implications of development proposals on the entire transport system.

4.2.3 The new guidance articulates that where possible a first principles approach should be taken in identifying traffic generations etc. rather than relying upon other databases, unless the development is of a common nature.

Transport White Paper – A New Deal for Transport: Better for Everyone

4.2.4 In July 1998 the Government published a White Paper on the future of transport titled, 'A New Deal for Transport: Better for Everyone.' The objective of the document is defined as being;

- *"To increase personal choice by improving the alternatives and to secure mobility that is sustainable in the long term."*

4.2.5 The White Paper outlines the Government's commitment to creating a more integrated transport system to address the problems of congestion and pollution. The objectives of the Government's integrated transport policy are:

- *"Integration within and between different types of transport – so that each contributes its full potential and people can move easily between them."*

- *"Integration with the environment - so that our transport choices support a better environment."*

- *"Integration with land use planning - at national, regional and local level, so that transport and planning work together to support more sustainable travel choices and reduce the need to travel."*

4.2.6 The above commitments are given the overall title of "*A New Deal for Transport*" and are aimed at achieving the objectives of:

- "Cleaner air to breathe by tackling traffic fumes."

- "Thriving town centres by cutting the stranglehold of traffic."

- "Quality places to live where people are the priority."

- "Increasing prosperity backed by a modern transport system."

- "Easier and safer to walk and cycle."

A New Deal for Trunk Roads in England

4.2.7 This document reports on the Government's strategic review of the road's programme against criteria of accessibility, safety, economy, environment and integration. It is one of a number of documents which spell out more fully the policies in the transport White Paper *a New Deal for Transport: Better for Everyone.*

4.2.8 In respect of freight transport the document sets out policies that seek to:

- "Bring transport and land use together at regional level."

- "Focus on strategic road and rail transport corridors, ensuring these are planned together in an integrated way."

- "Provide safer and more accessible interchanges between different forms of transport, e.g. freight transfer facilities."

- "Consider trunk roads as a part of an overall transport network which includes local Roads, railways, inland waterways, ports, airports, and public transport interchanges."

4.2.9 Making better use of existing road capacity and infrastructure is a key priority of the trunk road policy. It proposes to achieve this by:

- *"Promote the development of innovative traffic management techniques."*
- *"Give priority to certain classes of traffic on trunk roads, for example….lorries where appropriate in the context of an integrated transport policy."*
- *"Integrate the operation of trunk roads with public transport and encourage the transfer of freight from road to rail."*

4.2.10 The policy recognises the need to support the national, regional and local economies through the management of road traffic by means of the integrated transport policy and its encouragement in the growth of sustainable modes of transport. Whilst trunk roads and motorways only constitute 4% of the English road network, at the time of the policy document 57% of all goods vehicle traffic was carried on them. In respect of freight transport the policy identifies:

- *"Promote….freight movement by rail..."*
- *"Give priority to particular types of traffic where appropriate, including Lorries..."*
- *"Integrate transport with land use planning and economic development at regional level through the regional planning process."*

4.2.11 The policy states that the management of the core routes, for which the M20 motorway is identified as one, must be carefully coordinated with parallel rail routes within the same transport corridors. The Highways Agency will work with rail operators to make interchanges easier, for example by improving access to freight transfer facilities.

Planning Policy Guidance 13 – Transport

4.2.12 PPG13 Established national planning guidance on transport issues is contained in PPG13 (Transport). In general terms the guidance encourages local authorities to plan land use and transport together in ways which enable people to carry out their everyday activities with less need to travel. In this way, it is suggested that authorities can reduce reliance on the private car and make a significant contribution to sustainable development goals.

4.2.13 In determining planning applications, PPG13 requires local authorities to negotiate for improvements to public transport as part of development proposals, in order to reduce the need to travel by car and the level of parking at such sites.

4.2.14 In respect of pedestrians local authorities are required to pay particular attention to the design, location and access arrangements of new development to help promote walking as a prime means of access. Specifically this looks to the provision of direct, safe and secure walking routes, particularly in and around town centres, to reduce the actual walking distance between land uses, and public transport. This is to be achieved whilst addressing the personal security concerns of pedestrians.

4.2.15 The design, location and access arrangements of developments should be considered so as to promote cycling. Similarly to pedestrian routes, the provision of direct, safe and secure cycling routes, particularly in and around town centres, will help to reduce the actual cycling distance between land uses, and public transport. This is to be achieved whilst addressing the personal security concerns of cyclists.

4.2.16 In respect of freight PPG 13 states that the Government has set out its policy framework on freight in its Sustainable Distribution Strategy (March 1999). While road transport is likely to remain the main mode for many freight movements, land use planning can help to promote sustainable distribution, including where feasible, the movement of freight by rail. In preparing their development plans and in determining planning applications, local authorities should:

- *Identify and, where appropriate, protect sites and routes, both existing and potential, which could be critical in developing infrastructure for the movement of freight (such as major freight interchanges including facilities allowing road to rail transfer or for water transport) and ensure that any such disused transport sites and routes are not unnecessarily severed by new developments or transport infrastructure. In relation to rail use, this should be done in liaison with the SRA which is best placed to advise on the sites and routes that are important to delivering wider transport objectives;*
- *Where possible, locate developments generating substantial freight movements such as distribution and warehousing, particularly of bulk goods, away from congested central areas and residential areas, and ensure adequate access to trunk roads.*
- *promote opportunities for freight generating development to be served by rail or waterways by influencing the location of development and by identifying and where appropriate protecting realistic opportunities for rail or waterway connections to existing manufacturing, distribution and warehousing sites adjacent or close to the rail network, waterways or coastal/estuarial ports.*
- *On disused transport sites consider uses related to sustainable transport first, before other uses.*

4.2.17 PPG13 discusses the issue of freight movements in sensitive areas, although it recognises that these particularly relate to those serving developments near to residential areas. It identifies the imposition of conditions, because of concerns over disturbance to residents, such as restricted hours of operation. However, PPG13 recognises that such restrictions can have the effect of exacerbating congestion during peak times, increasing local pollution. PPG13 states that policies need to strike a balance between the interests of local residents and those of the wider community, including the need to protect local employment opportunities.

4.2.18 PPG13 suggests that local authorities, freight operators, businesses and developers should work together, within the context of freight quality partnerships, to agree on lorry routes and on reducing vehicle emissions and vehicle and delivery noise levels, to enable a more efficient and sustainable approach to operations in such sensitive locations.

4.2.19 The Department is preparing good practice advice on the content and preparation of Transport Assessments to be submitted alongside applications for development proposals which would have significant transport implications. Advice will also be provided on using accessibility considerations in both RPG and development plans.

SRA Freight Strategy

4.2.20 May 2001 saw the publication of the SRA's Freight Strategy. This document had the aim of delivering the growth of rail freight as set out in the Governments Ten Year Plan (80% goal for freight growth), by encouraging modal shift from road to rail. The strategy was built on four elements relating to: network; interchanges; funding; and service delivery.

4.2.21 Of particular note is the interchange strategy which recognises the need for substantial additional interchange capacity on order to meet the governments 80% targeted growth in rail freight.

4.2.22 The aim of the SRA Interchanges Strategy is to facilitate development of a network of rail freight interchanges with the right facilities and in the appropriate locations to support the growth of freight on rail. The SRA's Interchanges Strategy addresses the need for more rail freight interchanges and seeks to encourage the location or relocation of manufacturing and distribution activity at existing or newly created rail-connected sites. The Strategy also addresses land and planning issues, in particular the shortage of sites in some areas and the need to improve the success rate of rail related planning applications.

4.3 Regional Policy & Guidance

Regional Planning Guidance for the South East (RPG9)

4.3.1 RPG9 covers the period up to 2016. The primary purpose of the guidance is to provide a regional framework for the preparation of local authority development plans. Other purposes of the guidance are to provide the spatial framework for other strategies and programmes such as the preparation of local transport plans. RPG9 takes in to account Government policies as set out in Planning Policy Guidance notes, circulars and other Government statements including White Papers. Finally, RPG9 states that all parts of it must be taken in to account by local planning authorities when preparing their development plans.

4.3.2 Policy T1 of RPG9 requires policies to be developed which minimise the distance which people need to travel whilst enhancing choice and ease of access to activities. In respect of large employment sites and freight movement the following specific policies of T1 are identified:

- *"Development should be planned holistically to minimise the need for movement and to facilitate and encourage safe movement on foot, by cycle and public transport."*
- *"Development that generates a large quantity of freight and goods movements should be located at or close to sites which maximise the opportunity for carriage by rail."*
- *"Development should be planned in such a way as to make best use of existing transportation networks and have regards to strategic priorities."*
- *"Give appropriate weight to environmental considerations, and in particular how the inter-relationship between land-use and transportation planning can minimise the overall environmental impact."*

4.3.3 Policy T6 of RPG9 identifies the need to fully integrate the freight distribution system within the region and to make the most efficient and effective use of road and rail. In taking forward the regional transport strategy, regional planning bodies are required to work with the Strategic Rail Authority, Highways Agency and other partners. The strategy should identify the following:

- *"A strategic freight network which supports the overall strategy and which promotes the efficient use of road and rail."*
- *"A criteria based assessment framework which will allow individual authorities to respond to proposals for inter-modal interchange facilities on a consistent basis."*

4.3.4 Policy T6 also states that development plans and local transport plans should:

- *"Include policies designed to increase the proportion of freight moved by rail….by maximising the potential of development sites to enhance access rail…for movement of freight."*
- *"Include proposals to safeguard sites for rail freight facilities … and permit development for rail freight operations and associated facilities for modal transfer where these would assist in the development of the strategic freight network."*
- *"Support spatial and locational policies set out in the guidance, for example, for development with higher generation of freight and commercial traffic to be located closest to inter-modal facilities, rail freight facilities…or roads designed and managed as traffic distributors."*

- *"Consideration should be given to the potential contribution that Freight Quality Partnerships could make to the development of a strategic multi-modal freight network."*
- *"Road improvements and commercial vehicle priority measures need to be considered as part of a comprehensive approach to freight distribution."*
- *"Local authorities should work with the Strategic Rail Authority and Highways Agency to enhance the level of rail freight access to ports and to develop combined transport freight systems and fully integrated distribution systems."*

The South East Plan

4.3.5 The South East plan is a full revision of RPG9 and covers the period to 2026. It is awaiting final government approval which is expected in 2008. The plan sets out a vision for the future of the South East region to 2026, outlining how the region intends to respond to challenges facing the region such as housing, the economy, transport and protecting the environment. The overriding aim is to ensure that the South East remains economically successful and an attractive place to live for future generations.

4.3.6 Section D4 of the South East Plan relates to Communications and Transport and forms the Regional Transport Strategy (RTS) for the South East of England. It is based on the existing RTS but the framework has been extended to 2026.

4.3.7 The South East Plan identifies the fact that the South East plays a vital role in the wider transport system not just for the UK but North-West Europe, because of its gateway function, transport is a UK wide problem and not just for the South East. In areas of the South East with a stronger economical presence, severe congestion on the roads and railways gives rise to unreliable and protracted journeys that reduce business performance and productivity for the region as a whole.

4.3.8 Section D4 of the plan, considers freight movements, it states that rail freight plays a key role in a number of markets and that there is a need to protect routes on the rail network that benefit freight movements and to address bottlenecks on the network that adversely affect rail freight. It also identifies the fact that there should be three to four large new inter-modal interchange terminals serving the South East and London, and that areas for potential sites should be identified in partnership between rail and road network operators, local authorities and the logistics industry. These new sites must be large enough to be able to accommodate longer trains with modern wagons and warehousing where rapid cargo transfer, handling and storage can take place.

4.3.9 Policy T11 on Freight and Site Safeguarding indicates that Relevant regional strategies, Local Development Documents and Local Transport Plans should include policies and proposals that:

- *"Safeguard wharves, depots and other sites that are, or could be, critical in developing the capability of the transport system to move freight, particularly by rail or water.*

- *Safeguard and promote sites adjacent to railways, ports and rivers for developments, particularly new intermodal facilities and rail related industry and warehousing, that are likely to maximise freight movement by rail or water.*

- *Encourage development with a high generation of freight and/or commercial movements to be located close to intermodal facilities, rail freight facilities, or ports and wharves."*

4.3.10 Policy T12 is specifically concerned with Rail Freight. It states that:

"The railway system should be developed to carry an increasing share of freight movements. Priority should be given in other relevant regional strategies, Local Development Documents, and Local Transport Plans, providing enhanced capacity for the movement of freight by rail on the following corridors:
- *Southampton to West Midlands.*
- *Dover/Channel Tunnel to and through/around London.*
- *Great Western Main Line.*
- *Portsmouth to Southampton/West Midlands.*

Potential site for these terminals will need to meet a number of criteria. In particular they must:
- *Be of sufficient size and configuration to accommodate an appropriate rail layout, transfer operation and added value activities.*
- *Be already connected or capable of rail connection at a reasonable cost.*
- *Have adequate road access or the potential for improved road access.*
- *Be situated away from incompatible land uses."*

4.3.11 Similarly, policy T13 is specifically concerned with intermodal interchanges. It identifies the fact the Regional Assembly should work jointly with the DfT, Network Rail, the Highways Agency , the Freight Transport Association and local authorities, to identify broad locations within the region for up to three intermodal interchange facilities. It further states that these facilities should be well related to:

- *"Rail and road corridors capable of accommodating the anticipated level of freight movement.*

- *The proposed markets.*

- *London."*

4.3.12 The executive summary of the South East Plan also identifies the importance of co-operating with neighbouring regions, especially :

"…London, East Midlands, the East of England and the South West of England… whilst …accepting a major future role for road freight but also encouraging railways to carry an increasing share of freight, especially on four strategic corridors supporting up to three regional freight transport interchanges."

4.4 Local Policy & Guidance

Local Transport Plan for Kent 2006/2011

4.4.1 The second LTP for Kent was submitted on 31 March 2006. Kent's second LTP seeks to provide choice in the transport network and reduce dependency on the private car, thereby improving accessibility for the whole community and protecting the environment.

4.4.2 Accessibility is particularly important in Kent as the County's economy is not as prosperous as most of the South East. 22% of households do not have access to a car, making it difficult for some residents to reach jobs and key services. Traffic levels continue to rise, in no small part due to Kent's role as the UK's gateway to Europe, and this is having a profound impact upon the unique environment which is the Garden of England. The challenge of two major growth areas demands that a sustainable approach be adopted to transport in the future.

4.4.3 Within Chapter 8 of the LTP2 the issue of the UK Gateway and International traffic due to the short sea crossing to France has caused the council to create a strategy on shipping and inland waterways that covers:

- *Qualified support for the expansion of international traffic, where it is supported by improvements in the road and rail network (within and beyond Kent) which are able to reduce congestion and encourage more traffic movements by rail.*
- *Support for the development of short sea shipping services as an alternative to land transport and greater use of the Thames and the Medway for moving freight and materials.*
- *International traffic through Kent being accommodated within the major international arteries (A2/M2, A20/M20, the CTRL and existing rail routes).*
- *Support for the parallel cross-channel options provided by the Channel Tunnel and the ports in order to allow choice, competition, safety, flexibility, job opportunities and a spreading of the pressure on the transport network.*
- *Recognition of how important Kent's major deep sea ports are and support for the right standard of road and rail access to serve them.*
- *Support for proposals for port expansion to be assessed against criteria that includes economic, social and environmental impacts and the need.*
- *To encourage freight traffic to move from road onto rail.*
- *If the need for a second fixed Cross Channel link is demonstrated, any proposal should encourage a substantial switch of traffic from road to rail and not jeopardise the choice of cross Channel modes, meet environmental criteria and minimise the impact on the county's roads.*

- *To explore with potential operators and the Environment Agency, the scope for providing passenger and freight services on the Thames and other inland waterways in Kent.*

The Kent and Medway Structure Plan

4.4.4 The plan was produced jointly by Kent County Council and Medway Council and was formally adopted on 6th July 2006, with the accompanying Supplementary Planning Guidance (SPG) adopted on 13th July 2006. It covers the period 2001-2021, although its housing provisions relate to 2001-2016, which was consistent with the time horizon of the old RPG9. The plan will guide more detailed local planning, the preparation of Local development documents and Local Transport Plans.

4.4.5 The structure plan sets out the *"…the strategic planning framework for the protection of our environment, major transport priorities, and the scale, pattern and broad location of new development including provision for new housing and major economic development."*

4.4.6 Chapter 8 of the plan is concerned with distribution and rail freight. It states:

"…as much goods traffic as possible should be transferred to rail because it is more environmentally sustainable and energy efficient than road transport. This is especially relevant to the use of the Channel Tunnel for rail freight. It is unlikely that Kent's road network could be improved sufficiently to handle the growth in transport movements expected during the Plan period. "

4.4.7 The plan also goes on to say that:

"… The transfer of freight from road to rail will be encouraged through schemes that provide additional rail freight capacity, improve road/rail interchanges and directly serve major development sites, unless there are overriding planning or environmental constraints."

4.4.8 The plan also identifies the fact that the completion of the Channel Tunnel Rail Link will remove Eurostar trains and some domestic services from the existing rail network, making more slots available for freight.

4.4.9 Further, Policy TP13 of the structure plan is concerned with rail freight and handling facilities and states that:

"…development which will encourage the transfer of freight from road to rail, including the development of freight handling facilities, will be permitted unless there is overriding conflict with other planning and environmental considerations. If necessary, conditions will be imposed on planning permissions in order to maximise the amount of non-road borne freight movements."

Maidstone Borough Council Core Strategy

4.4.10 The Core Strategy sets out: a spatial vision for the Borough of Maidstone, together with the strategic objectives which follow on from the vision.

4.4.11 Policy CS7 is associated with strategic infrastructure including new transport links) to enable new development and looks to ensure that the sale and pace of new development is dependant on the provision of new infrastructure to meet the needs that it generates. These matters will require periodic review and phased implementation over the Plan period 2006-2026. The aims of the policy are:

- *"New strategic infrastructure (and transport links) necessary to enable development to meet Plan objectives must be provided in a timely manner. Conversely, major new developments should not proceed in the absence of the necessary strategic infrastructure.*

- *To provide for the South East Maidstone Strategic Link (SEMSL) in order to regenerate and open up development locations (which should be built to high environmental standards) in and around the outer SE quadrant of urban Maidstone.*

- *To provide for strategic highway road improvements in the Upper and Lower Stone Street and All Saints areas, to improve accessibility and the quality of the urban environment, and to enable environmental improvement (including air quality) and redevelopment potential in the Principal town of Maidstone.*

- *To support multi-modal strategic transport improvements identified: within and around the urban area of Maidstone, and on the route corridors of the M20 corridor, the corridor between Maidstone and Medway (particularly improvements to the Medway Valley line), and Maidstone and Tonbridge/Tunbridge Wells."*

Maidstone Local Development Framework

4.4.12 The Planning and Compulsory Purchase Act 2004 laid out new provisions for the replacement of Local Plans with Local Development Frameworks (LDF). This is a new system, which removes Structure Plans at County level, and replaces them with Regional Spatial Strategies (RSS). Maidstone Borough Council submitted its Local Development Scheme under the Local Development Framework in March 2007. The Framework is made up of distinct parts based on smaller documents so that each can be examined and reviewed separately from the whole document.

4.4.13 Transportation will be included in second cycle of the Development Plan Documents, post 2007. It will address the new infrastructure needs of the Borough, and manage the spatial implications of transportation arising from new development.

Summary

- The development of the Kent International Gateway would be fully compliant with all national, regional and local policies in that it would:
    - § Meet the objectives of transferring a greater proportion of freight in the UK by rail.
    - § Provide for integration between different types of transport – to ensure that each contribute its full potential.
    - § Provide a safe and accessible interchange between different forms of transport – through the provision of a freight transfer facility.
    - § Encourage the transfer of freight from road to rail.
    - § Provide a facility in a location that is away form a congested central areas and residential areas and close to adequate access to the trunk road network.
    - § Be on a site that can readily provide access to the UK's rail network.
    - § Provides a facility that has the potential to contribute towards meeting the governments Ten Year Plan objective of 80% goal for freight growth.

5 DEVELOPMENT PROPOSALS

5.1.1 The proposed development at KIG comprises an intermodal freight transfer site including a rail transfer facility, warehousing with associated administration and some smaller commercial units of B1/B2/B8 nature. Table 5.1 below presents details of the proposed development, while Figure 12 presents the proposed layout of the site.

5.1.2 The principle objective of the development is to increase the opportunity of moving freight in the UK by rail rather than road and thus reduce the number of HGV kilometres on the road network.

Use Class	Proposed Land Use	Area in Metres^2	Area in Feet^2
Sui Generis	Inter Modal Area	62,709	675,000
B8	Rail Distribution Warehouse	170,708	1,837,500
B2/B8	Industrial Units/Warehousing	193,339	2,081,100
B1/B2/B8	Small Industrial Units	11,371	122,400
	Total	438,127	4,716,000

Table 5.1: Schedule of Development

5.2 Schedule of Accommodation

5.2.1 Table 5.2 below presents a breakdown of the site by each unit. All figures are Gross Internal Areas.

Use Class	Unit Name	Proposed Land Use	Area in Metres^2	Area in Feet^2
Sui Generis	Inter Modal Area	Road/Rail Freight Transfer	62,709	675,000
Inter Modal Area			*62,709*	*675,000*
B8	R1	Rail Distribution Warehouse	125,836*	1,354,500*
B8	R2	Rail Distribution Warehouse	44,872*	483,000*
Total Rail Distribution			170,708	1,837,500
B2/B8	Ind A	Industrial Unit/Warehouse	7,073*	75,600*
B2/B8	Ind B	Industrial Unit/Warehouse	21,460*	231,000*
B2/B8	Ind C	Industrial Unit/Warehouse	26,825*	288,750*
B2/B8	Ind D	Industrial Unit/Warehouse	18,534*	199,500*
B2/B8	Ind E	Industrial Unit/Warehouse	74,136*	798,000*
B2/B8	Ind F	Industrial Unit/Warehouse	45,360*	488,250*
Total Industrial Units			*193,389*	*2,081,100**
B1/B2/B8	Small Industrial Units		11,371	122,400
Sui Generis	Truck Layover	Truck lay-over & Driver Motel	-	-
		Total	438,127	4,716,000

**Includes 5% associated office within*

Table 5.2: Schedule of Accommodation

On Site Truck Stop

5.2.2 In addition to the above schedule of accommodation, the KIG development will also have a small HGV car park and truck stop. This will be exclusive to vehicles associated with the site and will enable drivers to take a break as required under EU regulations on driving hours.

5.3 Hours of Operation

5.3.1 With the exception of the B1/B2/B8 units to the eastern end of the development, the site will probably operate on a 24hour basis. This is attributable to the fact that freight operations throughout the UK and Europe serve markets that rely on frequent deliveries of goods and produce for the success of their business. The shift patterns, three 8 hour shifts, whilst not set in stone at this time are likely to be:

- 0600 – 1400
- 1400 – 2200
- 2200 - 0600

5.3.2 Table 5.3 gives a breakdown of the likely hours of operation by unit type.

Unit Name	Land Use	Hours Of Operation	Shift Pattern (if Applicable)*
Inter Modal Transfer Area	Inter Modal Transfer between Road and Rail	24 Hr	0600 - 1400 1400 – 2200 2200 – 0600
R1 & R2	Rail Distribution Warehousing	24 Hr	0600 - 1400 1400 – 2200 2200 – 0600
Ind A to F	Industrial Units / Warehousing	24 Hr	0600 - 1400 1400 – 2200 2200 – 0600
Small Industrial Units	B1/B2/B8 Units	0900 - 1700	

**Assumed shift patterns subject to review to link in with public transport where possible*

Table 5.3: Expected Hours of Operation

5.4 Means of Access

5.4.1 It is proposed that all vehicular access to the KIG site will be accessed via two signal controlled junctions from the A20 at the eastern end of the KIG site, Figure 13 refers. Both KIG access junctions will have restricted access.

HGV Access Junction

5.4.2 The eastern junction will be designated for use by HGV's only. The junction will be signal controlled with ingress and egress restricted to and from the east, i.e. towards the M20. A designated right turn lane will be provided for inbound HGV traffic and will be vehicle activated. The A20 westbound ahead lane would not be signal controlled as there would be no opposing traffic movement.

5.4.3 Entry and exit to the KIG site will be controlled at the proposed gatehouse, located some distance in to the site. Sufficient vehicle stacking distance has been provided between the junction and the gatehouse to ensure vehicles entering KIG do not stack back on to the A20 hindering traffic flows. Vehicles exiting the site would be similarly controlled at the gatehouse, particularly at times when their release on to the M20 would be impeded with Operation Stack. The on-site truck stop and other holding areas adjoining the warehouses would be used to park-up HGV's for any prolonged period where they couldn't be released on to the M20.

5.4.4 Controlled pedestrian and cycle crossing facilities, likely to be a Toucan crossing, will be provided across the site arm of the junction.

Non-HGV Access Junction

5.4.5 The western access junction will be an all movement signal controlled junction providing access for all non-HGV traffic to the KIG site. Designated inbound turning lanes are provided on the A20.

5.4.6 Controlled pedestrian and cycle crossing facilities, likely to be a Toucan crossing, will be provided across the site arm of the junction.

Pedestrian and Cycle Access

5.4.7 In addition to the vehicular access the site will also benefit from a number of pedestrian and cycle access points. These will be:

- A dedicated cycle/footway from the A20 via the car only access junction.
- A dedicated cycle/footway from Crismill Lane from the A20 near the centre of the site.
- A dedicated cycle/footway from Thurnham Lane at the western extremity of the site.

5.4.8 Figure 14 identifies the proposed pedestrian and cycle access points to the site. These are discussed in more detail in chapter 6.

5.4.9 The cycle and pedestrian access points will be supplemented by improvement to infrastructure on the A20 between Roundwell and the eastern HGV access point. Further provision on site will also be made with the inclusion of segregated infrastructure for pedestrians and cyclists throughout with the provision of shared and mainly segregated pedestrian/cycleway alongside the internal roads.

6 IMPACT OF GENERATED TRAFFIC

6.1 Employee Numbers and Mode split

Employee Numbers and Work Patterns

6.1.1 Based on the schedule of accommodation contained within chapter 5 above, the proposed development at KIG will result in the creation of a significant number of jobs. To estimate the prospective numbers of employees, the Great Britain Freight Model (GBFM), as recently adopted by DfT, has been used. Appendix G presents details of how the GBFM works.

6.1.2 The GBFM model has estimated that the Industrial Units A-F, Rail Distribution Warehouses R1 and R2 and the Inter-Modal Freight Transfer point elements of the development will employ a total of 3,000 employees. It has been assumed that 10% of these, that is 300, will be office staff working conventional office hours 0900 – 1700. The remaining 2,700 will work over the three shift patterns, with a heavier weighting towards the 0600 – 1400 and 1400 – 2200 shifts day shifts than that of the 2200 – 0600 night shift.

6.1.3 In addition the smaller commercial units to the east of the development will employ in the order of a further 500 people. The hours of work are likely to be 0900 – 1700.

6.1.4 From experience elsewhere it is known that development of this nature has an absence rate often in excess of 5%. However, in order to prepare as robust assessment as possible this percentage reduction has not been considered in this assessment. Nevertheless, for completeness the absence factor has been calculated. Table 6.1 below summarises the employee numbers by land use and work hours, with and without a sickness factor.

Land Use	Time Period	No Of Employees	Less 5% for Absence	No of Employees on site
B2/B8 Employment (Industrial Units / Warehousing A-F, rail distribution warehouses) and the sui generis Inter Modal Freight Transfer	0600 -1400	1000	50	950
	1400 – 2200	1000	50	950
	2200 - 0600	700	35	665
B8 Admin	0900 – 1700	300	15	285
B1/B2/B8 Small Industrial Units	0900 – 1700	500	25	475

Table 6.1: Employees by Land use and Work Hours

Travel to Work Mode Splits

6.1.5 In establishing travel to work mode splits, the starting point has been to consider the Maidstone Travel to Work Datasets from the 2001 Census – Dataset KS15. Table 6.2 below presents a summary of that data.

Mode	Percentage of Employees Using Mode
Foot	10.21%
Cycle	1.24%
Train	6.13%
Bus	4.27%
Car Driver	60.72%
Car Passenger	5.69%
Home worker	10.08%
Motor Cycle	0.87%
Other	0.42%
Taxi	0.27%
Underground	0.10%

Table 6.2 – Summary of Maidstone Travel to Work Statistics – Census 2001

6.1.6 Given that the proposed development is somewhat bespoke some of the mode split percentages have been modified to take account of the following:

- The majority of the employees will be blue-collar workers; therefore higher percentages are likely to access the site by sustainable modes or car share to the site.
- There is currently no major housing within close proximity; therefore the number of people arriving on foot will be reduced (NB, future growth planned for east Maidstone is likely to greatly improve this).
- There is a rail station within close proximity of the site; proposals for a shuttle bus/extended bus service into the development will make this a viable option for travel to/from the site.
- The location of the site means that commuter trips by car will be higher than average.
- Working on a 24hr shift basis is likely to increase the amount of commuter trips to the site by car.

6.1.7 Based upon the information contained within the Census data, operational characteristics and our assessment of the accessibility of the site, we have determined that the appropriate mode splits to be applied to this development should be those presented in Table 6.3 below.

Mode	Percentage of Employees Using Mode
Foot	1.00%
Cycle	2.50%
Train	8.00%
Bus	8.00%
Car Driver	71.75%
Car Passenger	7.50%
Other	1.25%

Table 6.3: Proposed KIG Mode Splits for Shift Workers

6.1.8 From the proportions identified in Table 6.3 above and the number of likely employees of the development, Table 6.1, it has been possible to determine the number of employees arriving at the site by each mode for each shift and land use; these are presented in Table 6.4 below.

Mode	Percentage of Employees by Mode	B8 Employees 0600-1400 Shift (1000)	B8 Employees 0600-1400 Shift (1000)	B8 Employees 0600-1400 Shift (700)	B8 Employees 0900-1700 Office (300)	B1 Employees 0900 -1700 Office (500)
Foot	1.00%	10	10	7	3	5
Cycle	2.50%	25	25	18	8	13
Train	8.00%	80	80	56	24	40
Bus	8.00%	80	80	56	24	40
Car Driver	71.75%	718	718	502	215	359
Car Passenger	7.50%	75	75	53	23	38
Other	1.25%	13	13	9	4	6

NB. Assumes no sickness

Table 6.4: Proposed KIG Mode Splits Shift Workers

6.1.9 As stated previously in this chapter, the number of trips by car derived in Table 6.4 above is the most likely to occur. However, in order to assess a robust case 100% attendance has been assumed in the impact assessment. Appendix H contains the full traffic data and trip calculation spread sheets.

7 POTENTIAL IMPROVEMENTS

7.1.1 This chapter considers the potential improvements to sustainable travel opportunities that could arise from the proposed KIG development.

7.2 Pedestrians and Cyclists:

7.2.1 As mentioned elsewhere in this report, the existing footways along the A20 in the vicinity of the site have become potholed and overgrown. As part of the development proposals it may be possible to improve this situation, particularly the section between the Roundwell Junction and the main site entrance. Here it may be viable to provide a new segregated 3.5 metre foot/cycleway within the existing highway.

7.2.2 The layout of the KIG will also ensure that pedestrians and cyclists are fully catered for. There will be a 3.5 metre shared foot/cycleway on at least one side of all main roads within the development.

7.2.3 Thurnham Lane has the potential to be used as a walk/cycle route form the western end of the KIG to Bearsted rail station. At this stage it is envisaged that a foot/cycleway could be provided into the site at the location of the public right of way, KM 81. This will need to be explored in more detail at the appropriate time.

7.2.4 Figure 15 identifies the potential improvements described above.

7.3 Public Transport

7.3.1 Buses: DWP met with the main bus operator, Arriva, in March 2007, (meeting notes appended at Appendix A) to discuss the possibilities of serving the KIG development. At this meeting it became clear that a new service would not be commercially viable and the attention turned to the possibility of extending the exiting 9/19 service to the site.

7.3.2 It was agreed at the meeting with Arriva that it may be possible to extend the 9/19 service into the site possibly via Thurnham Lane or using Water Lane. Further investigation is currently ongoing to identify the technical feasibility of this.

7.3.3 At the meeting, the possibility of a shuttle bus linking Bearsted station with the KIG was discussed as a potential way of connecting the station with KIG. Further analysis of this option is currently being undertaken.

7.3.4 In order to encourage the use of public transport to access the site some additional analysis has been undertaken into the viability of providing dedicated bus services to the site for employees. The analysis has considered that if a dedicated service was to be introduced, then the potential modal shift to use bus would be 15%. The distribution of employees has been based upon that described in detail at chapter 10 of this report.

7.3.5 Using this distribution and assuming that 15% of employees would use buses to travel to work has enabled us identify 5 potential routes to and from the KIG site. Figure 16 identifies the potential routes

7.3.6 Unfortunately our analysis has indicated that whilst in principal, the provision of dedicated services would be desirable and could encourage modal shift, the distances required to be travelled to collect employees would result in unrealistic journey times. For instance, journey times extended to up to 70 minutes, whilst patronage levels ranged from 16 persons to just 3 persons.

7.3.7 Presented with these long journey times and low patronage levels, the financial implications of running dedicated bus services to and from the KIG site at shift change over times for such a small potential modal shift are unrealistic.

7.3.8 The one exception that could be introduced would be a route from Maidstone town centre to the KIG site. This service could also potentially stop at Bearsted rail station before entering the site. Our analysis has shown that this route would take approximately 36 minutes. However, patronage levels would again be low carrying at most 16 employees (depending on the shift) between Maidstone and the KIG site.

7.3.9 Based on these findings it has been determined that the mode splits described in chapter 6 should remain those to be assessed in the traffic impact sections of this report.

7.3.10 In the longer term with the proposed growth of Maidstone, to the east, depending upon the exact location of the growth, it is possible that bus operators could run new services along the A20 past the KIG site. If such an opportunity arose, Arriva indicated that they would be happy to stop at new bus stops on the A20 to serve the KIG development. Figure 17 identifies these opportunities.

7.3.11 Trains: DWP met with Network Rail in March 2007 to discuss the possibilities for linking the KIG development with Bearsted station. At the meeting it was discovered that Network Rail has submitted a planning application for development at the adjacent former goods yard which will alter the existing arrangements at the station forecourt.

7.3.12 The possibility of running a shuttle bus between the station and the KIG development was discussed. Network Rail indicated that provision will be made within the new arrangements for the coach serving Leeds Castle to be better accommodated within the existing station forecourt. They indicated that it would be possible for a shuttle bus between the KIG and the station to enter the station forecourt to pick-up/drop-off potential KIG employees and visitors. Further analysis of this option is currently being undertaken.

7.3.13 Pedestrian linkages to Bearsted Station along Thurnham Lane into the site at the public rights of way are also being considered.

7.3.14 It is acknowledged that the train times are beyond the control of the development, with the rail operator, South Eastern, being responsible for these decisions. As such, the objective will be to consider the possibilities of ensuring that where possible KIG shift patterns are compatible with train times to increase use of this mode.

Summary

- It could be viable to improve the provision for pedestrians and cyclists in the vicinity of the KIG.
- Existing bus services may be extended to serve KIG.
- Analysis has resolved that dedicated buses to other towns and villages at shift changeover would not be viable due to excessive journey times.
- A shuttle bus will be provided between the KIG and Bearsted rail station at shift changeover.
- Alterations to the existing layout arrangements at the rail station will facilitate the required movements for the shuttle bus.

8 SUSTAINABILITY AND TRAVEL PLANNING

8.1 Introduction

8.1.1 This section outlines a framework travel plan that will be developed to capitalise on the transport sustainability of the development. In preparing this work, reference has been made to the various prevailing policies and initiatives relating to sustainability in transport at the national, regional and local level. In particular, reference has been made to the following sets of guidelines:

- Tools for Travel Planning in Urban Areas (Transport for Quality of Life, 2004);
- A Travel Plan Resource Pack for Employers (Department for Transport, 2000);

8.2 Sustainability Analysis

8.2.1 Previous chapters of this report have already identified in some detail the sustainable travel credentials for the development site.

8.2.2 The operational requirements of the KIG development has resulted in it being located at a major transport interchange in respect of rail and HGV trips. However, this has resulted in its accessibility by other modes being to a lesser standard of provision.

8.2.3 On site transport provisions have been designed to minimise transport impact and maximise sustainability. In this regard, the principal features of the site are as follows:

- Bus stops within easy walking distance of the development site serving Maidstone and other transport hubs such as Bearsted station.
- National Rail services at Bearsted station to a comprehensive range of destinations within a comfortable walking distance of the KIG site.
- Pedestrian footways in the vicinity of the site could be brought up to an adequate level of provision and combined with cyclists.
- The proposed level of cycle parking provision at the site would be generous.

8.3 Framework Travel Plan

8.3.1 The potential sustainable features outlined above will be reinforced and exploited by the introduction of the travel plan, a single travel plan being required to be adopted by all operators within the KIG site. The plan can only be properly prepared when the development is occupied and the travel patterns of its occupiers can be measured. However, a framework travel plan from which ultimate travel plans will be developed is presented here under the following headings:

- Objectives.
- Structure.
- Measures.

8.3.2 For each different use class the objectives and structure of the travel plan will be the same. However, the measures that will need to be implemented are likely to vary.

8.3.3 In developing this framework travel plan, reference has been made to the various national, regional and local travel planning guidance and advice identified in Section 3.

Objectives

8.3.4 The overall objective of the travel plans will be to manage and reduce the impact of travel associated with the development site on the transport network and on the environment. This will be pursued through the following objectives:

- Reduce the amount of development site generated travel made in private cars.
- Increase the amount of site related travel made by public transport, walking and cycling.
- Reduce the need to travel.

Structure

8.3.5 The basic structure of the travel plans will be as follows:

- Confirm support from the site developer for the preparation of travel plans.
- Appoint a travel plan coordinator to develop, execute and monitor the travel plans.
- Establish baseline travel conditions associated with the site by means of a travel behaviour survey of occupiers.
- Establish realistic and achievable mode share targets that the travel plan should aim to achieve.

- Devise and implement a series of measures to encourage modal shift towards the required targets.
- Monitor progress in relation to mode share targets, and revise the plan accordingly.

Measures

8.3.6 The cornerstone of the travel plans will be the series of measures aimed at achieving a mode share in line with the plan's objectives and the identified targets. These are likely to be slightly different for different land uses and are therefore presented separately for the commercial and residential components of the development.

8.3.7 The measures identified here do not represent a comprehensive list of measures that will be introduced. Rather they represent an indication of the types of measures that will be considered for inclusion in a travel plan.

8.3.8 The measures that will be considered include the following:

- Membership of a Travel Plan Group.
- Car sharing schemes, to be coordinated where possible with other nearby sites.
- Provision for participation in car clubs.
- Prioritisation of parking for car sharers, car club drivers, the mobility impaired and key staff.
- Car parking restrictions or penalties for drivers that do not fall into the above categories.
- Provision of information on public transport routes and services to site users.
- Interest free loans to employees for season tickets.
- Offering preferential charges to site users who have travelled by public transport.
- Remedying security concerns such as poorly lit bus stops.
- Allowing flexible working hours to coordinate with public transport schedules.
- Provision of information regarding the health benefits of walking and cycling.
- Provision of information on designated pedestrian and cycle routes in the surrounding area.
- Promotion of, and financial assistance with, cycling proficiency training.
- Interest free loans or financial subsidy for the purchase of cycles, cycling and walking equipment.
- Encouraging membership of bicycle users and walkers groups.
- Telephone and video conference facilities to enable meetings to be held without the need to travel between sites.
- Providing a centralised travel register such that details of impending external trips can be coordinated.

8.4 Conclusions

8.4.1 Based on the data and analysis presented in this report, the following conclusions can be drawn:

- The site layout, access and parking provisions comply with standards and guidelines set out by KCC and MBC;
- Employee vehicular traffic generated by the proposed development will be modest in comparison to the development size and will have a manageable traffic impact on the surrounding road network;
- The proposed framework travel plan will maximise the opportunity for employees at the KIG site to travel by sustainable modes of transport.

9 PARKING PROVISION

9.1 KCC Standards

9.1.1 The Kent and Medway Structure Plan 2006, Supplementary Planning Guidance SPG 4 sets out the KCC vehicle parking standards that should be applied to development. However, having considered the bespoke nature of this development proposal it would be inappropriate to comply with these standards. This is due to the fact that if the standard were to be applied there would be a requirement to provide the 5,551 spaces. Table 9.1 below provides the rational for arriving at this figure.

Land Use	Floor space	Standard	Spaces Required
B8 – General Industry	170,708	1 space per 50 m^2	3,414
B8 – Storage and Distribution	193,388	1 space per 110m^2	1,758
B1 – Offices (Small Ind units)	11,371	1 space per 30 m^2	379
Total			5,551

Table 9.1: Required Parking Spaces Based on SPG4

9.1.2 Given that the Inter Modal transfer operations and the warehousing and distribution elements of the proposed development are to generate approximately 3000 employees, working over a 24hr 3 shift pattern, there will never be a demand to provide this many spaces. As a direct consequence of this a more sensible approach to the provision of car parking on site has been derived. The following paragraphs present details.

9.2 Proposed Bespoke Parking Provision:

9.2.1 As identified above there will be a total of 3,000 working at the KIG site on the freight element of the development and a further 500 on the B1/B2/B8 small commercial units to the east to the site.

9.2.2 Conversely some assumptions need to be made about the number of employees requiring parking provision on the other more bespoke elements of the site. These are surmised below:

- As the development will operate on a shift basis 3,000 employees will not be on site at the same time.
- Of the 3000 employees, nearly 30% will travel to the site by modes other than the private car, e.g. car passenger, bus, train, cycle and walk.
- A site of this nature will have a daily absence record of approximately 5%.
- There will need to be sufficient spaces to accommodate shift changeover.

9.2.3 Taking a first principles approach, which has considered the shift pattern, employees numbers, and mode split information provided in Chapters 5 and 6, it has been possible to calculate the maximum number of spaces that will need to be provided.

9.2.4 The process has been based upon parking accumulations relating to the number of employees on site at any one time together with the number of visitor and servicing trips to the site. Table 9.2 identifies the accumulation of parking over a 24 hour period.

Time Range	Car Trips Employees		Car Trips Visitors & Servicing		Vehicle Parking Accumulation
	Arrivals	Departures	Arrivals	Departures	
00:00-01:00	0	0	0	0	502
01:00-02:00	0	0	0	0	502
02:00-03:00	0	0	0	0	502
03:00-04:00	0	0	0	0	502
04:00-05:00	0	0	0	0	502
05:00-06:00	717	0	33	5	1247
06:00-07:00	0	502	49	39	755
07:00-08:00	72	0	16	5	838
08:00-09:00	431	0	11	0	1279
09:00-10:00	72	0	16	10	1358
10:00-11:00	0	0	5	10	1353
11:00-12:00	0	0	11	20	1345
12:00-13:00	0	0	27	20	1352
13:00-14:00	717	0	0	5	2065
14:00-15:00	0	718	0	5	1342
15:00-16:00	0	0	5	30	1318
16:00-17:00	0	72	5	15	1237
17:00-18:00	0	431	38	34	810
18:00-19:00	0	72	33	44	727
19:00-20:00	0	0	0	10	717
20:00-21:00	0	0	0	0	717
21:00-22:00	502	0	0	0	1219
22:00-23:00	0	718	0	0	502
23:00-24:00	0	0	0	0	502

Table 9.2: 24 Hour Parking Accumulation at KIG

9.2.5 From the above Table it can be seen that the maximum number of parking spaces required at the KIG site is 2065 spaces between 13:00 and 14:00. This requirement arises primarily as a result of the shift changeover between the 06:00 – 14:00 shift and the 14:00 – 22:00 shift.

10 TRAFFIC IMPACT OF DEVELOPMENT

10.1.1 The approach to the transport assessment has been based upon the guidance and policy discussed above and has included the following elements:

- Identify Area of Assessment
- Determine Years of Assessment
- Determine Base Traffic Flows
- Estimate Traffic Generation associated with the development
- Establish Assessment Time Periods
- Determine Traffic Distribution
- Assign Development Related Traffic
- Identify Impact of Development

10.1.2 Each of these elements is considered in turn below.

10.2 Area of Assessment

10.2.1 The area of assessment is illustrated by Figure 18. The junctions that will be assessed as part of this assessment are:

- HGV Access from A20 into site Traffic Signal Controlled Junction
- Car traffic access from A20 into site Traffic Signal Controlled Junction
- A20/Roundwell priority junction
- A20 Roundabout link with M20 Junction 8
- A20/Eyhome Street Roundabout
- A20/Penfold Hill Roundabout
- A20 / Willington Street Junction

10.2.2 In addition to these junctions consideration will also be given to:

- M20 Junction 8 Slip Roads
- All Links Connecting and Feeding the Above Junctions

10.3 Assessment Years

10.3.1 It is envisaged that the proposed development will be completed and fully operational by 2016 and as such the traffic impact of the development has been assessed for the following years.

- 2007 – Base year without development (chapter 2).
- 2016 – Year of opening with and without development.
- 2026 – Design year with and without development.

10.3.2 It is worth noting that these years of assessment are also consistent with the Highways Agency's modelling of the M20 between junctions 4 and 8. In time it is envisaged that it may be possible for the HA to add this proposed development to their traffic model to determine the likely impact on this section of the M20.

10.4 Estimate Traffic Generation Associated with the Development

10.4.1 Trip generations for employment have been based upon the employee numbers identified in Table 6.1, ignoring the absence factor, and the mode splits in Table 6.3. A first principles approach has been applied which has identified the number of trips by each land use and mode as per Table 6.4.

10.4.2 Following this process, the number of trips undertaken by car have then been converted using a 24hr profile. The daily profile chosen has been devised on a first principle basis taking into account the three-shift pattern and 09.00 – 17.00 workforce. The resulting traffic generation figures in respect of employee trips have then been calculated and are presented in Table 10.1 below.

	Trip Rate Profile		Trip Generation Car driver 71.75%	
Time Period	Arrivals	Departures	Arrivals	Departures
00:00-01:00	0%	0%	0	0
01:00-02:00	0%	0%	0	0
02:00-03:00	0%	0%	0	0
03:00-04:00	0%	0%	0	0
04:00-05:00	0%	0%	0	0
05:00-06:00	28.57%	20.00%	717	502
06:00-07:00	0%	0%	0	0
07:00-08:00	2.86%	0%	72	0
08:00-09:00	17.15%	0%	431	0
09:00-10:00	2.86%	0%	72	0
10:00-11:00	0%	0%	0	0
11:00-12:00	0%	0%	0	0
12:00-13:00	0%	0%	0	0
13:00-14:00	28.57%	28.57%	717	717
14:00-15:00	0%	0%	0	0
15:00-16:00	0%	0%	0	0
16:00-17:00	0%	2.86%	0	72
17:00-18:00	0%	17.15%	0	431
18:00-19:00	0%	2.86%	0	72
19:00-20:00	0%	0%	0	0
20:00-21:00	0%	0%	0	0
21:00-22:00	20.00%	28.57%	502	717
22:00-23:00	0%	0%	0	0
23:00-24:00	0%	0%	0	0

NB: Trip Generations for Car Drivers only, all other presented in Appendix H.

Table 10.1: 24hr Trip Generation for Employees

10.4.3 In addition some assumptions have been made to identify other visitor vehicle trips, servicing trips and freight trips associated with the operation of the KIG site outside of the main travel to work time periods. The following paragraphs give details.

10.4.4 Business Related Trips, Visitor Vehicle Trips and Servicing Trips: The 2001 census indicates that there are, on average, an additional 8% of business related trips and visitor trips to and from development. An additional 2% has been added to reflect service trips. These vehicles would be car and LGV's. Finally a 2.5% proportion of HGV's associated with this has been applied. As for the Employee trips the 24 hour profile has been applied. Table 10.2 presents the results.

	Daily Trip Profile		Trip Generation Cars and LGV's		Trip Generation HGV's	
Time Period	Arr	Dep	Arr	Dep	Arr	Dep
00:00-01:00	0%	0%	0	0	0	0
01:00-02:00	0%	0%	0	0	0	0
02:00-03:00	0%	0%	0	0	0	0
03:00-04:00	0%	0%	0	0	0	0
04:00-05:00	0%	0%	0	0	0	0
05:00-06:00	13.04%	1.96%	33	5	3	1
06:00-07:00	19.57%	15.69%	49	39	5	4
07:00-08:00	6.52%	1.96%	16	5	2	1
08:00-09:00	4.35%	0%	11	0	1	0
09:00-10:00	6.52%	3.92%	16	10	2	1
10:00-11:00	2.17%	3.92%	5	10	1	1
11:00-12:00	4.35%	7.84%	11	20	1	2
12:00-13:00	10.87%	7.84%	27	20	3	2
13:00-14:00	0%	1.96%	0	5	0	1
14:00-15:00	0%	1.96%	0	5	0	1
15:00-16:00	2.17%	11.76%	5	30	1	3
16:00-17:00	2.17%	5.88%	5	15	1	2
17:00-18:00	15.22%	13.73%	38	34	4	4
18:00-19:00	13.04%	17.65%	33	44	3	5
19:00-20:00	0%	3.92%	0	10	0	1
20:00-21:00	0%	0%	0	0	0	0
21:00-22:00	0%	0%	0	0	0	0
22:00-23:00	0%	0%	0	0	0	0
23:00-24:00	0%	0%	0	0	0	0

Table 10.2: 24hr Trip Generation Visitor and Servicing Trips

10.5 Freight Traffic Associated with the Operation of the KIG

10.5.1 The number of HGV's associated with the KIG development has been derived from the GBFM model, details of which are presented in Appendix G. The model has predicted that there will be 1,931 inbound and 1,931 outbound HGV movements in a given 24 hour period. The GBFM also predicts the 24 hour profile for such trips. Table 10.3 identifies the 24hr profile and the number of freight vehicles in each period.

	Road Freight Trips Daily Profile		Road Freight HGV Trips – Vehicles	
Time Period	Arrivals	Departures	Arrivals	Departures
00:00-01:00	1.99%	2.53%	38	49
01:00-02:00	2.52%	3.49%	49	67
02:00-03:00	1.87%	2.40%	36	46
03:00-04:00	1.81%	3.22%	35	62
04:00-05:00	2.52%	2.26%	49	44
05:00-06:00	3.69%	4.73%	71	91
06:00-07:00	4.04%	5.68%	78	110
07:00-08:00	5.21%	4.79%	101	92
08:00-09:00	4.10%	4.59%	79	89
09:00-10:00	6.91%	5.21%	133	101
10:00-11:00	6.67%	4.38%	129	85
11:00-12:00	6.85%	6.58%	132	127
12:00-13:00	4.86%	6.10%	94	118
13:00-14:00	7.49%	4.86%	145	94
14:00-15:00	6.21%	5.62%	120	109
15:00-16:00	5.15%	5.41%	99	104
16:00-17:00	4.86%	4.86%	94	94
17:00-18:00	4.27%	4.45%	82	86
18:00-19:00	3.57%	1.99%	69	38
19:00-20:00	3.46%	3.84%	67	74
20:00-21:00	3.34%	3.56%	64	69
21:00-22:00	2.81%	3.49%	54	67
22:00-23:00	2.87%	2.81%	55	54
23:00-24:00	2.93%	3.15%	57	61

Table 10.3: Road Freight Traffic Daily Profile and Trips

10.5.2 In order to calculate the total development related trips it is necessary to combine the information contained in Tables 10.1, 10.2, and 10.3. This task has been undertaken and is presented in Table 10.4 below. It is these trips that will be assessed in the capacity analysis.

	Trip Generation Cars and LGV's		Trip Generation HGV's	
Time Period	Arr	Dep	Arr	Dep
00:00-01:00	0	0	34	43
01:00-02:00	0	0	43	60
02:00-03:00	0	0	32	41
03:00-04:00	0	0	31	55
04:00-05:00	0	0	43	39
05:00-06:00	750	5	63	81
06:00-07:00	49	542	69	97
07:00-08:00	88	5	89	82
08:00-09:00	441	0	70	78
09:00-10:00	88	10	118	89
10:00-11:00	5	10	114	75
11:00-12:00	11	20	117	113
12:00-13:00	27	20	83	104
13:00-14:00	717	5	128	83
14:00-15:00	0	722	106	96
15:00-16:00	5	30	88	93
16:00-17:00	5	87	83	83
17:00-18:00	38	465	73	76
18:00-19:00	33	116	61	34
19:00-20:00	0	10	59	66
20:00-21:00	0	0	57	61
21:00-22:00	502	0	48	60
22:00-23:00	0	718	49	48
23:00-24:00	0	0	50	54

Table 10.4: Total Development Trips

10.6 Reduction of Freight Traffic from the UK's Strategic Road Network

10.6.1 The Rail Report produced in support of this development by MDS Transmodal Ltd, has considered both the need for the facility and the associated benefit in terms of modal shift from road to rail.

10.6.2 It is important to note that whilst this development will invariably result in an increase in traffic (particularly HGV's in the vicinity of the site, particularly at Junction 8 of the M20) there will be many wider benefits for the strategic road network as large numbers of freight vehicles will be removed from the strategic road network.

10.6.3 This assessment has however not considered the reduction in vehicles on the highway network that will result from the operations associated with the KIG site, and as such therefore represents a robust assessment.

10.7 Development Traffic Distribution

10.7.1 The distribution of employee traffic has been determined by the use of a simple gravity model. The gravity model has taken the surrounding 7 counties (including GLA) and inclusive of 75 local authority areas. For each of the areas the resident economically active populations have been deduced from OPCS census data. The journey time to the main town or city within each area has been determined using a travel planning computer program.

10.7.2 Factors of attraction for the development have been derived. This calculation was undertaken for each area and the proportional distribution of trips to and from each determined. The resulting gravity model calculation sheets are included as Appendix I whilst the results are identified in graphic form as Figure 19. In summary the districts have been grouped into Counties and the resulting distribution of trips to each identified. Table 10.5 below present a summary of the gravity model findings.

County	Attraction
Kent	49.79%
East Sussex	1.70%
West Sussex	2.80%
Surrey	5.68%
London	28.19%
Hertfordshire	3.98%
Essex	7.86%

Table 10.5: Trip Distribution Gravity Model Summary

Assignment of Development Related Traffic

10.7.3 For the purpose of this report the development traffic has been manually assigned on to the local highway network using the results of the gravity model for geographical distribution. The assignment process has determined the most likely routes to be taken between the origins and destinations taking into account factors such as road hierarchy, congestion and travel times. Where more than one route could be taken, traffic has been split according to likely probability of choosing either route. Figures 21 and 22 identify the AM and PM peak hour traffic flows in the study area.

10.7.4 It should be noted that traffic to and from the KIG site is likely to be restricted from using Roundwell, The Street and Wear Street roads though a range of measures to be determined dependant upon time of day and vehicle type. This has been assumed within the assignment methodology.

10.8 Impact of Development

10.8.1 To assess the impact of the development is has been necessary to consider the operational capacity of the Highway network for 2016 and 2026; the year of opening and the design year respectively. The following sections report the findings of this analysis.

10.9 2016 Base Network Conditions

10.9.1 In order that the traffic impact of the development can be assessed it has been necessary to growth the 2007 base traffic flows, Figures 10 and 11, to those likely to be experienced on the highway network at the assumed year of opening, that is, 2016. This process has been undertaken using the NTEM and the resultant flows are presented in Figures 22 and 23 for the AM and PM peak hours respectively.

Junction Capacity Analysis

10.9.2 As with the base 2007 traffic analysis, contained within Chapter 2 of this report, the junctions that have been assessed to determine junction capacity issues are:

- A20 / M20 Link Roundabout Junction.
- A20 / B2163 /Hotel Roundabout Junction.
- A20 / B2163 Penfold Roundabout Junction.
- A20 / Roundwell Priority Junction.
- A20 / Willington Street Signalised Junction.

10.9.3 The peak traffic flows identified in Figures 22 and 23 have been used to undertake this analysis. Geometric values for each of the junctions have been extracted from Ordnance Survey plans supplemented by on-site observations of road and lane markings. Tables 10.6 to 10.10 below identify the 'worst case' in terms of capacity for each of the local junctions being assessed, whilst Appendix J presents the full printouts.

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.401	1	0.07	0.169	0	0.05
Arm B : M20 Link	0.412	1	0.03	0.440	1	0.03
Arm C : A20 East	0.713	2	0.06	0.577	1	0.05

Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds

Table 10.6: A20 / M20 link Roundabout Junction, 2016 Year of Opening Without Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.516	1	0.04	0.602	2	0.05
Arm B : B2163	0.613	2	0.17	0.345	1	0.14
Arm C : A20 East	0.692	2	0.06	0.511	1	0.04
Arm D : Hotel Access	0.222	0	0.20	0.070	0	0.10
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.7: B2163 / A20 / Hotel Roundabout Junction, 2016 Year of Opening Without Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 East	0.663	2	0.08	0.483	1	0.06
Arm B : B2163 Penfold Hill	0.368	1	0.04	0.278	0	0.03
Arm C : A20 West	0.513	1	0.04	0.583	1	0.05
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.8: A20 / B2163 Penfold Hill Roundabout Junction, 2016 Year of Opening Without Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm B : Roundwell Left Turn	0.342	1	0.14	0.248	0	0.12
Arm B : Roundwell Right Turn	0.271	0	0.28	0.185	0	0.25
Arm C : A20 East Right turn	0.238	0	0.14	0.244	0	0.14
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.9: A20 / Roundwell Junction, 2016 Year of Opening Without Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	DoS	Max Q (PCU)	Delay (Sec's)	DoS	Max Q (PCU)	Delay (Sec's)
A20 (E) Ahead and Left Turn	102.4%	24	111s	97.2%	18	84s
Willington Street Left Turn	73.0%	8	20s	82.2%	10	24s
Willington Street Right Turn	96.1%	11	119s	99.0%	14	137s
A20 (W) Ahead	21.3%	2	4s	30.1%	3	5s
A20 (W) Right Turn	100.6%	19	77s	100.2%	19	78s
	PRC : -13.7%			PRC : -11.4%		

Table 10.10: A20 / Willington Street Junction, 2016 Year of Opening Without Development Traffic

10.9.4 The above tables show that all of the junctions other than the Willington Street Junction are operating well within their desired operational capacity in 2007. The Willington Street junction has a PRC of -13.7% in the AM peak.

10.9.5 The link roundabout is busiest in the AM peak with a maximum RFC of 0.713. The hotel roundabout is busiest during the AM peak with a maximum RFC of 0.692; the A20 / Penfold Hill roundabout is busiest in the AM peak with a maximum RFC of 0.663. The A 20 / Roundwell junction is busiest in the AM peak with a Maximum RFC of 0.342.

10.9.6 From the assessment it can be concluded that other than the Willington Street Junction, the junctions assessed operated well within their operational capacity in 2016. The fact that the Willington Street junction is operating well over capacity without the KIG development would indicate that there will be a requirement to upgrade this junction with or without KIG.

Link Capacity Analysis

10.9.7 To supplement the 2016 without KIG junction capacity analysis, the traffic flows observed for the links feeding the junctions assessed in 2016 have again been compared to the link capacities identified in DMRB TA79/99. Table 10.11 below provides a comparison of observed peak hour traffic flows with TA79/99 typical capacities identifying the relative level of reserve capacity. As can be seen from this Table, significant reserve capacity of between 43% and 87% exists on the highway network in the study area.

Road / Link	TA79/99 Capacity	2016 Base Flow	Reserve
A20 west of KIG access	1860	795	57%
Roundwell	1300	169	87%
A20 east of KIG access	1860	758	59%
A20 / M20 Link Road	3600	1724	52%
A20 between B2163	3600	1585	56%
A20 East of B2163	1860	1051	43%

Note: busiest direction flow in either peak hour (vph)

Table 10.11: Comparison of 2016 Without Development and TA79/99 Link Capacity Flows

2016 Merge & Diverge Capacity Analysis with the M20

10.9.8 In addition to the junction capacity and link capacity analysis, consideration has also been given to the capacity of the merge and diverge slip roads from Junction 8 of the M20, reference has been made to TD22/06. The existing merge and diverge slip roads have been identified as being of Type B on the west side (London) of the junction and Type A on the east side (Dover) of the junction. The two diverge (off) slip roads have single lane provision whilst the two merge (on) slip roads have two lanes provided. Table 10.12 below presents a summary of the findings.

	Traffic Flow vph		Configuration	
	Diverge / Merge	Mainstream	Actual Configuration	Required Configuration
Southeast bound off slip (Diverge)				
2016 AM peak	896	1961	Type B 2 Lanes	Type A
2016 PM peak	1084	1917		Type A
Northwest bound on slip (Merge				
2016 AM peak	1515	2510	Type B 1 Lanes	Type F
2016 PM peak	879	1465		Type E
Southeast bound on slip (Merge				
2016 AM peak	209	1961	Type A 1 Lane	Type A/D
2016 PM peak	237	1917		Type A/D
Northwest bound off slip (Diverge)				
2016 AM Peak	265	2510	Type A 2 Lanes	Type A
2016 PM Peak	166	1465		Type A

Table 10.12: Assessment of Merge and Diverge Capacities at M20 Junction 8, 2016 Without KIG

10.9.9 As can be seen from the above table this simple form of assessment has identified that all junctions would be able operate within the existing design flow parameters attributed to each of the Type designs with the exception of the northwest bound on slip merge.

10.9.10 There would be no need to alter the three existing slips that are able to operate within the existing design. Indeed, in the case of the southeast off slip diverge will exceed that required by one design step, i.e. Type B in place of Type A, therefore significant reserve capacity would exist on this slip road.

10.9.11 However, the northwest on slip merge would not adequately provide for predicted 2016 base traffic flows with the AM peak requiring the need for a Type F design. The PM peak would require a Type E design. These upgrades will therefore be required with or without the KIG development in 2016.

10.10 2016 Base + Development Network Conditions

10.10.1 The effect of the KIG on the highway network has been assessed for the peak periods in 2016, i.e. year of opening. The process for determining the total traffic flows on the network in 2016 with KIG has been to combine the development traffic flows (Figure 20 and 21) with those on the highway network in 2016 (Figures 22 and 23). The resultant flows are presented in Figures 24 and 25 for the AM and PM peak hours respectively.

Junction Capacity Analysis

10.10.2 Based on the traffic flows presented in Figures 24 and 25, junction capacity analysis has been undertaken for the peak hours on the following junctions:

- A20 / M20 Link Roundabout Junction.
- A20 / B2163 /Hotel Roundabout Junction.
- A20 / B2163 Penfold Hill Roundabout Junction.
- A20 / Roundwell Priority Junction.
- A20 / Willington Street Signalised Junction.
- The Two Signal controlled Access junctions to the KIG site from the A20

10.10.3 Tables 10.13 to 10.18 below present a summary of the capacity assessment identifying the 'worst case' for each of the junctions assessed, with full printouts appended to this report as Appendix K.

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.529	1	0.09	0.530	1	0.08
Arm B : M20 Link	0.553	1	0.04	0.495	1	0.03
Arm C : A20 East	0.852	6	0.11	0.615	2	0.05
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.13: A20 / M20 link Roundabout Junction, 2016 Year of Opening With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.520	1	0.04	0.621	2	0.05
Arm B : B2163	0.621	2	0.17	0.369	1	0.15
Arm C : A20 East	0.711	2	0.06	0.516	1	0.04
Arm D : Hotel Access	0.250	0	0.23	0.071	0	0.10
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.14: B2163 / A20 / Hotel Roundabout Junction, 2016 Year of Opening With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 East	0.679	2	0.08	0.489	1	0.06
Arm B : B2163 Penfold Hill	0.381	1	0.04	0.283	0	0.03
Arm C : A20 West	0.516	1	0.04	0.603	2	0.05
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.15: A20 / B2163 Penfold Hill Roundabout Junction2016 Year of Opening With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm B : Roundwell Left Turn	0.394	1	0.16	0.252	0	0.12
Arm B : Roundwell Right Turn	0.298	0	0.31	0.204	0	0.27
Arm C : A20 East Right turn	0.248	0	0.15	0.282	0	0.15
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.16: A20 / Roundwell Junction, 2016 Year of Opening With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	DoS	Max Q (PCU)	Delay (Sec's)	DoS	Max Q (PCU)	Delay (Sec's)
A20 (E) Ahead and Left Turn	102.4%	24	111s	107.1%	29	132s
Willington Street Left Turn	73.0%	8	20s	83.9%	11	26s
Willington Street Right Turn	100.8%	15	147s	100.1%	15	146s
A20 (W) Ahead	24.6%	2	4s	30.4%	3	5
A20 (W) Right Turn	103.4%	21	87s	104.3%	22	92s
	PRC : -14.9%			PRC : -19.0%		

Table 10.17: A20 / Willington Street Junction, 2016 Year of Opening With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	DoS	Mean Max Q (PCU)	Delay (Sec's)	DoS	Mean Max Q (PCU)	Delay (Sec's)
A20 West approach to Car Access	71%	15	18s	66%	13	18s
A20 East Approach to Car Access (Right turn)	71%	9	37s	6%	0	13s
A20 East approach to Car Access (Ahead)	51%	8	7s	45%	6	6
Car Egress (Right turn)	4%	0	40s	38%	3	46s
Car Egress (Left turn)	2%	0	27s	68%	9	38s
A20 West approach to HGV Access	69%	4	6s	88%	17	19s
A20 East Approach to HGV Access (Right turn)	53%	4	50s	75%	5	72s
HGV egress (left turn)	31%	3	31s	36%	4	35s

Table 10.18: A20 / Kent International Gateway Access Junctions, 2016 Year of Opening With Development Traffic

10.10.4 Tables 10.13 to 10.18 above identify that all of the junctions other than the Willington Street Junction are operating well within their operational capacity in 2016 with development. The Willington Street junction has a PRC of -19.1% in the PM peak.

10.10.5 The link roundabout is busiest in the AM peak with a maximum RFC of 0.852. The hotel roundabout is busiest during the AM peak with a maximum RFC of 0.711; the A20 / Penfold Hill roundabout is busiest in the AM peak with a maximum RFC of 0.679. The A 20 / Roundwell junction is busiest in the AM peak with a Maximum RFC of 0.394. The KIG car access is busiest in the AM peak with a degree of saturation of 71%, whilst the HGV access is busiest in the PM peak with a Degree of Saturation of 88%.

10.10.6 From the assessment it can be concluded that other than the Willington Street Junction, the junctions assessed operate well within their operational capacity in 2016. As identified above the Willington Street junction would be operating well over capacity without the KIG development, and it is therefore considered that this junction would be upgraded with or without the KIG development.

Link Capacity Analysis

10.10.7 To supplement the 2016 with KIG development junction capacity analysis, the traffic flows observed for the links feeding the junctions assessed in 2016 have again been compared to the link capacities identified in DMRB TA79/99. Table 10.19 below provides a comparison of observed peak hour traffic flows with TA79/99 typical capacities and identifies the relative level of reserve capacity. As can be seen from this Table, significant reserve capacity of between 38% and 81% exists on the highway network.

Road / Link	TA79/99 Capacity	2016 Base + Dev Flow	Reserve
A20 west of KIG access	1860	890	52%
Roundwell	1300	242	81%
A20 east of KIG access	1860	1151	38%
A20 / M20 Link Road	3600	1704	53%
A20 between B2163	3600	1626	55%
A20 East of B2163	1860	1075	42%

Note: busiest direction flow in either peak hour (vph)

Table 10.19: Comparison of 2016 Base + Development and TA79/99 Link Capacity Flows

2016 With Development, Merge & Diverge Capacity Analysis with the M20

10.10.8 In addition to the 2016 with KIG development junction capacity and link capacity analysis, consideration has also been given to the capacity of the merge and diverge slip roads from Junction 8 of the M20, reference has been made to TD22/06. Table 10.20 below presents a summary of the findings.

	Traffic Flow vph		Configuration	
	Diverge / Merge	Mainstream	Actual Configuration	Required Configuration
Southeast bound off slip (Diverge)				
2016 AM peak	1219	1961	Type B 2 Lanes	Type A
2016 PM peak	1157	1917		Type A
Northwest bound on slip (Merge				
2016 AM peak	1573	2510	Type B 1 Lanes	Type F
2016 PM peak	1228	1465		Type E
Southeast bound on slip (Merge				
2016 AM peak	131	1961	Type A 1 Lane	Type A/D
2016 PM peak	137	1917		Type A/D
Northwest bound off slip (Diverge)				
2016 AM Peak	319	2510	Type A 2 Lanes	Type A
2016 PM Peak	192	1465		Type A

Table 10.20: Assessment of Merge and Diverge Capacities at M20 Junction 8, 2016 With Development

10.10.9 The 2016 base plus development traffic flows have been plotted on the diverging and merging diagrams as previous. As can be seen from the above table this simple form of assessment has identified that all junctions would be able operate within the existing design flow parameters attributed to each of the Type designs with the exception of the northwest bound on slip merge.

10.10.10 There would be no need to alter the three existing slips that are able to operate within the existing. Indeed in the case of the southeast off slip diverge will continue to exceed that required by one design step, i.e. Type B in place of Type A, therefore significant reserve capacity would exist on this slip road.

10.10.11 However, the northwest on slip merge would not adequately provide for predicted 2016 base plus development traffic flows with the AM peak requiring the need for a Type F design. The PM peak would require a Type E design. As identified above, this upgrading would be required by 2016 with or without the KIG development.

10.11 2026 Base Network Conditions

10.11.1 The base network conditions have also been assessed for the peak periods in 2026, i.e. the design year, ten years after the assumed year of opening without the KIG development The process for undertaking this has been to growth the 2016 base traffic flows, Figures 22 and 23 to those likely to be experienced on the highway network at the design year. This process has been undertaken using the NTEM and the resultant flows are presented in Figures 26 and 27 for the AM and PM peak hours respectively.

Junction Capacity Analysis

10.11.2 Based on the traffic flows presented in Figures 26 and 27, junction capacity analysis has been undertaken for the peak hours on the following junctions:

- A20 / M20 Link Roundabout Junction.
- A20 / B2163 /Hotel Roundabout Junction.
- A20 / B2163 Penfold Hill Roundabout Junction.
- A20 / Roundwell Priority Junction.

10.11.3 Tables 10.21 to 10.25 below present a summary of the capacity assessment identifying the 'worst case' for each of the junctions assessed. The full assessment printouts are presented at Appendix L.

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.461	1	0.08	0.183	1	0.05
Arm B : M20 Link	0.434	1	0.03	0.463	1	0.03
Arm C : A20 East	0.806	4	0.08	0.609	2	0.05
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.21: A20 / M20 link Roundabout Junction, 2026 Design Year Without Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.544	1	0.04	0.636	2	0.05
Arm B : B2163	0.691	2	0.20	0.401	1	0.16
Arm C : A20 East	0.733	3	0.07	0.539	1	0.04
Arm D : Hotel Access	0.314	0	0.27	0.082	0	0.10
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.22: B2163 / A20 / Hotel Roundabout Junction, 2026 Design Year With out Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 East	0.705	2	0.09	0.513	1	0.06
Arm B : B2163 Penfold Hill	0.395	1	0.04	0.298	0	0.03
Arm C : A20 West	0.540	1	0.04	0.615	2	0.05
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.23: A20 / B2163 Penfold Hill Roundabout Junction, 2026 Design Year Without Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm B : Roundwell Left Turn	0.371	1	0.15	0.266	0	0.13
Arm B : Roundwell Right Turn	0.302	0	0.31	0.209	0	0.31
Arm C : A20 East Right turn	0.257	0	0.15	0.264	0	0.15
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.24: A20 / Roundwell Junction, 2026 Design Year Without Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	DoS	Max Q (PCU)	Delay (Sec's)	DoS	Max Q (PCU)	Delay (Sec's)
A20 (E) Ahead and Left Turn	107.9%	30	138s	106.1%	27	129s
Willington Street Left Turn	76.9%	9	21s	84.8%	11	26s
Willington Street Right Turn	101.5%	14	153s	104.0%	16	154s
A20 (W) Ahead	22.3%	2	4s	31.7%	3	5
A20 (W) Right Turn	105.7%	25	98s	103.7%	22	88s
	PRC : -19.8%			PRC : -17.9%		

Table 10.25: A20 / Willington Street Junction, 2026 Design Year Without Development Traffic

10.11.4 Tables 10.21 to 10.25 above identify that all of the junctions other than the Willington Street Junction will continue to operate well within their desired operational capacity in 2007. The Willington Street junction has a PRC of -19.8% in the AM peak.

10.11.5 The link roundabout is busiest in the AM peak with a maximum RFC of 0.806. The hotel roundabout is busiest during the AM peak with a maximum RFC of 0.733; the A20 / Penfold Hill roundabout is busiest in the AM peak with a maximum RFC of 0.705. The A 20 / Roundwell junction is busiest in the AM peak with a Maximum RFC of 0.371.

10.11.6 From the assessment it can be concluded that other than the Willington Street Junction, the junctions assessed operate well within their operational capacity in 2026 with KIG. It should again be noted that the Willington Street junction would be operating well over capacity without the KIG development in 2007. It is therefore considered that this junction would require amelioration measures of some kind with or without the KIG development.

Link Capacity Analysis

10.11.7 To supplement the 2026 base network junction capacity analysis, the traffic flows observed for the links feeding the junctions assessed in 2026 have been again been compared to the link capacities identified in DMRB TA79/99. Table 10.26 below provides a comparison of observed peak hour traffic flows with TA79/99 typical capacities and identifying the relative level of reserve capacity. As can be seen from this Table, significant reserve capacity of between 40% and 82% exists on the highway network within the study area.

Road / Link	TA79/99 Capacity	2026 Base Flow	Reserve
A20 west of KIG access	1860	835	55%
Roundwell	1300	236	82%
A20 east of KIG access	1860	797	57%
A20 / M20 Link Road	3600	1813	50%
A20 between B2163	3600	1668	54%
A20 East of B2163	1860	1107	40%

Note: busiest direction flow in either peak hour (vph)

Table 10.26: Comparison of 2026 Design Year + Development and TA79/99 Link Capacity Flows

2026 Design Year With Development, Merge & Diverge Capacity Analysis with the M20

10.11.8 In addition to the 2026 base network conditions junction capacity and link capacity analysis, consideration has also been given to the capacity of the merge and diverge slip roads from Junction 8 of the M20. Reference has been made to TD22/06. As identified earlier in this report, existing merge and diverge slip roads are Type B on the west side (London) of the junction and Type A on the east side (Dover) of the junction. The two diverge (off) slip roads have single lane provision whilst the two merge (on) slip roads have two lanes provided. . Table 10.27 below presents a summary of the findings.

	Traffic Flow vph		Configuration	
	Diverge / Merge	Mainstream	Actual Configuration	Required Configuration
Southeast bound off slip (Diverge)				
2016 AM peak	943	2108	Type B 2 Lanes	Type A
2016 PM peak	1140	2060		Type A
Northwest bound on slip (Merge				
2016 AM peak	1594	2698	Type B 1 Lanes	Type F
2016 PM peak	924	1575		Type E
Southeast bound on slip (Merge				
2016 AM peak	219	2108	Type A 1 Lane	Type A/D
2016 PM peak	250	2060		Type A/D
Northwest bound off slip (Diverge)				
2016 AM Peak	278	2698	Type A 2 Lanes	Type A
2016 PM Peak	175	1575		Type A

Table 10.27: Assessment of Merge and Diverge Capacities at M20 Junction 8, 2026 Without Development

10.11.9 As can be seen from the above table this simple form of assessment has identified that all junctions would be able operate within the existing design flow parameters attributed to each of the Type designs with the exception of the northwest bound on slip merge.

10.11.10 There would be no need to alter the three existing slips that are able to operate within the existing design. Indeed, in the case of the southeast off slip diverge will exceed that required by one design step, i.e. Type B in place of Type A, therefore significant reserve capacity would exist on this slip road.

10.11.11 However, the northwest on slip merge would not adequately provide for predicted 2026 base traffic flows with the AM peak requiring the need for a Type F design. The PM peak would require a Type E design. These upgrades will be required with or without KIG well before 2026.

10.12 2026 Base + Development Network Conditions

10.12.1 Finally, the effect of the KIG on the highway network has also been assessed for the peak periods in 2026, i.e. the design year, ten years after the assumed year of opening. The process for determining the traffic flows on the network has been to combine the development traffic flows, i.e. Figures 20 and 21, with those predicted to be on the highway network in 2026, i.e. Figures 26 and 27. The resultant flows are presented in Figures 28 and 29 for the AM and PM peak hours respectively.

Junction Capacity Analysis

10.12.2 Based on the traffic flows presented in Figures 23 and 24, junction capacity analysis has been undertaken for the peak hours on the following junctions:

- A20 / M20 Link Roundabout Junction.
- A20 / B2163 /Hotel Roundabout Junction.
- A20 / B2163 Penfold Hill Roundabout Junction.
- A20 / Roundwell Priority Junction.
- A20 / Willington Street Signalised Junction.
- The Two Signal controlled Access junctions to the KIG site from the A20

10.12.3 Tables 10.28 to 10.33 below present a summary of the capacity assessment identifying the 'worst case' for each of the junctions assessed, with full printouts appended to this report at Appendix M.

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.600	1	0.11	0.551	1	0.08
Arm B : M20 Link	0.575	1	0.04	0.518	1	0.03
Arm C : A20 East	0.961	17	0.22	0.650	2	0.06
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.28: A20 / M20 link Roundabout Junction, 2026 Design Year With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 West	0.548	1	0.04	0.655	2	0.05
Arm B : B2163	0.699	2	0.21	0.433	1	0.17
Arm C : A20 East	0.751	3	0.07	0.545	1	0.04
Arm D : Hotel Access	0.370	1	0.32	0.084	0	0.10
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.29: B2163 / A20 / Hotel Roundabout Junction, 2026 Design Year With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm A : A20 East	0.721	3	0.09	0.520	1	0.06
Arm B : B2163 Penfold Hill	0.409	1	0.04	0.302	0	0.03
Arm C : A20 West	0.544	1	0.04	0.634	2	0.05
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.30: A20 / B2163 Penfold Hill Roundabout Junction, 2026 Design Year With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	RFC	Mean Max Q (PCU)	Delay (Sec's)	RFC	Mean Max Q (PCU)	Delay (Sec's)
Arm B : Roundwell Left Turn	0.427	1	0.17	0.273	0	0.13
Arm B : Roundwell Right Turn	0.335	0	0.34	0.231	0	0.29
Arm C : A20 East Right turn	0.267	0	0.15	0.302	0	0.15
Notes: RFC is the ratio of flow to capacity for the worst affected arm expressed as a percentage; max Q is the maximum queue in vehicles for the worst affected arm; the delay is the average delay per vehicle at the junction in seconds						

Table 10.31: A20 / Roundwell Junction, 2026 Design Year With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	DoS	Max Q (PCU)	Delay (Sec's)	DoS	Max Q (PCU)	Delay (Sec's)
A20 (E) Ahead and Left Turn	107.9%	30	138	112.3%	38	168s
Willington Street Left Turn	76.9%	9	21	88.2%	12	31s
Willington Street Right Turn	105.7%	17	161	105.0%	16	158s
A20 (W) Ahead	25.7%	3	4	32.1%	3	5s
A20 (W) Right Turn	108.6%	30	119	109.7%	31	128s
	PRC : -20.7%			PRC : -24.7%		

Table 10.32: A20 / Willington Street Junction, 2026 Design Year With Development Traffic

ARM	Weekday AM Peak 08:00 – 09:00			Weekday AM Peak 17:00 – 18:00		
	DoS	Mean Max Q (PCU)	Delay (Sec's)	DoS	Mean Max Q (PCU)	Delay (Sec's)
A20 West approach to Car Access	73%	16	19s	68%	14	18s
A20 East Approach to Car Access (Right turn)	75%	9	42s	6%	0	13s
A20 East approach to Car Access (Ahead)	54%	8	7s	47%	7	7s
Car Egress (Right turn)	4%	0	40s	38%	3	46s
Car Egress (Left turn)	2%	0	27s	70%	9	40s
A20 West approach to HGV Access	71%	4	6s	90%	19	21s
A20 East Approach to HGV Access (Right turn)	58%	4	54s	83%	6	91s
HGV egress (left turn)	33%	3	32s	38%	4	36s

Table 10.33: A20 / Kent International Gateway Access Junction, 2026 Design Year with Development Traffic

10.12.4 Tables 10.28 to 10.33 above identify that all of the junctions other than the Willington Street Junction are operating well within their desired operational capacity in 2007. The Willington Street junction has a PRC of -24.7% in the PM peak.

10.12.5 The link roundabout is busiest in the AM peak with a maximum RFC of 0.961. The hotel roundabout is busiest during the AM peak with a maximum RFC of 0.751; the A20 / Penfold Hill roundabout is busiest in the AM peak with a maximum RFC of 0.721. The A 20 / Roundwell junction is busiest in the AM peak with a Maximum RFC of 0.427. The KIG car access is busiest in the AM peak with a degree of saturation of 75%, whilst the HGV access is busiest in the PM peak with a Degree of Saturation of 90%.

10.12.6 From the assessment it can be concluded that other than the Willington Street Junction, the junctions assessed operate well within their operational capacity in 2026 with KIG. As identified above the Willington Street junction would be operating well over capacity without the KIG development, and it is therefore considered that this junction would be upgraded with or without the KIG development.

Link Capacity Analysis

10.12.7 To supplement the 2026 with KIG development junction capacity analysis, the traffic flows observed for the links feeding the junctions assessed in 2026 have again been compared to the link capacities identified in DMRB TA79/99. Table 10.34 below provides a comparison of observed peak hour traffic flows with TA79/99 typical capacities and identifies the relative level of reserve capacity. As can be seen from this Table, significant reserve capacity of between 36% and 81% exists on the highway network.

Road / Link	TA79/99 Capacity	2016 Base + Dev Flow	Reserve
A20 west of KIG access	1860	930	50%
Roundwell	1300	253	81%
A20 east of KIG access	1860	1190	36%
A20 / M20 Link Road	3600	1678	53%
A20 between B2163	3600	1709	53%
A20 East of B2163	1860	1130	39%

Note: busiest direction flow in either peak hour (vph)

Table 10.34: Comparison of 2026 Design Year + Development and TA79/99 Link Capacity Flows

2026 Design Year With Development, Merge & Diverge Capacity Analysis with the M20

10.12.8 In addition to the 2026 with KIG development junction capacity and link capacity analysis, consideration has also been given to the capacity of the merge and diverge slip roads from Junction 8 of the M20, reference has been made to TD22/06. Table 10.35 below presents a summary of the findings.

	Traffic Flow vph		Configuration	
	Diverge / Merge	Mainstream	Actual Configuration	Required Configuration
Southeast bound off slip (Diverge)				
2026+ Dev AM Peak	1265	2108	Type B 2 Lanes	Type A
2026+ Dev PM Peak	1214	2060		Type A
Northwest bound on slip (Merge				
2026+ Dev AM Peak	1652	2698	Type B 2 Lanes	Type F
2026+ Dev PM Peak	1275	1575		Type E
Southeast bound on slip (Merge				
2026+ Dev AM Peak	26	2108	Type A 1 Lane	Type A/D
2026 Dev PM Peak	144	2060		Type A/D
Northwest bound off slip (Diverge)				
2026+ Dev AM Peak	332	2698	Type A 2 Lanes	Type A
2026+ Dev PM Peak	200	1575		Type A

Table 10.35: Assessment of Merge and Diverge Capacities at M20 Junction 8, 2026 With Development

10.12.9 The 2026 base plus KIG development traffic flows have been plotted on the diverging and merging diagrams as previous. As can be seen from the above table this simple form of assessment has identified that all junctions would be able operate within the existing design flow parameters attributed to each of the Type designs with the exception of the northwest bound on slip merge.

10.12.10 There would be no need to alter the three existing slips that are able to operate within the existing design Indeed in the case of the southeast off slip, diverge will continue to exceed that required by one design step, i.e. Type B in place of Type A, therefore significant reserve capacity would exist on this slip road.

10.12.11 However, the northwest on slip merge would not adequately provide for predicted 2026 base plus development traffic flows with the AM peak requiring the need for a Type F design. The PM peak would require a Type E design. As identified previously, this upgrading would be required well before 2026 with or without the KIG development.

Summary

10.12.12 This chapter has demonstrated that the majority of the highway network has sufficient existing capacity to accommodate the KIG development. Table 10.36 below presents a summary of the of the Junction capacity analysis presenting the worst case for each junction for each year of the assessment.

Junction	Scenario				
	2007	2016	2016 + KIG	2026	2026 + KIG
A20 / M20 Link Roundabout	AM Max RFC 0.705	AM Max RFC 0.713	AM Max RFC 0.852	AM Max RFC 0.806	AM Max RFC 0.961
A20 / B2163 Hotel Roundabout Junction	AM Max RFC 0.640	AM Max RFC 0.692	AM Max RFC 0.711	AM Max RFC 0.733	AM Max RFC 0.751
A20 / B2163 Penfold Roundabout	AM Max RFC 0.611	AM Max RFC 0.663	AM Max RFC 0.679	AM Max RFC 0.705	AM Max RFC 0.721
A20 / Roundwell Priority Junction	AM Max RFC 0.308	AM Max RFC 0.342	AM Max RFC 0.394	AM Max RFC 0.371	AM Max RFC 0.427
A20 Willington Street Signalised Junction	AM Max PRC -3.4%	PM Max PRC -13.7%	PM Max PRC -19%	AM Max PRC -19.8%	PM Max PRC -24.7%
KIG Car Access	N/A	N/A	AM Max DoS 71%	N/A	AM Max DoS 75%
KIG HGV Access	N/A	N/A	PM Max DoS 88%	N/A	PM Max DoS 90%
Notes					

Table 10.36: Summary of Development Impact Analysis

10.12.13 As can be seen from the above table, the only junction that will be operating over capacity will be the A20/Willington Street Junction. This junction is already operating above its theoretical design capacity in 2007 with a PRC of -3.4. This increases to -13.7% and -19.8% by 2016 and 2026 respectively without the KIG development. It is therefore considered that this junction will require some attention, possibly upgrading, irrespective of the KIG development proceeding.

10.12.14 The link capacity analysis has also indicated that the existing highway network would be able to accommodate the KIG development, with a reserve capacity on all links in 2026 with the KIG development being no less than 36%

10.12.15 Similarly, the analysis of the M20 Junction 8 Merge Diverge slip road analysis has shown that three out of four of the slips will be able to accommodate traffic, including KIG associated traffic in 2026 within their existing configuration. The only exception is the Northwest onbound slip which will exceed its existing configuration by one design step. This occurs in 2007, irrespective of the KIG development. It is therefore considered that some upgrading of this junction will be necessary whether or not the KIG site is developed.

10.12.16 Our analysis has show that it would be necessary to upgrade the Northwest bound on slip from Type B to Type F, this would be a significant change as the Type F layout requires the nearside lane of the mainstream carriageway to form a 'lane gain' for the merging traffic.

10.12.17 The provision of a new lane on the northwest bound carriageway of the M20 between junctions 8 and 7 would be massive in terms of cost. The most likely and cost effective solution would be to 'drop' a lane on the northwest bound approach to junction 8, the dropped lane forming the off slip as a Type C diverge, and then 'gaining' the nearside lane on the western side of the junction as a per Type F merge.

11 CONSTRUCTION TRAFFIC

11.1.1 The construction analysis has been prepared by White Young Green Consulting Ltd, and sets out a series of strategies, standards and mitigation measures and procedures. In order to minimise adverse environmental effects, these will be observed through the construction process.

11.1.2 It is acknowledged that the standards and procedures will need to be updated as the design progresses and as new and further information becomes available. As the KIG development progresses, a series of detailed construction method statements will be developed for the works, to be administered by individual building contractors once appointed.

11.1.3 It is envisaged that the development of the site will be spread over a number of years: the final timescale being driven by market demand. It is, however, envisaged that the new rail connection and Intermodal area will be constructed, in the first stage of the development of the site.

11.1.4 The construction method statement has assumed that the construction programme will run over a period of 7 years, with the works being undertaken on a phased basis. The principal construction works will consist of and include, but not be limited to the following:

- A20/Willington Street Traffic Signals.
- Environmental protection & ecological works.
- Ecology/translocation/planting.
- Archaeological and Heritage protection.
- Temporary site accommodation and welfare facilities.
- Services diversions.
- Temporary and permanent utility supplies.
- Primary Infrastructure works.
- Demolition works.
- Remediation.
- Earth Modelling.
- Re-profiling of land
- Earthworks cut and fill of existing site to new profile.
- Retaining walls at changes in level.
- New railway sidings and new connections to railway lines.
- New intermodal area with new travelling overhead cranes.
- Alterations to existing railway cuttings and embankments.
- New rail over bridge carrying new roadway.

- New tunnels under new sidings for existing rights of way.
- Surface water sewers and retention ponds.
- Work to existing water courses.
- Foul water sewers and sewage treatment works.
- Off-site highway connections/road works.
- On-site roads, pavements and cycleways.
- Construction of buildings.
- Minor bridges over watercourses and new roads.
- Landscaping.
- Final ecological re-instatement works.

11.1.5 It is envisaged that the works will, in principle, be demand driven, with the main construction works being broken down into phases with individual buildings to meet occupier demand.

11.1.6 The construction method statement produced by WYG has established that the peak traffic generations for the construction period will occur between September 2011 and January 2012.

11.1.7 Subject to the Authorities' consent, normal working hours are likely to be from 0800 to 1800 on weekdays and from 0800 to 1300 on Saturdays; not on Sundays, Bank or Public Holidays. The management team will adhere to these normal working hours for the works as far as reasonably practicable. However, certain operations are season and weather dependent and in these instances it may be necessary to extend the working hours for such operations to take advantage of daylight hours. Other operations particularly with respect to work to or alongside the railway, may be restricted to agreed possessions where work to embankments, installation of bridges, track works, etc; are to be carried out. Any other special or unusual activities due to take place such as road closures, deliveries of large plant or certain special works will be notified to the relevant neighbourhood occupants and in agreement with Local Authorities/Statutory Authorities.

11.1.8 In identifying the likely transport impact of the construction period the Transport Assessment has therefore considered the impact of the AADT flows for the peak construction period, i.e. September 2011 to January 2012. Table 11.1 below identifies the resulting construction traffic movements, represented as 2-way AADT flows, on the local highway network being assessed.

Link	AADT 2-Way Flow	
	Light Vehicles	Heavy Vehicles
A20 west of Roundwell	2	0
Roundwell	0	0
A20 west of site access	2	0
A20 east of site access	9	97
A20/M20 link	8	91
B2163 Eyhorne St.	0	0
B2163 Penfold Hill	0	6
A20 east of B2163	1	0
M20 east of Jct. 8	1	28
M20 west of Jct. 8	7	62

Table 11.1: Construction Phase Annual Average Daily Traffic 2-Way Flows

11.1.9 These flows have been considered in relation to the traffic flows on the highway network in 2011. Table 11.2 below identifies the resulting increase in AADT vehicle movements likely to occur during the peak construction phase of the development on the local highway network.

Link	AADT 2-Way Flow	
	Light Vehicles	Heavy Vehicles
A20 west of Roundwell	0.02%	0.01%
Roundwell	0.01%	0%
A20 west of site access	0.02%	0.01%
A20 east of site access	0.07%	6.13%
A20/M20 link	0.04%	6.78%
B2163 Eyhorne St.	0%	0%
B2163 Penfold Hill	0%	2.15%
A20 east of B2163	0%	0.04%
M20 east of Jct. 8	0%	0.30%
M20 west of Jct. 8	0.01%	0.66%

Table 11.2: Proportional Increase in Traffic (Construction) – AADT Flows

11.1.10 As identified above, the proportional increase in traffic on the local highway network during construction phase would be minimal, with no greater than a 6.78% increase in HGV movements likely to occur.

12 SUMMARY AND CONCLUSIONS

12.1.1 This transport assessment has been prepared in support of an outline planning application for the Kent International Gateway, Bearsted Kent. It has considered the likely transport implications of the proposed development. The following conclusions can be made.

12.1.2 The site is located immediately adjoining junction 8 of the M20 motorway with the A20 running along its southern boundary and the Channel Tunnel Rail Link and Ashford to Maidstone East railway lines running along the northern boundary of the site. As such it has been identified that the site is located at the confluence of a number of strategic and primary transport routes all of which could be identified as running within the M20 corridor and which could provide excellent accessibility by road and rail to the site.

12.1.3 The assessment has been undertaken based upon all current guidance for preparing transport assessments and has taken a full account of national, regional and local policy.

12.1.4 A proposed access strategy for the development has been identified and which is based on a hierarchical approach which where appropriate places sustainable transport first and descends to private car transport as the final consideration. This approach has been adopted to ensure transport infrastructure provides a more sustainable system for the development, which meets its social, economic and environmental needs.

12.1.5 It has been identified that current accessibility by public transport, cycle and on foot to the site was poor with infrequent bus services passing, no bus linkage from local stations to the site and poor footway provision to the site from neighbouring areas including the two local railway stations. Cycleway provision is limited in the local area and could be considered to be fragmented for Maidstone as a whole.

12.1.6 The location of the site does not lend itself to a significantly large number of trips being made on foot. However, in order to accommodate the relatively small number of pedestrian trips that would occur, it is probable that the existing footway provision along the A20 would be renovated and upgraded to provide a segregated walk cycleway.

12.1.7 Discussions with the main bus operator have indicated that the development itself is unlikely to support new commercial bus services. However, they would be potentially willing to extend existing services into the IG development. In addition to this a shuttle bus would be run by KIG to and from Bearsted station during shift changeover.

12.1.8 Consideration has also been given to the possibility of providing dedicated bus services for employees commuting to the site from other towns and villages. Unfortunately the resultant journey time of such services would be unrealistic for employees to consider using them.

12.1.9 The development would be served by means of two new vehicular accesses off the A20 at a point along the site frontage. The eastern of the two junctions will be an all movement signal controlled junctions restricted to cars and service vehicles. The second junction will again be signal controlled but restricted to HGV vehicles only. To ensure these vehicles enter/exit form the east (M20 direction) the design of this junction is such that it will only allow right in and left out movements.

12.1.10 Internal to the site the access road will be a single carriageway design. Footways and cycleways will be provided alongside all main access roads within the development.

12.1.11 Detailed traffic flow information has been acquired for the local highway network from a variety of sources. The traffic data was used to inform the study, in conjunction with site observation, of the existing network operating characteristics.

12.1.12 The impact of the proposed KIG development has been made in comparison to what network conditions would have been if the development were not to occur. Therefore the capacity assessment results are shown for 2016 base and 2016 base plus development, 2026 base and 2026 base plus development.

12.1.13 In respect of link capacity it was found that significant reserve capacity of between 36% and 81% would exist on the local highway network in 2026 with KIG with only a marginal detrimental impact being identified as a direct result of development traffic on the local highway network.

12.1.14 The junction capacity the assessment identified that all of the junctions other than the A20/Willington Street junction would be operating within their operational capacity in both 2016 and 2026 without and with the development traffic taken into account. To surmise:

- The link roundabout would be busiest in the AM peak with a maximum RFC of 0.713 in 2026 and increasing to 0.806 in 2026 without development traffic. With development the maximum RFC's would be 0.852 and 0.961 in 2016 and 2026 respectively.

- The Hotel Roundabout would be busiest in the AM peak with a maximum RFC of 0.692 in 2016 and increasing to 0.0.733 in 2026 without development traffic. With development the maximum RFC's would be 0.711 and 0.751 in 2016 and 2026 respectively.

- The Penfold Roundabout would be busiest in the AM peak with a maximum RFC of 0.663 in 2016 and increasing to 0.705 in 2026 without development traffic. With development the maximum RFC's would be 0.679 and 0.721 in 2016 and 2026 respectively.

- The Roundwell Junction would be busiest in the AM peak with a maximum RFC of 0.342 in 2016 and increasing to 0.371 in 2026 without development traffic. With development the maximum RFC's would be 0.394 and 0.427 in 2016 and 2026 respectively.

- The Willington Street Junction was found to be busiest without development with a PRC of -13.7% in the PM peak in 2016, and in 2026 the AM peak had a PRC of -19.8%. With development the PRC was -19% and -24.7% in the 2016 and 2026 AM peaks respectively.

12.1.15 As such the local highway network in the vicinity of the development site, other than the Willington Street junction has been identified through analysis to be operating within both its link and junction capacity in 2016 and 2026 and with only a marginal impact occurring as a result of the inclusion of development traffic. The Willington Street junction is already operating over and above its theoretical capacity in 2007 with a PRC of -3.4%

12.1.16 The assessment of the merge and diverge capacities at junction 8 of the M20 that has been undertaken has identified that in the AM and PM peak periods the actual configuration of southeast bound off-slip exceeds that actually required by one design step, i.e. Type B in place of Type A. Therefore significant reserve capacity exists on this slip road. For the southeast bound on-slip the actual configuration was found to match the required configuration in 2016 and 2026 and is also able to accommodate the additional development traffic. However according to the standards in TD22/06 the northwest bound off slip has already exceeded its capacity in the 2007 AM peak and requires an upgrade to a Type F merge.

12.1.17 In respect of current road safety, no defined pattern or type of accident could be determined from the data provided. An accident remedial scheme for the A20 fronting the site has recently been implemented which would see improved pedestrian facilities and reduced vehicle speeds.

12.1.18 Overall in our professional opinion, there is no transport reason why the proposed development of the Kent International Gateway could be refused planning permission.