Regional Investment Programme

M25 J10 / A3 Wisley Interchange Improvements

Technical Appraisal Report

01 Nov 2016

HE551522-ATK-HGN-1-RP-C-2700
V 1.5, 01 November 2016

Notice

This document and its contents have been prepared and are intended solely for Highway England's information and use in relation to the Scheme and PCF product. Atkins Ltd assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

Document control

The Project Manager is responsible for production of this document, based on the contributions made by his/her team existing at each Stage.

Document Title	Technical Appraisal Report
Author	Graham Bown
Owner	Hugh Coakley
Distribution	
Document Status	Final for sign off

Revision History

This document is updated at least every Stage.

Version	Date	Description	Author
1.0	27/5/16	Partial draft	Dunstan Westbury, Paul Jones, Neil Watson
1.1	21/09/16	First draft	Graham Bown, Dunstan Westbury, Paul Jones, Neil Watson
1.2	13/10/16	Second draft	Graham Bown, Dunstan Westbury, Paul Jones, Neil Watson
1.3	20/10/16	Third draft	Graham Bown, Dunstan Westbury, Paul Jones, Neil Watson
1.4	26/10/16	Fourth draft	Graham Bown, Dunstan Westbury, Paul Jones, Neil Watson
1.5	01/11/16	Final for sign off	Graham Bown

Reviewer List

Name	Role
Hugh Coakley	Highways England MP Project Manager
Henry Penner	Highways England PTS Environmental Lead
Raphael Lung	Highways England PTS Geotechnical Lead
Mike Jones	Highways England PTS TAME
Sandra Brown	Highways England PTS Safer Roads Group

Approvals

The Project SRO is accountable for the content of this document

Name	Signature	Title	Date of Issue	Version
Andy Salmon		Senior Responsible Owner		

Table of Contents

Table of Abbreviations

AADT	Annual Average Daily Traffic
ALR	All Lanes Running
AMI	Advanced Motorway Indicators
AOD	Above Ordnance Datum
AP	All-purpose
AQMA	Air Quality Management Area
AST	Appraisal Summary Table
ATC	Automatic Traffic Counter
BCR	Benefit Cost Ratio
BoQ	Bill of Quantity
C&C	Command and Control System
CCTV	Closed Circuit Television
COBA	Cost Benefit Analysis
CPS	Connect Plus Services
CSR	Client Scheme Requirements
DaSTS	Delivering a Sustainable Transport System
DDS	Dynamic Display System
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DNO	Distribution Network Operator (Electricity Supply)
EA	Environment Agency
ENVIS	Environmental Information System
ERT	Emergency Roadside Telephone
GQA	General Quality Assessment
GVA	Gross Value Added
HABIT	Highways England Business Information Technology
HADDMS	Highways Agency Drainage Data Management System
HAGDMS	Highways Agency Geotechnical Data Management System
HAPMS	Highways Agency Pavement Management System
HATMS	Highways England Traffic Management System
HE	Historic England
ICCS	Integrated Communications Control System
INCA	Incident Cost Analysis
IP	Internet Protocol (Ethernet)

IPC	Infrastructure Planning Commission
ITS	Intelligent Transport Systems
LATS	London Area Transport Survey
LDF	Local Development Framework
MIDAS	Motorway Incident Detection and Automatic Signalling
MP	Major Projects
MP	Marker Post
MS3	Message Sign Type 3 (Text Only)
MSA	Motorway Service Area
NE	Natural England
NMU	Non-Motorised User
NO2	Nitrous Oxide
NRTS	National Roads Telecommunications Service
NTIS	National Traffic Information Service
OD	Operations Directorate
OS	Ordnance Survey
PCF	Project Control Framework
PM10	Particles with diameter less than 10µg
PRA	Preferred Route Announcement
PTS	Professional and Technical Solutions
PTZ	Pan/Tilt/Zoom
PVB	Present Value of Benefits
PVC	Present Value of Costs
QUADRO	Queues and Delays at roadworks
RCC	Regional Control Centre
RFC	Ratio of Flow to Capacity
RIP	Roads Investment Programme
RSI	Roadside Interview
RTMC	Regional Technology Maintenance Contractor
SAC	Special Area of Conservation
SC10	Service Category (Communications)
SC8	Service Category (Communications)
SC8RMD	Service Category (Communications)
SCC	Surrey County Council
SEB	Statutory Environmental Body
SEEPB	South East England Partnership Board
SEERA	South East England Regional Assembly

SERCC	South East Regional Control Centre
SMIS	Structures Management Information System
SNCI	Site of Nature Conservation Interest
SoS	Secretary of State
SPA	Special Protection Area
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
TAG	Transport Analysis Guidance
TAME	Traffic Appraisal Modelling and Economics team
TAR	Technical Appraisal Report
TEMPRO	Trip End Model Projections
TOS	Highways England's Traffic Officer Service
TUBA	Transport User Benefit Analysis
VMS	Variable Message Sign
VMSL	Variable Mandatory Speed Limit
VOC	Vehicle Operating Cost

Executive summary

Background

In December 2014 the Department for Transport (DfT) published the Road Investment Strategy (RIS) for 2015-2020. The RIS sets out the list of schemes that are to be delivered by Highways England over the period covered by the RIS (2015 – 2020). The RIS identified improvements to M25 J10/A3 Wisley Interchange as one of the key investments in the Strategic Road Network (SRN) for the London and South East region.

The proposed improvements to M25 J10 as stated in the RIS should deliver: “free-flowing movement in all directions, together with improvements to the neighbouring Painshill interchange on the A3 to improve safety and congestion across the two sites”. Expected cost £100m to £250m. For the purposes of this report, this is referred to as the aim of the scheme.

The need for intervention

Previous studies have identified the following persistent problems at the interchange:

- It is one of the busiest interchanges in the country:

  Between M25 J10 and M25 J11, which is amongst the top links for national five year average flow, approximately 170,000 vehicles per day use this section. The A3 south of M25 J10 is typically utilised by approximately 101,500 vehicles each day.

- It has one of the highest accident records on the SRN:

  During the period of 2009-2013 (inclusive), there have been 239 accidents in total (just under 50 per year on average) on and around M25 J10 and the A3 between Painshill and Ockham.

- It experiences frequent disruption and unreliable journey times:

  In the weekday peak hours of 06:00 to 09:59 and 16:00 to 19:59 the M25 and A3 links that are served by M25 J10 were congested 67% of the time over the five year period from 2010/11 to 2014/15. All four of the M25 links have experienced congestion in at least 75% of weekday peak journeys.

- It is an essential interchange in a growing region:

  The Enterprise M3 Growth Deal will deliver 11,500 new homes, 30,700 new jobs and £757m direct Gross Value Added (GVA); of which developing the former Wisley Airfield can deliver 2100 homes is a key element of Guildford Borough’s Core Strategy.

The Client Scheme Requirements lists a number of objectives for the scheme but on the basis of these problems, the following **core objectives** for the study were devised:

- **Route Operation** - Support any projected traffic increases from other committed schemes on the strategic road network
- **Capacity** - Reduce the average delay (time lost per vehicle per mile) on the mainline A3
- **Safety** - Reduce annual collision frequency and severity ratio on the mainline A3 and slip roads and M25 J10 gyratory

In addition to these objectives Highways England has published its Delivery Plan, 2015 - 2020 and Strategic Business Plan (SBP). It states that:

“Government has made a strong commitment to an ongoing improvement in environmental outcomes through the operation, maintenance and modernisation of the strategic road network”. A number of environmental interventions to meet this commitment are transposed into Key Performance Indicators (KPIs) to measure how Highways England are delivering better environmental outcomes across the network over the next five years. The proposed scheme options will aim to contribute to meeting these PIs and KPIs and the scheme will be developed over the PCF stages to achieve this aim.

The area around Junction 10 is particularly environmentally sensitive and much of it is covered by international/national ecological designations such as Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI), as well as designations such as a Common Land and Access Land which enables it to be used freely for recreation by the public. There are three Scheduled Monuments around the interchange and numerous listed buildings as well two Registered Parks and Gardens of Historic Interest. The development of the scheme options in PCF 1 has recognised the environmental quality of the area. During the option sifting work environmental considerations were taken into account along with other factors to arrive at the selected options. It is recognised that the three options selected would have varying impacts on the environment and these are assessed and reported in the Environmental Study Report and summarised later in this document.

The solutions

During PCF Stage 0 it was established that the problems would only be solved through highway interventions. At the start of PCF Stage 1, Atkins reviewed the potential options generated during the previous stage against the environmental and cost constraints and generated further options that were assessed during an options workshop. From this, three junction improvement options we developed from a shortlist of 21 potential options that progressively addressed the scheme objectives. For PCF Stage 1, the three options were:

- Option 14 involves **modifying the existing roundabout** by elongating the existing roundabout with additional lanes to provide more circulatory capacity and enable more traffic to discharge the roundabout whilst also providing free flowing left turns under a permanent green signal.
- Option 9 **retains the existing roundabout** but adds a fourth level layout to provide free flowing right turns from the A3 to the M25 whilst also providing free flowing left turns under a permanent green signal.
- Option 16 **removes the roundabout** and replaces it with a cyclic layout (like M25 J12) that provides free-flow for all traffic movements.

A complementary set of changes to Painshill Interchange has also been developed that widens the carriageway on the A245 to three lanes in each direction between Painshill Junction and the junction with Seven Hills Road. The upgrading of the A3 to D4 Expressway standards between Ockham and Painshill and consequent changes to the accesses to the A3 were also developed and applied to all options.

The impact

All options provide significant improvements in highway performance compared with the current situation. Options 9 and 16 provide the highest level of delay reduction at M25 J10, with average delay per vehicle mile on the A3 forecast to be approximately 70% shorter in the morning peak in 2022 for Option 9 and 75% shorter for Option 16. Option 14 is forecast to reduce average network journey times by 45% in the morning peak in 2037.

All options also accommodate a much greater throughput (excluding the through M25 and A3 movements) in 2037 compared with the do-minimum across the day. Option 9 and 16 are forecast to increase throughput at the junction by approximately 40% whereas Option 14 is forecast to accommodate over 35% more traffic compared to no improvement.

From a traffic perspective Option 9 and Option 16 perform better than Option 14 in terms of meeting objectives that support projected traffic increases from other committed schemes on the strategic road network and reducing average delay.

It has been established that safety is currently a significant problem at this junction and the A3 and M25 links feeding in to it. The removal of traffic from the roundabout by the provision of free flow elements in Option 9 and 16 is forecast to have the greatest impact on safety over the appraisal period. Option 16, which is fully free flow is forecast to have the greatest improvement in safety, with an average of over 20 fewer accidents per year expected. Option 9 is forecast to reduce accidents by an average of 15 per year whilst Option 14, with all movements still using a modified version of the existing roundabout, would result in reducing the number of accidents per year by just one on average.

From a safety perspective Option 16 and Option 9 perform better than Option 14 in terms of meeting objectives that reduce annual collision frequency and severity ratio on the mainline A3 and slip roads and junction 10 gyratory.

It is evident that Option 9 and 16 perform better than Option 14 at meeting the core objectives of the scheme, although only Option 16 meets the aim of the study by providing the *free-flowing movement in all directions, together with improvements to the neighbouring Painshill interchange on the A3 to improve safety and congestion across the two sites* as specified in the RIS.

Whilst Option 16 is expected to result in the greatest reduction in accidents, both Option 9 and 16 perform more or less equally well in traffic terms. Analysis shows that providing free flow opportunities for those movements with lower traffic volumes is countered (in economic performance terms) by the extra travel distance incurred for these movements using the cyclic design.

Option 16 has been estimated as costing £310 million (in 2014 prices), above the expected scheme cost range whilst Option 9 (£215 million) and Option 14 (£152 million) are expected to fall within the expected cost range of £100 million to £250 million.

The economic assessment of the three options highlights how the extra cost of meeting the *free-flowing movement in all directions* requirement of the scheme does not yield commensurate benefits:

- Option 9 is the best performing of the three options with a BCR of 8.3
- Option 16 is second best with a BCR of 7.4 as a result of greater cost and little extra benefit
- Option 14 has a BCR of 5.2

The challenge

This study has considered scheme options that progressively addressed the scheme objectives to deliberately highlight the possible trade-offs between meeting scheme objectives and scheme cost. The study has also been mindful of the uniquely important land around M25 J10, which is covered by international/national ecological designations, and is a small but important contributor to what makes living and working in this area attractive and thus driving the need for growth.

By devising the scheme options in such a way, it has been possible to not only see what design is required to meet those objectives, but also to understand the contribution of the different elements of the scheme. In this instance it is clear that Option 9, providing free flow opportunities for the two right turns from the A3 to the M25 as well as free flowing left turns under a permanent green signal, satisfies the core objectives almost as well as Option 16. Whilst Option 9 is not forecast to reduce accidents by quite as much as Option 16 (saving 15 per year rather than 20); it crucially takes less land. Option 9 will take approximately 17ha,

which is approximately 30ha fewer than Option 16. Whilst Option 14 does not contribute to the study objectives as well as Options 16 and 9, it requires 8ha of land.

The challenge is therefore to consider the degree to which the scheme aim (fully free-flow) needs to be met in order to deliver the scheme objectives, and to deliver value for money. In summary:

- Option 16 meets the study aim and core objectives but its cost exceeds the expected range
- Option 9 provides traffic and safety improvements and thus meets the core objectives without quite meeting the study aim. Its expected cost is within the expected range but it falls outside the target cost
- Option 14 meets the target cost and contributes towards the core objectives but its performance is weaker, especially against the safety objective

1 Introduction

1.1 Introduction

In December 2014 the Department for Transport (DfT) published the Road Investment Strategy (RIS) for 2015-2020. The RIS sets out the list of schemes that are to be delivered by Highways England over the period covered by the RIS (2015 – 2020).

The RIS identifies improvements to M25 J10/A3 Wisley Interchange as one of the key investments in the SRN for the London and South East region. The proposed improvements being as follows:

"Wisley interchange to allow free-flowing movement in all directions, together with improvements to the neighbouring Painshill interchange on the A3 to improve safety and congestion across the two sites". Expected cost £100m to £250m.

This commitment to take forward the scheme for delivery in RIS 1 is confirmed within the Highways England Delivery Plan.

In 2015 Atkins were commissioned by Highways England to compile existing and new information and to produce the necessary documentation for PCF Stage 0 (Strategy, Shaping and Prioritisation). This work confirmed the case for the need for an improvement at M25 Junction 10/A3 Wisley Interchange and Painshill Junction and considered the options available to take forward to the options identification stage. Atkins were subsequently commissioned to undertake PCF Stage 1 in December 2015.

1.2 Previous work

A number of studies have been completed over recent years that have considered options to improve M25 J10, either directly as part of the RIS programme or as localised junction improvement initiatives. The relevant projects completed are summarised below.

WSP PB undertook a study in 2013/2014 to look at the issues over the Surrey section of the A3. The report contains a range of options for consideration at M25 J10 (including A3) and Painshill.

Prior to that the following studies were undertaken:

- 2014 – Highways England and Parsons Brinckerhoff – two studies:
  - Stage 2, Route Based Strategy: M25 J10 and A3
  - Stage 2, Route based Strategy: M25 J10 to 12
- 2012 – Connect Plus
  - Junction 10 dedicated left-turn to A3 north with 3 options merge exit, 2-lane dedicated exit and 3-lane dedicated exit
- 2007/08 – Mouchel
  - M25 J10 roundabout, proposed improvements
  - M25 Junction 11, capacity improvement, northbound – widening from 4 to 5 lanes
  - M25 Junction 12 to 11, capacity improvement, southbound, widening from 4 to 5 lanes

1.3 Timeframe

The scheme is being developed to be delivered under the RIS 1 (2015-2020) period with construction to be started by the end of that timeframe. Table 1-1 sets out the timeframe over which the scheme will develop from the current PCF Stage through to construction.

Table 1-1 M25 J25 scheme timeframes within RIS 1

PCF Stage	Phase	From	To
1	Option phase	10/2015	10/2016
2		11/2016	11/2017
3	Development phase	12/2017	06/2018
4		06/2018	06/2019
5		06/2019	01/2020
6	Construction phase	03/2020	03/2022
7		2022	2023

1.4 Scheme context

The Government's Road Investment Strategy (RIS) was published in December 2014 and set's out a long-term vision for the strategic road network, together with a multi-year investment plan and high-level objectives for the first roads period of 2015 to 2021. The RIS identified five overarching long-term challenges for the SRN, of which the following were of key importance to the M25 J10:

- Access around major cities – addressing serious congestion at the periphery of the major cities which are anticipated to be the greatest drivers of growth (particularly London) through lasting solutions which make the best use of all modes;
- Building a smarter network – unlocking the potential of smarter infrastructure and new technologies to enable the most to be made of the SRN.

The RIS presents a vision for the SRN in 2040 is founded on the following aspirations that are applicable to the M25 J10/A3 Wisley Interchange scheme:

- Smoother – Connecting people and businesses safely, swiftly and seamlessly;
- Smarter - A world leader in road building and traffic management technology
- Sustainable – Driving the transition to a decarbonised, environmentally and locally sensitive road network

1.5 Purpose of the Technical Appraisal Report (TAR)

This TAR summarises the technical aspects of the existing highway problems and describes how a suitable scheme might solve them. The TAR also describes the existing highway network in the study area, existing traffic conditions, and the condition of the surrounding environment and landscape. The planning factors that affect the potential scheme are summarised along with a description of alternative options previously considered.

A range of options for M25 J10 are considered including an assessment of how these support local planning policies, an assessment of the environmental impacts, traffic and economics factors, and a proposed programme to achieve the project objectives.

The TAR confirms the options considered for further development and consultation during Stage 2.

1.6 Structure of this report

The TAR report is arranged in 16 chapters following this introduction, supported by a number of appendices.

- **Chapter 2** summarises key aspects of the consultant's brief and the objectives of the project
- **Chapter 3** describes the existing conditions, primarily relating to traffic, engineering and environmental aspects
- **Chapter 4** sets out the planning factors which have influenced the development of the Junction 28 scheme options
- **Chapter 5** introduces the scheme options considered, including sections on the development of options in previous work and a description of the route options set out full appraisal
- **Chapter 6** presents a detailed engineering assessment of junction options, identifying anticipated engineering difficulties, including a summary of the vertical and horizontal geometry, operational issues, and works to existing and new structures
- **Chapter 7** summarises the traffic analysis undertaken, and presents traffic forecasts for use in the option development, environmental assessments and economic appraisal of the Junction 28 options
- **Chapter 8** presents the option estimates
- **Chapter 9** summarises the economic assessment
- **Chapter 10** summarises the initial safety assessment
- **Chapter 11** describes the operational characteristics and option design implications for the safe and economic operation and maintenance of the scheme
- **Chapter 12** summarises the assessment of the on- and off-road technology requirements of the project
- **Chapter 13** provides an early assessment of the implications of the scheme on the future maintenance regime
- **Chapter 14** presents a summary of the assessment of environmental impacts
- **Chapter 15** provides a summary assessment of the scheme options, including the Appraisal Summary Tables (ASTs) for the options
- **Chapter 16** provide the current programme for the scheme development and implementation
- **Chapter 17** concludes the report with a summary of the key findings and recommendation for the subsequent stages of the project, and confirms those options to be taken forward further consideration and consultation in Stage 2.

2 Planning brief

2.1 Phase objectives

The scheme is currently in PCF Stage 1 (option identification) and the phase objectives are therefore to:

- Develop the pre-feasibility options identified in PCF0, along with new options;
- To assess them on their ability to achieve the overall scheme objectives through an optioneering process and to decide on a shortlist of potential options;
- To develop the shortlisted options in partnership with Highways England officers;
- To appraise the shortlisted options against strategic objectives through understanding their impact on the Highways England KPIs; and
- To select the preferred options, based on the delivery against the objectives and other criteria.

2.1.1 Transport objectives

The scheme objectives were defined in line with addressing the problems experienced at M25 J10 and their consequences. They align closely with the business strategies for the Highways England, the Local Economic Partnership and for Local Government. The objectives are summarised in Table 2-1.

Table 2-1 The high level transport objectives that the improvement should meet

Category	Objective
Route Operation	Support any projected traffic increases from other committed schemes on the strategic road network.
Capacity	Reduce the average delay (time lost per vehicle per mile) on the mainline A3. Smooth the flow of traffic by improving journey time reliability on the mainline A3.
Safety	Reduce annual collision frequency and KSI ratio on the mainline A3 and slip roads and junction 10 gyratory.
Social	Support the projected population and economic growth in the area.
Environment	Treat noise important area's (IA's) where practical Support sustainable travel routes promoted by Surrey County Council and Developers. Improve biodiversity within the scheme if the opportunity exists.

In addition to the scheme objectives outlined above, the following additional objectives should also be considered:

- Where possible, make best use of existing infrastructure by providing additional capacity within the existing highway boundary;
- The scheme should provide good value for money with an efficiencies register as standard;
- Feasible and deliverable within the RIS timeframe;
- The scheme should look to minimise the impact on the surrounding highway network whilst providing the best solution to the issues;

- The scheme should consider provision of a viable winter service plan for all complex solutions and liaise with service providers for both Area 5 and Area 3;
- Avoid the need for further capacity interventions for at least ten years after opening and accommodate projected traffic demand for this period (to 2032, based on an opening year of 2022);
- Ensure that activities already funded and carried out on the network by the M25 DBFO contactor and Area 3 ASC are not duplicated in the funding of the design, delivery and operation of the project;
- Ensure that Network Delivery & Development (including Connect Plus) are consulted and agree with the design and operation; and
- Consider no return within a minimum of 5 years for major carriageway interventions This could be achieved through design and costing of a fully resurfaced network within the constraints of the scheme with funding contributions from NDD and Service Providers where the cost would be outside of the committed RIS I funding

2.2 Strategic case

One of the key aims of the PCF Stage 0[1] work was to confirm the Strategic Case for improving the M25 J10; that is to test and confirm the nature and scale of the problems affecting the performance of junction.

This analysis had been achieved through a review of relevant evidence including information and data from previous and current projects looking at improvements to the junction. It also included engagement with Highways England. Based on this evidence review four key problems were confirmed:

- It one of the busiest interchanges in the country;
- It has one of the highest accident records on the SRN;
- It experiences frequent disruption and unreliable journey times; and
- It is an essential interchange in a growing region.

2.3 Strategic need

Without the intervention of measures to improve M25 J10, congestion on the approaches to, and through the junction will continue. This will become exacerbated by future traffic growth which would serve to discourage economic growth in the immediate surrounding areas, and along the A3 corridor. It would therefore hinder the aspirations of the Enterprise M3 LEP as well as Surrey County Council and Guildford Borough Council. It is considered that there are no real alternatives to meeting this volume of travel demand via means other than road based improvements given the wide range of movements made through the interchange.

[1] Road Investment Strategy – M25 Junction 10 Improvements, PCF0 Final Report (September 2015), by Atkins on behalf of Highways England.

2.3.1 Highways England Strategic Business Plan

The Highways England Business Plan sets out the outcomes, KPIs and associated targets within the RIS 1 plan period. As a primarily congestion-relieving scheme, the scheme will address the key business plan objectives of encouraging economic growth and supporting the smooth flow of traffic whilst also making the network safer.

2.3.2 Highways England Delivery Plan 2015 – 2020

The Highways England Delivery Plan includes specific key performance indicators (KPIs) for 'Delivering better environmental outcomes'. Some features of this are:

- Noise - 1150 noise important areas mitigated by 31 March 2020
- Biodiversity - delivery of improved biodiversity, as set out in the Company's Biodiversity Action Plan
- Cyclists, Walkers and Other Vulnerable Users - demonstrate consideration of VRU's and incorporate measures within the scheme for them to be able to continue to use the network as they can currently
- Air Quality - Undertake air quality testing and minimise effects on the local environment and local residents
- Safety – Reducing ratio of those Killed or Seriously Injured (KSI) in collisions on the SRN by 40% by 2020
- Social and environmental objectives should form part of the design solution as required either through the Highways England licence agreement or other government commitments

This scheme should look to address and incorporate contributors to these KPI's where possible both within the scheme constraints and beyond if it is practical and economic to do so.

2.3.3 DfT's Roads Investment Strategy

The Department for Transport's Roads Investment Strategy: Performance Specification details eight areas for improved performance including three particularly relevant to this project:

- Encouraging economic growth
- Supporting the smooth flow of traffic
- Safe and Serviceable Network

2.3.4 Enterprise M3 Strategic Economic Plan

The Enterprise M3 area includes over 1.6m people with over 740,000 jobs. The Growth Deal will deliver to Government the accelerated provision of 11,500 new homes, 30,700 new jobs and £757m direct GVA and these are economic successes that impact across the country. Coast to Capital Local Enterprise Partnership Growth Deal will deliver 14,000 jobs, 4,600 new homes and 190,000 square meters of employment space.

Guildford is identified as one of four 'Growth Towns' in the Enterprise M3 SEP, with a combined GVA forecast increase of 14% between 2014 and 2019, compared with 11% for the UK in the same period, and projects around congestion, housing and specific infrastructural investments have been identified as growth packages required to facilitate and unlock this forecast growth.

2.3.5 Local Plans

The Guildford Core Strategy also has a number of policies on housing and jobs growth, infrastructure and sustainability that are relevant to the M25 J10 area. These are:

- Policy 13 – economic development - support the provision of 11,000 to 15000 new jobs to 2031, Wisley Airfield identified as a development site;
- Policy 15 – Guildford town centre – promote Guildford as the key retail and service centre for Surrey county and beyond, facilitate the building of 2000 new homes and four major comparison retail developments at Ladymead (near A3) recently approved; and
- Policy 18 – sustainable transport – encourage walking and cycling by providing high quality, safe and direct routes.

Developing the former Wisley Airfield can deliver 2100 homes with a population in excess of 4000. The development will have direct access to the A3. This increases demand on the A3 and interventions to address congestion in the area were considered as part of the site's planning application.

The current Elmbridge Strategic Housing Land Availability Assessment (July 2010) indicates that there is sufficient housing potential within the urban area to deliver 3,710 net additional dwellings between 2011 and 2026. Additional housing at any of the preferred locations, most notably Cobham (575-625), would add additional pressure to the A3, Painshill Interchange and M25 J10.

2.3.6 London Local Plan

The London Plan has been prepared by the Greater London Authority and presents the long-term strategic plan for growth in London to 2036. Initially published in 2011, the Plan was recently updated (in March 2015) to include minor alterations. The Plan identifies strategic growth locations and sets minimum annual housing growth targets for each of the London boroughs. Of note for the A3 corridor is that South Wimbledon/Colliers Wood has been identified as an area for intensification.

2.4 Current problems and issues

The following problems and issues have been identified:

- There are no real alternatives that cater for the demands of orbital travel via other modes in this corridor;
- The southwest quadrant of the M25, where M25 J10 sits, is one of the busiest sections of the motorway network and experiences severe congestion;
- Queueing occurs on the mainline A3 on a daily basis on the approach to M25 J10, causing knock-on impacts to junctions to the south of M25 J10 and as far back as Ripley to the south and Painshill to the north and even further back during incidents;
- Part of the queuing problem is caused by the difficulty accessing the M25 clockwise due to congestion on the M25 but this is being addressed through a separate M25 J10-J16 scheme;
- Traffic leaving the A3 at Painshill is often prevented from doing so because of local network congestion tails back from the A245 Seven Hills Road junction that is signal controlled;

- The area around M25 J10 has the highest recorded collision rate across the network nationally. M25 J10 is ranked the most dangerous junction nationally in terms of casualty rate. Between 2009 and 2014 there were approximately 30 Personal Injury Accidents per year on or around M25 J10;
- There are several heavily used (by HGV's mostly) layby's along this stretch of the A3 and some areas, both north and south of M25 J10, where HGV's park illegally;
- The land around M25 J10 and the A3 is mainly designated SSSI; and
- There are some facilities for walkers/cyclists along the A3 on the southbound carriageway but they are in a poor state.

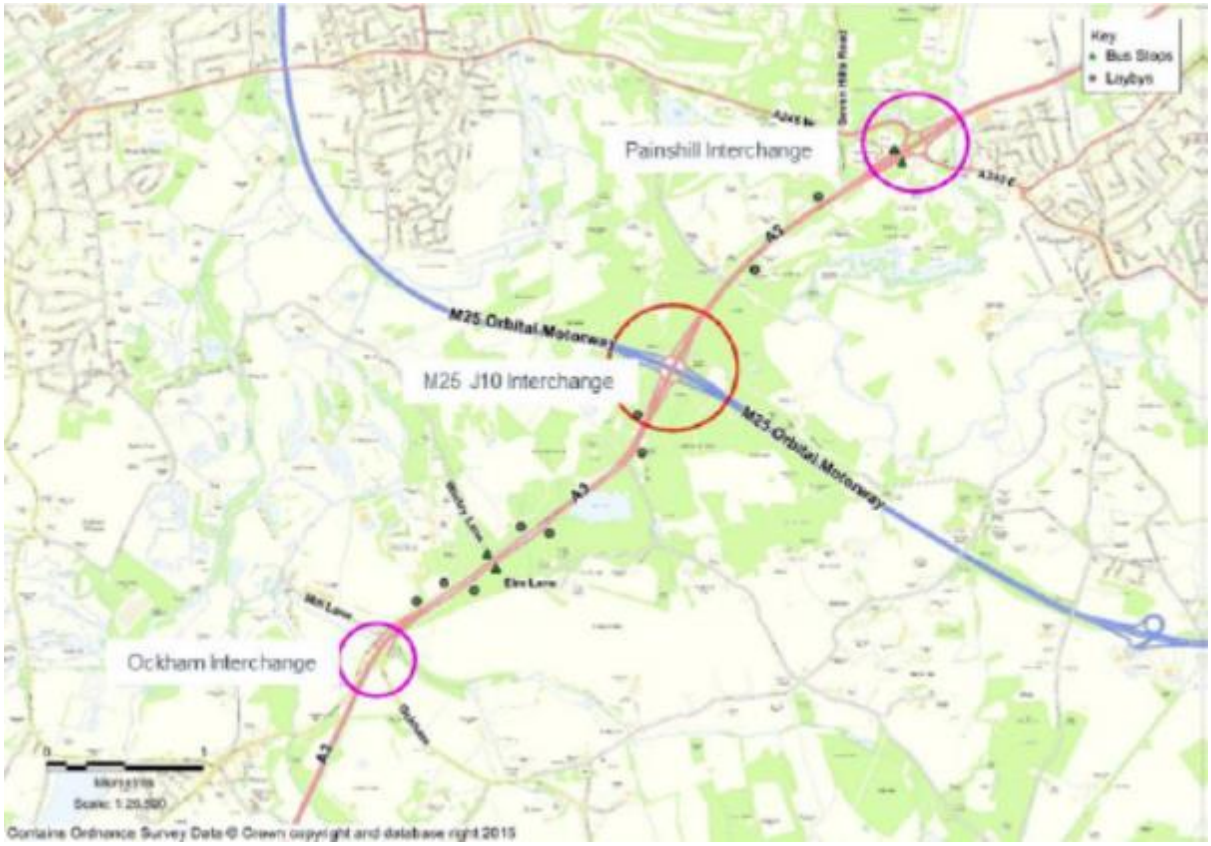
3 Existing conditions

3.1 Description of the locality

3.1.1 Study area

The M25 J10 lies in the south west quadrant of the M25 London Orbital Motorway. At J10 the A3, a key radial route from London to Portsmouth, crosses the M25 motorway. In addition to J10 itself, it has been recognised that the adjacent junction on the A3: Painshill Interchange to the north is also a pinch-point. Figure 3-1 provides an overview of junctions on the M25 and A3 within the study area.

Figure 3-1 Location of junctions, side roads and Lay-bys



M25 J10 interchange forms the confluence of a number of radial routes between Surrey, Hampshire and Greater London with orbital routes between Kent, East and West Sussex, Surrey, Berkshire and beyond. The junction itself does not serve an immediate urban conurbation or a significant trip attractor, but proposed future developments in the area, such as the development of Wisley Airfield, could increase trip generation in the immediate vicinity.

M25 J10 interchange sits on the eastern edge of the Borough of Guildford, and is also in close proximity to the boroughs of Elmbridge and Woking. Together these boroughs have a population of over 375,000. These boroughs have strong and diverse economies, all containing offices of multi-national companies as well as local retail and business centres. There are relatively high levels of commuting into London, and Heathrow and its surroundings also serve as a major source of employment.

Putting it in a broader context, the M25 J10 / A3 Wisley interchange area is on the eastern side of the Enterprise M3 Local Enterprise Partnership (LEP) area which has a

population of 1.6 million and sustains 740,000 jobs. High levels of housing and employment growth are planned for the wider area.

3.2 Existing highway network

3.2.1 M25 Junction 10

The M25 is a D4M motorway (dual carriageway with 4 lanes in each direction) either side of Junction 10, although the section of the motorway between the slip-roads through the junction is of D3M standard (3 lanes in each direction). The A3 is a D3 road (dual carriage way with 3 lanes in each direction) either side of the junction, but only D2 between the slip-roads.

The junction itself is a signal controlled roundabout junction with no free-flow left-turn lanes. The roundabout has 3 lanes on the circulatory carriageway, although it has four lanes at the stop lines with the M25 westbound off-slip and with the A3 southbound off-slip.

All slip-roads have two lanes; with the A3 northbound off-slip and M25 westbound off-slip having four lanes at the stop-line, and the A3 southbound off-slip and M25 eastbound off-slip having three lanes at the stop-line

There are pedestrian, cycle and equestrian crossings on the roundabout.

3.2.2 Painshill Interchange

Painshill Interchange is approximately 2km to the north of M25 J10 on the A3, where it crosses the A245. This junction is the principle access point to the trunk road network for many surrounding settlements, including Cobham (via A245 east), Byfleet and Brooklands (via A245 west) and the southern parts of Weybridge and Walton-on-Thames via B365 Seven Hills Road. The A3 is a D3 road (dual carriage way with 3 lanes in each direction) either side of, and through, the junction. The A245 has a two lane approach from the west and a single lane approach from the east. The junction consists of a signalised two-lane roundabout with two lanes at each stop line.

To the west of Painshill, the A245 is a D2 dual carriageway for a short stretch until it crosses Seven Hills Road (Seven Hills Junction). Seven Hills Junction is a signalised junction. West of Seven Hills, both the A245 towards Byfleet and Seven Hills Road towards Weybridge are single carriageways.

3.2.3 Ockham Interchange

Ockham Interchange is approximately 2.5km to the south of M25 J10 where it provides local access from Ripley, Ockham and surrounding areas. It has north facing slips only and the next junction to the south (Clandon) has only south facing slips.

The A3 is a D3AP road (dual carriage way with 3 lanes in each direction) either side of, and through, the junction. This junction itself is a non-signalised roundabout.

3.2.4 Along the A3

There are a number of minor junctions along the A3 between M25 J10 and Ockham Interchange. Southbound from M25 J10, there is a junction with Old Lane on the southbound on-slip road. Just before the turn-off into Old Lane is a layby. After the point of merging of the on-slip is the junction with Elm Lane. Elm Lane provides access to a small number of dwellings and is signed as a non-through route. There is access only between Elm Lane and the southbound A3. There is no diverging lane at Elm Lane, and turning traffic has to slow down on the main carriageway; there is also

no merge lane onto the A3 from Elm Lane. Immediately after Elm Lane is a bus stop, presently served by Route 515 between Kingston and Guildford. Buses serving this stop must also decelerate and accelerate on the main carriageway.

On the northbound carriageway between M25 J10 and Ockham Interchange there is the junction with Wisley Lane, which leads to RHS Wisley Gardens. There is no access between Wisley Lane and the southbound A3. There is only a small length of diverging lane off the A3 into Wisley Lane. Traffic coming from Wisley Lane travels some 100m on a 'slip-road' before merging. This slip-road is also used as a bus stop and a layby. On the northbound on-slip there is an access road to Park Barn Farm.

Between M25 J10 and Painshill Interchange there are a number of residential accesses on to the A3 on both north and southbound carriageways.

3.2.5 Non-motorised users – current arrangements

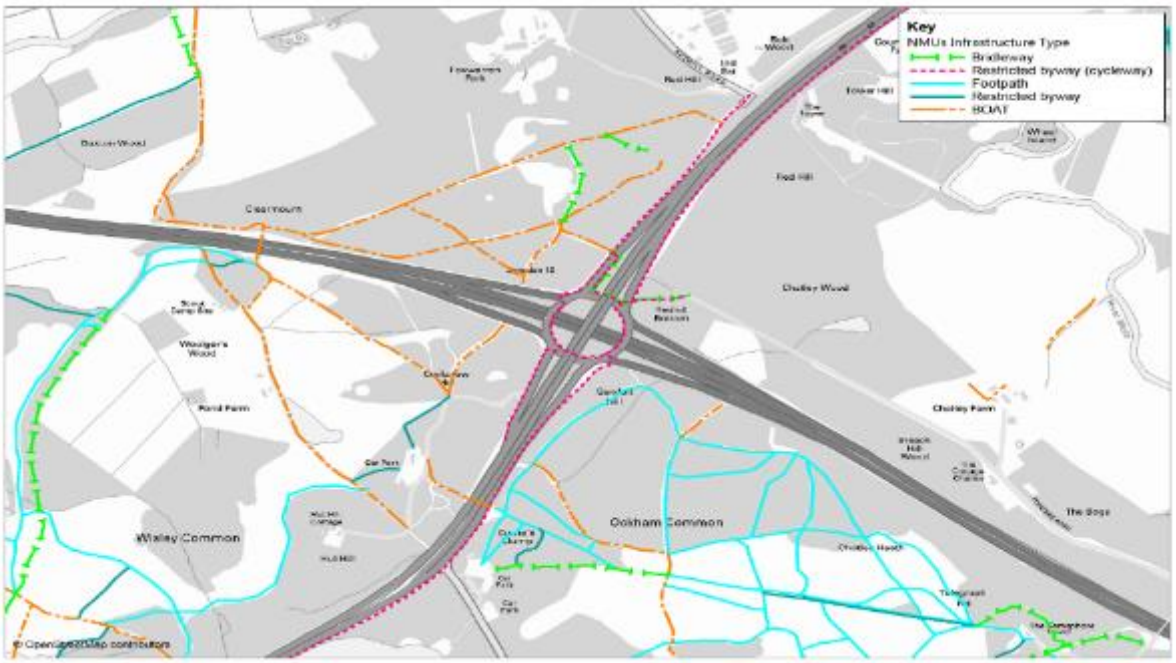
As part of PCF1, a Non-Motorised User (NMU) context report was produced which followed guidance in *Design Manual for Roads and Bridges (DMRB) V5 S2 Part 5 Non-Motorised User Audits (HD42/05).* A number of NMU routes have been identified within the study area around M25 J10. These are briefly described below and shown graphically in Figure 3-2.

Considering the land use in the local area (Wisley and Ockham Commons) as well as existing trip generators (Wisley RHS Gardens), it can be assumed that the NMU infrastructure mainly accommodates leisure movements. This is supported by the generally low flows of NMUs observed during a survey undertaken in 2015. Because of the very low flows of users, it is difficult to assess a priority of importance to specific desire line.

NMU infrastructure in the vicinity of the junction includes shared use paths, footways, paths, tracks and bridleways. There is also a Pegasus crossing at M25 J10 and a bridleway travelling east to west.

The NMU Context Report referenced a previous NMU assessment (*Integrated M25 DBFO Network Pedestrians, Cyclists & Equines Study)* which found a number of areas around the M25 J10 / A3 Interchange and the wider area where tactile paving, and/or dropped kerbs are of poor quality, or stepped access is the only means of accessing areas. Barriers to movement can present major safety issues for some of the most vulnerable road users, either resulting in risky behaviour or avoidance of travel.

Figure 3-2 M25 Non-motorised users – current arrangements



Base map source: www.google.co.uk

3.3 Traffic

The M25 J10 is one of the busiest interchanges in the country:

- Between M25 J10 and M25 J11, which is amongst the top links for National five year average flow, approximately 170,000 vehicles per day use this section (Table 3-1). The other side of the M25 J10 interchange, approximately 153,500 vehicles per day travel between J9 and J10.
- The A3 south of M25 J10, when both directions of travel are combined, is typically utilised by approximately 101,500 vehicles each day. The A3 north of M25 J10, when both directions are combined, is typically utilised by 85,500 vehicles each day.

With the exception of M25 J9 to J10 all of the links have increased in AADT compared to 2010/11. M25 J11 to J10 has increased by over 10% compared to 2010/11, the majority of this increase occurred in 2011/12.

M25 J10 is a heavily used junction, with 133,000 vehicles per day moving through it from the M25 and 58,000 vehicles per day from the A3. The interchange at J10 accommodates 35% of all passing vehicles. The M25 J10 interchange experiences over 7500 vehicles making turning movements between 8am and 9am and 7000 vehicles making turning movements between 5pm and 6pm. In both peaks there are approximately 1000 vehicles are making six of the possible eight turning movements; meaning the movements at the junction are both heavy and complex. The A3 northbound off-slip is the most heavily utilised out of all the off-slips, with over 2300 vehicles per hour using this slip road in the morning peak hour. The largest turning movement being from the A3 northbound to M25 clockwise.

Table 3-1 Yearly change, 5-year average and national ranking of AADT on links in the study area

Road Link Description	2010/11 AADT	2011/12 AADT	2012/13 AADT	2013/14 AADT	2014/15 AADT	5 Year Average	National Rank
M25 between M25 J11 and M25 J10 (LM300)	80,213	86,422	86,739	88,151	88,977	86,100	14
M25 between M25 J10 and M25 J11 (LM299)	80,315	84,580	83,856	85,224	86,281	84,051	16
M25 between M25 J10 and M25 J9 (LM298)	77,297	75,629	74,462	93,126	77,596	79,622	27
M25 between M25 J9 and M25 J10 (LM297)	75,482	73,347	72,159	73,877	74,575	73,888	51
A3 between M25 J10 and A247 (AL643)	50,664	51,345	50,764	51,231	52,122	51,225	350
A3 between A247 and M25 J10 (AL641)	49,781	49,976	49,011	51,713	51,592	50,415	368
A3 between M25 J10 and A245 (AL647)	43,092	43,314	42,599	43,514	43,797	43,263	533
A3 between A245 and M25 J10 (AL644)	42,605	42,862	41,978	42,652	43,216	42,663	551

3.4 Accidents and journey time reliability

3.4.1 Accidents

Highways England has supplied reported accident data for five years between 2009 and 2013. During the period of 2009-2013 (inclusive), there have been 239 accidents in total (just under 50 per year on average) on and around M25 J10 and the A3 between Painshill and Ockham (Figure 3-3). It is likely that a number of collisions not resulting in injury go unreported, although the number of such events is unknown.

Of these reported accidents over the five year period, approximately 160 accidents were on either M25 or A3 main carriageways (just under 30 per year on average and over the same five year period the other 80 accidents happened on or near M25 J10.

Table 3-2 presents a comparison of accident rates at three local M25 junctions (which are of broadly similar nature). The M25 J10 is shown to have a slightly higher accident rate than M25 J13, but none of the accidents resulted in serious injury.

Table 3-2 Comparison of five-year accident rates at southwest quadrant junctions

Junction	Slight	Serious	Fatal	Total	Per year
M25 Junction 10	**57**	**0**	**0**	**57**	**11.4**
M25 Junction 11	37	3	0	40	8
M25 Junction 13	45	6	0	51	10.2

Figure 3-3 Accidents (2009 – 2013) in vicinity of M25 J10 (with A3)

3.4.2 Journey time reliability - Congestion

In the weekday peak hours of 06:00 to 09:59 and 16:00 to 19:59 the M25 and A3 links that are served by M25 J10 were congested 67% of the time over the five year period from 2010/11 to 2014/15. The M25 J11 to J10 eastbound was the worst affected by congestion with 93 – 94% of peak journeys experiencing some congestion, shown in Table 3-3

All four of the M25 links have experienced congestion in at least 75% of weekday peak journeys. There is a less significant problem with congestion on the M25 links westbound in the evening, however this is still the majority of peak time periods.

Notably, the A3 links north of J10 have more of a problem with congestion than the roads south of J10, which have higher AADTs. The A3 links north of J10 both experience congestion in the majority of weekday peak time periods.

Further interrogation of the data has revealed that the approaches to the interchange from both sides of the A3 are slow for the straight-on movement (approx. 25mph), suggesting that vehicles which are leaving the A3 for the M25 and are queuing back onto the main carriageway and causing delay to straight-on movements both north and south of M25 J10. Average morning peak journey time from Ockham Interchange to Painshill Interchange is over six minutes, compared with an average of three minutes off-peak. Journey time variability for this movement is high, with journey times of 16 minutes, not uncommon in the morning peak hour.

Table 3-3 Comparison of peak period congestion at southwest quadrant junctions

Link	Percentage of weekday morning peak periods with congestion	Percentage of weekday evening peak periods with congestion	Percentage of total weekday peak periods with congestion
M25 between M25 J11 and M25 J10 (LM300)	93.9 %	93.3 %	93.6 %
M25 between M25 J10 and M25 J11 (LM299)	93.5 %	78.1 %	85.8 %
M25 between M25 J10 and M25 J9 (LM298)	79.8 %	79.7 %	79.7 %
M25 between M25 J9 and M25 J10 (LM297)	91.4 %	60.5 %	75.9 %
A3 between M25 J10 and A245 (AL647)	69.8 %	71.0 %	70.4 %
A3 between A245 and M25 J10 (AL644)	65.6 %	55.7 %	60.6 %
A3 between A247 and M25 J10 (AL641)	48.3 %	38.1 %	43.2 %
A3 between M25 J10 and A247 (AL643)	29.3 %	25.0 %	27.1 %

Looking at the busiest turning movement, the average morning peak journey time from Ockham Interchange to M25 J11 is approximately 14 minutes, compared with six minutes off peak. Analysis of the route in detail shows that it takes an average of approximately three minutes to travel from the A3 diverge to M25 merge in the morning peak hour and highlights how the majority of the 14 minute average journey time is actually experienced on the A3 and M25 rather than at the J10 Interchange. Journey time variability for this movement is high, with journey times of 27 minutes, not uncommon in the morning peak hour.

3.5 Topography, land use, property and industry

3.5.1 Agricultural land

The areas affected by the proposed scheme options are classified as other land primarily in non-agricultural use in accordance with Defra's Agricultural Land Classification[2].

3.5.2 Residential properties

There are several residential and non-residential properties which are located within close proximity to the study area however at this stage none appear to be required within the land parcels required to accommodate the Proposed Scheme Options:

- Hut Hill Cottage, in vicinity of Wisley Common.
- Pains Hill Bungalow (45m), Pains Hill (50m) in proximity to Painshill Interchange.
- The Tower, to the south of the A3.
- Redhill Road Industrial Estate, which includes an equestrian school, personal training studio and car repairs amongst other light industrial uses.

To the north of the A3 and west of the Painshill Interchange there is Feltonfleet School which fields abut the road A3 and A245.

[2] Natural England. 2010. Agricultural Land Classification map London and the South East (ALC007). [ONLINE] Available at: http://publications.naturalengland.org.uk/publication/141047?category=5954148537204736. [Accessed 27th January 2016].

There is a mixed use development between the A3 and A245 within 300m of the Painshill Interchange, and further residential buildings located at Seven Hills Road, approximately 430m from the Painshill Interchange. The land south west of the Painshill Interchange towards the M25 and beyond, is sparsely populated.

It is understood that there are proposals to develop the land occupied by the former Wisley Airfield into residential housing. The redevelopment proposals are to construct a new settlement consisting of up to 2,100 homes. This development would be subject to planning permission.

The following non-residential noise sensitive receptors have been identified within 600m of the M25, A3, and A245 Byfleet Road: Feltonfleet School, St George's Nursing Home, Hilton Hotel, Notre Dame Senior School, Notre Dame Preparatory School, Cobham Free School, Painshill Fire Station, Silvermere Equestrian Centre's Riding School, and Royal Horticultural Society's Garden.

3.5.3 Community land

There are no known allotments, playgrounds or sports pitches that would be affected by the proposed scheme options. However, both the A3 and M25 bisect Wisley and Oakham Commons both of which are 'Special Category Land'.

There are a number of land types in the M25 J10 interchange area that would qualify as 'Special Category Land' under Section 19 of the Acquisition of Land Act 1981 (ALA 1981):

- Registered common land, as so defined on the Surrey County Council (SCC) Common Land Register. There are no commoner's rights included on the Register in association with these areas of registered common land [TBC].
- Registered Village Green, as so defined on the SCC Common Land Register.
- Access Land, as defined under the Countryside and Rights of Way Act (CRoW) 2000.
- Other land currently with unencumbered access by the public for recreational use (which would not include RHS Wisley and SCC Painshill Park, as an entry fee is charged for both of these).

3.6 Climate

The RHS Wisley Gardens climate monitoring stations suggests that the area has a typically English climate. The area experiences 112 days of rainfall and 1,500 hours of sunshine per year. Winter temperatures have an average low of approximately 2 degrees Celsius, and highs of 8 degrees Celsius. In the peak summer months temperatures range from 12 to 23 degrees Celsius on average.

Nothing suggests that the climate at Wisley is markedly different from much of the south-east region.

3.7 Drainage

3.7.1 Existing drainage

The assessment of the existing drainage was undertaken using information available on the Highways Agency Drainage Data Management System (HADDMS) database. The information available on HADDMS is not comprehensive and has been supplemented by available as-built information and, where necessary, assumptions

have been made based on Google Street View and engineering judgement. Existing outfalls are shown in Table 3-4.

The existing road edge drainage on the mainline carriageway on the A3 between Ockham Park junction and A3/A245 Painshill junction predominantly employs a kerb and gully system, combined surface and subsurface filter drains, and ditches at intervals along the carriageway.

Ditches in the central reserve exist on the A3 near Ockham Junction. Surface water channels and combined surface and sub-surface filter drains are also used in the central reserve at intervals along the A3.

The A3 on and off slip roads at M25 J10 have a mixture of combined surface and ground water filter drains, kerb and gully units in both directions. The A3 on slip at the north of M25 J10 has ditches and filter carrier drains. The A3 on and off slip roads at the south of M25 J10 and the off-slip at the north of the junction have a mixture of combined surface and sub-surface water filter drains, and kerb and gully units.

M25 J10 has kerb and gully systems. M25 through the junction has kerb and gully systems in the verge in both directions. The M25 on and off slip roads at Junction 10 predominantly have ditches and filter carrier drains.

Table 3-4 Existing outfalls

Ref	Location	Outfall
1,2	Near Ockham Junction	Outfalls directly into stream of the River Wey tributary
3,4	Near Ockham Junction	Outfalls into cross carriageway culvert of the River Wey tributary.
5,6	Near Ockham Junction	Outfalls into culvert under A3 slipway of the River Wey tributary.
7,8	Near Elm Lane	Outfalls into the River Wey tributary.
9	Near Bolder Mere	Outfalls to brook.
10	Near Bolder Mere	Outfalls to ditch
11	Near Bolder Mere	Gully pipe
12	Near Cockrow Footbridge	Outfalls to ditch
13	Near River Wey crossing to the west of M25 J10	Outfalls to retaining pond.
14	At M25 northbound on-slip at Junction 10	Outfalls to ditch.
15,16	Near Painshill Junction	Outfalls directly into River Mole
17	Near Painshill Junction	Outfalls into River Mole before crossing A3 carriageway

There is one oil interceptor installed near A3 Ockham interchange discharging into the River Wey tributary, and there are also three oil interceptors installed north of the Painshill Junction with each outfall discharging into the River Mole.

3.7.2 Culverts

The following major culverts have been identified from the Structures Management Information System (SMIS) but it should be noted that there may be some minor culverts i.e. <900mm diameter that will need to be identified at a later date.

- 6089 – Stratford Brook Culvert South
- 31779 – Boldermere Culvert

3.7.3 Drainage assets condition

HADDMS database provides limited information on the condition of the existing drainage assets. Based on the available condition information, parts of the existing drainage networks must be replaced or alternatively defect rectification should be provided to ensure that pipes have sufficient residual life.

3.7.4 Flood risk

According to HADDMS flood plain information A3 Ockham Interchange is in the high level flood risk plain and M25 J10 is in the very high level flood risk plain. Geology

3.8 Geology

Baseline information was gathered from the publicly available sources with no assurance is given as to their accuracy. As such, it should be noted that the desk based assessment is indicative only at this stage and is pending the findings of a future geotechnical investigation.

Geological mapping identifies that superficial deposits are expected in the study area, although they are indicated to be absent across majority of the site.

Superficial deposits of Lynch Hill Gravel Member and River Terrace Deposits are generally present in outcrop; located immediately north/northeast and to the south/southwest of Junction 10. Alluvium and Kempton Park Gravel Member, associated with the River Wey, are present at the southern extent of the site and to the southwest/west of Junction 10. Alluvium and deposits of Taplow Gravel Memer are anticipated at the location of the River Mole.

The Lynch Hill Gravel Member, Kempton Park Gravel Member, Taplow Gravel Member and River Terrace Deposits (undifferentiated) are anticipated to comprise sand and gravel, locally with lenses of silt, clay and/or peat. Alluvium typically comprises very soft and soft organic clays and low strength peat.

Bedrock geology is anticipated to comprise Bagshot Formation of the Bracklesham Group over London Clay Formation of the Thames Group.

The Bagshot Formation typically comprises pale yellow-brown to pale grey or white, locally orange or crimson, fine- to coarse-grained laminated sand which is frequently micaceous and locally clayey, with sparse glauconite and sparse seams of gravel.

The London Clay Formation is generally described as a bioturbated or poorly laminated, fissured, blue-grey or grey-brown (when weathered) silty to very silty clay. Table 3-5 summarises the anticipated geology at M25 J10.

Table 3-5 Summary of anticipated geology

Group	Formation	Member	Thicknesses (m)	Top depth encountered in BGS boreholes (m bgl)	Location and description (BGS Lexicon)
-	Made Ground	-	Unknown – not encountered in BGS boreholes	Unknown (anticipated to be ground level) – not encountered in BGS boreholes	Anticipated to likely comprise reworked Lynch Hill Gravel Member and Bagshot Formation. Expected to be localised to and associated with

Group	Formation	Member	Thicknesses (m)	Top depth encountered in BGS boreholes (m bgl)	Location and description (BGS Lexicon)
					construction of the M25 and the A3.
Fluvial Deposits	Alluvium	-	0 - 2.1	Ground level	Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present.
	River Terrace Deposits (undifferentiated)	-	Unknown – not encountered in BGS boreholes	Unknown (anticipated to be ground level) – not encountered in BGS boreholes	Sand and gravel, locally with lenses of silt, clay and/or peat.
Thames Catchment Subgroup	Maidenhead Formation	Kempton Park Gravel Member	0 - 6.9	Ground level	Sand and gravel, locally with lenses of silt, clay and/or peat.
		Taplow Gravel Member	Unknown – not encountered in BGS boreholes	Unknown (anticipated to be ground level) – not encountered in BGS boreholes	Sand and gravel, locally with lenses of silt, clay and/or peat.
		Lynch Hill Gravel Member	Unknown – not encountered in BGS boreholes	Unknown (anticipated to be ground level) – not encountered in BGS boreholes	Sand and gravel, locally with lenses of silt, clay and/or peat.
Bracklesham Group	Bagshot Formation	-	22.5+ (base unproven in all but one borehole – TQ05NE57)	Ground level	Generally pale yellow-brown to pale grey or white, locally orange or crimson, fine- to coarse-grained sand that is frequently micaceous and locally clayey, with sparse glauconite and sparse seams of gravel. Commonly cross-bedded but some are laminated. Thin beds and lenses of laminated pale grey to white sandy or silty clay or clay ('pipe-clay') occur sporadically, becoming thicker towards the top of the formation. A thick clay bed, the Swinley Clay Member, is included at the top. In places, there is a basal

Group	Formation	Member	Thicknesses (m)	Top depth encountered in BGS boreholes (m bgl)	Location and description (BGS Lexicon)
					bed of gravelly coarse-grained sand.
Thames Group	London Clay Formation	-	17.5+ (base unproven)	22.5+ (only encountered in one BGS borehole - TQ05NE57)	Mainly comprises bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. Commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation. At the base, and at some other levels, thin beds of black rounded flint gravel occurs in places. Glauconite is present in some of the sands and in some clay beds, and white mica occurs at some levels.

3.8.1 Site history

The earliest available historical maps date from 1870 and the latest available date from 1991. The historical development at the site is summarised in Table 3-6.

Table 3-6 Historical development of the Site and surrounding area

Date	Summary of development (within 250m of the Site)
1870	The A3 is present, however is mapped as a single lane unnamed road; its alignment is similar to that of current configuration. Several tracks lead off from the road. A fish pond is mapped approximately 250m east of M25 J10. A gravel pit is mapped immediately to the south and a sand pit in mapped approximately 250m north east of the junction. Land surrounding the unnamed road is dominated by woodland and rough pasture.
1896	Wisley Common is mapped to the south west of M25 J10. Some of the tracks are no longer mapped. The sand pit is mapped as an 'old' sand pit.
1914	Some of the tracks are no longer mapped. The gravel pit appears disused.
1934	Ockham Common is mapped to the south east.
1961	The pond is no longer mapped.
1972	The unnamed road is identified as Portsmouth Road (now known as Portsmouth Road/A3). A Tumulus is mapped immediately south west of the junction, in Wisley Common.

Date	Summary of development (within 250m of the Site)
1977	Works appear to have been carried out on Portsmouth Road; developing the single lane road into a two lane carriageway. The area surrounding the site is generally mapped as woodland, not rough pasture.
1989	On the 1989 map the M25 had been constructed, including the current configuration of M25 J10. An overbridge has been constructed immediately south of M25 J10, linking Ockham Common to Wisley Common. Several new roads have been developed in the area.

3.8.2 Hydrogeology

The Bagshot Formation and, where present, the overlying Alluvium, Lynch Hill Gravel Member and River Terrace Deposits (undifferentiated) are classified as a Secondary A Aquifer[3] by the Environment Agency (EA). The Kempton Park Gravel and Taplow Gravel Formation are both classified as a Principal aquifer by the EA. The London Clay Formation is an unproductive stratum.

There are no groundwater abstractions or groundwater Source Protection Zones located within the study area. The site is not subject to tidal influence.

BGS borehole logs suggest that groundwater will be encountered in discrete granular layers of the Bagshot Formation at approximately between 1.5m and 5.0m below ground level.

3.8.3 Historic landfill sites

The Environment Agency's 'What's In Your Backyard' website records four historic landfill sites within 500m of the proposed scheme. The identified historic landfill sites are as follows:

- Old Rectory Farm: <10m east of Ockham Park Junction (A3);
- Cobham Bridge: <10m north of Painshill Junction (A3);
- Norwood Farm: <10m north of the extent of the scheme near Painshill Junction (A3); and
- Land at Pond Farm: approx. 380m west of M25 J10.

The historic landfill sites pose several risks to the scheme including the presence of made ground, contamination and potential instability/subsidence. It should be noted that earthworks in the vicinity of historic landfill sites may be susceptible to leachate infiltration. Works in the areas involving the installation of sheet pile walls or gantry piles could experience excessive corrosion and/or groundwater contamination due to the highly aggressive nature of the historic landfill site. The impact of historic landfill sites on this scheme should be considered in more detail in the Preliminary Sources Study Report (PSSR).

3.8.4 Maintenance records

A preliminary review of HAGDMS undertaken on 04 March 2016 identified 104 earthworks within the proposed scheme and within close proximity on the M25 and A3. The condition of the earthworks are classified as 'A – As New' or 'C – Satisfactory'

[3] A Secondary aquifer is defined as an aquifer with, 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers'.

based on the classification of the worst case feature class. The earthwork condition has been classified in accordance with Schedule 14 of the M25 DBFO contract (CPS, 2011).

The number of features per class and the feature description recorded within the 104 earthworks on the M25 J10/A3 Wisley Interchange are as follows:

- Nil Feature Class 1A 'Major defects'.
- Twelve Feature Class 1D 'Minor defects', comprising minor soil slips, tension cracks, minor subsidence and erosion.
- Fourteen Feature Class 2 'At Risk areas' comprising the presence of nearby historic landfill sites, potential subsidence, defective drainage, defective slope reinforcement and animal burrowing.
- Nil Feature Class 3 'At Risk Repaired areas'.

Table 3-7 below defines the assessment of the features from HD 41/15 (Highways England, 2015).

Table 3-7 Classification of features from HD 41/15 (Highways England, 2015)

Class	Description of feature	Examples of features
Class 1: (visible defects)		
1A	Major defects.	A slip greater than ½ height of a major earthwork. A rock fall involving large boulder-size* blocks of rock or greater than 1m³ volume of rock debris.
1D	Minor defects.	Defects other than Major defects.
Class 2: (likely defects)		
2	At Risk areas. Assessment may be based on available information (maps, historical reports, behaviour of similar assets, etc.) and or visual inspection.	An asset overlying an area of mining activity where no mitigation measures were carried out during construction or where mitigation measures have deteriorated. An area of sidelong natural or made ground subject to historical slope movement. Animal burrows.
Class 3: Areas of repair		
3	At Risk Repaired areas. Sections of geotechnical assets where defects have been repaired or where preventative works have been undertaken to prevent deterioration of areas considered to be at risk. This class does not apply to areas that have been reinforced as part of a widening or improvement project.	Granular slope replacement of a failed cutting. Areas of remedial slope drains. Areas of remedial mine filling. Areas of remedial rock bolting. Areas of bio-engineering.
Notes: Class 1B and 1C as used in HD 41/03 have been consolidated into Class 1A. Class 2A and 2B as used in HD 41/03 have been consolidated into Class 2. Class 3A, 3B and 3C as used in HD 41/03 have been consolidated into Classes 2 and 3. *Large boulder is particle of diameter greater than 600mm, approx.		

The defect and at risk features have been recorded in accordance to HD 41/03 (Highways England, 2003). Since July 2015, the HD 41/03 document has been superseded by HD 41/15 (Highways England, 2015). The Notes in Table 3-7above give some details of the changes in feature class classifications between HD 41/03 and HD 41/15.

It may be possible that new features have occurred or existing features have developed since the previous inspections.

3.8.5 Mining

The site is not located in an area affected by mining or quarrying based upon a review of the Coal Authority interactive map viewer and BGS non-coal mining plans.

3.8.6 Geological SSSI

The Ockham and Wisley Commons SSSI are located directly adjacent to the south-east, south-west and north-west of M25 J10 and 85m to the north-east of the junction. The SSSI citation available on the Natural England website indicates that there are no special geological features associated with this SSSI, only biological features as this site contains areas of heath, bog, open water, secondary woodland and scrub.

No Local Geological Sites have been identified within the study area.

3.9 Public utilities

3.9.1 Enquiries

Statutory Undertaker's C2 searches were made in January, 2016. These are compiled and included in PCF Doc. No. HE551522-ATK-HGN-1-DO-C-3100, 'Statutory Undertakers Estimate', dated October, 2016. Composite drawings of all information received is included therein (C3 Cost Estimate enquiries will be advanced during Stage 2 as agreed with the Highways England PM). Identification of public utilities that either require diversion or protection are summarised below.

Ockham Junction:

- UKPN HV & LV routes affected by slip road widening and new Wisley access road.
- Affinity water affected by new Wisley access road.
- BT underground route affected by slip road widening and new Wisley access road.
- NRTS affected by slip road widening.

A3 south of Junction 10, northbound:

- Affinity water affected by new Wisley access road.
- UKPN HV crossing affected.
- Affinity water affected by carriageway widening.
- BT underground crossing affected by carriageway widening.

A3 south of Junction 10, southbound:

- BT underground route affected by carriageway widening & retaining wall.
- NRTS affected by carriageway widening & retaining wall.
- UKPN HV route affected by carriageway widening.

At Junction 10 the extents of the affected utilities will vary for each option, however the affected utilities are:

- BT
- UKPN HV & LV
- Affinity Water
- NRTS

A3 north of Junction 10, northbound:

- Two overhead EHV transmission lines, above proposed carriageway widening works but should not be affected by any works (other than crane use etc. in the vicinity).
- Affinity water (including 1 No. crossing) affected by carriageway widening.
- UKPN LV crossings x3 affected by carriageway widening.
- Affinity water affected by carriageway widening.
- BT underground crossing affected by carriageway widening.

A3 north of Junction 10, southbound:

- As per northbound.

Painshill Junction

- BT route crossing affected by widened slip roads.
- UKPN HV & LV route affected by widening at roundabout.
- Sky route affected by widening at roundabout & widening of A245 Byfleet Road.
- Virgin media route affected by widening at roundabout & widening of A245 Byfleet Road.
- Affinity water affected by widening at roundabout.

3.10 Environmental status

There are many land designations all around M25 J10 and along the A3 corridor. The junction is set within a predominantly wooded area to the south of Cobham and Byfleet and it is an attractive area despite the presence of the A3 and M25. The Royal Horticultural Society's headquarters are located at Wisley gardens to the south west and Painshill Park is to the north east; both are designated as Registered Parks and Gardens of Historic Interest. Much of the area around M25 J10 / A3 Wisley Interchange is covered by international/national ecological designations; Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI), as well as designation as a Local Nature Reserve. There are four Noise Important Areas at the M25 J10 / A3 Wisley Interchange. No Air Quality Management Areas (AQMA) have been declared by the local authorities for the area immediately around the junction and there are few human health receptors nearby.

There are three Scheduled Monuments around the M25 J10 / A3 Wisley Interchange and a number of Listed Buildings in the study area. There are no Source Protection Zones or groundwater water abstractions near the junction and flooding is not an issue although both the River Mole and River Wey are nearby. There are four disused landfill sites in the study area that accepted inert waste and the sand and gravel geology means that the area is sensitive to pollution incidents. The area immediately round the M25 J10 / A3 Wisley Interchange is designated as common land and these

areas and RHS Wisley and Painshill Park are well used by the public. There are some facilities for walkers/cyclists along the A3 on the southbound carriageway but they are in a poor state and a submission has been made to the Environment Designated Fund (Walking and Cycling) team to fund an upgrade to the facilities and provide a DDA compliant footbridge to replace the existing one at Elm Corner. There are controlled pedestrian and equestrian crossings at the M25 J10 / A3 Wisley Interchange and a number of Public Rights of Way in the surrounding area.

3.11 Environment

The conditions presented in the sub-sections below are derived from the Environmental Study – Scoping Report (ES-SR)[4] that was carried out in February 2016.

3.11.1 Noise

The M25 J10 / A3 Wisley Interchange is located between the urban areas of Ockham and Cobham in Surrey. The land use within 600m of the proposed scheme options consists mostly of green space, including Chatley Wood, Ockham Common and Wisley Common. The majority of the noise sensitive receptors are located close to the Painshill Interchange to the north east of the study area.

The closest buildings to the M25 J10 / A3 Wisley Interchange are in proximity to the Painshill Interchange and include Pains Hill Bungalow (45m), Pains Hill (50m), and Feltonfleet School (50m). There is a mixed use development between the A3 and A245 within 300m of the Painshill Interchange, and further residential buildings located at Seven Hills Road, approximately 430m from the Painshill Interchange. The land south west of the Painshill Interchange towards the M25 and beyond, is sparsely populated with few noise sensitive receptors located within 600m of the proposed scheme options in this area. The locations of the nearest noise sensitive receptors to the proposed scheme options are shown in Figure 3-4 and Figure 3-5 below.

In addition to the existing noise sensitive receptors located close to the proposed scheme options, it is understood that there are proposals to develop the land occupied by the former Wisley Airfield into residential housing. The redevelopment proposals are to construct a new settlement consisting of up to 2,100 homes, which if approved, would introduce more noise sensitive receptors to the study area that could be affected by the proposed scheme options.

The following non-residential noise sensitive receptors have been identified within 600m of the M25, A3, and A245 Byfleet Road: Feltonfleet School, St George's Nursing Home, Hilton Hotel, Notre Dame Senior School, Notre Dame Preparatory School, Cobham Free School, Painshill Fire Station, Silvermere Equestrian Centre's Riding School, and Royal Horticultural Society's Garden.

In the context of the ES-SR, a noise survey were not undertaken and will be undertaken at later PCF stages to ascertain the baseline noise levels at noise sensitive receptors within the study area. However, based on aerial imagery it is expected that road traffic noise from the M25 and the A3 are the main noise sources influencing noise levels in the study area. There is potential for aircraft noise to contribute to the noise climate as the study area is positioned between Heathrow and

[4] Road Investment Strategy, M25J10 / A3 Wisley Interchange Improvements, Environmental Study – Scoping Report, February 2016.

Gatwick airports. There are no railways or heavy industrial sources in proximity to the proposed scheme options.

Strategic noise maps were published during 2015 by Defra for major road and railways sources to meet the requirements of the Environmental Noise Directive (Directive 2002/49/EC) and the Environmental Noise (England) Regulations 2006 (as amended). The strategic noise maps for road traffic noise during the daytime (07:00-23:00) and night-time (23:00-07:00) periods are shown in Figure 3-4 and Figure 3-5 below. These noise maps represent the annual average noise levels from road traffic sources during 2012, in areas with populations of 100,000 people (agglomerations) and along major traffic routes. The noise levels shown were calculated for a receptor height of 4m above ground level, using the LAeq, T (A-weighted equivalent continuous sound pressure level during time period T) and Lnight (outdoor sound pressure level defined in the Environmental Noise Directive that is equivalent to LAeq, 8h) noise indices.

Important Areas for noise were identified to highlight any particular constraints on the design options. Important Areas are the locations where the 1% of the population are affected by the highest noise levels from major roads and railways according to the strategic noise mapping undertaken by Defra. The locations of these Important Areas are also shown in Figure 3-6 and Figure 3-7.

The strategic noise maps for road traffic noise indicate that the average noise levels exceed 60 dB LAeq, 16h during the daytime and 55 dB Lnight at the majority of locations within 600m of the extents of the proposed scheme options. Areas with higher noise levels are close to the M25 J10 / A3 Wisley Interchange, where the land use is mainly rural with isolated buildings.

Figure 3-4 Local noise receptors

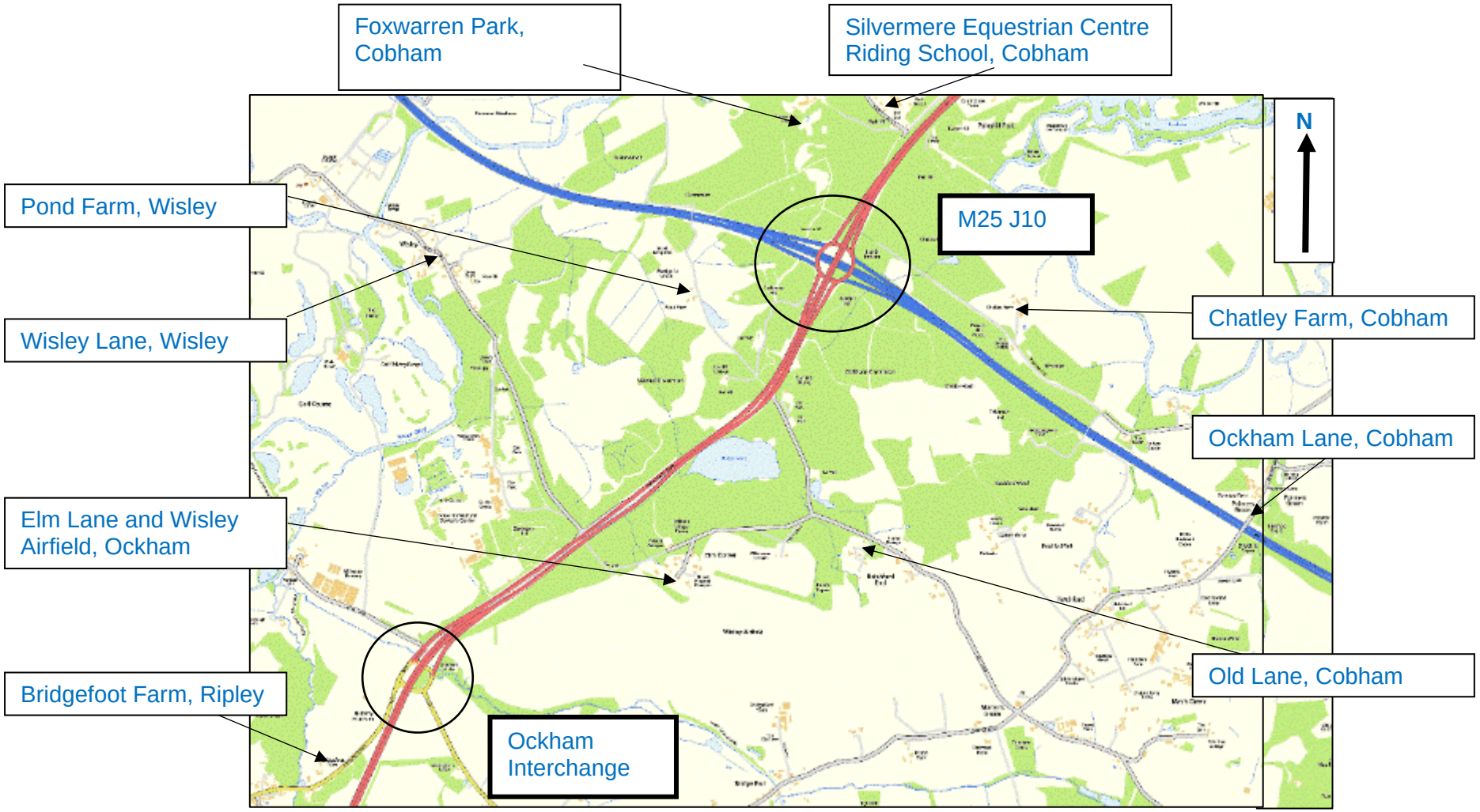
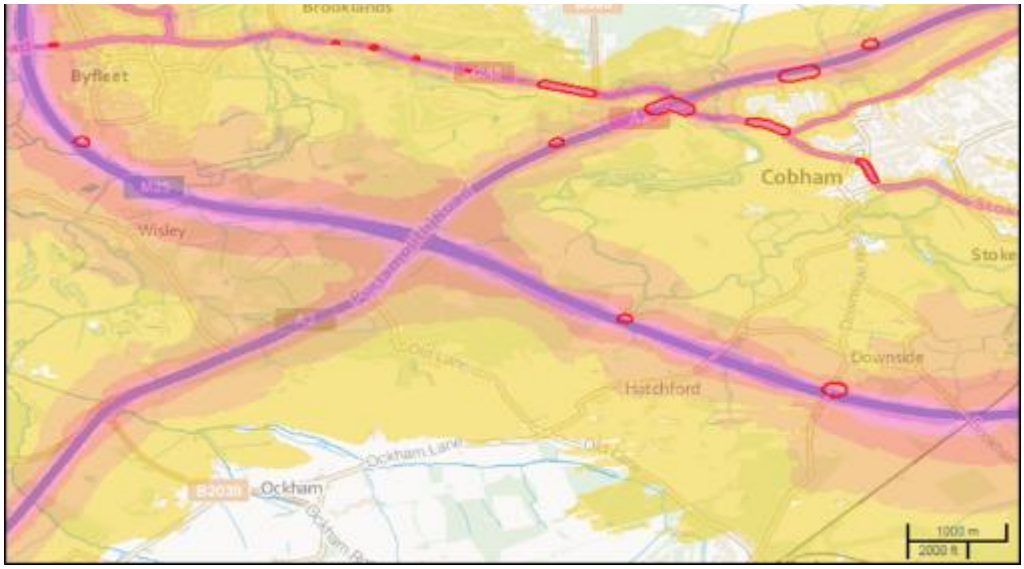


Figure 3-5 Local noise receptors

Figure 3-6 Defra Round 2 Environmental Noise Maps - Road Noise LAeq, 16h (07:00-23:00)



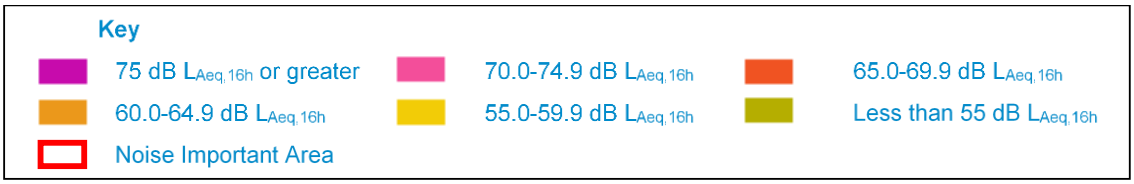
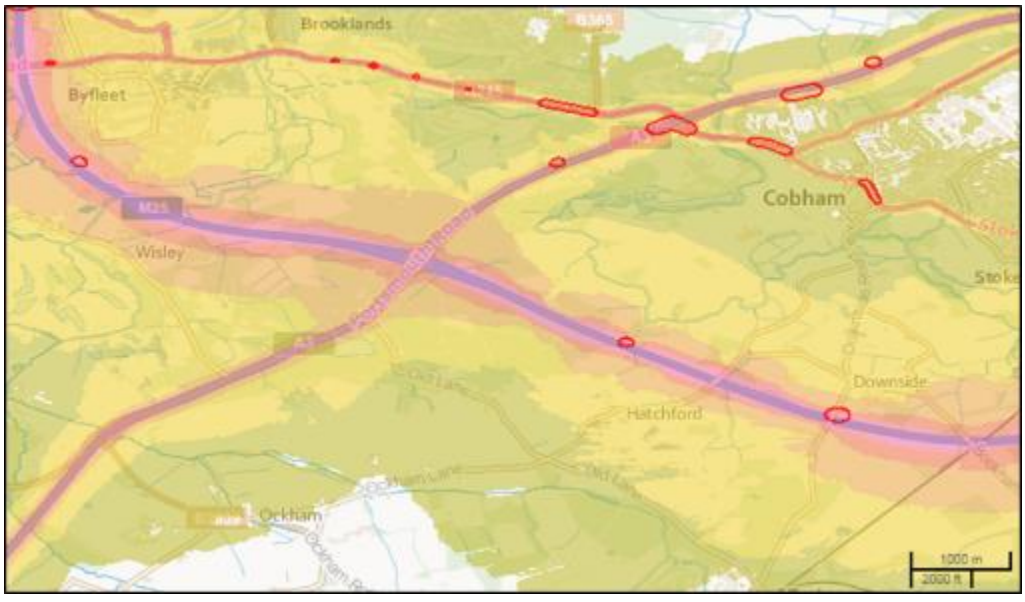
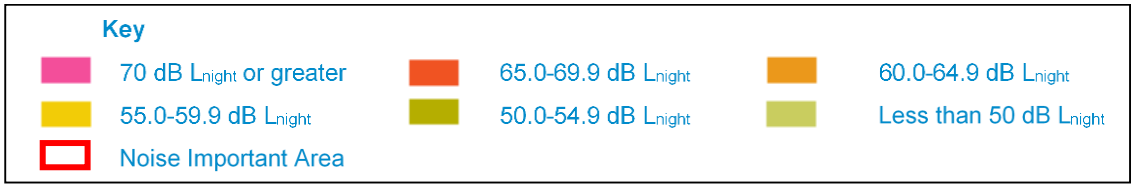


Figure 3-7 Defra Round 2 Environmental Noise Maps - Road Noise Lnight (23:00-07:00)





3.11.2 Local air quality

The physical extent of each of the three scheme options, and the extent of the study area is located within the boundaries of Runnymede Borough Council (RBC), Woking Borough Council (WBC), Guildford Borough Council (GBC), Elmbridge Borough Council (EBC) and Mole Valley District Council (MVDC).

There are no AQMAs declared in the GBC and MVDC areas. There are seven declared for exceedances of the annual mean UK AQS objective for NO2 within the EBC administrative area. However, the nearest AQMA in the EBC area is approximately 2.5 kilometres from M25 J10 / A3 Wisley Interchange at Cobham High Street and all others are more than 7 kilometres from M25 J10, so all seven are far beyond the extent of the air quality study area.

WBC has declared one AQMA for exceedances of the annual mean UK AQS objective for NO2. This AQMA is situated on a four way junction on Anchor Hill, Woking more than 10 kilometres from M25 J10 / A3 Wisley Interchange, so also outside the study area.

Within the area of RBC, two AQMAs have been declared, one in Addlestone Town Centre, approximately 1.5 kilometres from the study area, for exceedances of the annual mean UK AQS objective for NO2 and one along the entire stretch of the M25 corridor within the RBC administrative area. This AQMA was declared for exceedances of both the annual and 24-hour mean UK AQS objective for PM10 as well as the annual mean UK AQS objective for NO2 and in within the study area.

The DEFRA PCM shows that during 2014 the only roads included within the model and in the vicinity of air quality study area were the A318 and A245 to the north of M25 J10 and the A245 and A307 to the north east of the M25 J10. It should be noted that the model did not include either the M25 or the A3.

3.11.3 Landscape

The M25 J10 is located within the registered Common Land (Wisley Common and Chatley Heath) and would potentially affect the Grade II* Registered Park and Garden RHS Wisley and Grade I Registered Park and Garden Painshill. The ESR will take into consideration whether the proposal will affect the landscape features and qualities of these designated areas.

M25 J10 is located within an area that is well contained by dense woodland cover and the visibility of the proposed scheme options would be restricted. There are relatively few visual receptors in the close proximity that could experience potentially significant effects.

The following five groups of people are considered to be the applicable visual receptors:

- Local communities (e.g. villages and settlements) and isolated residential properties.
- People in their places of work.
- People using nationally designated or regionally promoted footpaths, cycle routes, bridleways, and users of the local rights of way network and areas of open access or Common land.
- Visitors at publicly accessible sites including, for example, the Registered Parks and Gardens, historic sites, and other visitor attractions.
- Road users.

3.11.4 Townscape

Not applicable

3.11.5 Heritage and historic resources

The scoping study assessed designated heritage assets around the M25 J10 to determine any key constraints in relation to the historic environment. A 500m-radius buffer was used for this purpose. The baseline information was divided into two sections for ease of reference – M25 J10 and A3 Painshill to Ockham; however, given their proximity there is some overlap of referenced assets.

M25 J10 Roundabout:

- Scheduled Monument: Bell Barrow on Cockrow Hill
- Scheduled Monument: Bowl Barrow west of Cockrow Hill
- Scheduled Monument: Hengi-form Monument at Red Hill
- Grade I registered Park and Garden: Painshill Park
- Grade II* Listed Building: The Gothic Tower, Painshill Park
- Grade II* Listed: Foxwarren Park
- Grade II Listed: Water tower in Foxwarren Park
- Grade II Listed: Foxwarren Cottage
- Grade II* Listed: Chatley Semaphore Tower
- Grade II Listed: Chatley Farmhouse
- Grade II Listed: Hatchford Park School
- Grade II Listed: Service Courtyard to Hatchford Park
- Grade II Listed: Entrance Walls, Pavillions and Gates, Hatchford Park

A3 Painshill to Ockham:

- Scheduled Monument: Late Roman Bath House at Chatley Farm
- Grade II* Listed: Painshill House, Painshill Park
- Grade II* Listed: The Gothic Temple, Painshill Park (In addition, a further nine Grade II listed buildings are located within the Painshill Park)
- Grade II Listed: Cobham Bridge
- Grade II listed: Feltonfleet School
- Grade II listed: Lodge east of Feltonfleet School
- Grade II listed: Chestnut Lodge
- Grade II listed: Entrance Lodge to Chestnut Lodge
- Grade II listed: Old Cottage/Post Boys
- Grade II listed: The Vermont Exchange, Cobham
- Grade II listed: Post Boys Row, Cobham
- Grade II listed: World's End Cottage, Cobham
- Grade II listed: The Old House/Vine House, Cobham

- Grade II* Registered Park and Garden: RHS's Gardens, Wisley
- Grade II listed: RHS Offices, Wisley
- Grade II listed: Walls and Gates to Ockham Park

Non-designated heritage assets have not been assessed at this scoping stage, nor has there been an assessment of potential buried archaeological remains.

3.11.6 Biodiversity

There are three statutory designated sites within 2 km of M25 J10, as summarised in Table 3-8 below and on the Environmental Constraints Map in Appendix A. These statutory sites include one internationally designated Special Protection Area (SPA)[5] , one nationally designated Site of Special Scientific Interest (SSSI)[6] and one Local Nature Reserve (LNR)[7].

Table 3-8 Summary of statutory designated sites within 2 km of M25 J10

Site name	Approximate distance and direction from M25 J10 Improvements	Description	Area ha.	National Grid reference
Thames Basin Heaths SPA	Directly adjacent to the south of M25 J10.	Regularly used by 1% or more of the Great Britain populations of the following species listed in Annex 1 of the EU Birds Directive in any season: Nightjar; 7.8% GB population, Woodlark; 9.9% GB population, Dartford Warbler; 27.8% GB population.	8,275 ha.	TQ078590
Ockham Common and Wisley Commons SSSI	Directly adjacent to the southeast, south west and north west of M25 J10. 85m to the north east of M25 J10.	The site consists of a large tract of heathland lying between the Mole and Wey rivers near Cobham. The site is contains areas of heath, bog, open water, secondary woodland and scrub. The large variety of habitats allows for a rich community of heathland plants and animals, including a large number of rare and local insects.	269 ha.	TQ070585, TQ082585; TQ084592; TQ078595
Ockham and Wisley LNR	Directly adjacent to the south east, south west and north west of M25 J10. 85m to the north east of M25 J10.	Declared an LNR in 2005.	332 ha	TQ070585, TQ082585; TQ084592; TQ078595

One Special Area of Conservation (SAC) where bats are listed as one of the qualifying features of the designation was identified within 30 km of M25 J10. Mole Gap to Reigate Escarpment SAC is located approximately 8.4 km, south-east of Junction 10 at national grid reference TQ199533. The site is situated within the North Downs and extends 13 km from Leatherhead to Reigate. The site consists of chalk downs supporting the only stable area of box scrub in the UK and priority orchid sites. The

[5] Designated under Article 4.1 of EC Directive 79/409 on the Conservation of Wild Birds (the Birds Directive)
[6] Sites of Special Scientific Interest (SSSIs) are protected under the Wildlife and Countryside Act 1981 (as amended) and The Countryside and Rights of Way Act 2000.
[7] Local Nature Reserves (LNRs) are protected under the National Parks and Access to the Countryside Act 1949.

site also contains some sections of semi-natural woodland and is deemed important for great crested newts, dormouse and several bat species including the Bechstein's Bat.

Eight Sites of Nature Conservation Interest (SNCI) were identified within 2 km of M25 J10. Information on these sites is provided in Table 3-9.

Table 3-9 Summary of SNCI within 2km of M25 J10

Site name	Approximate distance and direction from M25 J10	Description	Area ha.	National Grid reference
Manor House SNCI	1 km north west	The site is located within the borough of Woking. The site consists of species-rich flood meadow and includes species such as sweet-grass and lesser spearwort.	3.2 ha	TQ072602
St George's Hill Golf Course SNCI	1.8 km north	The site consists of a large golf course, with a mixture of semi-natural habitats including mixed and coniferous woodland, acid grassland and heath. The site is noted as important for invertebrates.	94.3 ha	TQ080620
River Wey Elmbridge SNCI	1 km north west	Approximately 7.5 km of the River Wey, The river supports a number of fish species including bullhead and potentially brook lamprey.	7.5 ha	TQ074656; TQ072601
River Wey-Woking (including Pyrford Place Lake) SNCI	1.6km west	Approximately 16.8 km of the River Wey, supporting a wide variety of invertebrate species, amphibians, birds, and a population of water voles.	16.8 ha	TQ008532; TQ072614 (TQ051583)
Manor Farm and Meadows (including Common Meadows Pond) SNCI	1.2 km north west	The site consists an area of wet meadow with value for both invertebrates and birds. Common Meadows pond has been identified as important due to its close proximity to other important sites and high diversity of aquatic species.	5.9 ha	TQ068599
Elm Corner Woods SNCI	1.8 km south west	The site contains a mixture of woodland with patches of associated wet drainage areas.	10.5 ha	TQ068579
Hunts Copse SNCI	1.1 km south	The site is coppiced Ancient Woodland. Due to its location the site is considered to act as a buffer to Ockham & Wisley Commons SSSI and an important as an ecological unit within the area.	5.2ha	TQ080580
Wisley Airfield SNCI	1 km south	The site consists of a disused airfield surrounded by ancient hedgerows and rough grassland. The west of the site is important for a number of plant species and the east of the site is noted for amphibians and reptiles.	117.5 ha	TQ076578

There are two conservation verges within 2 km of M25, Junction 10. Details of these are provided in Table 3-10.

Table 3-10 Summary of non- statutory conservation verges within 2km of the M25 J10

CV Number	Site Name	Length	Grid Reference	Site Description	Biodiversity Interests
CV005	Bolder Mere	799.5 m	TQ07945825	Both verges, approximately 200 m in either direction from central grid reference.	Significant population within the county of common toad.
CV058	Wisley Lane 2	172.2 m	TQ06325924	Wisley Lane, Wisley. Southern side of the road opposite Deers Farm from TQ06235932 to TQ06345919.	Supports County Scarce plants sheep's bit and royal fern.

There are 13 parcels of ancient woodland within 1 km of M25 J10. A summary of these is provided in Table 3-11.

Table 3-11 Summary of ancient woodland within 1 km of the M25 J10

Site name	Approximate distance and direction from M25 J10	Total Area	National Grid reference
Unnamed Woodland	1.3 km south east	0.5 ha	TQ093585
Hatchford Wood	1 km south	14.7 ha	TQ088582
Little Brickfield Copse	1.6 km south east	0.5 ha	TQ095581
Foxholm Covert	1.7 km north	0.7 ha	TQ077610
The Bogs	8 km south east	3.9 ha	TQ091588
Bramble Wood	1.9 km south east	4.2 ha	TQ099584
Queen Anne's Hill	730 m north	0.4 ha	TQ076602
Woodland adjacent to Queen Anne's Hill	730 m north	0.6 ha	TQ075601
The Hangers	1 km north	6.5 ha	TQ076604
Unnamed woodland	1.3 km south	0.4 ha	TQ081578
Hunts Copse	1.1 km south	1.9 ha	TQ080578
Unnamed woodland	1.1 km north east	1.6 ha	TQ089602
Unnamed woodland	1.5 km north east	0.4 ha	TQ092603

3.11.7 Habitats

The main habitat immediately surrounding M25 J10 is mixed woodland with Scot's pine, silver birch and oak the most frequent species. Some areas of broadleaved woodland are present, such as to the north west of M25 J10, which is dominated by young silver birch trees.

To the south of the M25 lowland heathland is present on both sides of the A3 this is a Habitats of Principal Importance (HPI).

A line of veteran oak trees is present in the woodland to the north west of Junction 10. Ponds, lakes and ditches are also present in various locations on all sides of the junction with Bolder Mere to the south east of the junction being noted as having reedbed habitat (also a HPI) around its margins.

3.11.8 Notable and protected species

Notable Plants

The recently restored heathland to the south west of M25 J10 was noted as supporting a range of mosses and lichens during the ecological scoping walkover survey.

Invertebrates

The desk study provided records of a number of invertebrate groups including the nationally scare scavenger water beetle and various species listed as Nationally Notable A , including the brown ant and heath potter wasp.

The Ockham Common and Wisley Common SSSI citation indicates that the open water surrounded by heathland presents an ideal habitat for many dragonflies and damselflies (Odonata), and over 20 species have been recorded from the site, which is thus of national importance for this group. They include the rare white-faced dragonfly, the local hairy dragonfly and the ruddy darter. The site also supports many other local and rare invertebrates. It is of national importance for true flies (Diptera); rare species include a bee fly Thyridanthrax fenestratus and a crane-fly Tipula livida, while the crane-fly Limonia inusta is among the many local species. A large number of local beetles (Coleoptera) are also found, including the ground beetle Amara infima and the weevil Byctiscus populi.

Amphibians and reptiles

The desk study during the ES-SR returned no records of great crested newts within 1km of the site.

The desk study identified aquatic habitat that could potentially be used by breeding great crested newt, including approximately 11 ponds within 500m of the options proposed for Junction 10. Approximately 13 additional ponds are present within 500m of the proposed A3 widening between A3 Ockham Interchange and M25 J10 and 6 additional ponds within 500m of the proposed A3 widening between M25 J10 and the A3/245 Painshill Junction. Suitable terrestrial habitat, particularly woodland habitat, was also present. The terrestrial habitats provide habitat connectivity to nearby ponds and offer suitable foraging and hibernation opportunities for great crested newts. Surveys for great crested newts, including Habitat Suitability Index assessment (HSI) and eDNA surveys are required. If the eDNA surveys identify the presence of great crested newts additional surveys to determine population size will be required.

The desk study identified records of common lizard, grass snake, slow worm, adder and sand lizard within 1km of the site. In addition, Wisley Airfield SNCI is identified in the desk study as being bounded by areas of long grass which is suitable habitat for common foraging reptiles. The east of the SNCI has been identified by Surrey Amphibian and Reptile Group as exceptional for reptiles and grass snake, slow worm and common lizard have all been recorded on site.

Areas of heathland are present at Ockham Common. This habitat has high suitability for reptiles, and is likely to support the common reptile species as well as sand lizard which were identified in the desk study as being present within the Wisley and Ockham Commons Surrey Wildlife Trust nature reserve.

The ecological scoping survey identified that the main habitat within the footprint of the scheme options was woodland. Due to the heavy shading of woodland this habitat has low suitability for reptiles, however, log piles and gaps around tree roots could potentially be used as reptile hibernating sites, particularly where they are located on the edge of a woodland. Reptile surveys will be required if more open habitats, such as heathland, would be affected by the preferred option.

Birds

The desk study identified a number of protected and rare species of bird within 1km of the site, including woodlark, nightjar, Dartford warbler and nightingale.

The Thames Basin Heaths SPA supports important breeding populations of a number of birds of lowland heathland, especially nightjar and woodlark, both of which nest on the ground, often at the woodland/heathland edge, and Dartford warbler, which often nests in gorse. There is potential for direct loss of heathland habitat to the south of M25 J10 and there could be indirect impacts on heathland birds through increased noise.

The ecological scoping survey and drive-by habitat assessment also identified that the woodland and scrub within the survey area offers suitable nesting opportunities for birds. Swans and ducks were present on the larger waterbodies and the reedbed fringes to Bolder Mere may provide habitat for birds associated with reedbeds, such as reed bunting. The River Mole could provide suitable habitat for kingfisher.

Bats

The desk study returned records from Surrey Bat Group which identified at least nine bat species within 5km of M25 J10: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Natterer's, brown long-eared, noctule, serotine, Daubenton's and Leisler's bats. Records include Natterer's and brown long eared bats at Hatchford Woods Ice House (presumably hibernating bats), soprano pipistrelle and noctule bats roosting in Ockham Common bat boxes and several roosts that are likely to be in houses. The SBIC desk study also includes a record of whiskered bat from the ten kilometre square (TQ05) which covers part of the search area requested. In addition, Mole Gap to Reigate Escarpment SAC is located approximately 8.4 km, south-east of Junction 10 and includes Bechstein's Bat as a qualifying species.

Trees with features suitable for roosting bats, such as splits and cavities, were noted in the woodlands surrounding M25 J10. An inspection of all trees that could potentially be felled should be undertaken from the ground to identify if any potential roosting features are present. Some trees may be identified as requiring more detailed surveys, such as a climbing inspection or dusk emergence/dawn return surveys. Bat activity surveys will also be undertaken in accordance with Bat Conservation Trusts Good Practice Guidelines.

Dormouse

The desk study returned no records of dormice within 1km of the site. The ecological scoping survey and drive-by habitat assessment identified conifer woodland, with occasional broadleaved species, as the main habitat present immediately surrounding the M25 J10. Much of the woodland is considered sub-optimal for dormice due to the dominance of conifers and absence of a scrub layer. However, there are patches of more diverse habitat, such as adjacent to the M25 to the south east of Junction 10, where species such as bramble, honeysuckle, holly, birch, gorse and sweet chestnut are present. A dormouse survey will therefore be undertaken.

Otter and water vole

The desk study returned no records of otters or water voles within 1km of the site, although the River Wey (Woking) SNCI, located approximately 1.6 km to the west, is listed as supporting water voles.

The River Mole passes under the A3 a short distance to the north of the Painshill Interchange. Should any of the proposed improvements involve alterations of this river crossing or have potential impacts on the river a survey to identify if otters or water voles are present will be required.

Badger

West Surrey Badger Group supplied records of nine badger setts within 1km of the centre of Junction 10 of the M25. Whilst the majority of these setts are located outside the footprint of the proposed scheme options there is potential that one or two of these setts may be directly impacted by the scheme.

The ecological scoping survey identified that the woodlands on all sides of Junction 10 of the M25 provided suitable habitat for badgers. An active badger sett was confirmed to the north west of Junction 10 of the M25, in a location identified by the West Surrey Badger Group desk study.

Deer

Roe deer were identified as present in the desk study and a group of four roe deer were seen during the scoping walkover survey in February 2016. Whilst not a legally protected species the presence of deer has relevance to the scheme in relation to road safety issues if they attempt to cross the carriageway and therefore the scheme design should take account of the presence of this species (i.e. consider the need for deer fencing).

Non-native invasive species

The SBIC desk study did not include records of invasive species.

During the ecological scoping survey undertaken in February 2016, rhododendron was noted as present in several of the woodlands. A public information board in the woodland to the north west of Junction 10 indicated that conservation work to remove invasive Turkey oak had been undertaken.

3.11.9 Water and environment

Surface watercourses

Waterbodies within the study area fall within the Thames River Basin District (RBD). The revised Thames River Basin Management Plan (RBMP) was due to be published in late 2015. However, flooding in December 2015 means that Defra has delayed publication so that its staff and those of the Environment Agency can focus on flood risk management activities. Consequently, data presented are based on interim data and the 2009 RBMP.

The existing alignments cross a number of existing watercourses (Environment Agency, 2016) of which two are classified reaches under the Water Framework Directive (WFD, 2000/60/EC).

The assessment of the importance of these watercourses has been determined using the criteria in HD45/09 and is summarised in Table 3-12. Although the current status of all watercourses may be below good status, the requirement of the WFD is for all watercourses to meet good status by 2027. For some waterbodies, the Environment Agency has designated them as Protected Areas, recognising particular features which are dependent upon the waterbody. In most instances these are linked to other pieces of legislation. The River Mole is designated as a Protected Area associated with their Freshwater Fisheries Directive (FWFD). Whilst the FWFD was repealed in 2013, the sensitivity of the watercourses is still relevant and reflected by the WFD through its Protected Area status. In line with the DMRB, watercourses which are designated as Protected Areas due to the FWFD have been assigned a very high importance.

The other watercourses crossed by the existing alignment are not classified under the WFD. However, these watercourses contribute to the WFD overall quality and status. Consequently, for the purposes of this baseline, these 'other' watercourses are all considered to be good status and are assigned high status. Where they contribute to the FWFD watercourses they will be assigned a very high importance.

At the time of reporting, the exact number is unknown due to inconsistencies between OS base mapping and digital river mapping. This should be confirmed at the next stage of the assessment and therefore 'surface watercourses' are scoped in as further assessment is required.

Table 3-12 WFD watercourse existing crossings[8]

Waterbody name (and ID)	2014 Overall WFD status	Objective (Cycle 2)	Hydromorphological designation	Protected area	Reason for Protected area	Assessment of importance
Stratford Brook (GB106039017890)	Moderate	Good	Not designated as a A/HMWB	Yes	ND	High
River Mole (Horley to Hersham) (GB106039017621)	Moderate	Moderate	Not designated as a A/HMWB	Yes	FWFD; ND; UWWTD	Very High

Key: A/HMWB = Artificial/Heavily Modified Waterbody, FWFD=Freshwater Fisheries Directive; ND = Nitrates Directive; UWWTD = Urban Waste Water Treatment Directive

Groundwater

The existing M25 J10 is underlain by a Secondary A Aquifer although the area itself is not underlain by a Principal A Aquifer, there are pockets within 1km, both north-west and south east of M25 J10 / A3 Wisley Interchange. There are no groundwater Source Protection Zones (SPZ) within 1km of the M25 J10 / A3 Wisley Interchange.

Secondary A aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The existing M25 J10 is underlain by one WFD Groundwater body. A summary of the importance of groundwater is shown in Table 3-13. This is related to aquifer type which is indicative of the potential water resource within an aquifer. As noted in relation to surface watercourses, data presented are based on interim data and the 2009 RBMP.

The potential inclusion of new cuttings in the proposed improvements means that groundwater is scoped in as further assessment is required.

Table 3-13 Groundwater body within 1km of the Proposed Scheme Options[9]

Waterbody name (and ID)	Quantitative quality		Chemical quality		Protected area	Reason for Protected area	Assessment of importance
	Current	2015 predicted	Current	2015 predicted			
Cobham Bagshot Beds (GB40602G601400)	Poor	Poor	Good	Good	Yes	DWPA	High

[8] Environment Agency. 2016. Catchment Planning http://environment.data.gov.uk/catchment-planning
[9] Environment Agency. 2016. What's In Your Backyard

Key: DWPA = Drinking Water Protected Area

Abstractions and discharges

The Environment Agency website[10] indicates that there are numerous surface and groundwater abstractions within 1km of the M25 J10. At the time of reporting, no data were available for this license. Confirmation of this is recommended at the next stage of the assessment and therefore abstractions are scoped into further assessment.

At the time of reporting, no data was available for discharges. Confirmation of numbers and locations is recommended at the next stage of the assessment and therefore discharges are scoped in as further assessment is required.

Flood risk

Environment Agency Flooding from Rivers interactive mapping[11] shows that Flood Zone 2 and 3 areas are present in the study area, indicating that there are areas at risk from flooding. Sources of flood risk include the following watercourses:

- Guileshill Brook
- Stratford Brook
- River Mole (Horley to Hersham)

The scale of the proposed works means that it is concluded that further flood risk assessment is required. Consequently Flood risk is scoped in as further assessment is required.

Designated sites

There is one SPA which is dissected by the existing alignment. This is the Thames Basin Heath and a component SSSI. Part of this SPA is also Ockham and Wisley Commons. These sites consist of a large tract of heathland lying between the Mole and Wey Rivers, containing areas of heath, bog, open water, secondary woodland and scrub. In their very nature they have a direct hydrological dependency. Further details of these are described in the Nature Conservation section

A further site, Esher Commons SSSI, is also within 1km and downstream of the M25 J10 and has a direct hydrological pathway. Further details of these are described in the Nature Conservation section.

Land contamination

There are historic landfill sites which abut the existing alignment of the improvement works.

Historically the M25 J10 has been surrounded by woodland and rough pasture; predominantly belonging to Ockham Common and Wisley Common.

Environment Agency website records one historic landfill to underlie the south western quadrant of the study area. The landfill site, known as ‘Land at Pond Farm’, is located at Wisley Common. Records show that the landfill operated between 31 December 1981 and 31 December 1982. The waste is recorded as inert, which the Environment Agency classifies as “Waste which remains largely unaltered once buried such as glass, concrete, bricks, tiles, soil and stones”. The site operator is unknown.

[10] Environment Agency. 2016. What’s In Your Backyard
[11] Environment Agency. 2016. What’s In Your Backyard

There is potential for localised Made Ground and any related contamination to be present associated with the historical infilling of a gravel pit and a pond and with the construction of the M25 and the A3.

Potentially contaminative activities may also have been undertaken at the small industrial estate at Bramley Hedge Farm, approximately 600 m north of the junction.

The site is not located in an area affected by mining or quarrying based upon a review of the Coal Authority interactive map viewer and BGS non-coal mining plans.

3.11.10 Journey ambience

Motorised travellers: View from the road

The existing views from M25 J10 are described below:

- The view from the A3 is screened by vegetation whilst travelling north and south bound. The M25 is visible when passing over the overbridge.
- The views from the M25 are also screened with vegetation alongside. At M25 J10 from the M25 there are clear views of the overbridge of the A3.

Motorised travellers: Driver stress

The M25 provides a continuous orbital route around Greater London but carries high volumes of traffic which cause disruption and delays to the surrounding road network particularly when emergency closures and lane closures are imposed. The south west quadrant of the M25 is one of the busiest sections of the motorway network and regularly experiences severe congestion. The probability of experiencing congestion in the peak period can be more than 80% in the south west quadrant of the M25. Average speed at peak times on the M25 can be as low as 31-40 mph west of Junction 10 and 41-50 mph to the east. The south west quadrant is in the top 10 percent nationally in terms of vehicle hour delay.

Driver stress is defined for the purposes of environmental assessment as the adverse mental and physiological effects experienced by a driver traversing a road network. The extent of stress induced in individual drivers will differ due to variations in their skill, experience, temperament, knowledge of the route, and state of health.

Driver stress has three main components: frustration, fear of potential accidents, and uncertainty relating to the route being followed.

Non-motorised users

There are several Public Rights of Way (PRoW) of local importance within a 1km radius of M25 J10, some of which cross or interact with the proposed scheme options. These are all formal Public Rights of Way and detailed as below, described from south west to north east, from the Ockham Park Interchange to Painshill Interchange.

The PRoW considered within the assessment have been identified from the Surrey County Council online mapping.

- Footpath FP13 / 13a comes within close proximity to the proposed highway works at the slip road upgrade at Ockham Park Interchange. The footpaths connect Ockham Lane to Ockham Road North across farmland.
- A 1.2km stretch of path, footpath FP6, travels eastwards from Mill Lane and along the northern boundary of Wisley Gardens, where it terminates at eastern edge of Wisley Gardens.
- Footpath FP7 runs approximately 900m along the eastern edge of Wisley Gardens south towards Wisley Footbridge which crosses the A3. This is due to be reconstructed.

- Footpath FP9 traverses Wisley Common for approximately 1.7km and terminates at the boundary of the common and A3.
- The end of FP14 abuts the proposed highway works at Bolder Mere to the south of the A3.
- Footpath FP10 traverses the eastern section of Wisley Common for approximately 1.2km, passing Pond Farm and Woolgers Wood to the west. It terminates at the boundary of the proposed highway works at Hut Hill.
- Footpath FP17 traverses Ockham Common for approximately 950m to the Cockrow Footbridge, which it crosses and terminates just south of the public car park on Wisley Common.
- FP12 is formed of a 350m footpath which splits from FP11 to the south on Wisley Common, located within the north-west quadrant of the M25 J10 / A3 Wisley Interchange.
- A section of FP11 is approximately 950m in length in the north-west quadrant of the Wisley Interchange. It travels from the M25 boundary to the east to the A3 boundary in the west across Wisley Common.

NMU users within the surrounding areas may be affected by traffic noise and the visual intrusion of the road network within the wider environment.

3.12 Accessibility

3.12.1 Option values

There is currently one scheduled bus service (515 Guildford – Kingston) that travels along the A3 at M25 J10, with bus stops on the A3 to the south of M25 J10. Whilst scheme options may require that the bus stops are relocated, no new transport options will be created by this scheme. The development at Wisley Airfield may result in further service provision and this should be considered if the planning application receives consent.

3.12.2 Severance

Footpath FP17 and FP7 traverse footbridges which will be subject to reconstruction as part of the proposed scheme options. FP17 links Ockham Common to Wisley Common. FP7 provides a connection from RHS Garden Wisley (a public gardens) to Wisley Footbridge which allows crossing over the A3 to Elm Lane and Wisley Airfield and FP17 links Ockham common to Wisley Common via Cockrow Footbridge.

Footpath FP11 and FP12 traverse proposed highway works as part the proposed scheme options.

An NMU context report has been undertaken and is included in Appendix B.

3.12.3 Access to the transport system

There is limited access to the public transport system in this location, with bus stops on both sides of the A3 south of M25 J10. There is not the opportunity for parking and transfer to pedestrian or cyclist infrastructure directly from the location of M25 J10.

3.13 Integration

3.13.1 Transport interchange

M25 J10 is over 4.5km from the closest mainline rail stations (Stoke D'Abernon and Horley). Only one bus service (the 515) is routed through or near to the junction, with the closest stops being 2km to the north and south. It is evident that this locale does not act as a local transport interchange.

3.13.2 Land use policy

Land use policy in the location of the scheme is governed by the Elmbridge Core Strategy (adopted in 2011). The Core Strategy was intended to be read in conjunction with the South East Plan (adopted 2009), however the later plan has since been revoked. In 2015, the Elmbridge Development Management Plan was adopted which includes policies in relation to development proposals within the borough.

The scheme will be designed with the policies relating to planning and land use in mind.

3.14 Technology

The data below was used to evaluate the existing technology infrastructure arrangements:

- Motorway Communication Drawings (MCY's) detailing the technology deployed between the A3 Marker Post 12/3 and Marker Post 16/8 dated September, 2009 and between M25 MP 71/4 and MP 73/3 dated August, 2001
- Site data used by Regional Control Centre (RCC) to set signals and signs for network operation
- Highways England Technology Performance Management Service (TPMS) data

The findings of this review are detailed in Appendix C. The technology design requirements and proposals for the various options are outlined in later sections of this document.

3.14.1 ITS equipment on A3

Currently there is minimal technology equipment on the A3. The technology equipment schedule is provided in Appendix C. It includes the following:

- Two Motorway Incident Detection and Automatic Signalling (MIDAS) loops sites on the A3 mainline to provide traffic counting data.
- Two MIDAS loops sites on the A3 exit slip roads to provide traffic counting data.
- Four strategic Motorway Signal 3 (MS3s) on the mainline, two on each direction (northbound and southbound) to provide strategic diversion messages.
- Four Pan, Tilt and Zoom (PTZ) Closed Circuit Television (CCTV) cameras to provide partial visibility coverage on the A3.
- Distribution Network Operator/Independent Distribution Network Operators (DNO/IDNO) electricity interfaces.

The design requirements for Motorway Communications will require equipment locations on the M25 outside of the option solution for any of the Junction 10/A3 scheme limits because there are specific requirements associated with spacing and coverage of signals and signs.

It should be noted that there are minor differences between the TPMS data and the Site Data. Typically these are a difference of 1 (i.e. 100m) between the addresses. A survey is required in the next stage to verify the existing situation.

3.14.2 ITS equipment on M25

Around M25 J10 it is a Controlled Motorway section. Below is a summary of technology equipment on the M25 within the scheme extent. The technology equipment schedule is provided in Appendix C. It includes the following:

- MIDAS loops sites for traffic counting and queue protection.
- Gantry mounted Variable Message Signs (VMS) and signals to provide speed limit information.
- PTZ cameras to provide full coverage of the section.
- Emergency Roadside Telephones (ERTs) for emergency use.
- Meteorological (Fog) sites.
- DNO/IDNO electricity interfaces.

3.14.3 Third party equipment

There are 15 existing DNO electricity interface cabinets currently within the extents of the scheme.

A fog detector is located at M25 MP 72/6B at J10. It is used to provide alert if a fog is detected.

There are traffic counting sites operated by the National Traffic Information Service (NTIS). The list of their loops is provided in Appendix C.

3.14.4 Communications network

The Highways England MCY drawings demonstrates that there is existing longitudinal communications infrastructure consisting of copper and composite optical fibre cable in the ducted network work on the A3.

There is a single Transmission Station (TS) located at Ockham MP 15/5A which is just outside the scheme extent.

NB: Any works associated with the scheme options will require services to be maintained both on the M25 and A3. Typically this is achieved by the use of bypass circuits. The bypass solution is likely to involve the interfacing of circuits at the TS located on the A3.

3.15 Maintenance and repair strategy statement

Below is a summary of the known maintenance accesses:

- The Ockham TS access is through a side road at the roundabout.
- Along A3 westbound carriageway (A-carriageway) there is a pedestrian/bicycle lane which allows the maintainer to stop off-network and access equipment via the pedestrian/bicycle lane. No pedestrian/bicycle lane is on eastbound carriageway (B-carriageway).
- The existing MS3s are mounted on man-accessible cantilever gantries.
- A side road is next to the MS3 at MP 011/7A which can be used for parking.

- A bus stop and a layby is next to the MS3 at MP 014/3B which can be used for parking or access through off-network.

3.15.1 Existing structures

A review of existing structures has been carried out using available information from SMIS and is tabulated in Table 3-14 below together with any significant issues identified.

It is highlighted that in the vicinity of Ockham Junction is sub-standard structure Stratford Brook Culvert South, Structure Key 6089. This is located on the off slip of the A3 southbound carriageway of the junction and has been identified as a sub-standard structure due to an assessment carried out in 2012. It has been found to have an assessed capacity of 3T Assessment Live Loading with no HB and has therefore been recommended for strengthening. Prior to this being completed a 3T ALL weight restriction is recommended and monitoring carried out. The construction sequence proposed for the options presented should not require any prolonged closures of the existing M25 J10 interchange. However, any closures proposed should either ensure that the diversion route does not use the sub-standard structure at Ockham Junction, or where it does suitable strengthening or load restrictions are implemented first.

From the review of information no reasons have been found for not retaining any of the existing structures, where not planned for replacement. The exception to this is Stratford Brook Culvert South, Structure Key 6089, which has been found to be substandard with strengthening works recommended, although no programmed works are confirmed at present.

Table 3-14 Existing structures

Structure key	Structure	Latest available PI	Latest available GI	Latest available SI	General arrangement available?	Key recent maintenance activities	Significant issues
3507	Hatchford Park	2012	2015	2012	Yes	Parapets & bearings maintenance June 13	
3512	Wisley IC East	2011	2015	2008	Yes	Parapets replaced 2005. Parapet maintenance May 13	
3514	Wisley IC A3	2011	2015	2008	Yes	Parapet maintenance May 13. Security mesh added to abutment bearing shelves 2012	
3533	Wisley IC West	2011	2015	2008	Yes	Parapets replaced 2005. Parapet maintenance May 13	
3558	Clearmount FB	2011	2015	2012	Yes	Bearings maintenance July 12. Parapet maintenance May 13	
3564	Buxton Wood FB	2011	2015	2012	Yes	Pipes/hangers maintenance Feb 12. Bearings maintenance July 12. Parapet & bearings maintenance May 13	
6050	Wisley FB	2013	2015	1991	No	Bearings maintenance July 12	
6068	Old Common Road Subway	2013	2012	1991	Yes	Parapet maintenance Nov 10	
6069	River Mole	2013	2012	2006	Yes	Parapets repaired 2002. Parapet maintenance Dec 10. West expansion joint replaced 2011 - deck resurfaced.	Structure susceptible to scour
6070	Covent Lane	2013	2015	2008	Yes	Parapet maintenance Nov 10. "Cosmetic repair to concrete to be done" June 13. Parapet system replaced 3 times between 89-95 - changed to 'kee klamp' galvanised steel parapet. Drainage channel across the road has been filled in with black top 1995.	
6072	Painshill IC East A245	2013	2015	2008	Yes	Bearings painted 1992. Parapet maintenance Nov 10. Expansion joint north end replaced 2006 - bridge deck resurfaced. Galvanised steel 'kee klamp' rails erected on wing walls.	
6073	Painshill IC West A245	2013	2015	1991	No - Proposed works GA only	Parapet maintenance Nov 10	
6078	Ockham North	2013	2015	1991	Yes	Parapet upgrade 1994	
6079	Ockham South	2013	2015	1991	Yes	Parapet upgrade 1994. Concrete repairs 2004	Accident resulting in damage to one of the prestressed beams '92. Technical survey 2003

Structure key	Structure	Latest available PI	Latest available GI	Latest available SI	General arrangement available?	Key recent maintenance activities	Significant issues
6089	Stratford Brook Culvert South	2013	2011	2012	Yes - from 277 report only	Headwall replaced 2005.	Classified as a substandard structure. Refer to section 1.5, 2.4 and 3.5 of Report.
6100	Wisley IC North	2013	2015	2008	Yes	Abutment repaired 2006. Bearings maintenance July 12. Parapet maintenance May 13	
6152	Wisley IC South	2013	2015	2008	Yes	Abutment and parapets repaired 2006. Bearings maintenance July 12. Parapet maintenance May 13	
6156	Cockrow FB	2013	2011	2008	Yes	Bearings maintenance July 12. Parapet maintenance May 14	
6074	Painshill SW Retaining Wall	2012	2013	2007	Yes	Klee Klamps fixed 2010	
6075	Painshill NW Retaining Wall	2012	2013	No	Yes		
6092	Ockham Retaining Wall	2013	2015	No	Yes		
15186	Redhill Retaining Wall	2013	2012	No	Yes		

4 Planning factors

4.1 Option constraints

4.1.1 Design

The RIS submission in 2014 assumed that the solution would be substantially within the highway boundary. However, a preferred option may require substantial amounts of land acquisition around M25 J10 and this would not be straightforward as much of the neighbouring land is in the ownership of Surrey County Council but managed by Surrey Wildlife Trust. The negotiations required to provide a solution would be on-going for a considerable portion of the development stage and may add unforeseen costs to the overall scheme cost. It is likely, with the three options explored in Section 5 of this report, that the amount of land required will breach the threshold limit for requiring Development Consent Orders.

4.1.2 Neighbouring development

On the A3 north of M25 J10 (London bound) the site known as the San Domenico Restaurant has been given consented approval for a hot food takeaway at the Coach House site. Whilst there were no safety concerns about this proposal, the impact of further development on the site could be a concern.

A proposed residential development at Wisley Airfield adjacent to the A3 at Ockham, which presently has had its planning application refused, is anticipated to generate a significant number of additional trips on the network should the application be approved. Further to this, Guildford Borough Council's Draft Local Plan proposes new north facing junctions to the A3 at the A247 Burnt Common interchange to mitigate the impact of the level of strategic planned growth and in particular the development traffic flows resulting from the development of a new settlement at the former Wisley airfield site.

RHS Gardens Wisley has growth proposals to increase visitor numbers at its already successful site.

4.1.3 Environment

There may be issues with air quality and noise depending on traffic volumes and speeds. M25 J10 is situated in land of high environmental value, with the majority being managed by the Surrey Wildlife Trust. Much of the area surrounding the junction is Registered Common Land. The design and construction will need to be sensitive to this and the constraints and opportunities presented by the scheme will need to be well communicated.

4.1.4 Operation

The M25 is a route of high strategic, national, and regional importance and therefore works associated with construction must not unduly affect the operation of the network. Buildability constraints including:

- Making all lanes available to the very busy M25 and A3 during the day and continued access throughout reduce lane operation at night
- Minimising excavation of existing highways and works sequencing
- Potential extension of existing structures adjacent to live running lanes

5 Scheme options

5.1 Introduction

The work undertaken during PCF Stage 0 concluded that a highway based junction improvement/replacement scheme would achieve some or all of Highways England's goals and objectives.

This led to the formulation of a number of highway schemes which were assessed against Highways England's eight Key Performance Indicators (KPIs) comprising:

- Making network safer
- Delivering better environmental outcomes
- Helping cyclists, walkers and other vulnerable users
- Encouraging economic growth
- Keeping the network in good condition
- Supporting the smooth flow of traffic
- Achieving real efficiency
- Improving user satisfaction

However, during the early stages of PCF Stage 1, traffic modelling using LINSIG (junction modelling software) was used to assess the capabilities of the options. This assessment found that only two options would operate within capacity and thus meeting two of the core objectives and consequently a number of further options were devised for consideration. The process for deriving a new long list of potential options, and then for reducing this to options for further evaluation and consultation in Stages 1 and 2, is described below.

5.2 Option development

5.2.1 PCF Stage 0

This stage was completed in September 2015 which confirmed and prioritised the problems associated with M25 J10 by reviewing available evidence, and examining the suitability and viability of a range of alternative solutions to address these. In doing so it also confirmed and scoped an appropriate improvement scheme for addressing the problems and achieving Highways England's strategic outcomes and KPIs. Stage 0 culminated with the identification of a number of alternative options to be considered further in PCF Stage 1.

The approach adopted in PCF Stage 0 was to develop and assess strategic options and scheme options and comprised several key steps including *Identification and assessment of high level Strategic Options* and *Initial development and assessment of Project Options.*

Identification and assessment of high level Strategic Options – a range of strategic options were identified which could potentially be considered to address the key problems at M25 J10. These strategic options give high level consideration to a range of alternatives dealing with transport supply and demand, and included options for different modes as well as different scales of highway intervention. Based on this assessment a strategic option focussing on localised highway improvements at M25 J10 and Painshill interchange was confirmed as the preferred solution. The key factors in selecting this strategic option include:

- Whilst a multi-modal approach would assist in reducing highway demand it would not reduce demand sufficiently to meet the scheme objectives;
- A highway proposal is strongly aligned to addressing the local problems identified for M25 J10;
- It is assumed that the M25 J10-J16 improvement scheme will alleviate problems on the M25 mainline that affects M25 J10; and
- It can be delivered within the RIS1 period;

Initial development and assessment of Project Options – based on the preferred Strategic Option a range of detailed project options were identified as concepts. Five project options were identified with incremental impact:

- Dedicated left turns at J10 and improvements at Painshill;
- Dedicated left turns at J10, improvements at Painshill and A3 widened to D4AP;
- Partial free-flow and dedicated lefts at J10, improvements at Painshill and A3 widened to D4AP;
- Free-flow (as J12) at J10, improvements at Painshill and A3 widened to D4AP; and
- Free-flow (diamond) at J10, improvements at Painshill and A3 widened to D4AP

These options were assessed based on the expected impacts of achieving the identified transport objectives, indicative cost ranges and key issues and risks relating to scheme delivery. This assessment was aligned with the principles of the Department for Transport's (DfT's) Early Assessment Sifting Tool (EAST) approach. In this way the key elements of the five case business case model were included in the assessment as appropriate at this early stage (Strategy, Economy, Managerial, Financial and Commercial) and enabled the assessment to consider deliverability issues. It was done in the absence of any traffic modelling.

5.2.2 PCF Stage 1

At the start of PCF Stage 1, Atkins undertook a high level modelling exercise to determine whether the selected options would provide sufficient capacity for a design life of ten to 15 years. The testing, using a LINSIG model of M25 J10, considered the scale of intervention required to ensure that the interchange would operate below capacity in ten and 15 years' time. It was found that either the roundabout would need to be significantly enlarged or at least all left turns and two busy right turns would need to be removed from the roundabout. In parallel to this a revised long list of options was devised (Table 5-1) which fell into the following three main groups:

- Keeping the existing roundabout and adding other infrastructure:
- Modifying the existing roundabout
- Removing the roundabout

Within the list, those that have been shaded pink were discarded as they were considered to have either:

- Not met the scheme objectives, particularly in terms of traffic operation/capacity or safety; or
- Would cost substantially more than the £250m budget.

Table 5-1 PCF1 longlisted options

Option	Approach	Implication	Change to A3
1	Keep existing roundabout	Use of Ockham and Painshill for right turns (J10 left turn only)	All D4
2	Keep existing roundabout	Dedicated left filtered turns	A3 NB N and S
3	Keep existing roundabout	Dedicated left turn lanes	A3 NB N and S
4	Keep existing roundabout	Dedicated left turns plus use of Ockham for U-turn right turn	All D4
5	Keep existing roundabout	Dedicated left turns plus use of Painshill for U-turn right turn	A3 NB N and S
6	Keep existing roundabout	Dedicated left turns plus use of Ockham for M25 J9 to Painshill and Painshill for M25 J11 to Ockham	All D4
7	Keep existing roundabout	Dedicated left turns plus free-flow right turn (A3S to M25 J11)	A3 NB N and S
8	Keep existing roundabout	Dedicated left turns plus free-flow right turn (A3S to M25 J11) plus M25 J9 Painshill via Ockham	All D4
9	Keep existing roundabout	Dedicated left turns plus two free flow right turns A3 to M25 J9 and A3 to M25 J11	A3 NB N and S
10	Keep existing roundabout	Dedicated left turns plus two free flow right turns M25 J11 to A3 and M25 J 9 to A3	A3 NB N and S
11	Keep existing roundabout	Keep Wisley but add new roundabout at Old Lane and operate these two as dumbbell	All D4
12	Modify roundabout	Skewed elongated with left filters	A3N NB
13	Modify roundabout	Elongated	A3N NB
14	Modify roundabout	Elongated + dedicated left filters	A3N NB
15	Modify roundabout	Elongated + dedicated left turns	A3N NB
16	Remove roundabout	Cyclic	All D4
17	Remove roundabout	Skewed free flow diamond	All D4
18	Remove roundabout	4 level stack	All D4
19	Remove roundabout	Whirlpool	All D4
20	Remove roundabout	Clover leaf	All D4
21	Remove roundabout	Clover stack	All D4

The remaining ten options (shaded green above) were assessed at an Options Workshop on 1st February 2016, involving Highways England's Major Projects

management team, the PTS Environmental Specialist and a representative from Connect Plus Services, in addition to key staff from the Atkins project team.

In the workshop each of the ten options were considered in detail and assessed by the group as to the likely impact of each of the options. A multi-criteria assessment framework based loosely around the DfT's Early Appraisal and Sifting Tool (EAST) was used to undertake the assessment. The workshop group scored each of the framework elements on a scale of 1 to 10 and Table 5-2 below contains the scores which were recorded at the workshop.

Table 5-2 Options workshop scores

Element	Options									
	8	9	10	12	14	15	16	17	18	19
Route operation	4.0	8.0	8.0	7.0	7.0	7.0	9.0	9.0	9.0	9.0
Capacity	6.0	8.0	8.0	6.0	6.0	6.5	9.5	9.5	9.5	9.5
Safety	4.0	8.0	8.0	5.0	5.0	5.0	9.0	9.0	9.0	9.0
Social	3.0	5.0	5.0	4.5	4.5	4.5	5.0	5.0	5.0	5.0
Achieving real efficiency	5.7	4.8	4.8	5.8	5.8	5.2	4.3	2.5	2.5	2.5
Helping NMU	5.0	5.0	6.0	4.0	4.0	4.0	9.0	9.0	9.0	9.0
Scale of impact	4.0	8.0	8.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0
Air quality	5.0	4.0	4.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0
Noise	4.0	4.0	4.0	5.0	5.0	5.0	4.0	2.0	2.0	2.0
Landscape	3.0	2.0	2.0	4.0	4.0	3.0	2.0	1.0	1.0	1.0
Natural Environment	3.0	2.0	2.0	4.0	4.0	3.0	1.0	1.0	1.0	1.0
Carbon emissions	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0
Feasibility	7.0	6.0	6.0	3.0	3.0	3.0	8.0	2.0	2.0	6.0
Risk	5.3	4.7	4.7	4.7	4.7	4.3	4.7	2.0	2.0	3.0
Affordability and cost	6.0	5.0	5.0	7.0	9.0	6.0	4.0	3.0	3.0	2.0
Flexibility	8.0	7.0	7.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

The average scores for each option were:

Option	8	9	10	12	14	15	16	17	18	19
Overall score	4.9	5.4	5.4	5.1	5.3	4.9	5.9	4.9	4.9	5.1

Based on the scoring developed through the workshop the following options were selected for further assessment:

- Option 16obtained the highest overall score despite being one of the most costly
- Options 9 achieved the next highest score and provided free flow right turn movements for a greater volume of traffic than Option 10 and was thus selected
- Option 14 scored marginally less than the other chosen options. However it is the most affordable of all options and for that reason it was agreed that it should be taken forward for further evaluation

Option 13 also scored well at the workshop but upon further evaluation of this skewed elongated roundabout option it was found to be more expensive and to perform no

better than Option 14 (elongated roundabout option but not skewed) and was therefore dropped.

Option 10, which scored as well as Option 9, did not have the same level of traffic demand for the right turn movement from the M25 as Option 9 did for the A3. During the workshop it was agreed to proceed with only one option that provided free flow opportunities for two right turn movements and Option 9 was selected,

PCF Stage 1 therefore focused on the provision of feasible designs and appraisal of the following options, which are also shown in Appendix D:

- Option 14 involves modifying the existing roundabout by elongating the existing roundabout with additional lanes to provide more circulatory capacity and enable more traffic to discharge the roundabout whilst also providing free flowing left turns under a permanent green signal.
- Option 9 retains the existing roundabout but adds a fourth level layout to provide free flowing right turns from the A3 to the M25 whilst also providing free flowing left turns under a permanent green signal.
- Option 16 removes the roundabout and replaces it with a cyclic layout (like M25 J12) that provides free-flow for all traffic movements.

5.3 Side roads option development

All side roads directly affected by the scheme are listed and summarised in Table 5-3 below. The side road options are described in more detail and the implications (pro's and con's) of each are considered in Appendix D. Adopted side road arrangements for the scheme layouts adopted are shown on Drg. No's HE551522-ATK-HGN-M25J10-DR-D-0161 to 0166 (inclusive), 0091 & 0141 in Appendix D. The layouts are included in the cost estimate produced by Benchmark. Side road options vary slightly at Junction 10 depending on the interchange layout (Options 9, 14 or 16). Many of the side road options can be 'mix and match' or 'bolt-on/bolt-off' scenarios. The options to take forward will be subject to feedback from public consultation in Stage 2.

Table 5-3 Side road options

Side Road Ref.	Side Road access	Description/Implication
PAIN-01	A245 Byfleet Road	Widen A245 from D2AP to D3AP between Painshill Junction and Seven Hills junctions.
PAIN-02	A245 E/B junction at Painshill roundabout	Provide inside dedicated lane to A3 northbound slip road.
PAIN-03	Access to Feltonfleet School	Existing access to Feltonfleet School from A245 (westbound) to be stopped up and realigned to connect into Seven Hills Road (South).
OCK-01	Mill Lane	Mill Lane to connect into Wisley Lane diversion.
OCK-01a	Mill Lane	Mill Lane to connect into Wisley Lane diversion.
OCK-02	Mill Lane	Existing Mill Lane to be stopped-up at Ockham Junction northbound slip road and diverted to Ockham Roundabout with new arm.
OCK-02a	Ockham Roundabout	New south facing slip roads added to Ockham Junction. Portsmouth Road (B2215) realigned to form a new arm to roundabout on western side. Existing Mill Lane to be stopped-up at Ockham Junction northbound slip road and connected with 'T' junction to new rerouted Wisley Lane link road. Wisley Lane to

Side Road Ref.	Side Road access	Description/Implication
		connect to B2215 west of roundabout. B2039 Ockham Road (N) realigned to form new arm to roundabout on eastern side.
OCK-02b	Ockham Roundabout	As Option OCK-02a but no Wisley Lane diversion and Mill Lane realigned to connect to B2215 west of roundabout.
OCK-02c	Ockham Roundabout	As Option OCK-02a but no Wisley Lane diversion and Mill Lane to remain as existing.
WIS-01	Wisley Lane diversion	Wisley Lane junction with the A3 stopped-up. Two-way link road to Ockham Junction.
WIS-02	Wisley Lane diversion	Wisley Lane junction with the A3 stopped-up. One-way link road from Ockham Junction to Wisley Lane. One-way link road from Wisley Lane to Junction 10.
WIS-03	Wisley Lane diversion	Wisley Lane junction with the A3 stopped-up and routed beneath A3 carriageways with underpass and earthworks cuttings. Two-way link road to Ockham Junction.
WIS-04	Wisley Lane diversion	As Option WIS-03 except earthworks replaced by retaining walls.
WIS-05	Wisley Lane diversion	As Option WIS-03 except Wisley Lane on west side realigned offline.
WIS-06	Wisley Lane diversion	As Option WIS-05 except earthworks are replaced by retaining walls.
WIS-07	Wisley Lane diversion	As Option WIS-03 except underpass is replaced by an overbridge with earthworks embankments.
WIS-08	Wisley Lane diversion	As Option WIS-05 except underpass is replaced by an overbridge with earthworks embankments.
ELM-01	Elm Lane (A3 southbound)	Elm Lane junction with the A3 stopped-up. Elm Corner traffic rerouted to Old Lane (via Hatch Lane).
ELM-02	Elm Lane (A3 southbound)	Elm Lane junction with the A3 stopped-up. Elm Corner traffic rerouted to Hatch Lane and Ockham Lane and B2039 to Ockham Junction.
ELM-03	Elm Lane (A3 southbound)	Elm Lane junction with the A3 stopped-up. Elm Corner traffic rerouted via two-way link road to Ockham Junction.
ELM-04	Elm Lane (A3 southbound)	Elm Lane junction with the A3 stopped-up. Elm Corner traffic rerouted to Wisley Airfield Development and a) southwards to Ockham Junction or, b) northwards to Old Lane.
OLD-01	Old Lane (A3 southbound)	Diverted via Ockham Lane and B2039 Ockham Road (N) to Ockham Junction.
PBF-01	Park Barn Farm	Access off A3 northbound slip road at J10.
A3-01	Charwell House (A3 southbound)	A3 Ch.3+800. For proposed rerouting see Options 9, 14 & 16 route scenarios.
A3-02	Court Close Farm (A3 southbound)	A3 Ch.4+210. For proposed rerouting see Options 9, 14 & 16 route scenarios.
A3-03	Heyswood Campsite (A3 southbound)	A3 Ch.4+210. For proposed rerouting see Options 9, 14 & 16 route scenarios.

Side Road Ref.	Side Road access	Description/Implication
A3-04	Long Orchard House (A3 northbound)	A3 Ch.4+255. New two-way link road connecting to Seven Hills Road South. Includes A3-05.
A3-05	San Domingo (A3 northbound)	A3 Ch.4+400. New two-way link road connecting to Seven Hills Road South. Includes A3-04.
A3-06	Electricity sub-station (A3 southbound)	A3 Ch.4+540. For proposed rerouting see Options 9, 14 & 16 route scenarios.
PAIN-04	Painshill Junction	Electricity pylon access off north-west corner of roundabout.

5.4 Option constraints

During the development and assessment of the different design options a number of potential issues and constraints have been highlighted as follows:

- **Environmentally sensitive areas**: there are a wide range of sensitive areas adjacent to or close to the junction including: Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Ancient Woodland, Scheduled Monuments, Listed Buildings and Registered Parks and Gardens. The next stage of the study will consider these impacts in more detail as well as any necessary mitigation;
- **Noise mitigation**: any additional noise generated by the options would need to be effectively mitigated;
- **Disruption to M25 and A3 and local attractions**: the design and building of the scheme will need to keep disruption to the M25 and A3 to a minimum and provide access to important local attractions (e.g. RHS Wisley).
- **Local development**: The design and construction of the scheme will need to take account of and accommodate works required for the Wisley Airfield development should it receive planning permission.

These issues will be assessed and taken account of during on-going scheme development.

5.5 Interdependencies

The success of the M25 J10 improvement will be partially dependent on the successful implementation of the M25 J10-J16 improvement scheme. Without the implementation of this project, benefits for traffic movements from A3 south to M25 west would not materialise and any blocking back on to the A3 would affect other A3 northbound movements.

Whilst not directly dependent, the scheme will also have an impact on the success of improvements proposed to the A3 at Guildford which is a RIS 2 scheme; a delay to the M25 J10 improvement could limit the success of the A3 Guildford scheme.

With regard to other projects in the wider vicinity, the M23 Smart Motorway Programme could affect this quadrant of the M25 and the Government's response to the Davis Commission, and whether further and substantial growth at Heathrow or Gatwick will materialise, is also likely to affect this section of the M25 and M25 J10 to some degree.

5.6 Risks

In developing the scheme further a comprehensive risk register will be maintained as part of the management of the project. The delivery of the scheme will be dependent on these risks being appropriately managed so that scheme delivery is not impacted. At this early stage the key potential risks can be summarised as follows:

- Strategic issues - such as changes in Government priorities and/or lack of support from local authorities;
- Traffic patterns and demands at the junction changing due to inadequate or inaccurate modelling;
- Statutory processes and land acquisition taking longer than envisaged and imposing additional time and cost on the scheme;
- Scheme opposition and challenges to the scheme; and
- Unpredicted issues being raised through the consultation process with the potential for delays to delivery.

5.7 Design standards and criteria

The design standards used for the M25 J10 scheme are based on the Design Manual for Roads and Bridges (DMRB) and Interim advice Notes (IAN's). Guidance was also derived from Department for Transport documents, namely, Local Transport Notes, Traffic Advisory Leaflets, Circular Roads, Traffic Sign Manual, and the Manual for Streets. Further to the aforesaid, design development has been supplemented by best practice and engineering judgement.

5.8 Option descriptions

5.8.1 General

Predicted traffic flows on the A3 for the design year of 2037 would require the widening of the A3 carriageway from D3AP to D4AP between Ockham Junction and Painshill Junction. This results in lane gain/lane drop arrangements at the northern and southern sides respectively of these junctions and also too at the interface either side of M25 J10 on the A3. The junction type of the three M25 J10 options selected (see above) will each have a variation in the length of and position of merges and diverges, and also effect on side roads in these vicinities. These issues are further discussed below.

5.8.2 A3 corridor

Refer to Drg. No's HE551522-ATK-HGN-M25J10-DR-D-0161 to 0165 for 'General Arrangement, A3 Corridor' in Appendix D.

Widening of the A3 from D3AP to D4AP results in several implications on the proposed scheme. In order to minimise land take through what is already a fairly constrained corridor, the proposed cross-section has been based on IAN 149/11, 'Existing Motorway Minimum Requirements', which prescribes the criteria for reducing lane widths. Proposed typical cross-sections are shown on Drg. No. HE551522-ATK-HGN-M25J10-DR-D-1001 (refer to Appendix D). Through J10 the existing two lanes of the A3 in both direction would remain to avoid structural modifications to the existing underbridges. The central reserve arrangement needs to be further considered as the design develops: The likelihood would be to use concrete as opposed to steel safety road restraints. This need will be determined by gantry supports and whether lighting columns should be positioned in the central reserve or verges.

The introduction of free-flow link roads and the resultant footprints, particularly of Options 9 &16 would result in a reduction of weaving lengths based on design criteria of existing speed limits. This may result in speed limits of 50mph and/or 60mph along parts of the A3 scheme limits. The introduction of a fourth lane would also result in several side roads that currently have direct access to the A3 being closed off.

This results in those accesses/egresses affected having localised diversions to other local roads and being segregated from the A3 trunk road.

Any existing laybys or bus stops over this section of D4AP would also be removed. Items mentioned above (i.e. cross-section, weaving and speed limit would be subject to Departures approvals and are described further below.

A3 Side Roads

The philosophy adopted is based on the requirements of TD 41/95, 'Vehicular Access to All-Purpose Trunk Roads', which are to provide safe movement where the speeds are high and any direct vehicular access on to trunk roads will be strictly limited. The required widening from D3AP to D4AP causes an increase in safety issues which is further exacerbated by shortened weaving length between the main junctions. As a result all existing direct accesses are proposed to be closed. This action will also future proof against further modification works as a result of the implementation of expressway standards. Refer to Doc. No. HE551522-ATK-HGN-1-RP-C-2900, 'Impact Assessment Report, Implementing Expressway Standards on the M25 J10 scheme'.

Side Roads and direct accesses affected by the A3 widening to D4AP are:

- On the A3 southbound: Electricity sub-station, Heyswood Campsite, Court Close Farm, Charwell House, Old Lane and Elm Lane; and
- On the A3 northbound are: Wisley Lane, Long Orchard House and San Domingo;

Elm Lane (A3 southbound between J10 and Ockham Junction) would be stopped up and traffic re-routed via the local road network.

Old Lane (A3 southbound between J10 and Ockham Junction) would be stopped up in Option 16 and traffic re-routed via the local road network. In Option 9 and 14, Old Lane junction with the Junction 10 slip road is maintained.

All other direct accesses affected by the carriageway widening are typically to properties and are connected by parallel service roads, new or existing sections of road. Refer to Table 5-3 above and Appendix D for further details. Wisley Lane is discussed further below.

5.8.3 Junction 10, Option 9 - Four level free-flow in two directions

Free-flow link roads from the A3 to both directions of the M25

Refer to Drg. No's HE551522-ATK-HGN-M25J10-DR-D-0091 & 0092 in Appendix D.

This option is based on providing half the movements of a standard 4 level free-flow interchange. The option consists of diverges from the A3, located upstream of J10 in both directions. The two lane exiting link roads from the A3 then bifurcate to provide two lanes of free-flow movement to both directions of the M25. Each new free-flow link road will consist of two lanes and comply with the standards of TD 27/05 for dimensions of cross-section components for rural motorway connector roads. Following bifurcation each right turn are provided on a medium span viaduct at level four, passing immediately north-west of the centre of the existing junction with intermediate supports to fit within the constraints of the existing junction layout.

The layout of the current J10 roundabout and slip roads all remain in operation as existing. Dedicated segregated left turn lanes will be added for the two M25 to A3 movements. The reduction in roundabout traffic will allow greater green signal time and result in greater junction capacity. The existing slips provide a 'U' turn facility and also offer residual back-up in the event of any future closure of the new links.

Successive diverges from the A3 northbound (new followed by existing) may require a Departure.

All other vehicle movements will be accommodated on the existing roundabout.

New segregated NMU routes would be required, refer to Section 5.9 below.

Option 9 Side Roads

Three side road options are proposed for Option 9 and are shown in Appendix D. The existing direct access from Charwell House, Court Close Farm, Heyswood Campsite and Electricity Sub-Station to the A3 southbound carriageway would be stopped up and rerouted via a new service road adjacent to the A3 southbound carriageway and:

- Option 9A (Red route) - connect into existing southbound off slip (A3 mainline diverge closed off).
- Option 9B (Green route) - rerouted via a new service road adjacent to A3 southbound carriageway and connect into Pointers Road.
- 9C (Purple route) - connect into Redhill Road via an underpass beneath the A3 Trunk Road. See 'Other Relevant Factors - Redhill Road' also.

5.8.4 Junction 10, Option 14 - Elongated roundabout + dedicated left filters

Refer to Drg. No's HE551522-ATK-HGN-M25J10-DR-D-0141 & 0142 in Appendix D.

This option involves modifications to the existing roundabout including the provision of new bridges over the M25 and the reuse of the existing underbridges below the A3. The circulatory carriageway through the underbridges would be widened to four lanes with five lanes of circulatory carriageway being provided where unconstrained by the existing structures. Right turns would be carried out on the modified roundabout and left turns would use new segregated left turn filter lanes.

Option 14 would prove the most challenging in construction terms due to:

- The close proximity of existing and proposed carriageways.
- Online modifications of existing to tie-in and match proposed carriageways whilst maintaining uninterrupted traffic flow.
- Significant level differences between new circulatory carriageway where crossing existing slip roads.
- Land take for diversionary routes due to the above points (would be handed back and reinstated).
- Considerable Temporary Traffic Management phasing
- Additional land required for site compound(s) etc.

Option 14 Side Roads

Two side road options are proposed for Option 14 and are shown in Appendix D. The existing direct access from Charwell House, Court Close Farm, Heyswood Campsite and Electricity Sub-Station to the A3 southbound carriageway would be stopped up and rerouted via a new service road adjacent to the A3 southbound carriageway and:

- 14A (Red route) - connect into existing southbound off slip (A3 mainline diverge closed off).
- 14B (Purple route) - connect into Redhill Road via underpass beneath A3 Trunk Road. See 'Other Relevant Factors - Redhill Road' also.

New segregated NMU routes would be required, refer to Section 5.9 below.

5.8.5 Junction 10, Option 16- Cyclic free flow

Refer to Drg. No's HE551522-ATK-HGN-M25J10-DR-D-0163 & 0166 in Appendix D.

This is the largest of the three options and provides fully free-flow left and right turn movements between the A3 and M25. The layout is similar to the M25 J12 configuration (interchange between M25 and M3) and is based on the standard two level cyclic interchange shown in TD 22/06, Figure 5/4.2c but modified to provide single merge and diverge to and from each mainline rather than two successive diverges from each mainline. New bridges would be provided over the M25 and under the A3 in order to accommodate the free-flow turning movements which would potentially eliminate the existing delays at the signalised roundabout. Whilst this option has the largest land take area (estimated at 48 Ha), it fits well into the existing topography with the new interchange link roads aligned at a similar level to the existing junction. The design is compact for a junction of this type. This is achieved by using R255m horizontal curves (Departure) and would require a 50mph speed limit on each link. The cyclic interchange is probably the safest layout due to the low number of conflict points. However, the removal of direct 'U' turn movements is a disadvantage. The existing roundabout, which is not utilised as part of the main interchange configuration, would be used to facilitate maintenance access and NMU users and would not be open to any A3 or M25 manoeuvres, thus the reconstructed junction would provide an opportunity to further address walking and cycling provision across the A3 and M25.

Option16 Side Roads

Two side road options are proposed for Option 16 and are shown in Appendix D.

16 (Green route Southside) - Direct access from Charwell House, Court Close Farm, Heyswood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and connect to Pointers Road.

16A (Red route) would require the following interventions:

- North-east quadrant: Direct access from Charwell House, Court Close Farm, Heyswood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and passes over (or under) link roads to connect to existing southern roundabout structure.
- South-east quadrant: New service road from existing roundabout to cross link roads and turn right with reverse curve. Runs adjacent to southbound slip road to connect into Old Lane.
- North-west quadrant: Existing northern roundabout structure utilised with service road to cross link roads and turn right with reverse curve. Runs adjacent to A3 northbound slip road to connect into Redhill Road. See 'Other Relevant Factors - Redhill Road' also.

5.8.6 Wisley Lane diversion

Refer to Drg. No's HE551522-ATK-HGN-M25J10-DR-D-0162 & 0161 in Appendix D.

Wisley Lane links the A3 northbound carriageway (and J10 to M25) with the villages of Pyrford, West Byfleet and Wisley. Probably more importantly connection from the A3 to Wisley Lane provides direct access to the public car park at RHS Garden Wisley. This destination attracts around one million visitors a year with the owners predicting an increase to 1.4M over the next few years.

The existing access/egress to Wisley Lane via the A3 is a segregated parallel grade separated 'T' junction. The downstream entry length also has approximately 140m length of parallel parking including a bus stop. The parking also provides maintenance access to a MS4.

Using the philosophy given in TD 41/95 (para's 1.7 & 1.8), Wisley Lane direct access/egress to the A3 would be closed off due to the shortened weaving length to J10.Refer to 5.9.1. The preferred proposal is to re-route Wisley Lane southwards with a S2 two-way carriageway running parallel to the A3 northbound carriageway. This will result in a thin strip of land take from RHS Garden Wisley. This may affect several large sequoia redwood trees which may need removal. Survey data of the tree positions are awaited from RHS Garden Wisley in order to undertake more detailed checks to determine the full consequences. The diversion continues parallel to the Ockham junction northbound slip road until it meets Mill Lane and then connects to the western side of Ockham roundabout (see further Ockham Junction below).

Alternative options for Wisley Lane are outlined in Table 5-3 above and described further in Appendix D.

Further issues relating to RHS Garden Wisley are covered in 'Other Relevant Factors'.

5.8.7 Ockham Junction

Refer to Drg. No's HE551522-ATK-HGN-M25J10-DR-D-0161 in Appendix D.

The existing Ockham Junction is a grade separated 'square' shaped roundabout with four arms. The A3 D3AP carriageway passes over the roundabout supported by two underbridges. The roundabout provides access and egress to/from the A3 on the north facing side of the junction only. The B2216 Portsmouth Road (former A3) connects the village of Ripley, Pyrford and Send to the south-west corner of the roundabout. The B2039 Ockham Road North connects to villages of Ockham and Horsley to the south-west corner of the roundabout.

The scheme limit is approximately at the centre of the junction roundabout (Ch.0+400). With the widening of the A3 from D3AP to D4AP the two slips road would become lane gain and lane drop. The existing structures carrying the D3AP over the junction would not be affected.

From visual inspection the southbound diverge off slip carriageway would only require replacement of road markings (the upstream left side of the carriageway is hatched out). In the event this is not possible, localised kerb widening will be required. The existing bus stop near the approach to the roundabout would be retained.

The northbound merge on slip carriageway is largely unaffected until the back of nose where D4AP commences. Wisley Lane diversion runs parallel to the Ockham junction northbound slip road, the diversion would bear west and form a semi-loop to connect into the western side of Ockham roundabout. Mill Lane would be locally realigned to connect into the new side road with a mini roundabout. The existing unusual

segregated southbound one-way link to the roundabout from Mill Lane would be closed off and removed.

Alternative options for Ockham Junction are outlined in Table 5-3 above and described further in Appendix D.

Further issues relating to Ockham Junction are covered in 'Other Relevant Factors'.

5.8.8 Painshill Junction and A245 to Seven Hills Road

Refer to Drg. No's HE551522-ATK-HGN-M25J10-DR-D-0164 in Appendix D.

The existing Painshill Junction is a grade separated roundabout with overbridges spanning the A3 D3AP carriageway. The junction is connected to the A3 with two-lane merge and diverge slip roads. To the east the A245 Portsmouth Road connects to Cobham and Esher. Painshill Junction roundabout is signalised. The A245 western arm is formed of a D2AP link road that connects to the signalised Seven Hills Road junction (crossroads). Ahead the A245 Byfleet Road connects to Byfleet and Weybridge. The right turn destinations are Hersham and Walton-on-Thames. The left turn, Seven Hills Road (South) provides local access only including the Hilton Hotel.

Due to the constraints of Painshill Park to the south-east and Feltonfleet School to the south-west there is limited opportunity for major improvements. The southbound merge two lane slip road will remain largely unaffected, forming the lane gain for widening of the A3 to D4AP. The A3 D3AP and north facing slip roads will be affected by the scheme. The existing northbound diverge two lane slip road will become a lane drop. The proposal is to widen the slip road to three lanes commencing downstream of the back of nose. At the signalised junction a segregated island will provide a dedicated left turn onto the A245 Byfleet Road.

The A245 link road that connects Painshill roundabout to Seven Hills Road junction will be widened from D2AP to D3AP. The access arrangement for accessing Feltonfleet School would remain similar to the current layout with a yellow box junction on the westbound carriageway to assist right turners to and from the A245 eastbound carriageway. A safer arrangement would be to move the school entrance into Seven Hills Road (South) and have all traffic entering and exiting via the signalised junction. This proposal would need stakeholder engagement as it would mean providing a realigned access road through an existing wooded area within the school land.

Alternative options for Painshill Junction/A245 are outlined in Table 5-3 above and described further in Appendix D.

Further issues relating to traffic signals at Painshill Junction and the A245 link road to Seven Hills Road are covered in 'Other Relevant Factors'.

5.9 Departures

Due to the existing layout and local constraints in the scheme corridor several departures may be required in order to provide some of the layout options. These will need to be assessed and developed at the preliminary design stage. An indicative list of departures is provided in the PCF product HE551522-ATK-HGN-1-RP-C-2800, 'Departures from Standards Checklist', there are three departures which are considered significant and would be integral to the option concepts. These Departures are described below.

5.9.1 Weaving length

The weaving lengths on A3 (Northbound/Southbound) between Ockham to J10 and J10 to Painshill are currently below standard and are made worse by the number and location of existing direct access to the carriageway. The proposed junction arrangements shortens the weaving length between the main junctions in order to implement the merge and diverge types required by TD22/06. The design mitigates this all by removing the direct accesses to the A3.

The existing weaving length on A3 (Northbound) between Wisley Lane to J10 is 870m and the weaving length on A3 (Northbound) between Wisley Lane to proposed Junction is 560m, (310m shorter). This weaving length could not be acceptable hence a link road from Ockham Junction to Wisley Lane is proposed.

The approximate proposed weaving lengths on each of the section are as follows:

- A3 Northbound: Ockham to J10 – Lact 1335m / J10 to Painshill – Lact 615m
- A3 Southbound: Painshill to J10 – Lact 645m / J10 to Ockham – Lact 1125m

The above dimensions are taken from the proposals for Option 16 as this would be the worst case scenario as all of the slip roads connecting to the A3 are modified.

This reduction in weaving length could be mitigated by the implementation of a 50mph speed limit on the section. Any change to the speed limit would require consultation with the police. This would also potentially be in conflict with any implementation of expressway standards within the section (refer to Doc. No. HE551522-ATK-HGN-1-RP-C-2900, 'Impact Assessment Report, Implementing Expressway Standards on the M25 J10 scheme').

The alternative options considered are as follows:

1. Provide a link road to TD 22/06, Figure 5/6 – This would have significant impact on land requirements and existing structures and would significantly increase scheme cost. The environmental impact of this proposal would increase at this highly sensitive location.
2. Move the existing junctions – This option is impractical due to connections to the existing road network.
3. Provide merges and diverges different to those required by TD22/06 – This would also require a departure, would not in all cases solve the problem, and would not provide the required capacity.

5.9.2 Cross-section

Refer to Drg. No. HE551522-ATK-HGN-M25J10-DR-D-1001 in Appendix D for typical cross-sections on the A3.

The scheme requires a 4 lane cross section to All Purpose (AP) road standards. However in TD27/05 there is no cross section which would meet this requirement, therefore an appropriate alternative has been considered. As the scheme is for widening with local constraints on land (SSSI and registered Park) and under structures, it is considered a similar situation to where IAN 149/11 would be used, although this standard is specifically for motorways, the layout in this section has similar characteristics and is in close proximity to the M25. Therefore the cross-section in IAN 149/11, Priority 9, has be used. The proposed cross section with reduced line widths for 4 running lanes is 13.95m (3.65m, 3.60m, 3.40m, 3.30m) with offside/nearside 0.7m hardstrips. This cross-section would require departures for the above reduced lane

widths and a 0.7m hard strip but would maintain consistency with the existing layout of this section of the corridor.

An alternative option considered is as follows:

- Provide a cross-section to TD 27/05 D3AP standard with the addition of an extra lane with the same width as lane 2. Four running line width 14.70m (3.65m, 3.70m, 3.70m, and 3.65m) and 1.0m hardstrips.
- This would have impacts on land requirements which would increase scheme cost and impact the environmentally sensitive location.

5.9.3 Horizontal radii within J10

A minimum radius of 255m has been used within the junction to reduce the land required for the scheme and minimise environmental impacts. This figure is 4 steps below a road with a design speed of 120kph or 2 steps below that of an 85kph Interchange link road design speed road but is thought appropriate due to the local precedent set by the nearby M25/M3 junction of a similar layout to the cyclic option. The impact of this could be mitigated by providing a 50mph speed limit within the junction.

An alternative option considered is as follows:

- Provide a minimum radius of 510m to meet the required standard for a 120kph design speed – this would have a major impact on the land required for the scheme and have a large impact on the environmentally sensitive location as well as some options impacting the adjacent scheduled monument adjacent to Junction 10.
- This would also further reduce the weaving lengths identified above.

5.10 Non-motorised Users

An existing shared use path runs for the full length between Ockham Junction and Painshill Junction on the eastern side of the A3 southbound carriageway; the offset from the carriageway varies. Signalised crossings are provided at Junction 10 at each of the four slip road entry/exits to the roundabout. The route is connected on the inside curve of the roundabout. On the western side of J10 a shared use path runs along the outside of both slip roads. The route extends the length of the parking layby on the northbound diverge and links into Redhill Road on the northbound merge.

Extensive pedestrian footways are provided at both Ockham Junction and Painshill Junction. A pedestrian footway runs from Painshill Roundabout along the A3 northbound slip road to the bus stop. This also connects to the old Byfleet Road (Feltonfleet School access) where it becomes a cul-de-sac.

A short equestrian route to the north of J10 and links to both sides of the A3. On the western side approximately 100m from the roundabout a push button signalised crossing is provided for all NMU's to cross the northbound on-slip road. The route then runs along the opposite side of the slip to the roundabout where it circumvents the outer side of roundabout. A signalised crossing for all NMU's is provided at the stop line of the southbound off-slip. The equestrian route then connects to the end of Pointers Lane on the eastern side.

On the A245 pedestrian footways run from Seven Hills Junction to bus stops on both sides of the carriageway. On the south side the footway extends into old Byfleet Road to Feltonfleet School.

Information was sourced from Ordnance Survey maps, the Surrey County Council website and Google maps. Refer to Drg. No's HE551522-ATK-ENM-M25J10-DR-D-0141, 0191 and 0161 to 0165 (inclusive) in Appendix D for plans of existing and proposed diversions of NMU routes.

The aim is to deliver, NMU provision in the proposed design where any existing NMU routes are affected by carriageway widening and modified junction layouts. Existing NMU facilities to be improved as far as is possible to comply with the latest standards. Where NMU provision extends outside the existing A3 corridor and proposed diversions at J10, the land take has been included in the scheme cost estimates. Locations where full standards are considered unachievable without significant impact and where diversions or routes will be permanently stopped-up are identified below:

- NMU access from Wisley Lane, Elm Road and Old Lane to A3 stopped-up.
- Pinch-point at Bolder Mere (lake), likely to result in a narrow NMU width. To provide full width alternative could require need to locally realign A3 mainline (unrealistic and costly) or construct a shared use bridge along the edge of the lake.
- Wisley Lane Footbridge and Cockrow Footbridge to be replaced with wider span structures. If built online then temporary closures will be required. This would prevent NMU passage from one side of the A3 to the other.
- Localised lengths of NMU provision adjacent Painshill Park may need to be reduced in width.
- For Option ELM-01, BOAT (Byway 525) at Hatch Lane would need to be converted to public road.

In addition to replacement of the two existing footbridges new NMU structures at Junction 10 are required as follows:

- Option 9 – Footbridge over A3 southbound diverge link road, subway (including equestrian use) under A3 to M25 on-slip and footbridge over A3 northbound off-slip.
- Option 14 – None.
- Option 16 – 2no footbridges over A3 southbound merge. Equestrian provision by subway under A3 southbound diverge link road and 2no bridges over link roads in north-west quadrant. New underpasses below A3 (2no.) to include NMU width provision.

Where segregated left turn lanes are proposed at M25 J10 roundabout for Options 9 & 14, these lanes will need to have dedicated signals. Generally these will be green to maximise free-flow for left turners. Push button facility for NMU's will be included on these and the slip road junction signals and linked to ensure pedestrians can have a safe passage in one stage.

The design has been based on TD 90/05, 'The Geometric Design of Pedestrian, Cycle and Equestrian Routes'. Proposed expressway standards will include measures ensuring the prevention of NMU access to the route corridor. Refer to Doc. No. HE551522-ATK-HGN-1-RP-C-2900, 'Impact Assessment Report, Implementing Expressway Standards on the M25 J10 scheme' for an assessment of what is required to future proof the scheme and provide for expressway design standards.

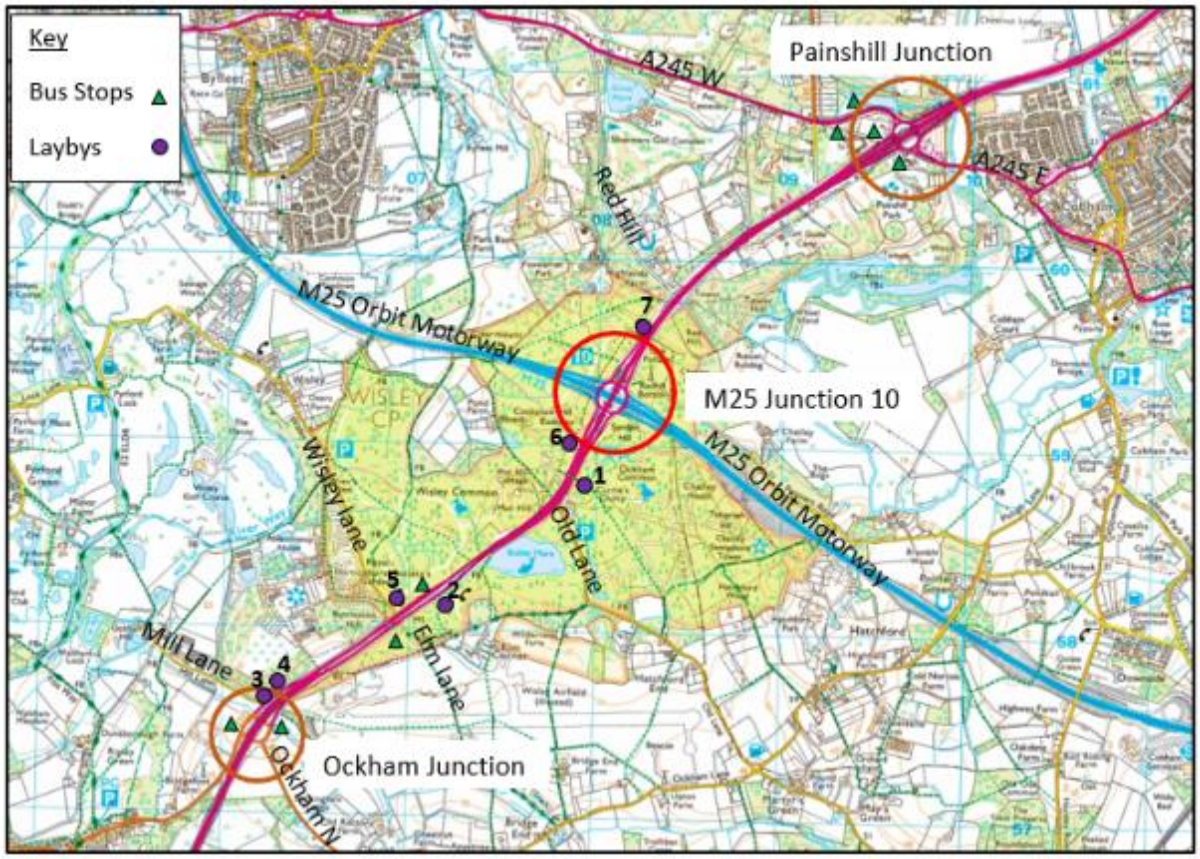
5.11 Other relevant factors

5.11.1 Laybys and HGV parking

Seven laybys have been identified along the A3 corridor, refer to Figure 5-1 below and summarised in Table 5-4 further below. Six laybys are located between Ockham Junction and J10. A maintenance layby for one vehicle is located on the J10 northbound on-slip. No further laybys exist between J10 and Painshill Junction. There are no laybys on the A245 link road.

If the A3 remains as D3AP it should be possible to retain all seven laybys. The layby along the Junction 10 on-slip road between Cockrow F/B and Old Lane is a dedicated HGV layby. Unofficial 'HGV's ONLY' worded road markings designate this provision.

Figure 5-1 Locations of laybys and bus stops



In the event of widening of the A3 to D4AP all the existing parking facilities would be removed due to safety reasons.

The nearest parking facilities are:

- M25 anticlockwise – Cobham Service Station. This also has HGV parking (payment required) and allows 'U' turning for return to J10.
- M25 clockwise – Junction 11, St. Peter's Way link road (D2AP), parking in both directions, primarily used by HGV's. A allows 'U' turning for return to M25 J11.
- A3 northbound – none.

- A3 southbound – Laybys approximately 860m south of Ockham Junction (prior to Rose Lane Overbridge). Wisley Service Stations are located approximately 1.6km south of Ockham Junction on both sides of the A3. Limited parking suitable for HGV's is only available on the northbound on-slip road.

HGV parking is further discussed in Doc. No. HE551522-ATK-HGN-1-RP-C-2900, 'Impact Assessment Report, Implementing Expressway Standards on the M25 J10 scheme' as part of the proposed expressways review.

Table 5-4 Existing layby provision

Ref.	Direction	Approx. chainage	Description	Possible to replace with D4M J10 Option		
1	S/B	Ch.2+250	J10 on slip road between Cockrow F/B and Old Lane. Unofficial 'HGV's ONLY' worded road markings.			
2	S/B	Ch.1+700	Between Bolder Mere and Elm Lane.			
3	N/B	Ch.0+600	Ockham junction on-slip road.			
4	N/B	Ch.0+700	Ockham junction on-slip road.			
5	N/B	Ch.1+500	Wisley Lane (also includes a bus stop).			
6	N/B	Ch.2+835	J10 off-slip road at private access to Park Barn Farm.			
7	N/B	Ch.3+400	J10 on-slip road (lane gain). Size and footway access suggest a redundant bus stop.			
8	N/B	Ch.3+540	J10 on-slip road (lane gain). Maintenance layby for comms cabinet.			

There appears to have been unwanted parking in the soft verge immediately prior to the A3 southbound diverge off-slip road (approx. Ch.0+900) to Ockham Junction.

5.11.2 Bus routes

Two bus services would be directly affected by the scheme. The 515 route operates from Guildford to Kingston entering the A3 from Ripley at Ockham Junction and exiting to Cobham at Painshill Junction.

The 515 service runs once per hour Monday-Sunday and provides access to RHS Wisley Garden. Pedestrian access is from Wisley Lane layby (A3 northbound) and Elm Lane (via footbridge over the A3 (southbound). The widening of the A3 to D4AP would remove these two bus stops from the route. The revised access proposed would be via Ockham Junction and the diverted Wisley Lane. This proposal would mean a longer bus route but would provide direct access to RHS Wisley Garden public entrance where the bus would loop back to Ockham Junction.

The two bus stops on the A245 link road (Routes C1 & C2) which cross Painshill Junction between Byfleet and Cobham would be repositioned at similar locations as a result of widening from D2AP to D3AP. A summary of bus routes are given in Table 5-5 below.

Table 5-5 Bus routes (affected by scheme shown in bold)

Bus No.	Bus Stop Location	Bus Route
515	A3 southbound on-slip road at Painshill Junction.	Guildford, Ripley, Wisley, Cobham, Esher, lower Green, Imber Court, Thames Ditton, Long Ditton, Surbiton and Kingston.
	A3 southbound at Elm Lane.	
	A3 southbound off-slip road at Ockham Junction.	
	A3 northbound at Wisley Lane.	
	A3 northbound off-slip road at Painshill Junction.	
462	B2215 Portsmouth Road northbound at Ockham Junction.	Woking, Send, Burnt Common, Burpham and Guildford.
463	B2215 Portsmouth Road northbound at Ockham Junction.	Woking to Guildford via Woking, Send, Burnt Common, Clandon, West Clandon, Merrow and Guildford.
678	B2215 Portsmouth Road northbound at Ockham Junction.	Ripley, Ockham, west Horsley, East Horsley and Howard of Effingham School.
C1	**A245 Byfleet Road (eastbound and westbound).**	Oxshott, Stoke D'Abernon, Cobham, Downside, Brooklands and Weybridge.
C2	**A245 Byfleet Road (eastbound and westbound).**	Leatherhead, Fetcham/Oxshott, Cobham, Brooklands Tesco and Brooklands Museum.

Route 515 is operated by Abellio Surrey. Route no's 462 & 463 are operated by Arriva. Route 678 is a dedicated school bus operated by Reptons Coaches. Route no's C1 and C2, Cobham Chatterbus, is operated by East Surrey Rural Transport Partnership. No stakeholder liaison has occurred with any bus operator to-date.

On event days, RHS Garden Wisley advised they run shuttle bus services from the site to Horsley and Woking railway stations.

5.11.3 Wisley Airfield Development

Planning consent for a development of approximately 2,100 units at Wisley Airfield, Hatch Lane, Ockham, immediately south-east of Elm Lane, is currently subject to appeal after being rejected by Guildford Borough Council. Proposed plans show a main spine road through the development connecting with Old Lane to the north and Ockham Junction to the south via a new arm to the roundabout immediately north of the B2039 Ockham Road North. Proposals show improvements to the roundabout that include three lanes on the west and east sides and two lanes to the north and

south sides. All existing arms retain their current layout, however, the roundabout would be signalised at each arm. There are no proposals for any south facing slip roads.

Connection of the diverted Wisley Lane into the western side of the roundabout will have a direct impact on the developer's scheme and the developer's proposals vice-versa. The proposed development is not within the scope of the Junction 10 improvements scheme and programmed construction is unknown at present.

Dependant on construction programmes and J10 scheme option adopted early engagement is recommended to either ensure the Developer includes an entry/exit stub for the proposed diverted Wisley Lane under a Section Agreement 278 or alternatively seek financial contribution from the Developer under a Section 106 Agreement.

5.11.4 RHS Garden Wisley access and egress

Due to the shortened weaving length on the A3 between Ockham Junction and M25 J10 the access/egress junction from Wisley Lane will be closed on safety grounds and diverted along a new side road to the western side of Ockham roundabout. This will result in visitors to RHS Wisley Garden, and the villages of Wisley and Pyrford travelling northbound on the A3 having to continue on to M25 J10 and 'U' turning at the roundabout (Options 9 & 14) and returning on the A3 southbound carriageway to exit at Ockham Junction. For Option 12 (cyclic layout) this journey would be extended to Painshill Roundabout to undertake a 'U' turn manoeuvre. For all traffic exiting from the aforesaid via Wisley Lane and heading southbound, this would mean entering the A3 northbound carriageway from Ockham Junction and undertaking similar movements as described above.

Given the current and projected visitor numbers to RHS Wisley Garden (see 'Wisley Lane Diversion' above), to fully understand the impact on vehicle numbers having to undertake the longer routing, it is recommended an origin traffic survey be undertaken. This information may be sourced to some degree from RHS membership address locations. This issue was discussed with RHS Wisley Garden during a stakeholder meeting on 16 August, 2016. During this meeting RHS suggested south facing slip roads are added to Ockham Junction to alleviate additional traffic exiting the A3 at Burnt Common Junction (Ripley, Woking, Dorking exit) and generating unwanted traffic through Ripley Village. RHS were advised this was out of scope of the current scheme but would be discussed further at a higher level within Highways England. A further issue raised by visitor feedback was concern of queues backing up from the A3 merge and entry difficulties to the A3.

5.11.5 Smart Motorway J10-J16

The M25 J10-J16 Smart Motorway (SM) scheme will have a direct impact on the Junction 10 scheme in terms of design and construction programme. This will be instigated following announcement of the J10-J16 designer. Close collaboration with the designer is required to ensure that design development is fully co-ordinated to ensure a seamless and fully integrated design.

Scheme limits of the design shall need to be agreed. For example, back of nose for M25 merges and diverges may be logical. This would result in the merge and diverge arrangements being constructed as part of the M25 Smart Motorway works. As the existing A3 already has MS4 type signs and other technology, this particularly will need close design co-ordination between the two project teams.

5.11.6 A245 traffic signals

The traffic signals on the A245 at Seven Hills Junction are operated by Surrey County Council (SCC) using MOVA. The traffic signals at Painshill Junction roundabout are currently owned by Highways England and monitored and maintained by RTMC (Telenet). The signals operate under fixed time UTC with fall back CLF. The existing detection (above ground) is obsolete and non-operational. Ideally the signals could be linked and operate on a compatible system to improve performance. The validated linked signals would improve the performance of the traffic signals providing better traffic flow between the two sets of signals.

5.11.7 Redhill Road

For J10 Option 9 (Purple Route), Option 14 (Purple Route) and Option 16 (Red Route, north-west quadrant), local road diversions are connected into Redhill Road. With limited opportunities for vehicles exiting Redhill Road onto the A245 Byfleet Road at Silvermere Golf Club (particularly right turning), the introduction of a small roundabout would be appropriate. However, this is outside the scope of this scheme commission, but consideration of dialogue with Surrey County Council to this end is recommended.

5.11.8 Expressway standards

Highways England issued an Expressways Technical Note, ref. Expressways Technical Note_HE_DES_V1.0_20160309, dated March, 2016 to provide initial guidance on forthcoming design criteria.

PCF, Part 1: Package Order Brief, Annex D, para's 4.20 & 6.2 requires the Supplier to investigate potential opportunities to achieve 'expressway' standards and outline the potential impacts of incorporating the emerging 'expressway' standard into the improvements programme in order to minimise risk of future incompatibility.

Refer to Doc. No. HE551522-ATK-HGN-1-RP-C-2900, 'Impact Assessment Report, Implementing Expressway Standards on the M25 J10 scheme'. Key points are:

- For the D4AP option additional landtake would be required for most of the southbound side of approximately 2370m in length adjacent to the A3 would be required for the alternative segregated NMU routes.
- The existing horizontal and vertical geometry shall be retained with D3AP being widened to D4AP and all direct public access and egress points are closed off in the current proposals.
- The expressway should operate at the national speed limit but as a result of reduced weaving lengths, and the potential unlikelihood of acquiring Departures on safety grounds, a speed limit of 50mph on the A3 may be required over most or part of the scheme length.

5.11.9 CCTV, Safety Cameras, VMS and MIDAS

The M25 has extensive coverage of CCTV, safety cameras, VMS and MIDAS. The A3 has limited technology but would need upgrading or replacing to accommodate D4AP standard. This subject is further reviewed in Doc. No. HE551522-ATK-HGN-1-RP-C-2900, 'Impact Assessment Report, Implementing Expressway Standards on the M25 J10 scheme'.

6 Engineering assessment

6.1 Structures

6.1.1 Option 9

Option 9 is a four level layout with free-flow in two directions. The option includes two structures spanning over the highest level of the existing interchange to provide free-flow right turns from the A3 northbound to the M25 anticlockwise and from the A3 southbound to the M25 clockwise. The right turns are provided on large medium span viaducts (approximately 260m in length) passing close to the centre of the existing junction with intermediate supports to fit within the constraints of the existing layout.

The viaducts would each carry two lanes of traffic, and comply with TD 27/05 with respect to cross-section dimensions for rural motorway connector roads. This results in an overall width of 15.1m incorporating two 3.65m wide lanes, a 3.3m hardshoulder, a 1m hard strip, a 1.5m nearside verge and a 2m offside verge.

6.1.2 Option 14

The elongated roundabout option requires the reuse of the existing underbridges beneath the A3. Two new overbridges across the M25 mainline will require spans of 43m. The decks would be 20.25m wide to accommodate five 3.65m wide lanes and two 1.0m wide hard strips. In addition the bridges may need to accommodate a non-motorised user (NMU) route on one side and they will also be wide enough to provide the necessary forward stopping sight distance. The structures would span the M25 mainline only and not the existing slips, meaning the new slips would need to be constructed first.

The option to span over the existing slips was considered as it would allow more flexibility in the construction sequence. However, the raised level of the existing slips would make the tie-in to the extended roundabout impossible to achieve leaving no option but to provide new slip roads and leading to a bridge configuration spanning just the M25 with new slip roads aligned away from the structures.

6.1.3 Option 16

This option is a cyclic layout providing free-flow for all traffic movements, based upon Figure 5/4.2c of TD 22/06. Each link road will carry two lanes of traffic, and therefore the deck widths would be 15.1m wide as for Option 9. There are four locations (north, south, east and west quadrants) where a set of structures would be required. The east and west quadrants require a structure to carry two cyclic link roads over the M25 and its proposed new on slip. The north and south quadrants require a structure to carry the new A3 on-slip over two new cyclic link roads, as well as a separate structure to carry those cyclic link roads under the existing A3. Four bridges and two underpass structures are proposed. Two bridges would have spans of 45m and two bridges would have spans of be 30m. The underpasses would have spans of 15m and would be 36m in length.

6.1.4 Summary of preferred structural arrangements

A summary of the preferred structure types and arrangements is given in the Table 6-1 below.

Table 6-1 Preferred structure types

Option	Structure	Span arrangement	Deck type and depth	Deck width	Typical pier / abutment height	Construction method
9	Link A (A3 southbound to M25 clockwise)	55m – 61m – 50m – 53m – 40m	Steel ladder beam deck, 3.3m deep	15.1m	19.2m (max)	Incremental launching
	Link B (A3 northbound to M25 anticlockwise)	55m – 67m – 65m – 50m	Steel ladder beam deck, 3.3m deep	15.1m	19.2m (max)	Incremental launching
14	East overbridge structure	43m	Precast beam and slab integral with abutments, 2.5m deep	20.25m	5.5m	Lifting of beams with insitu deck
	West overbridge structure	43m	Precast beam and slab integral with abutments, 2.5m deep	20.25m	5.5m	Lifting of beams with insitu deck
	North underbridge	Existing structure				
	South underbridge	Existing structure				
16 (spanning over existing slip roads)	East quadrant structures	62m – fill – 29m	Steel composite girder, integral for structure over M25 only, 2.5m deep	15.1m for each link road	6.5m	Lifting of beams with insitu deck
	West quadrant structures	62m – fill – 30m	Steel composite girder, integral for structure over M25 only, 2.5m deep	15.1m for each link road	5.8m	Lifting of beams with insitu deck
	North quadrant structures	55m long box	2 no. 15m wide concrete boxes	55m	7.4m	Jacked beneath A3
		21.5m – 21.5m overbridge	Non integral precast beam and slab, 1.4m deep	15.1m	6.0m	Lifting of beams with insitu deck
	South quadrant structures	55m long box	2 no. 15m wide concrete boxes	55m	7.4m	Jacked beneath A3
		24m – 24m overbridge	Non integral precast beam and slab, 1.6m deep	15.1m	6.0m	Lifting of beams with insitu deck
16 (spanning over mainline only)	East quadrant structures	45m – fill – 29m	Steel composite girder, integral for structure over M25 only, 1.8m deep	15.1m for each link road	7.2m	Lifting of beams with insitu deck
	West quadrant structures	45m – fill – 30m	Steel composite girder, integral for structure over M25 only, 1.8m deep	15.1m for each link road	6.5m	Lifting of beams with insitu deck
		32m long box	2 no. 15m wide concrete boxes	32m	7.4m	Jacked beneath A3

Option	Structure	Span arrangement	Deck type and depth	Deck width	Typical pier / abutment height	Construction method
	North quadrant structures	21.5m – 21.5m overbridge	Non integral precast beam and slab, 1.4m deep	15.1m	6.0m	Lifting of beams with insitu deck
	South quadrant structures	36m long box	2 no. 15m wide concrete boxes	36m	7.4m	Jacked beneath A3
		24m – 24m overbridge	Non integral precast beam and slab, 1.6m deep	15.1m	6.0m	Lifting of beams with in-situ deck

For details of the rationale behind proposals for the optimum and alternative structural solutions refer to Appendix E.

6.2 Drainage

Allowable discharge rates have been calculated for the existing outfalls using the modified rational formula with time of concentration based on the longest path. Greenfield runoff rates have been established based on the ICP SuDS method using Microdrainage and additional volume due to widening works on the A3 between Ockham and Painshill was estimated using the Quick Storage Estimate method using the same software. There are 17 drainage outfalls affected by the proposals. At nine of the outfalls, attenuation ponds would be provided to cater for predicted increased discharges and consequent storage requirements. At one location, additional attenuation would be provided through the use of oversized drainage pipes. The results are shown in Table 6-2 to Table 6-5 below.

Table 6-2 Quick storage estimate

Ref	Quick Storage estimate V (m^3)	Provision required
Outfall 1	787	Attenuation pond
Outfall 2	283	Attenuation pond
Outfall 3	No increase	None
Outfall 4	No increase	None
Outfall 5	268	Attenuation pond
Outfall 6	No increase	None
Outfall 7	38	In pipe attenuation provision
Outfall 8	117	Attenuation pond
Outfall 9	487	Attenuation pond
Outfall 10	581	Attenuation pond
Outfall 11	48	In pipe attenuation provision
Outfall 12	No increase	None
Outfall 15	2081	Attenuation pond
Outfall 16	No increase	None
Outfall 17	No increase	None

Additional volume estimation for outfalls 13 and 14 will vary depending on the M25 J10 option.

Table 6-3 Option 16 - Quick storage estimate

Ref	Quick Storage estimate V (m^3)	Provision required
Outfall 13	44120	Attenuation pond
Outfall 14	1657	Attenuation pond

Table 6-4 Option 14 - Quick storage estimate

Ref	Quick Storage estimate V (m^3)	Provision required
Outfall 13	4321	Attenuation pond
Outfall 14	658	Attenuation pond

Table 6-5 Option 9 - Quick storage estimate

Ref	Quick Storage estimate V (m^3)	Provision required
Outfall 13	4447	Attenuation pond
Outfall 14	1207	Attenuation pond

6.3 Lighting

Additional lighting to that which currently exists together with the replacement of some of the existing lighting where it is affected by the scheme would be provided for each of the options as determined by the appraisal. The proposed lighting will be capable of variable operation and be used sensitively to aid safety whilst minimising light pollution. Lighting equipment will be the most efficient available, including the use of modular, upgradeable components, intended to future-proof the lighting provision. It is assumed that Lighting Emitting Diode (LEDs) would fulfil this requirement. Proposed lighting levels will be determined by following a robust investigation of the most appropriate levels of lighting.

The existing M25 J10 is lit by conventional column mounted road lighting but is surrounded by woodland which tends to diminish its visual impact and there are relatively few sensitive visual receptors such as residential properties in the immediate area surrounding the junction. The proposed options would each require lighting which could increase the visual impact of the scheme particularly where elevated links are required. New lighting could also increase the effect of the junction on the sensitive ecology of the area and increase disturbance to bats and birds.

6.4 Pavement

6.4.1 Construction records

Pavement condition has been compiled from Highways Agency Pavement Management System (HAPMS) records. Additional information was also received form Connect Plus Services (CPS), the Area 5 MAC. The construction records are complete, however, the accuracy of the data ideally would need to be validated by completing a coring and Ground Penetration Radar (GPR) survey programme.

6.5 TRACS data

Available HAPMS data indicates some surface course deterioration which would need to be validated on site with appropriate remedial work included in design development.

There are gaps identified in the data, some of which is the result of maintenance works being completed after the latest survey. Other missing data is a result of the lane not being surveyed.

6.6 SCRIM data

HAPMS data available reports areas of low SCRIM (at or below the Investigatory Level) however this survey is risk based and therefore not all areas need maintenance.

There are gaps identified in the data, some of which is the result of maintenance works being completed after the latest survey. Other missing data is a result of the latest survey being over three years old and therefore invalid and other areas not being surveyed.

6.7 TSD data

HAPMS data available reports some areas of concern from a structural perspective and other areas not reporting a condition measure due to the data collected not being able to be analysed and therefore reporting WOAL (Well Outside Acceptable Limits). It is recommended that areas of concern and areas reporting WOAL are surveyed by Deflectograph and/or Falling Weight Deflectometer (FWD).

Gaps in the data identify TSD is a relatively new survey and therefore coverage is not as good as TRACS or SCRIM. The missing data is generally unexplainable as a survey has been completed but no results returned when analysed.

It is recommended that the HAPMS document ‘M25 FWD Recommendations.xslx’ is used to assist in identifying where Deflectograph and/or Falling Weight Deflectometer (FWD) surveys are commissioned to collect the required structural condition data. It is essential that CL1 is surveyed where structural data is not available and the need to survey CL2, CL3 and CL4 should be assessed to determine the importance.

6.8 Deflectograph data

Deflectograph data is only collected on the network when a potential need for maintenance is identified therefore there is only a small quantity of data available.

6.9 Hardshoulder data

Routine condition surveys are not completed in the hardshoulder therefore it is recommended that site investigations are commissioned to validate the construction records, record the visual condition and ascertain the structural condition.

7 Traffic analysis

7.1 Introduction

This section describes the development of the traffic modelling process to support the appraisal tasks for PCF Stage 1 for the M25 Junction 10/A3 Wisley Interchange study (referred to subsequently as M25 J10). The PCF Stage 1 work was undertaken using the existing SATURN M3M4 2009 model as a basis and enhancing the detail of this model in the M25 J10 area. It is anticipated the subsequent PCF stages may be undertaken using the South East Regional Model currently under development by Highways England.

The purpose of the traffic modelling is to provide traffic forecast data to enable the appraisal of alternative schemes to address traffic congestion at M25 J10. The interchange connects the M25 to the A3 and serves both strategic and local traffic. Thus the modelling system for the appraisal of M25 J10 needed to provide adequate replication of the potential effects upon both longer distance strategic traffic and shorter distance local traffic.

The M25 J10 scheme is being promoted as part of the Road Investment Programme stage one. The programme also includes the M25 J10-J16 scheme, which is intended to provide Smart Motorway (SM) widening along this section of the M25. The M25 J10-J16 scheme will be included in the do-minimum and do-something options for M25 J10 and thus it is important that the modelling system is capable of reflecting the traffic effects arising from the proposed M25 J10-J16 SM improvement, in addition to those arising from the M25 J10 scheme itself.

The following three schemes are currently under consideration for M25 J10:

- Improvements to the existing roundabout
- Partial grade separation
- Full grade separation

The modelling system for the M25 J10 study is based upon the M3M4 model developed for the M3 and M4 Smart Motorway (SM) schemes, as reported in the 'M3M4 Managed Motorways Local Model Validation Report Revision 6', dated 01 May 2013. The existing M3M4 2009 base year model has been enhanced for the M25 J10 study through the addition of local detail as described below.

The M3M4 model comprises four time periods:

- AM1 (07:00-08:00)
- AM2 (08:00-09:00)
- IP (average 10:00-16:00)
- PM (17:00-18:00)

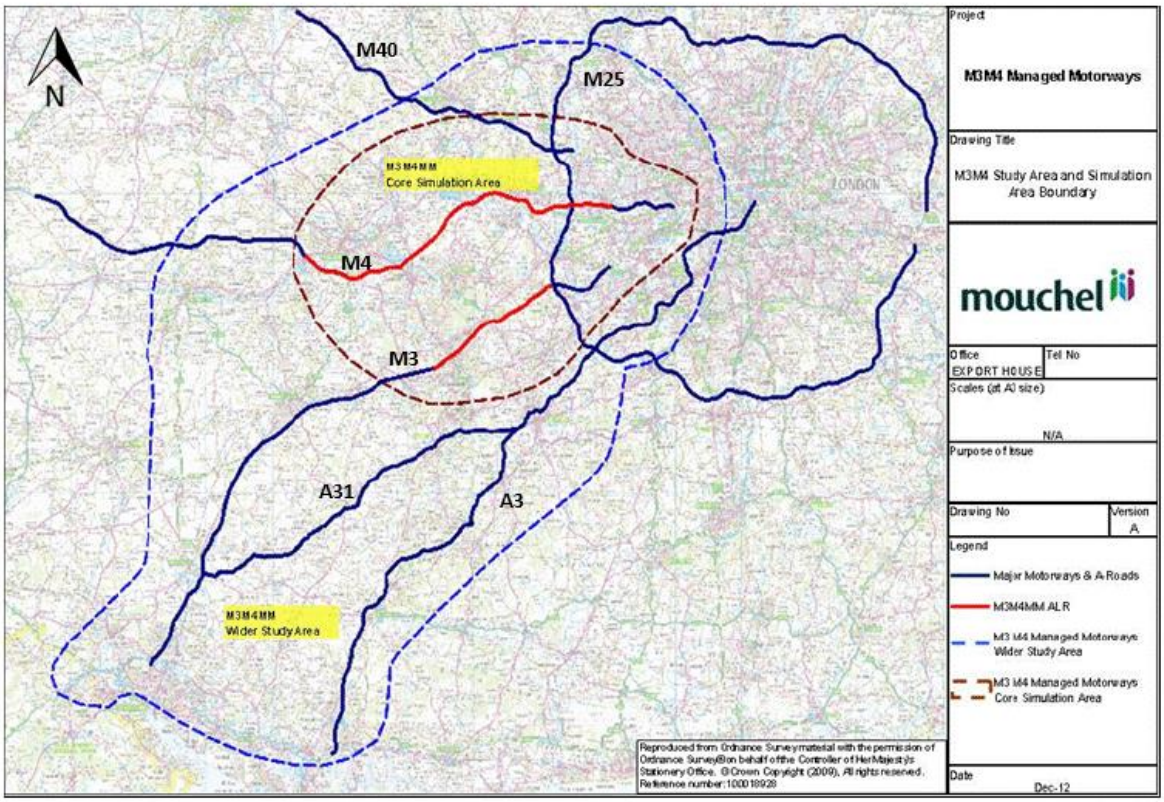
This work undertaken to enhance the existing M3M4 model, comprised:

- Refinement of the model in the area of M25 J10 with extension of the simulation area
- Recalibration of the model for a 2009 base year
- A present year validation of the model for 2015

This work is described in the M25 J10 Local Model Validation Report.

The area covered by the original M3M4 model is shown in Figure 7-1 below and the extension of the simulation area of the model to include M25 J10 and the A3 is shown in red in Figure 7-2.

Figure 7-1 Extent of M3/M4 strategic model (Mouchel)



The modelled area extends beyond the expected scale of impacts and addresses the locations of the environmental constraints for the study area. Whilst the modelled area is beyond that required for the M25 J10 scheme alone, it enables the effects of the M25 J10-J16 SM scheme to be fully reflected. This is important as the M25 J10-J16 SM scheme is likely to have significant effect upon traffic flows on the M25 to the west of M25 J10. Retention of the full M3M4 modelled area also minimises the work required to provide suitable modelling for M25 J10 and retains consistency with the traffic work for the M3 and M4 schemes.

7.2 Traffic data

As explained above, the modelling for the M25 J10 study is based on refinement of the existing M3M4 2009 model. Additional detail was required for M25 J10 and adjacent junctions on the A3 which lie just outside the simulation area of the M3M4 model. Thus data has been collected to enable the inclusion of M25 J10 and adjacent parts of the A3 in the simulation area, the re-calibration of the refined model focused upon M25 J10 and the immediately surrounding network and a present year validation to 2015. Given the timescales for this work, and that the re-calibrated M3M4 model is only required for PCF Stage 1, no new data collection has been undertaken and the work has been based upon collation of data from existing sources.

Figure 7-2 Extended simulation area

7.3 Data sources

Existing data has been collated from a number of sources, primarily:

- The M3M4 2009 traffic model and data sources presented in the LMVR for that model
- The Highways England TRADS database
- Trafficmaster journey time data
- The Surrey County Council traffic model and associated data
- An ANPR survey conducted at M25 J10 in 2014 to identify turning movements

Mapping data has also been used to undertake network and junction coding checks.

The data collation process and the data sources are described in detail in the Traffic Data Collection report for the M25 J10 study.

7.4 Traffic analysis

7.4.1 Network development

The network development for the Junction 10 model comprised refinement of the M3M4 model to add simulation coding in the Junction 10 area. The network structure from the M3M4 model was retained in full. This was refined to extend the simulation area to include M25 J10, the M25 between J9 and J10, and the A3 between the A247 Send Junction south of the M25 and the A244 Oxshott Junction to the north.

The South East Regional Highway model coding was obtained and used as the basis for coding the following locations to include simulation coding for junctions and speed flow curves for links:

- M25 J10
- A3/A247 Send junction
- A3/Portsmouth Rd/B2039 Ripley junction
- A3/A245 Painshill junction
- A3/A247 Oxshott junction
- M25 J9 to J19
- A3 between the Send and Oxshott Junctions.

The SE Regional Model coding was from an initial version of the Regional Model network so this was used as a starting point and checked against mapping data with adjustments made where appropriate.

7.4.2 Matrix development

The matrix development for the M25 J10 model comprised refinement of the M3M4 matrices to provide better representation of local traffic movements in the M25 J10 area. The M3/M4 model was developed to be largely consistent with the existing M25AM and TEMPRO 6.2 zone boundaries. This resulted in a model comprising 742 zones, including 25 dummy zones as provision for representation of future land use developments. The M25 J10 model has retained the M3M4 model zone structure unchanged.

The data source for the matrix refinement was obtained from the 2009 Surrey County Council SINTRAM model. Select Link Analysis (SLA) matrices were obtained from the Surrey County Model for all arms approaching the M25 J10 roundabout for each of the AM and PM peak periods. Equivalent select link matrices were removed from M3M4 model prior matrices and replaced by the SCC SLA matrices. For the inter-peak period, the replacement matrices comprised the average of the AM and PM SCC SLA matrices factored according to local count data. The resulting matrices provided the prior matrices for matrix estimation for each of the modelled time periods.

Adjustments were made to the order of the counts used for M3M4 model matrix estimation to rearrange counts on the M25 Mainline between Junction 10 to Junction 16 and A3 Mainline within vicinity of M25 J10 to give greater focus on the M25 J10 area. The counts were further updated to include factored 2009 M25 J10 turn counts and A3 mainline counts. As described above, the prior matrices for the ME exercise were the original M3M4 model prior matrices with selected local movements around M25 J10 replaced by movements from the SCC model.

7.4.3 Model calibration

The base year model was calibrated to 2009. Table 7-1 summarises the calibration results in the immediate area of M25 Junction 10, further details are given in the validation report.

Table 7-1 Summary of 2009 calibration results for M25 mainline links from J9 to J17, turn counts at J10 and A3 within immediate vicinity of M25 J10

Time Period	Calibration Counts Passing		Comments
	Flow	GEH	
Total number of Counts	38	38	
AM1	35	35	Number of calibration counts passing WebTAG criteria
AM2	35	36	
IP	37	37	
PM	36	36	
AM1	92%	92%	Proportion of calibration counts passing WebTAG criteria
AM2	92%	95%	
IP	97%	97%	
PM	95%	95%	

These results show that the model calibrates to a high standard in the area of interest.

7.4.4 Model validation

A 2015 present year validation (PYV) was undertaken, this compared the 2009 modelled flows with 2015 observed flows. The 2009 modelled flows were used for the 2015 PYV as observed data showed generally small changes in traffic flow in the area between 2009 and 2015, with typically a slight decline in traffic levels in 2015. The results of the PYV are shown in Table 7-2 together with the calibration results for comparison, further details are given in the validation report.

Table 7-2 Calibration and validation results within immediate vicinity of M25 J10

	Calibration (2009 modelled and observed)	Present Year Validation (2009 modelled and 2015 observed)
AM1	94%	94%
AM2	83%	83%
IP	100%	78%
PM	78%	67%
All time periods	89%	81%

Whilst the modelled flow validation results showed a reduced performance from the calibration results, this is generally due to the use of the 2009 model to represent traffic flows in 2015 and the trend to lower observed flows in 2015. Importantly, the turn flows at Junction 10 validate well in the three peak period models, and whilst some individual turns do not meet criteria in the inter-peak model the overall throughput at the roundabout is within 2.7% of the observed flow.

Journey time validation compared 2009 modelled journey times with 2015 observed journey times for the M25 between Junctions 10 and 17 and the A3 between the A247, this comparison is summarised in Table 7-3. Further details of journey time validation are given in the model validation report.

Table 7-3 2009 modelled and 2015 observed journey time summary

Time Period	JT passing	JT failing	% pass
AM1	3	1	75%
AM2	3	1	75%
IP	4	0	100%
PM	2	2	50%
All periods	12	4	75%

Overall the majority (12 out of 16) of cases meet the validation criteria of being within 15% but the proportion (75%) is less than that recommended. The instances where journey times do not validate are on the most congested sections of the M25 in the peak periods, where in all cases the model is under-predicting travel times and thus the degree of congestion. This occurs in the clockwise direction in the PM peak and in the anti-clockwise direction in all three peak periods. The M25 achieves validation criteria in the IP period as does the A3 in all time periods.

The under-prediction of congestion on the M25 is the same as that reported for the original M3M4 model and is a function of standard (WebTAG compliant) speed flow curves being unable to represent speeds and journey times in flow breakdown conditions. Flow validation is generally reasonable, as discussed above, with modelled flows tending to be higher than observed flows in 2015 due to a small general reduction in traffic between 2009 and 2015. This under representation of congestion will tend to lead to underestimation of scheme benefits, as it will tend to affect the do-minimum case (with higher levels of congestion) more than the do-something case.

7.5 Forecasting

Forecast traffic movements have been generated for 2022 and 2037 future years. Forecast year networks were prepared through inclusion of major road schemes expected to be opened before the relevant model year, these are detailed below.

Demand forecasting was undertaken using the M3M4 Variable Demand Model to produce forecast traffic movements for each option. This model combines application of growth from NTEM6.2 (cars) and NTM (goods vehicles) with a WebTAG compliant variable demand process. Full details of the forecasting process are reported in the M25 Junction 10/A3 Wisley Interchange Traffic Forecasting Report.

7.5.1 Forecasting methodology

Table 7-4 below identifies the schemes included in the 2022 and 2037 future year do-minimum model networks. The schemes of most relevance to the M25 J10 scheme are the M25 J10-16 Smart Motorway scheme and the proposed widening of the A3 Guildford bypass scheme between the A31 and north of Guildford. The latter scheme is only included in the 2037 network and as it is outside the simulation area is represented by the adoption of higher fixed speeds for the improved links.

Demand forecasting was undertaken using the M3M4 variable demand model which follows WebTAG guidelines. This model provides:

- forecasts of changes in travel demand over time, as a result of changes in land-use, economic growth, travel costs and committed transport supply changes

- forecasts of the responses of travel demand to changes to the transport system, such as improvements to existing roads, the construction of new roads, and implementation of highway demand management schemes

Car and bus demand growth is derived by applying purpose-specific trip-end growth factors (derived from NTEM software and incorporating TEMPRO planning assumptions), using a matrix-balancing procedure. This is applied at the 24-hour level. It is therefore implicitly assumed that proportions of by-purpose reference demand by time period do not change over time. Changes in time period proportions resulting from travel cost differentials are however forecast by the demand model.

Table 7-4 Major schemes included in M3M4 model for M25 J10 study

Scheme	Description	Year
A3 widening Guildford	Widening of A3 between A31 and north of Guildford	2037
M25 J10 to Junction 16	SM-ALR scheme with selected through junction running and changes to slip road configurations. RIS1 scheme assumed opening in same time frame as J10 scheme	2022
M3 Junction 2 to 4a	Three lanes Smart Motorway including improvements to the on and off slips at Junction 2 with the M25, with section of the between J4-3 with 60mph.	2022
M4 Junction 3 to 12	Provision of SM-ALR between Junctions 3 and 12. This results in a lane gain along the entire scheme, except through the Junctions at 4b and 10. As part of these improvements there are also changes to many of the slip roads to reflect the changed mainline carriageway layout.	2022
M4 Junction 10 (M4/A329(M) Interchange)	Merge slip roads from the M4 to A329(M) NB and SB one lane capacity. Improved slip road capacity by adding extra merge slips to A329 (M) NB and SB to relieve congestion.	2022
M25 Junction 16 to Junction 17	Three lanes widened to four lanes.	2022
M25 Junction 17 to Junction 23	Three lanes widened to four lanes.	2022
M25 Junction 27 to Junction 30	Three lanes widened to four lanes.	2022
M25 Junction 5 to Junction 7	Three lanes Smart Motorway.	2022
M25 Junction 23 to Junction 27	Three lanes Smart Motorway.	2022

NTM freight growth forecasts represent actual forecasts of growth, including the effect of changes in the cost of travel. As M3M4DM also models this effect, applying both would double-count the effect. Consequently, M3M4DM does not adjust freight demand in response to economic and other changes over time: the freight demand response is disabled for Core Scenario scheme tests. In testing Option Test schemes, freight demand is adjusted in much the same way as other demand segments, allowing demand responses to congestion, charges etc.

There was a proposal for a new settlement of around 2,000 homes on the Wisley airfield site but the planning application for this was refused by Guildford Borough Council in April 2016. The site remains as a potential development opportunity in the local plan but permission for the current proposal was refused. As such the forecasts adopt NTEM 6.2 growth with no adjustment for individual developments.

7.6 Assessment

All three scheme options provide significant reductions in delay at M25 J10 and large increases in traffic flow through the junction when compared with the do-minimum. Percentage increases in total throughput (excluding the through M25 and A3 movements) in 2037 compared with the do-minimum across the modelled time periods are as follows:

- Option 14 (Elongated Roundabout) – 21% to 43%
- Option 9 (Four level free flow in two directions) – 24% to 52%
- Option 16 (Cyclic free flow) 19% to 50%

It may be noted that Option 9 provides the highest level of throughput although Option 16 has the higher degree of flow separation. Inspection has shown that this is due to the additional length of the free flow lanes in Option 16 offsetting the reductions in delay due to flow separation. In Option 9, the removal of traffic from the roundabout due to the two free flow slips provides large reductions in delay to traffic continuing to use the roundabout and the analysis suggests that there is little extra to be gained by providing the additional free flow slips in Option 16.

All options show a similar pattern of flow changes from the do-minimum across the network, with increases in flow on the A3 (north and south of Junction 10) and the M25 to the west and small changes (generally reductions) on the M25 east of Junction 10. There are general reductions in traffic around M25 J9 (as traffic reroutes to use M25 J10) and the Leatherhead area and on local roads around Woking.

Option 14 provides the lowest level of delay reduction compared with the do-minimum and thus the least journey time improvement, with increases in journey times for some turning movements at the junction and in some time periods for the M25 and A3. Option 9 provides large reductions in delay and journey time for the majority of movements using M25 J10, with journey times for some movements reduced by more than 50%. Option 16 provides similar reductions in journey times and delay to Option 9 for most movements with further improvements in journey time and delay for the right turn movements using the additional free flow slips.

A number of movements will be operating over capacity by 2037 in Option 14, although it is still an improvement on the do-minimum situation. Most movements in Option 9 will be operating close to capacity in 2037 with a minority over capacity. Capacity in Option 16 is broadly similar to Option 9, with some improvements in capacity relating to the additional free flow slips.

7.7 Conclusion

All options provide significant improvements in highway performance compared with the current situation. Options 9 and 16 provide the highest level of delay reduction at M25 J10, with average delay per vehicle mile on the A3 forecast to be approximately 70% shorter in the morning peak in 2022 for Option 9 and 75% shorter for Option 16. Option 14 is forecast to reduce average network journey times by 45% in the morning peak in 2037.

All options also accommodate a much greater throughput (excluding the through M25 and A3 movements) in 2037 compared with the do-minimum across the day. Option 9 and 16 are forecast to increase throughput at the junction by approximately 40% whereas Option 14 is forecast to accommodate over 35% more traffic compared to no improvement.

The removal of traffic from the roundabout by the provision of free flow elements in Option 9 and 16 is forecast to have the greatest impact on safety over the appraisal period. Option 16, which is fully free flow is forecast to have the greatest improvement in safety, with an average of over 20 fewer accidents per year expected. Option 9 is forecast to reduce accidents by an average of 15 per year whilst Option 14, with all movements still using a modified version of the existing roundabout, would result in reducing the number of accidents per year by just one on average.

The benefits offered by the additional free flow slips in Option 16 compared with Option 9 appear to be limited due to the relatively low delays for the relevant movements in Option 9 and the increased travel distance due to the length of the free flow lanes in Option 16.

8 Option estimates

8.1 Introduction

Option estimates have been produced by Benchmark on behalf of Highways England Commercial division. During PCF Stage 1 estimates were prepared for Options 9, 14, and 16. These have been based on the following information provided by the project team:

- General layout & cross section drawings for all options
- Identification of areas/volumes of earthworks cut and fill by options
- High level construction programmes for options
- C3 Statutory undertakers estimates
- Land cost estimates for each option produced by the district valuer
- SGAR dates
- Historic costs
- A risk register for each option

8.2 Assumptions

In preparing the commercial cost estimates for the options, assumptions were made on a small number of key items:

- Information was not available at this stage on third party costs and/or fees, and estimates were assumed for the following:
  - Rail Authority costs
  - Environment Agency Costs
  - Local Authority costs
- Statutory Undertakers diversion costs - C3 budget estimates (utility returns) were not available at the time the commercial cost estimates were prepared, therefore diversionary costs were estimated based on the composite drawings provided.

8.3 Cost estimates by option

The estimated costs for the options are:

- Option 9 (estimate 6) is £214.703m
- Option 14 (estimate 10) is £152.428m
- Option 16 (estimate 14) is £339.662m

9 Economic assessment

9.1 Introduction

Economic appraisal for each of the three scheme options identified for M25 J10 at the PCF1 stage has been undertaken and is documented in detail in the Economic Assessment Report (EAR). This chapter provides a summary of the approach adopted for the economic assessments, together with the underlying assumptions and the results.

The economic assessment of the M25 J10 options was based on the use of outputs from a refined version of the M3M4 model, itself based upon the M25 Assignment Model and is focussed on four areas of impact:

- **The impacts of each option on travel times and vehicle operating costs** for trips using the junction. These impacts were estimated on the basis of the forecast change in travel conditions caused by each option compared to a Do Minimum scenario.
- **The impacts of each option on road accidents at the junction and the surrounding network** were estimated using the changes in traffic levels and in the highway network for each option.
- **The impacts of the construction** on travel times and delay for journeys within and through the study area.
- **The costs of construction**, accounting for works, land acquisition, preparation and supervision costs.

The wider economic impacts of the improvement (including its regeneration potential) have not been considered in the assessment as they are not considered to be significant in this area, a view supported by Highways England for PCF Stage 1. These impacts will be reconsidered in PCF Stages 2 and 3.

9.1.1 Forecast years and appraisal period

For each option, estimates of each element of the scheme's costs and benefits after opening were made for three modelled time periods (AM1 peak AM2 peak, Inter Peak and PM peak), for two modelled forecast years:

- 2022, opening year
- 2037, design year (15 years after opening)

The TUBA and COBALT analyses provided assessments of impacts over a 60 year appraisal period after scheme opening (2022 to 2081), using outputs from all three time periods and both years provided by the model. No further growth in demand or benefits was assumed after 2037 (apart from real growth in values of time and fuel costs, in line with WebTAG).

An assessment of impacts of construction on travel times provided a representation of impacts during the construction period, with the relevant duration identified for each anticipated element of traffic management.

Estimates of the monetary value of reliability impacts of the options have not been assessed at this stage as agreed with PTS TAME, due to the recognised difficulty in quantifying reliability impacts. These will be assessed at PCF3 stage utilising MYRIAD with the outputs of the regional strategic model for the south east.

9.1.2 Construction costs

Financial modelling has been restricted at this stage to an estimate of design, land purchase, and construction costs. Highways England Commercial Services Benchmark Estimating have provided scheme estimates (Appendix F) predicted on the basis of information known at the point of estimation. They are not to be considered a sign-off of figures.

The extent of works to divert Statutory Undertaker's assets is unknown and values are based on a percentage of the construction cost

Project overhead and method related costs have been estimated using an approved Highways England Prelims model and are based on estimated contract duration and complexity.

The costs provided by Highway England were provided as being rebased to 2010 and presented as factor prices. These have been discounted to 2010 prices and converted to market prices. Therefore the Present Value Costs (PVC) used in the economic appraisal of the M25 J10 options are:

- Option 9: £156.9 million PV
- Option 14: £111.7 million PV
- Option 16: £244.0 million PV

9.2 Application of assessment software

The economic assessments for each improvement option for M25 J10 were carried out in line with Department for Transport (DfT) and Treasury guidance and utilising the Transport User Benefit Appraisal (TUBA) software. The DfT's Transport Appraisal Guidance data book has been used to provide input parameters.

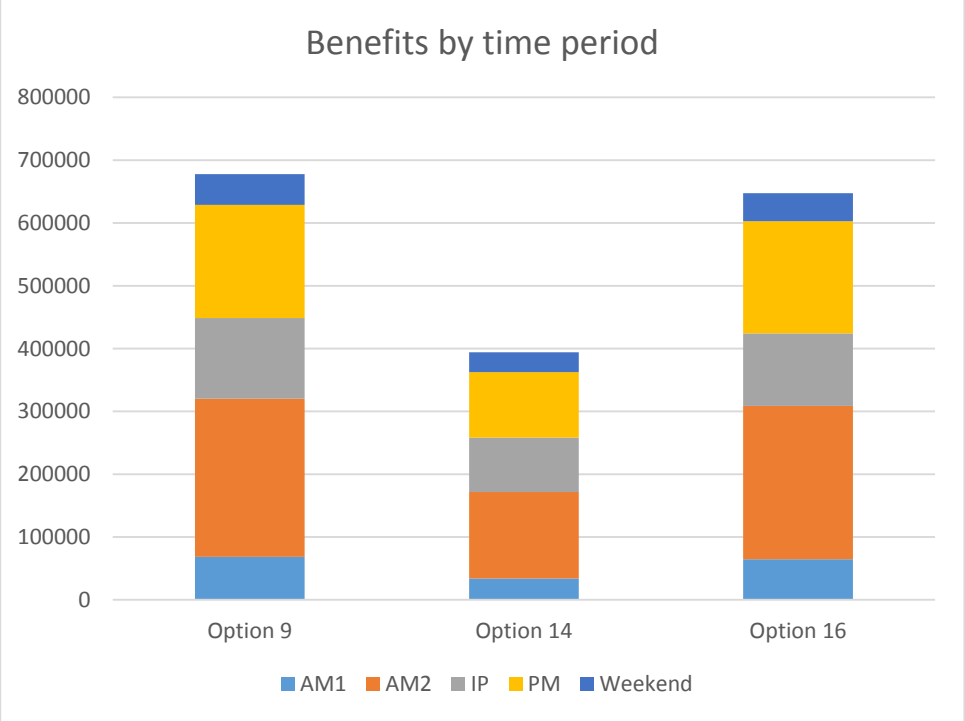
COBALT v2013.2 (using the parameters input v2016.1) was used to determine the change in the frequency and severity of accidents.

9.3 Individual impacts

9.3.1 Benefits' profile by time period

For each of the proposed scheme options benefits are seen in all time periods. Not surprisingly, the peak periods see many of the benefits with approximately half of the benefits arising from the AM period (Figure 9-1).

Figure 9-1 M25 J10 scheme option benefits by time period

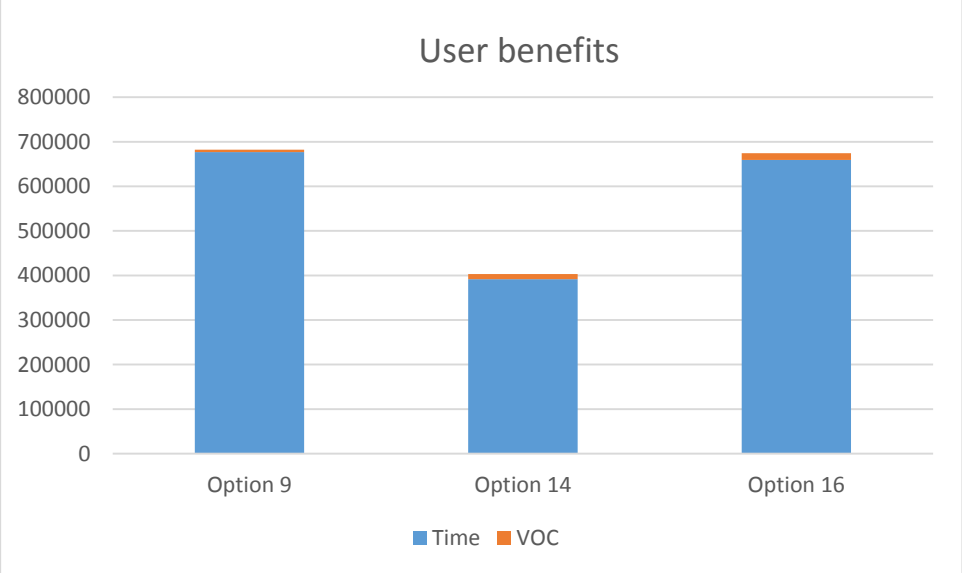


The economic appraisal shows that benefits rise between 2022 and 2037 as congestion in the do minimum worsens. After 2037, the benefits are held level. Option 14 has consistently lower benefits than the Options 9 and 14, which provide almost identical level of benefit.

9.3.2 Travel time and vehicle operating benefits

As shown in Figure 9-2 time savings account for the majority of user benefits at an average of 97% over the three scheme options.

Figure 9-2 User benefits



9.3.3 Accidents

Given the level of free-flow provided in options 9 and 16 (as opposed to the retention of a roundabout in Option 14 albeit with left-turn filters) the accident savings are predicted to be much higher than for Option 14. Table 9-1 summaries the accidents saved and the monetised benefits of that saving.

Table 9-1 Accidents savings for scheme options

Option	Accidents saved (60 years)	Accident benefits (£000s PV)
Option 9	916	40,004
Option 14	46	1,489
Option 16	1,310	53,740

9.3.4 Environmental impacts

Monetised impacts of the scheme options on air quality and noise have not been assessed in PCF stage 1.

Greenhouse gases costs are calculated by TUBA using WebTAG-compliant values as agreed by Highways England PTS Environment in the PCF1 Appraisal Specification Report. Each of the scheme options are shown to have a positive outcome with a reduction in greenhouse gases. However the benefits of Option 14 are half or less of those of Options 9 and 16.

9.3.5 Analysis of monetised cost and benefit

Table 9-2 details the impacts of each option on users of the transport system (impact on travel time and operating cost by user class) in a summary Transport Economic Efficiency table.

Table 9-2 Summary TEE table for each option

Category		Option 9	Option 14	Option 16
Commuting	Travel time	305238	194049	307697
	Operating cost	14103	10103	16841
	During construction	-17590	-26385	-26385
	Total	301751	177767	298153
Business	Travel time	606988	393866	602508
	Operating cost	19102	29782	2254
	During construction	-11106	-16660	-16660
	Total	614984	406988	588102
Other	Travel time	367700	256908	358936
	Operating cost	-3671	-4772	4503
	During construction	-13177	-19765	-19765
	Total	350852	232371	343674
Present Value TEE Benefit		1267587	817126	1229929
Notes: From TEE tables. Values in £000s				

Table 9-3 provides a summary of the costs and benefits for each options and presents the scheme Benefit Cost Ratio (BCR).

Table 9-3 AMCB table summary

Category	Option 9	Option 14	Option 16
Greenhouse gases	11,348	6,820	14,783
Accidents	40,004	1,489	53,740
TEE: Commuting	301,751	177,767	298,153
TEE: Business	614,984	406,988	588,102
TEE: Other	350,852	232,371	343,674
Wider public finances	-13,496	-2,752	-22,683
PVB	1,305,443	822,683	1,275,769
Broad transport budget	156,909	111,657	243,974
PVC	156,909	111,657	243,974
NPV	1,207,767	713,212	1,146,457
BCR	8.320	7.368	5.229
Notes: From scheme option AMCB tables. PV, £000s, 2010 prices & values			

9.4 Discussion of overall results

The economic assessment has used TUBA to estimate travel time and vehicle operating cost benefits. The benefits have been masked to only include benefits to traffic using M25 J10 or the network in the immediate vicinity, thus excluding benefits accrued to movements further away from the scheme. As a result, the estimate of scheme benefits is on the conservative side. All assessment processes and values were in line with WebTAG using the December 2015 databook.

9.4.1 Preferred option recommendation

The analysis showed that all three options have BCRs which provide “very high" *Value for Money*. Option 16 has all movements grade separated and generally smaller delays on most of the turn movements. However, throughput demand at M25 J10 for Option 16 is not as great as Option 9 and whilst delays for Option 16 and fewer than for Option 9, the route distances for grade separation of movements such as M25 Westbound to A3 Northbound and M25 eastbound to A3 southbound to M25 eastbound are greater and negate the benefits of free flow provision.

Option 9 is therefore the best performing of the three options with a BCR of 8.32.

9.4.2 Major assumptions or caveats affecting the interpretation of results

Further analysis will make use of the forthcoming South East Regional Traffic Model, which has been designed and produced specifically for carrying out appraisals on the Highways England network. That analysis will also need to use revised Values of Time which have been released ‘In Draft’ and will become formal guidance from November 2016.

10 Safety assessment

10.1 Safety management system

This section considers the Safety, Operational, and Maintenance aspects of the proposed options and identifies key areas to be considered as the project develops. Consultation has taken place with the CPS Route Performance Manager.

One of the key objectives of this scheme is to improve capacity and reduce congestion through the M25 J10 Wisley Interchange. This has been a problem which at peak hours, has seen queueing onto the A3 and has contributed towards collisions. All of the options under consideration have been designed to increase capacity at M25 J10 as well as providing additional capacity on the A3 by widening from D3AP to D4AP standard.

Option 9 will seek to achieve the scheme aims by supplementing the existing gyratory with bridges providing free-flow on the priority links from the A3 on to the M25 in both directions.

Option 14 will expand and elongate the existing gyratory, increasing overall capacity. The gyratory will essentially function in the same way as the existing road network and will remain as a signal controlled junction, but will increase capacity and provide segregated left turn lanes.

Option 16 will replace the existing gyratory with a cyclic free-flow arrangement for all left and right turn movements.

An assessment has been completed to confirm the suitable Safety Management System (SMS) for each option using IAN 191/16 as guidance. This enables the project to be categorised in order to determine the appropriate level of rigour for safety risk management and therefore which SMS type is most appropriate (Type A, B or C) as defined in IAN 191/16. At this stage this has been completed to inform programming of latter stages and is summarised in the Table 10-1 below. A more detailed assessment is required in PCF Stage 2. This will be documented in the Safety Plan PCF Product which is produced for the first time at PCF Stage 2.

Table 10-1 SMS Selection All Options (Note: selections highlighted in bold)

Feature	Sub Feature	Type A	Type B			Type C					Comments
1. Stakeholder Interest[12]											
	Number of stakeholders	**Single or few**	Several	or	Single or few	Many	or	Key	or	Several	*The proposed improvements on this scheme are conventional and are unlikely to attract an increased level of stakeholder interest. There are no significant issues or strong opposition views.*
	Impact	**Limited**	Limited	or	Significant	Limited	or	Significant	or	Major/critical	
2. Operational Experience											
	Extent	**Widespread**	Limited	or	Some	None in UK nor overseas					*There is widespread experience of operating APTR such as the A3. The upgrades proposed to the M25 J10 intersection itself are seen elsewhere on the SRN and there is significant experience in these types of operational scenarios.*
	Where	**UK**	UK	or	Overseas only						
3. Technology and/or Infrastructure											
	Technology experience (consider degree of innovation and criticality of application)	**Widespread**	Used in different application	or	Applied in part	Not previously applied					*The technology proposed is in widespread use. The use of unusual technology is not proposed.*
	Level of safety risk that introduced technology affects	**Low**	Medium			High					
4. Standards and Legislation											

[12] Note: Stakeholder interest is related to road safety e.g. operation by stakeholders (e.g. emergency services, recovery organisations or road safety groups) that may be affected by the scheme

Feature	Sub Feature	Type A	Type B	Type C			Comments
	Design covered by existing standards	**All**	Mostly	No	or	New standard	*Work is mostly covered by existing standards*
	Safety related departures from standard	None/No significant	**Some/Few significant**	Many Significant	or	Some Critical departures	*No significant departures required. Some significant departures required. (Review top three departures)*
	Changes to legislation	**None**	Minor changes only	Moderate	or	Significant	*None*
	Highways England Guidance (in the form of IAN or similar)	**Existing/not applicable**	Relevant new guidance available	Major development in relevant guidance			*Existing guidance has been applied. Other IANs may apply and the Implementation of New Standards will be maintained to identify IANs relevant to the project and assess impact.*
5. Impact on Organisation - (consider structure, responsibility, competency, whole life impact)							
		No changes	Minor changes/responsibility transfer	Significant change or responsibility transfer			*No changes to the organisational structure or competencies of staff have been identified. No additional staffing requirement has been identified.*
6. Project Scale							
	Infrastructure affected	Single/small location	**Major location/implications**	Widespread/national implications			*M25 J10 is a large interchange, but in the overall context its impact is not nationally significant. The scheme will have implications on a regional scale.*
	Extent of roll-out	**None/minimal**	Moderate	National potential			*The scheme is not a pilot or trial.*

The following Table 10-2 provides a summary of the above assessment. As summarised below, Type A Safety Management System is considered suitable for all the options.

Table 10-2 Summary of SMS assessment

Option	Type A	Type B	Type C	Overall
All options	5	1	0	Type A

Type A SMS applies to projects that:

- Highways England has extensive experience of delivering and operating.
- Are uncontroversial in safety terms and fall completely, or almost completely, within the scope of existing standards, legislation, practice and procedures (a small number of minor safety-related departures would be allowed in this instance).
- Have limited impact on the network as a whole.
- Meet Highways England's 'usual' requirements for approvals and documentation.

A Type A SMS means this project requires a basic level of safety management to be applied and is likely to include the following activities:

Completion of a simple hazard analysis to support the production of:

- A Safety plan
- Combined safety and hazard log report

In terms of decision making, Type A decision criteria are decisions which are relatively routine and familiar so there should be plenty of existing professional experience and direct data to inform Type A decisions thus; additional analysis should not be needed to inform these decisions.

10.2 Impact on road user – Strategic safety action plan

Where free-flow has been provided through the interchange and the radius of the bend is below standard, there is a possibility of loss of control collisions. Reduced speed limits may mitigate against this, although signing will have to be carefully positioned so as to avoid confusion for traffic using the mainline. Enforcement of mandatory speed limits on relatively short sections such as this is problematic and education and encouragement options such as an advisory speed limit should also be considered.

Lighting should be provided on what will be a relatively complex intersection. Existing lighting provision on the A3 should be subject to a detailed assessment in order to establish the service life and condition of the existing infrastructure. Lighting at complex junctions and interchanges follows current best practice on the Smart Motorway Programme and future Expressway schemes, but would need to be justified by assessment.

As part of the RIP, there are plans to upgrade the M25 at this interchange to Smart Motorway, as a result there is a possibility that hardshoulders on the M25 exit slip roads at this location may be considered a safe haven for breakdowns. For this reason it will be desirable for lighting to be retained and also hardshoulder provision, or sufficient hard strip, to provide a safe place to stop.

Although Non-Motorised User (NMU) numbers on the A3 mainline are very low and cycle paths exist, there is technically nothing to stop cyclists using the A3 carriageway. The obvious speed differential between NMUs and motorists could lead to incidents and until such time as a full NMU prohibition is in place (as it would be on an Expressway) there is still the likelihood of collisions occurring with this high risk group. Existing NMU provision relies upon signalised crossings, Option 16 which is completely free-flow achieves this with bridges and subways in the design. Options 9 and 14 retain a signalised gyratory which is utilised to provide NMU crossings.

Option 14 proposes an increased width of up to 5 lanes on the gyratory. Lane discipline is likely to be an issue and it may be necessary to provide gantry signage in order to avoid confusion and late decision making.

Provision of suitable weaving length is important to ensure that users can safely negotiate this busy interchange. This has been an issue with the current layout and needs to be considered carefully as part of the assessment of available options. Option 16 in particular will present challenges in this respect.

10.3 Impact during construction and operation

10.3.1 Construction

Options 9 and 16 both involve large elements of off-line construction and will therefore have less impact on operations during these phases. Option 14 with its elongated roundabout will require works on the existing roundabout and slip roads and these will need to be carefully managed to ensure safety and in order to minimise delays to traffic.

Any widening of the A3 mainline is likely to require lane closures and restrictions such as reduced lane widths. The constrained working area and proximity of traffic will increase the importance of the reduced speed limits to safety, therefore safety camera enforcement is likely to be required and will need to be considered at later stages.

10.3.2 Impact on emergency responders

Depending on the chosen option there will be differing impacts on emergency responders, both during works and after handover. Access will need to be discussed in detail and suitable arrangements agreed.

This interchange is sometimes used for the movement of police escorted abnormal loads. The heaviest loads are often limited on routing options into central London due to weight or height restrictions further along the route. As this is close to the border between Surrey and the Metropolitan Police areas, the existing lay-by at Wisley is used for the handover of police escorted loads. Any loss of provision here should be discussed with the relevant Police representatives.

In terms of responding to incidents elsewhere on the network, Options 9 and 14 provide the same access through the intersection as is currently provided, (i.e. it is possible to circulate the junction and effectively carry out a ‘U-turn’ in order to access incidents on the opposite carriageway). Option 16 does not allow this manoeuvre and could add to response times for emergency responders, including Highways England Traffic Officer Service (TOS). The provision of crossover points (where two adjacent slip roads pass closely) could address this, but a secure gateway would be needed to avoid public access and misuse. The operational aspects of using this type of facility would have to be discussed in detail with emergency responders. (There is a similar arrangement at M25 J27).

Further consultation will take place with emergency services as the scheme design develops, this should also include the Highways England TOS OD Emergency Planner.

11 Operational characteristics

Road characteristics and option design implications

11.1 Schemes operating regime

The road will operate under existing guidelines for All Purpose Trunk Road or Motorway depending on specific locations. Where provided, emergency laybys and emergency roadside telephones will meet the standard detailed in TD 69/07. There are a several of lay-bys provided on the A3 mainline, which are frequently used as rest areas by HGV drivers who are unwilling to use paid for facilities at the nearby Service Areas of Cobham (M25) and Wisley (A3). There are verges and other areas on the A3 locally, which are also used for this purpose and this creates unnecessary safety and maintenance demands. Care should be taken to avoid inadvertently providing such areas which could be exploited in this way.

A clear signage regime should be followed with particular care taken to avoid confusion on Option 9 where, due to the retention of the existing roundabout, there are effectively two choices for the user who wants to access the M25 from the A3 in either direction. As previously mentioned, the increased width roundabout on Option 14 requires additional signing to avoid confusion.

Option 9 has a greater degree of operational resilience, mainly due to the fact that it retains the existing roundabout, as well as providing overbridges. In the event of an incident or maintenance requirement on any of the new link roads, the pre-existing roundabout is available as a diversion route. It also possible that the retained space could be utilised as a Police/TOS observation platform.

11.2 Driver compliance

Effective speed limits rely on compliance rather than enforcement. However there will be some drivers who make a conscious decision to exceed the speed limit and a new link of high quality trunk road will be seen by some as an opportunity to do this. Any speed camera enforcement will have to be agreed with Surrey Police and the Safety Camera Partnership. Average speed cameras have proven to be effective in achieving speed limit compliance and should be considered an effective deterrent.

There is currently no provision for Police or TOS to conduct observations at this location; where schemes propose that existing infrastructure is maintained, consideration should be given to utilising this space as an observation platform. A facility such as this at such a key strategic location would be a valuable tool in achieving driver compliance.

12 Technology assessment

12.1 Introduction

Where possible, the existing technology equipment will be retained. This section summarises the impact on the technology equipment of various options.

12.2 Motorway Incident Detection and Automatic Signalling (MIDAS)

Following the design methodology in TD 45/94, it is assessed that no additional MIDAS sites will be required for Option 14 while Option 9 and 16 will meet the criteria for providing additional MIDAS sites on A3. Economical appraisal will be carried out to justify the provision of MIDAS sites for this scheme in the next stage.

Where MIDAS sites are to be provided, it is estimated that approximately 20 MIDAS radar sites will be required for both carriageways on a 5.3km mainline stretch between Ockham Park Junction and Painshill Junction keeping a nominal distance of 500m between the sites. The exact number and location of the MIDAS sites will be identified in the next stage after the preferred option is selected. It is assumed that further sites using inductive loops will be required at each junction, as side-firing radars cannot cover the slip road elevation. This makes a total of 24 MIDAS sites for the scheme.

Where the MIDAS is provided for Option 9 or 16, MIDAS Internet Protocol (IP) technology will be implemented in line with Highways England standards developed for technology systems. Communication links between outstations and South East Regional Control Centre (SERCC) requires standard NRTS service type SC8RMD.

Radar sensors will be used in lieu of traditional inductive road loops on the main carriageways. The Radar sensors will interface to local MIDAS Outstations provided in accordance with TR2169 and replicate the functionality of inductive loop detectors. This is required to mitigate against road surface degradation of the carriageway due to the loop installation and to reduce exposure to road workers during installation.

For all three options, the MIDAS sites on M25 will require assessment to meet the operation requirement due to the junction modification.

12.3 Signs

For Option 14, no additional signage is proposed for the scheme. The existing MS3s on the A3 may require relocation due to the change of the junction. This will be confirmed once the diverge datum points are determined.

For Option 9 or 16, additional signage will be required to warn drivers approaching the M25 Controlled Motorway and the upgraded interchange.

Message Signs will be connected to an IP enabled Message Sign roadside controller and controlled by the SERCC.

MS4 signs will be used to deliver tactical driver information and signalling. They are capable of displaying both text and legends and are mounted on a gantry or cantilever arm over the first lane of live traffic (Lane 1).

MS3 signs displaying 3 lines of 18 characters will be used to display strategic motorway network management information and are placed at locations agreed with NTIS at defined Strategic Junctions.

For all three options, the signs on the M25 will require assessment to meet the operation requirement due to the junction modification.

12.4 Signals

The scheme includes installation of Advanced Motorway Indicators (AMI), which are capable of displaying variable mandatory speed limit aspects (VMSL).

For Option 14, it is proposed that post mounted entry stop signals will be installed on the on slip roads to the M25. The existing signals could be re-used if they pass the condition assessment and would be installed at the new entry point locations.

For Option 9 or 16, it is proposed that both gantry mounted AMI and post mounted Entry Stop Signals will be connected to IP enabled roadside controllers and will connected to SERCC using the NRTS network standard SC8 service type. It is estimated that eight additional AMIs are required for Option 9 and twelve additional AMIs for Option 16.

For all three options, the signals on the M25 will require assessment to meet the operation requirement due to the junction modification.

12.5 Emergency Roadside Telephones

For Option 9 and 16, additional ERTs will be required within the junction.

For Option 14, no additional ERTs are proposed for the A3.

For all three options, the ERTs on the M25 will require assessment and relocation to meet the operation requirement due to the junction modification.

12.6 CCTV

The PTZ 2nd Generation CCTV solution will be used for the scheme with NRTS network standard service types SC8 for data and SC10 for video transmission.

It is proposed to provide 100% coverage for A3 within the scheme extent for Option 9 and 16. Assuming that a CCTV camera is required every 500m to provide the required 100% coverage, ten additional cameras will be required for the scheme to provide full coverage for the mainline and the complex gyratory.

There is potential to retain the existing cameras and masts and this will be evaluated during the course of the design lifecycle.

12.7 National Traffic Information Service (NTIS) assets

All existing NTIS loop sites listed in Appendix C will be retained.

12.8 Distribution Network Operator supplies

Additional DNO supplies may be required on the A3 and the quantities will be identified when the preferred option is selected.

12.9 Fog detector

The existing fog detector within J10 will be affected by the scheme. It will be upgraded to an IP equipment if Option 9 or 16 is selected.

12.9.1 RCC systems and subsystems

There are several communications systems already in place at the South East RCC (SERCC), Godstone. These are used for general communication within Highways England, for communication with stakeholders and for operational communication with

the on-road Traffic Office Service (TOS). The main technologies currently deployed at the RCC are:

- Command and Control System (C&C).
- Integrated Communications Control System (ICCS).
- Airwave Radio.
- Operational Telephony.
- Highways England Business IT (HABIT).
- Highways England Traffic Management System (HATMS).
- Dynamic Display System (DDS).
- Surveillance (Pan, Tilt, Zoom) CCTV system (TVBS).
- SPICE radio communications capability.

Additional roadside equipment will be installed for each option. No new systems or subsystems are required at the RCC to support the M25 J10 scheme.

12.9.2 Communications network

In line with Highways England instructions, all technology proposed will apply IP equipment and adopt NRTS IP services for the outstation to instation communications link. Existing infrastructure will be re-used where practicable.

NRTS as-built drawings (MCY's) identify that the existing communications network within the scheme extent comprises a ducted network. Due to the age of the network, to meet NRTS requirements the scheme will require a survey to validate their condition and suitability for re-use. If the duct network does not meet the current standards or requirements, the duct network will be upgraded within the scheme with interfaces at scheme boundaries. It is proposed to extend the network boundary to the Ockham TS at MP 15/5A.

NRTS have been consulted on this scheme and no fundamental network design issues raised.

13 Maintenance assessment

13.1 Maintenance and repair strategy for civils infrastructure

Safe access for maintenance is essential to protect roadside workers. Access is likely to be required along the entire length of the route to carry out maintenance or repair to existing or new in infrastructure. Drainage for instance, will need to be maintained on a regular basis. The design of any new footway or shared path should consider access and movement of equipment, or an alternative means of safe access provided. All maintenance activity on this interchange will be carried out at night, so lighting provision will assist in providing a safer working environment.

Winter maintenance is affected by all options, to a lesser degree Option 14, but Options 9 and 16 will lead to increased demand and a re-assessment of routes. Provision of a cut through may assist, although the close proximity of turnarounds at Cobham MSA, Painshill and Ockham junctions should be considered in assessing the need for further provision.

Option 14 retains a signal controlled gyratory and this will create (or at least retain) a maintenance demand. Any work on the dedicated left turn slip roads will need extended closures due to the geometry of the curve in order that oncoming drivers have sufficient notice of workers being present in the road, this also applies to works on any of the Option 16 free flow links. Option 9 has the advantage of retaining the existing roundabout which could be used as a diversion route if work was required on either of the bridge structures or additional dedicated left turn lanes.

Where existing infrastructure, such as bridge structures are retained, this will need to be maintained and safe access will need to be provided. Planted areas will also need to be regularly managed and access to bridge supports for inspection and maintenance purposes should also be considered.

In Option 16, security of the redundant roundabout could be an issue and unauthorised access should be mitigated against. Bridges over motorways with easy access have been used for suicide attempts and this should be guarded against.

Existing lighting columns on the A3 are situated in the central reserve and are therefore more difficult to maintain than if they were located in the verge. Proposed lighting provision will be subject to an assessment, if a decision is taken to renew lighting consideration will be given to the new provision being in the verge.

13.2 Maintenance access

Maintenance hard standings are required at pertinent locations along the scheme route. These will be developed (IAN 69/15) once the preferred option has been selected and initial design requirements are considered (e.g. access to gantries, communications cabinets, drainage facilities). This will also be undertaken in conjunction with the Area 5 MAC and, where necessary, any local authorities etc. Hardstanding will be of the reinforced concrete grass paving to conceal and discourage misuse by the public. For further details see Doc. No. HE551522-ATK-HGN-1-RP-C-2900, ‘Impact Assessment Report, Implementing Expressway Standards on the M25 J10 scheme’.

For Options 9 & 14 there are no major issues for emergency or maintenance vehicles seeking to undertake ‘U’ turns as a roundabout is provided in both layouts. For Option 12, the cyclic layout, there are no formal ‘U’ turn arrangements. Localised access links will be required and will be developed in conjunction with the Area 5 MAC and

emergency services. M25 Junction 27, intersection with the M11 has such an arrangement.

13.3 Maintenance and repair strategy for road side technology

In the scheme area the Regional Technology Maintenance Contractor (RTMC) are working under the supervision of Connect Plus, who have been appointed as Service Manager for the contract. Through the engagements with Connect Plus, the maintenance requirements of equipment to be maintained by the RTMC will be captured and agreed.

A PCF document to outline the maintenance and repair strategy will be produced in the preliminary design stage to capture additional maintenance and repair requirement for roadside technology equipment.

Where existing access provision for maintenance is in place, this should be preserved along the route. Where this is not possible a suitable alternative should be provided. Any new roadside infrastructure will need suitable access either from the A3 itself, or from an offline access road. Where practicable, positioning of roadside technology should consider access for routine maintenance, preferably away from the roadside. Access for vehicles and other equipment should be provided.

Option 16 utilises free-flow, meaning that existing signals will be removed and a reduction in maintenance demand. Signals are retained in Option 9 and 14 and control cabinets will need to be located nearby, with suitable access and parking for a maintainer’s vehicle.

The current best practice for technology gantries is provision of man-access and this should be provided for those required on the A3 mainline as well as any additional gantries for lane signage on Option 14’s increased width roundabout.

14 Environmental assessment

14.1 Introduction

As this is only the option identification PCF Stage1 of the project process, there is no attempt to make any form of comparative assessment of the options. Therefore, in this conclusion section, we present the initial findings of the optioneering process for each of the disciplines. Dependent upon the nature of the assessment undertaken, i.e. Simple or Detailed, not all the options within the overall schemes have been assessed individually.

14.2 Option 9

14.2.1 Air quality

Adverse air quality impacts on designated ecological sites will be unavoidable. The free flow links may offset adverse effects due to instances of reduced distance between the emissions source and sensitive receptors by improving vehicle flow resulting in a reduction in emissions.

There is expected to be an increase in AADT and likely negative effects on nearby receptors with the proposed scheme on the majority of links included in the ARN including:

- the three arms of M25 J10 to the northeast, northwest and south west;
- the A245 running through Cobham;
- Ripley to Pyford Village

There is expected to be a decrease in AADT and likely positive effects on nearby receptors with the proposed scheme on the following roads:

- The western arm of the Painshill Interchange;
- Wisley Lane off the A3; and
- The M25 southbound from J10.

14.2.2 Cultural heritage

Option 9 has the potential to result in significant adverse effects on five assets, including temporary and permanent large adverse effects on a Scheduled Monument. All the significant effects relate to impacts on the settings of designated assets. Additionally, a number of non-designated archaeological assets may be removed or truncated by construction of the scheme, as may previously undiscovered archaeological remains in areas of previously undisturbed land take.

14.2.3 Landscape

Significant landscape effects are expected during construction stage and operational stage due to a major alteration to the local landscape character as large scale construction operations would be required. New features introduced by the Proposed Scheme would substantially alter landscape character also in the operational stage as the proposed planting would not fully integrate it into the existing local landscape character. Majority of the identified visual receptors will be significantly affected both in the construction stage due to a large scale of construction activities. During

operational stage potential environmental design measures would help to integrate the Proposed Scheme into the existing landscape, however some elements of the Proposed Scheme would remain prominent resulting in a noticeable deterioration to the existing views for some receptors.

14.2.4 Nature conservation

This scheme will involve approximate land take of 17 ha, of which:

- 10.98ha is designated as Thames Basin Heaths SPA
- 16.02 ha is designated as Ockham and Wisley Commons SSSI

Land take would be focussed in the south west and north east quadrants. Woodland and regenerating heathland habitat would be lost. The south east quadrant, which supports the established heathland habitat, where all qualifying SPA species were recorded, would be almost completely avoided (only very localised road realignment at the junction).

14.2.5 Geology and soils

The anticipated geology and soils present over the majority of the proposed route of Option 9 comprise Made Ground and solid geology of the Bagshot Formation. Superficial deposits of Alluvium, Lynch Hill Gravel Member, Kempton Park Gravel Member and Taplow Gravel Member are anticipated locally within the option extents. Solid geology of London Clay Formation is anticipated to be encountered at the south-western extent of the site. Construction associated with widening of the A3 is proposed on or adjacent to historical landfill sites. There is potential for impacts to: the scheme associated with ground conditions that may be encountered; and human and/or controlled waters receptors associated with potential sources of contamination within or in proximity to the proposed route, such as localised deposits of Made Ground, historical landfill sites and other contaminative land uses.

14.2.6 Materials and waste

At this stage of the design process no information on the use of materials or generation of waste associated with the proposed options is currently available. However, it is assumed that proposed options which cover the greatest area (physical extent) will require the greatest amount of demolition works, have the greatest volume of earthworks (excavation works), and will require the greatest volume of construction materials, thus have the potential to produce more waste. A summary of the key effects associated with Option 9 are summarised below:

- Potential excess material use / waste generation if wastes are not reused / recycled where practicable.
- Potential for the disposal of large quantities of excavated materials, if the materials are found to be hazardous and thus not suitable for reuse.
- Increased waste arisings associated with the modification / realignments of existing carriageways, slip roads and the roundabout.
- Increased waste arisings works associated with bridge (under and over) construction (i.e. piling).

14.2.7 Noise and vibration

Major noise increases in the Opening and Design years are predicted on the new links from the A3 to M25, and the M25 eastbound off slip road. The free flow links in Option 9 may offset adverse air quality effects by improving vehicle flow resulting in a reduction in emissions. There would be negative effects on the majority of links in the ARN but some positive effects on other roads as well. Adverse air quality impacts on designated ecological sites would be unavoidable.

14.2.8 People and communities

During the construction phase there is expected to be a change in amenity for NMU users at footpaths, particularly those located close to construction works. No significant effects have been identified for any of the PRoWs and footpaths during construction or operational phase. PRoW FP7 has been identified as the most sensitive, given the higher NMU surveys, particular care should be given to maintaining this footpath. Views from Option 9 would be restricted by a combination of landform with a dense woodland therefore, this setting will continue to restrict the visibility of Option 9 including from potential receptors. Both construction and operational phase land will be required and loss from Wisley and Ockham Commons, and is assessed to have moderate adverse effect on community land.

14.2.9 Road drainage and the water environment

Of the three options considered in this assessment, Option 9 is the least environmentally damaging for the water environment. Although this option proposes three new crossings, the proposed works for Option 9 are smaller in scale than the other options.

14.3 Option 14

14.3.1 Air quality

The widening of the junction would reduce the distance between the road and sensitive receptors. The sources of vehicle emissions would be brought within the boundaries of designated ecological sites, with the potential to adversely impact on vegetation and also reduce the distance between the road and isolated residential properties, although they will remain at a distance of over 200 metres from the emissions source. The adverse impacts from moving the emission source closer to sensitive receptors may be offset by improving vehicle flow resulting in a reduction in emissions. The majority of roads within the ARN are expected to experience an increase in AADT with the scheme. The extent of the affected links are similar to that for Option 9 however all arms of Junction 10 are expected to experience an increase of AADT with this option variant.

14.3.2 Cultural heritage

Option 14 has the potential to result in significant adverse effects on three assets, including a temporary large adverse effect on a Scheduled Monument. All the significant effects relate to impacts on the settings of designated assets. Additionally, a number of non-designated archaeological assets may be removed or truncated by construction of the scheme, as may previously undiscovered archaeological remains in areas of previously undisturbed land take.

14.3.3 Landscape

No significant landscape effects were identified during operational and construction stage for the Option 14. A minor loss and alteration to the local landscape character is expected as a result of construction activities as these would be located close to the perimeter of the existing road corridors. It is expected that in the operational stage there is a good potential to accommodate these options into the existing landscape. Some closely located receptors, within Painshill Park, adjacent Common's and ProW's will be significantly affected during construction stage as views would be dominated by construction activities. In the operational stage the Proposed Scheme would be better integrated into the existing landscape through the incorporation of the environmental design measures and would be seen as slight extension to the existing road corridors.

14.3.4 Nature conservation

This scheme will involve approximate land take of 8 ha, of which:

- 3.84 ha is designated as Thames Basin Heaths SPA
- 6.74 ha is designated as Ockham and Wisley Commons SSSI

An elongated roundabout would result in loss of small areas of woodland habitat from all four quadrants. Option 14 may have the lowest negative impact due to the smallest land take and loss of the least amount of buffering habitat between the roads and mature and regenerating heathland habitat.

14.3.5 Geology and soils

The anticipated geology and soils present over the majority of the proposed route of Option 14 comprise Made Ground and solid geology of the Bagshot Formation. Superficial deposits of Alluvium, Lynch Hill Gravel Member, Kempton Park Gravel Member and Taplow Gravel Member are anticipated locally within the option extents. Solid geology of London Clay Formation is anticipated to be encountered at the south-western extent of the site. Construction associated with the widening of the A3 is proposed on or adjacent to historical landfill sites. There is potential for impacts to: the scheme associated with ground conditions that may be encountered; and human and/or controlled waters receptors associated with potential sources of contamination within or in proximity to the proposed route, such as localised deposits of Made Ground, historical landfill sites and other contaminative land uses.

14.3.6 Materials and waste

At this stage of the design process no information on the use of materials or generation of waste associated with the proposed options is currently available. However, it is assumed that proposed options which cover the greatest area (physical extent) will require the greatest amount of demolition works, have the greatest volume of earthworks (excavation works), and will require the greatest volume of construction materials, thus have the potential to produce more waste. A summary of the key effects associated with Option 14 are summarised below:

- Potential excess material use / waste generation if wastes are not reused / recycled where practicable.
- Potential for the disposal of large quantities of excavated materials, if the materials are found to be hazardous and thus not suitable for reuse.

- Increased waste arisings associated with the modification / realignments of existing carriageways, slip roads and the roundabout.
- Increased waste arisings works associated with bridge (under and over) construction (i.e. piling).

14.3.7 Noise and vibration

Major increases in noise are predicted on new links from M25 eastbound to A3 northbound, A3 northbound and westbound M25, and a new section of the M25 eastbound on slip road

14.3.8 People and communities

Construction phase there is expected to be a change in amenity for NMU users at footpaths, particularly those located close to construction works. No significant effects have been identified for any of the PRoWs and footpaths during construction or operational phase. PRoW FP7 has been identified as the most sensitive, given the higher NMU surveys, particular care should be given to maintaining this footpath. Views from Option 14 would be restricted by a combination of landform with a dense woodland therefore, this setting will continue to restrict the visibility of Option 14 including from potential receptors. Both construction and operational phase land will be required and loss from Wisley and Ockham Commons, and is assessed to have moderate adverse effect on community land.

14.3.9 Road drainage and the water environment

Option 14 is the ‘middle ground’ option between Option 9 and Option 16. It crosses the same number of watercourses as Option 9, however works are on a larger scale. Based on the number of new watercourse crossings, Option 14 is less environmentally damaging than Option 16.

14.4 Option 16

14.4.1 Air quality

Although Option 16 introduces new road links in closer proximity to nearby residential receptors (Redhill Road), they have the potential to positively affect local air quality conditions through reduced congestion and removal of idling vehicles in the area. Air quality effects on designated ecological sites will be unavoidable as new emissions sources are introduced within designated site boundaries. The majority of roads within the ARN are expected to experience an increase in AADT with the scheme. The extent of the affected links are similar to that for the other two options and as with Option 9, three arms of J10 are expected to experience an increase of AADT with the scheme.

14.4.2 Cultural heritage

Option 16 has the potential to result in significant adverse effects on seventeen assets, including temporary or permanent large adverse effects on two Scheduled Monuments, one Grade I and one Grade II* Registered Park and Garden, and a Grade II listed building. These significant effects relate to impacts on the settings of designated assets, and the removal of small sections of the Registered Parks and Gardens. Additionally, a number of non-designated archaeological assets may be

removed or truncated by construction of the scheme, as may previously undiscovered archaeological remains in areas of previously undisturbed land take.

14.4.3 Landscape

Significant landscape effects are expected during construction stage and operational stage due to a major alteration to the local landscape character as large scale construction operations would be required and new features introduced by the Proposed Scheme would substantially alter landscape character also in the operational stage as the proposed planting would not fully integrate it into the existing local landscape character. Majority of the identified visual receptors will be significantly affected both in the construction stage due to a large scale of construction activities. During operational stage potential environmental design measures would help to integrate the Proposed Scheme into the existing landscape, however some elements of the Proposed Scheme would remain prominent resulting in a noticeable deterioration to the existing views for some receptors.

14.4.4 Nature conservation

This scheme will involve approximate land take of 48 ha, of which:

- 22.98 ha is designated as Thames Basin Heaths SPA
- 41.69 ha is designated as Ockham and Wisley Commons SSSI

This option will involve the loss of a significant amount of habitat within all four quadrants. Large areas of woodland habitat would be lost or isolated within the junction and there would be loss of a heathland glade in the northwest quadrant and a part of the regenerating heathland in the southwest quadrant. Option 16 may have the greatest negative impact due to the largest land take, loss of small areas of heathland habitat and the greatest amount of buffering habitat between the roads and heathland habitat, supporting SPA qualifying bird species.

14.4.5 Geology and soils

The anticipated geology and soils present for the majority of the proposed route of Option 16 comprise Made Ground and solid geology of the Bagshot Formation. Superficial deposits of Alluvium, Lynch Hill Gravel Member, Kempton Park Gravel Member and Taplow Gravel Member are anticipated locally within the option extent. Solid geology of London Clay Formation is anticipated to be encountered at the south-western extent of the site. Construction associated with the widening of the A3 and reconfiguration of M25 J10 is proposed on or adjacent to historical landfill sites. There is potential for impacts to: the scheme associated with ground conditions that may be encountered; and human and/or controlled waters receptors associated with potential sources of contamination within or in proximity to the proposed route, such as localised deposits of Made Ground, historical landfill sites and other contaminative land uses.

14.4.6 Materials and waste

At this stage of the design process no information on the use of materials or generation of waste associated with the proposed options is currently available. However, it is assumed that proposed options which cover the greatest area (physical extent) will require the greatest amount of demolition works, have the greatest volume of earthworks (excavation works), and will require the greatest volume of construction

materials, thus have the potential to produce more waste. A summary of the key effects associated with Option 16 are summarised below:

- Potential excess material use / waste generation if wastes are not reused / recycled where practicable
- Potential for the disposal of large quantities of excavated materials, if the materials are found to be hazardous and thus not suitable for reuse
- Increased waste arisings associated with the modification / realignments of existing carriageways, slip roads and the roundabout
- Increased waste arisings associated with the construction of a new two lane roundabout and additional slip roads
- Potential for enhanced quantities of demolition waste airings associated with the demolition of the existing roundabout and slip roads
- Increased waste arising from works associated with bridge (under and over) construction (i.e. piling)

14.4.7 Noise and vibration

In both the Opening and Design years, most of the newly constructed links, and the carriageways travelling away from J10 are predicted to have major increases in traffic noise. This is due to traffic not having to slow down at junctions and therefore increasing the average speed. The majority of roads within the ARN are expected to experience an increase in AADT with the scheme and three arms of J10 are also expected to experience an increase of AADT with the scheme.

14.4.8 People and communities

Construction phase there is expected to be a change in amenity for NMU users at footpaths, particularly those located close to construction works. No significant effects have been identified for any of the PRoWs and footpaths during construction or operational phase. PRoW FP7 has been identified as the most sensitive, given the higher NMU surveys, particular care should be given to maintaining this footpath. Option 16 contains elevated features that would require considerable earthworks to accommodate them within existing landscape but also bridges that would be elevated considerably in comparison to the baseline alignment of the junction. Therefore some glimpsed, filtered views may be available over the adjacent landform and woodland. Both construction and operational phase land will be required and loss from Wisley and Ockham Commons, and is assessed to have moderate adverse effect on community land. Option 16 requires the greatest land take from the commons and therefore has the greatest impact on People and Communities out of all the options.

14.4.9 Road drainage and the water environment

Option 16 is the most environmentally damaging for the water environment as this crosses more watercourse, and proposed works are on a larger scale than those associated with the other options.

15 Assessment summary

15.1 Appraisal Summary Tables (AST)

The Appraisal Summary Tables (AST) are provided in Appendix G.

15.2 Summary of consultation with public bodies

During the course of PCF Stage 1 the consultation events with public bodies that have been undertaken are shown in Table 15-1

Table 15-1 PCF Stage 1 Consultation

Date	Activity	Audience	Desired outcome
20 January 2016	Meeting	Sir Paul Beresford MP	Progress meeting on Highways England schemes
January 2016	Initial Risk Workshop	Technical design and risk specialists from Atkins, Connect Plus Services and Highways England (MP)	Risk Management Plan including Communications risks
01 February 2016	Options Workshop	Highways England (MP, OD and PTS)/ Atkins/Connect Plus Services	Internal Options workshop
March 2016	Face to face meeting	Surrey County Council (highways and environment); Natural England; Surrey Wildlife Trust	Technical discussion to inform the optioneering
March 2016	Face to face meeting	RHS Wisley (landowner)	Technical discussion to inform the optioneering
June 2016	Individual face to face meetings	Key stakeholders including Surrey County Council, SEBs, Surrey Wildlife Trust, RHS Wisley	Inform of progress on options and early sight of what is to be taken to public consultation
June 2016	Equalities Screening	Equality groups	Identify any equalities issues using EDIT and Equalities screening to inform final Communications Plan and Public Consultation Strategy
July 2016	Value Management workshop	Surrey CC Surrey Wildlife Trust Natural England Connect Plus	Scheme review workshop
August 2016	Public Consultation Strategy	Highways England (MP)	Develop Public Consultation Strategy to inform approach to public consultation going forwards
August 2016	Letter to all MPs	MPs	Atkins to draft update letter to MPs (joint with SMP J10-J16) to update on consultation timeline and SMP progress

The key comments and views discussed at these initial stakeholder events are summarised in Table 15-2. The key stakeholders are either fully supportive or at least actively engaged in the process.

Table 15-2 Summary of Consultees' Comments and Views

Consultee	Comments / Views
Highways England	Fully supportive of the scheme, in that it meets the scheme objectives, HE's strategic objectives and options have been identified that are currently considered affordable against the original scheme budget.
Surrey County Council	Broadly supportive of the scheme. It will help the county deliver growth, particularly in Guildford Borough. Need to ensure that environmental concerns are addressed.
Connect Plus Services	Fully supportive of the scheme, in that it meets the scheme objectives and addresses issues concerned with congestion, resilience and reliability during events of an accident, breakdown etc.
Surrey Wildlife Trust	Actively engaging with the process. Need to ensure that environmental concerns are addressed.
RHS Wisley	Actively engaging with the process. Can see benefits of improved access and egress via Wisely Lane but have their own preferences to how this should be delivered.

All stakeholders recognised that current issues being experienced at M25 J10 in terms of congestion and journey time reliability and safety exist and that without intervention will deteriorate considerably in the future as traffic volumes increase.

The concepts of providing a free flow links for the right turns from the A3 to the M25 was accepted as a good way to address these issues as part of the RIS1 road plan (Option 9) although there are cost and land take issues. It was said that the elongated roundabout (Option 14) would result in a lot of disruption during construction without fully addressing the scheme's objectives but would require least cost and land take. The cyclic option (Option 16) was described as being too intrusive on environmentally sensitive land and costly. The need for appropriate mitigation of environmental impacts associated with the proposed link options was recognised.

15.3 Comparison of options

15.3.1 Overview

This section summarises the performance of the options against the scheme objectives and against the formal appraisal criteria for traffic, environment and economics. On the basis of the assessment of the problems at M25 J10, the following core scheme objectives for the study were devised:

- Route Operation - Support any projected traffic increases from other committed schemes on the strategic road network.
- Capacity - Reduce the average delay (time lost per vehicle per mile) on the mainline A3.
- Safety - Reduce annual collision frequency and severity ratio on the mainline A3 and slip roads and junction 10 gyratory.

Additional scheme objectives include:

- Smooth the flow of traffic by improving journey time reliability on the mainline A3;
- Treat noise important area's (IA's) where practical;
- Support sustainable travel routes promoted by Surrey County Council and Developers; and
- Improve biodiversity within the scheme if the opportunity exists.

15.3.2 Options

The M25 J10/ A3 Wisley Interchange scheme consists of the following elements:

- Improvements to M25 J10 interchange
  - **Option 14** involves modifying the existing roundabout by elongating the existing roundabout with additional lanes to provide more circulatory capacity and enable more traffic to discharge the roundabout whilst also providing free flowing left turns under a permanent green signal.
  - **Option 9** retains the existing roundabout but adds a fourth level layout to provide free flowing right turns from the A3 to the M25 whilst also providing free flowing left turns under a permanent green signal.
  - **Option 16** removes the roundabout and replaces it with a cyclic layout (like M25 J12) that provides free-flow for all traffic movements.
- Improvements to Painshill Interchange,
- Widening the A3 to D4 standard and consequent changes to access arrangements as a result of widening the A3 to incorporate Expressway standards.

During Stage 1 the focus has been on the assessment of options for the M25 J10 interchange. Although feasible options for Painshill Interchange and access arrangements to/from the A3 have been identified, at this stage these have been assumed to be common to whichever option is considered at M25 J10 and those elements of the scheme warrant further consideration during Stage 2's public consultation.

15.3.3 Traffic

The analysis has shown that all options provide improvements compared with the current situation, although to varying degrees.

All three scheme options provide increases in traffic flow through the junction when compared with the do-minimum and thus meet the objective to support any projected traffic increases from other committed schemes on the strategic road network.

Percentage increases in total throughput (excluding the through M25 and A3 movements) in 2037 compared with the do-minimum across the modelled time periods are as follows:

- Option 14 (Elongated Roundabout) – 21% to 43%
- Option 9 (Four level free flow in two directions) – 24% to 52%
- Option 16 (Cyclic free flow) 19% to 50%

Whilst there is no predetermined view regarding the scale of projected traffic increase to be accommodated, **it is evident that all options are capable of accommodating more growth and that Options 9 and 16 are capable of accommodating more growth than Option 14**.

All three scheme options reduced delay at the junction when compared with the do-minimum and thus support the objective to reduce the average delay (time lost per vehicle per mile) on the mainline A3:

- Options 9 is forecast to reduce delay on the A3 by approximately 78% northbound and 64% southbound in the morning peak hour (7am to 8am) in 2037 compared with the do-minimum;
- Options 14 is forecast to reduce delay on the A3 by approximately 69% northbound and 55% southbound in the morning peak hour (7am to 8am) in 2037 compared with the do-minimum;
- Options 16 is forecast to reduce delay on the A3 by approximately 82% northbound and 77% southbound in the morning peak hour (7am to 8am) in 2037 compared with the do-minimum;

Regarding the performance of the whole junction in 2037:

- Option 9 is forecast to reduce delay on at M25 J10 by approximately 63% in the morning peak hour (7am to 8am) compared with the do-minimum;
- Option 14 is forecast to reduce delay on at M25 J10 by approximately 30% in the morning peak hour (7am to 8am) compared with the do-minimum; and
- Option 16 is forecast to reduce delay on at M25 J10 by approximately 72% in the morning peak hour (7am to 8am) compared with the do-minimum

Whilst there is no predetermined view regarding the scale of projected delay to be achieved, **it is evident that all options are capable of reduce the average delay (time lost per vehicle per mile) on the mainline A3 and that Options 9 and 16 are capable of reducing delay better than Option 14**.

Analysis shows that a number of movements will be operating over capacity by 2037 in Option 14, although it is still an improvement on the do-minimum situation. Most movements in Option 9 will be operating close to capacity in 2037 with a minority at capacity. Capacity in Option 16 is broadly similar to Option 9, with some improvements in capacity relating to the additional free flow slips.

15.3.4 Safety

Safety is currently a highlighted problem at this junction and a core scheme aim is to reduce annual collision frequency and severity ratio on the mainline A3 and slip roads and junction 10 gyratory.

For options 9 and 16 where free-flow has been provided through the interchange and the radius of the bend is below standard, there is a possibility of loss of control collisions. Reduced speed limits may mitigate against this. Option 14 proposes an increased width of up to 5 lanes on the gyratory. Lane discipline is likely to be an issue and it may be necessary to provide gantry signage in order to avoid confusion and late decision making.

Although Non-Motorised User (NMU) numbers on the A3 mainline are very low and cycle paths exist, there is technically nothing to stop cyclists using the A3 carriageway. Existing NMU provision relies upon signalised crossings, Option 16 which is

completely free-flow achieves this with bridges and subways in the design. Options 9 and 14 retain a signalised gyratory which is utilised to provide NMU crossings.

Options 9 and 16 both involve large elements of off-line construction and will therefore have less impact on operations during these phases. Option 14 with its elongated roundabout will require works on the existing roundabout and slip roads and these will need to be carefully managed to ensure safety and in order to minimise delays to traffic.

Any widening of the A3 mainline is likely to require lane closures and restrictions such as reduced lane widths. The constrained working area and proximity of traffic will increase the importance of the reduced speed limits to safety, therefore safety camera enforcement is likely to be required and will need to be considered at later stages.

The removal of traffic from the roundabout by the provision of free flow elements in Option 9 and 16 are forecast to have the greatest impact on safety over the appraisal period. Option 16, which is fully free flow is forecast to have the greatest improvement in safety, with over 20 fewer accidents per year expected. Option 9 is forecast to reduce accidents by 15 per year. Option 14, with all movements still using a modified version of the existing round, is forecast to result in approximately one fewer accident per year.

It is evident that only Options 9 and 16 are reduce annual collision frequency significantly.

15.3.5 Economics

The economic assessment has used TUBA to estimate travel time and vehicle operating cost benefits along with accident benefits (COBALT) and the impact of delays during construction (estimated using the traffic model). All assessment processes and values were in line with WebTAG using the December 2015 databook.

The analysis showed that all three options have BCRs which provide “very high" *Value for Money* as follows:

- Option 9 is therefore the best performing of the three options with a BCR of 8.3
- Option 16 is second best with a BCR of 7.4
- Option 14 has a BCR of 5.2

The additional benefits in Option 16 over Option 9 due to reduction in delays are generally negated by the extra distance that needs to be travelled. Hence, additional grade separation provided in Option 16 over and above Option 9 is not forecast to provide additional benefits.

15.3.6 Environment

The environmental assessment has focussed on the formal requirements of PCF Stage 1 and focuses on delivering the Appraisal Summary Tables and Environmental Appraisal Report. There are no core scheme objectives that relate to the environment, but a constraint to any improvement is the land around the interchange. Much of the area around M25 J10 is covered by international/national ecological designations: Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI), as well as designations such as a Common Land and Local Nature Reserve.

Table 15-3 compares the environmental impacts of the options, these are based on the ASTs and it is evident all options are likely to have an adverse impact. A summary of the environmental impacts of each option is presented below.

Table 15-3 Comparison of options - environment

	Option 9 Four level free flow in two directions	Option 14 Elongated roundabout	Option 16 Cyclic
Noise*	Anticipated Adverse	Anticipated Adverse	Anticipated Adverse
Air Quality*	Anticipated Adverse	Anticipated Adverse	Anticipated Adverse
Greenhouse gases*	Anticipated Adverse	Anticipated Adverse	Anticipated Adverse
Landscape	Moderate Adverse	Moderate Adverse	Moderate Adverse
Historic Environment	Large Adverse	Large Adverse	Large Adverse
Biodiversity	Very Large Adverse	Large Adverse	Very Large Adverse
Water Environment	Large Adverse	Large Adverse	Large Adverse

* Topics normally report quantitative impacts at later PCF stages – qualitative entries here are a balance of worst case predicted impacts at Stage 1

Option 9 has the potential to result in significant adverse effects on five heritage assets, including large adverse effects on a Scheduled Monument. Other significant effects relate to impacts on the settings of designated assets. Additionally, a number of non-designated archaeological assets may be removed or truncated by construction of the scheme. Significant landscape effects are expected due to a major alteration in the local landscape character. There are relatively few visual receptors that would be affected by Option 9 but the majority of these would be significantly affected.

This option would involve land take of approximately 11ha from Thames Basin Heaths SPA and 16 ha from Ockham and Wisley Commons SSSI (17ha in total as some of the land has both designations). Woodland and regenerating heathland habitat would be lost. However the south east quadrant, which supports the established heathland habitat where all qualifying SPA species were recorded, would be almost completely avoided. There is potential for geological impacts to the scheme associated with ground conditions that may be encountered and effects on human and/or controlled waters receptors associated with potential sources of contamination within or in proximity to the proposed route, such as localised deposits of Made Ground, historical landfill sites and other contaminative land uses.

Major noise increases in the Opening and Design years are predicted on the new links from the A3 to M25, and the M25 eastbound off slip road. The free flow links in Option 9 may offset adverse air quality effects by improving vehicle flow resulting in a reduction in emissions. There would be negative effects on the majority of links in the ARN but some positive effects on other roads as well. Adverse air quality impacts on designated ecological sites would be unavoidable.

There is expected to be a change in amenity for NMU users at footpaths but no significant effects have been identified for any of the PRoWs except for the shared cycleway and footpath along the A3. Land would be required from Wisley and Ockham Commons and is assessed to have major adverse effect on community land. Option 9 is the least environmentally damaging for the water environment. Although this option proposes three new watercourse crossings, the proposed works for Option 9 are smaller in scale than the other options.

Option 14 has the potential to result in significant adverse effects on three heritage assets, including a temporary large adverse effect on a Scheduled Monument. Additionally, a number of non-designated archaeological assets may be removed or truncated by construction of the scheme. No significant landscape effects were identified for the Option 14. Some closely located receptors, within Painshill Park, adjacent Common's and PRoW's would however be significantly affected during construction.

This option would involve approximate land take of 4 ha from the Thames Basin Heaths SPA and 7 ha from Ockham and Wisley Commons SSSI (8ha in total as some of the land has both designations) and would also result in the loss of small areas of woodland habitat from all four quadrants. There is potential for geological impacts to the scheme associated with ground conditions that may be encountered and effects on human and/or controlled waters receptors associated with potential sources of contamination within or in proximity to the proposed route, such as localised deposits of Made Ground, historical landfill sites and other contaminative land uses.

Major increases in noise are predicted on new links from M25 eastbound to A3 northbound, A3 northbound and westbound M25, and a new section of the M25 eastbound on slip road. The widening of the junction would reduce the distance between the road and sensitive air quality receptors but the adverse impacts may be offset by improving vehicle flow resulting in a reduction in emissions. The majority of roads within the ARN are expected to experience an increase in AADT with the scheme and all arms of Junction 10 are expected to experience an increase of AADT. The sources of vehicle emissions would be brought within the boundaries of designated ecological sites, with the potential to adversely impact on vegetation.

During the construction phase there is expected to be a change in amenity for NMU users at footpaths, particularly those located close to construction works but no significant effects have been identified for any of the PRoWs except for the shared cycleway and footpath along the A3. Land would be lost from Wisley and Ockham Commons which would have a major adverse effect on community land. For water quality Option 14 is the 'middle ground' option between Option 9 and Option 16. It crosses the same number of watercourses as Option 9, however works are on a larger scale.

Option 16 has the potential to result in significant adverse effects on ten heritage assets, including large adverse effects on two Scheduled Monuments, one Grade I and one Grade II* Registered Park and Garden, and a Grade II listed building. Additionally, a number of non-designated archaeological assets may be removed or truncated by construction of the scheme. Significant landscape effects are expected due to a major alteration to the local landscape character. Although relatively few visual receptors would be affected the majority would experience significant effects.

This scheme would involve approximate land take of 48 ha, of which 23 ha is designated as Thames Basin Heaths SPA and 42 ha is designated as Ockham and Wisley Commons SSSI (48ha in total as some of the land has both designations). This option would involve the loss of a significant amount of habitat within all four quadrants. Large areas of woodland habitat would be lost or isolated within the junction and there would be loss of a heathland glade in the northwest quadrant and a part of the regenerating heathland in the southwest quadrant. There is potential for geological impacts to the scheme associated with ground conditions that may be encountered and effects on human and/or controlled waters receptors associated with potential sources of contamination within or in proximity to the proposed route, such as

localised deposits of Made Ground, historical landfill sites and other contaminative land uses.

In both the Opening and Design years, most of the newly constructed links, and the carriageways travelling away from J10 are predicted to have major increases in traffic noise. This is due to traffic not having to slow down at junctions and therefore increasing the average speed. The majority of roads within the ARN are expected to experience an increase in AADT with the scheme and three arms of J10 are also expected to experience an increase of AADT with the scheme. Despite this and although Option 16 introduces new road links in closer proximity to nearby residential receptors it has the potential to improve local air quality through reduced congestion and removal of idling vehicles. Adverse air quality effects on designated ecological sites would be unavoidable.

There is expected to be a change in amenity for NMU users at footpaths but no significant effects have been identified for any of the PRoWs, except for the shared cycleway and footpath along the A3. Land would be lost from Wisley and Ockham Commons which would have a major adverse effect on community land, the greatest impact of all the options. Option 16 is the most environmentally damaging for the water environment as it crosses more watercourses and the proposed works are on a larger scale than the other options.

In summary, all options are likely to have an adverse effect on the environmental indicators. Option 9 will take approximately 17ha, which is approximately 30ha fewer than Option 16. Both Option 9 and 16 could accommodate the site compound and other land to constrict the scheme within the estimated above and whilst Option 14 requires 8ha of land; further land would be required for Option 14 during construction.

15.3.7 Construction

Prior to commencing this phase narrow lanes and a 50mph speed restriction will need to be implemented on the M25 and A3 for all options. This will be necessary for reasons of safety in view of the close proximity of the works to the existing slip road traffic lanes.

Two additional vehicle recovery stations are likely to be needed, located remotely, at an adjacent M25 junction and at an adjacent A3 junction to reduce vehicle recovery times during times of peak traffic.

Key features of the construction impact are shown in Table 15-4 below. It should be noted that the construction footprint of Option 14 – Elongated roundabout is much larger than its operation footprint as it necessitates construction of temporary detours beyond the permanents works area, and its compound could not be located within the operation footprint.

Table 15-4 Comparison of options - construction

	Option 9 **Four level free flow in two directions**	**Option 14** **Elongated roundabout**	**Option 16** **Cyclic**
Duration	Expected duration of work is 24 months with On the M25 closure for 20 nights bridge launching (simultaneously with gantry	Expected duration of work is 24 months with On the M25 closure for 10 nights bridge launching (simultaneously with gantry	Expected duration of work is 24 months with On the M25 closure for 20 nights bridge launching (simultaneously with gantry

	Option 9 Four level free flow in two directions	Option 14 Elongated roundabout	Option 16 Cyclic
	erection and each slip road closed 20 nights. On the A3 5 nights erection of sign gantries and each slip road closed 20 nights.	erection and each slip road closed 20 nights. On the A3 closure for 10 night's bridge launching, each slip road closed 20 nights and 5 nights' erection of sign gantries.	erection and each slip road closed 20 nights. On the A3 5 nights erection of sign gantries and each slip road closed 20 nights.
Compound	A contractor's site compound with a plan area of the order of 200mx200m will be required to accommodate the site offices and material and plant storage plus the vehicle recovery base station. It is assumed that the area in the south west quadrant between the works and the A3 plus the area in the north east quadrant between the works and the M25 would both be available.	A contractor's site compound with a plan area of the order of 200mx200m will be required to accommodate the site offices and material and plant storage plus the vehicle recovery base station. It is unlikely that it will be permissible to locate the compound immediately adjacent to the junction works as the land in the 4 quadrants is designated SSSI that will be subject to stringent environmental constraints	A contractor's site compound with a plan area of the order of 200mx200m will be required to accommodate the site offices and material and plant storage plus the vehicle recovery base station. It is assumed that there will be sufficient space available within the 4 central quadrants of the junction.
Other issues	The contractor's utilisation of access and egress points from and to the existing slip roads will inevitably cause a reduction in junction traffic capacity. However this will predominantly only affect the slip roads adjacent to the south west and north east quadrants where the major component of the works is located.	The layout of the proposed elongated roundabout necessitates construction of temporary detours beyond the permanents works area. Consideration should be given to relocating the permanent works slip roads further away from the existing slip roads, subject to the constraint of maintaining a compliant alignment through the existing interchange under bridges. This would have the benefit of reducing the requirement for temporary detours.	The contractor's utilisation of site access and egress points from and to the existing slip roads will inevitably cause a reduction in junction traffic capacity. It may be necessary to relocate the traffic signal stop lines, on the off slips adjacent to the south west and north east quadrants, further from the roundabout to accommodate the contractor's egress points

The assumption has been made that this scheme will be carried out separately to the proposed M25 Smart Motorway Scheme and that M25 traffic management should be minimised. However, if the scheme is carried out simultaneously then traffic management on the M25 would be available and this would give the Contractor more flexibility in the programming of the works.

15.3.8 Non-motorised users

The study area is served by a number of footways, crossing and shared use paths, which would be traversed or impacted by all route options. These PRoWs are important public amenity resources, and in all options the availability and continuity of these would be maintained.

16 Programme

An outline programme has been produced for the M25 J10 improvements scheme from Stage 1 through to the start of works.

In particular a review was undertaken looking at the Options and Development Phases, where the programme was updated based on the following inputs:

- Highways England Regional Investment Programme DCO Process Map – Planning Act 2008 (Version 1.11)
- An review of the initial programme with Highways England's Programme Management Team and DCO specialist, and
- A number of collaborative programme planning sessions with the integrated project team and programme management team.

Table 16-1 provides a summary of key milestones within the updated programme for Junction 28.

Table 16-1 Proposed timeframe for options, development and construction phases

Milestone	From	To
SGAR 1		October 2016
Undertake non-statutory public consultation	November 2016	December 2016
SGAR 2	November 2016	June 2017
SGAR 3	July 2017	June 2016
SGAR 4	July 2018	May 2019
SGAR 5	May 2019	March 2020
SGAR 6	March 2020	June 2021
SGAR 7	July 2021	June 2022

17 Conclusion and recommendations

17.1 Background

In December 2014 the Department for Transport (DfT) published the Road Investment Strategy (RIS) for 2015-2020. The RIS sets out the list of schemes that are to be delivered by Highways England over the period covered by the RIS (2015 – 2020). The RIS identified improvements to M25 J10/A3 Wisley Interchange as one of the key investments in the SRN for the London and South East region.

The proposed improvements to Junction 10 as stated in the RIS should **aim** to deliver: *"free-flowing movement in all directions, together with improvements to the neighbouring Painshill interchange on the A3 to improve safety and congestion across the two sites". Expected cost £100m to £250m.*

17.2 Strategic case

Based on the evidence review undertaken during PCF Stage 0, four key problems were confirmed for M25 J10:

It one of the busiest interchanges in the country:

- Between M25 J10 and M25 J11, which is amongst the top links for National five year average flow, approximately 170,000 vehicles per day use this section. The A3 south of M25 J10 is typically utilised by approximately 101,500 vehicles each day.

It has one of the highest accident records on the SRN:

- During the period of 2009-2013 (inclusive), there have been 239 accidents in total (just under 50 per year on average) on and around M25 J10 and the A3 between Painshill and Ockham.

It experiences frequent disruption and unreliable journey times:

- In the weekday peak hours of 06:00 to 09:59 and 16:00 to 19:59 the M25 and A3 links that are served by M25 J10 were congested 67% of the time over the five year period from 2010/11 to 2014/15. All four of the M25 links have experienced congestion in at least 75% of weekday peak journeys.

It is an essential interchange in a growing region:

- The Enterprise M3 Growth Deal will deliver the provision of 11,500 new homes, 30,700 new jobs and £757m direct GVA; of which developing the former Wisley Airfield can deliver 2100 homes is a key element of Guildford Borough's Core Strategy.

Without appropriate intervention to improve the performance of M25 J10, each of these problems would be expected to deteriorate further in the future as traffic levels increase. This would result in significant consequences for the efficiency of traffic flow, road safety, network resilience, and user satisfaction. Ultimately it will reduce the ability of the junction to perform its role in supporting local and regional aspirations for development and growth.

Specifically, without intervention:

- M25 J10 will be a constraint on the wider SRN caused by the inadequate capacity of the junction and the increasingly high traffic demands (10% more demand than now)

- average delays across all movements on M25 J10 will be at least 40% greater than that experienced at present
- the resilience of the junction roundabout to remain open and available in the event of an accident or incident will diminish
- the ongoing safety issues will be exacerbated without improvements

On the basis of these problems, the following **core objectives** for the study were devised:

- **Route Operation** - Support any projected traffic increases from other committed schemes on the strategic road network
- **Capacity** - Reduce the average delay (time lost per vehicle per mile) on the mainline A3
- **Safety** - Reduce annual collision frequency and severity ratio on the mainline A3 and slip roads and junction 10 gyratory

Furthermore, a constraint to any improvement is the land around the interchange. Much of the area around M25 J10 is covered by international/national ecological designations: Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI), as well as designations such as a Common Land and Local Nature Reserve. There are also three Scheduled Monuments around the interchange. Whilst not a core objective, it is imperative that any land taken is balanced against the schemes ability to meet the core objectives.

17.3 Option identification

Stage 1 commenced with a comprehensive review of the options shortlisted at Stage 0. This involved refining and developing the shortlisted options resulting from a more detailed understanding of the key issues, risks and constraints, as well as progressing the designs. A key focus for the refinement and development of the options was to find an additional option that reduced land take to a minimum. This would then enable a better comparison between the ability of options to meet the scheme's aims and objectives against a background of land take and cost.

17.4 Options consider under PCF Stage 1

Establishing that the problems would only be solved through highway interventions and in light of these challenges and constraints, Atkins developed three junction improvement options (shortlisted from a total of 21 potential options) that progressively addressed the scheme objectives:

- Option 9 **retains the existing roundabout** but adds a fourth level layout to provide free flowing right turns from the A3 to the M25 whilst also providing free flowing left turns under a permanent green signal.
- Option 14 involves **modifying the existing roundabout** by elongating the existing roundabout with additional lanes to provide more circulatory capacity and enable more traffic to discharge the roundabout whilst also providing free flowing left turns under a permanent green signal.
- Option 16 **removes the roundabout** and replaces it with a cyclic layout (like M25 J12) that provides free-flow for all traffic movements.

A complementary set of changes to Painshill Interchange has also been developed that widens the carriageway on the A245 to three lanes in each direction between

Painshill Junction and the junction with Sevenhills. The upgrading of the A3 to D4 Expressway standards between Ockham and Painshill and consequent changes to the accesses to the A3 were also developed and applied to all options.

17.5 The impact

All options provide significant improvements in highway performance compared with the current situation. Options 9 and 16 provide the highest level of delay reduction at M25 J10, with average delay per vehicle mile on the A3 forecast to be approximately 70% shorter in the morning peak in 2022 for Option 9 and 75% shorter for Option 16. Option 14 is forecast to reduce average network journey times by 45% in the morning peak in 2037.

All options also accommodate a much greater throughput (excluding the through M25 and A3 movements) in 2037 compared with the do-minimum across the day. Option 9 and 16 are forecast to increase throughput at the junction by approximately 40% whereas Option 14 is forecast to accommodate over 35% more traffic compared to no improvement.

From a traffic perspective Option 9 and Option 16 perform better than Option 14 in terms of meeting objectives that support projected traffic increases from other committed schemes on the strategic road network and reducing average delay.

It has been established that safety is currently a significant problem at this junction. The removal of traffic from the roundabout by the provision of free flow elements in Option 9 and 16 are forecast to have the greatest impact on safety. Option 16, which is fully free flow is forecast to have the greatest improvement in safety, with over 20 fewer accidents per year expected. Option 9 is forecast to reduce accidents by 15 per year whilst Option 14, with all movements still using a modified version of the existing round, is forecast to result in approximately one fewer accident per year.

From a safety perspective Option 16 and Option 9 perform better than Option 14 in terms of meeting objectives that reduce annual collision frequency and severity ratio on the mainline A3 and slip roads and junction 10 gyratory.

Option 16 has been estimated as costing £298m (in 2014 prices), and is above the expected scheme cost range; whilst Option 9 (£190m) and Option 14 (£135m) are expected to fall with the expected cost range of £100m to £250m.

The economic assessment of the three options reflects the benefits derived by the scheme against the costs and is useful in demonstrating whether the extra cost of delivering the *free-flowing movement in all directions* requirement of the scheme is economically justified. The BCR for the three options are shown below and shows that Option 16 does not yield benefits commensurate with its additional cost:

- Option 9 is has the best performing of the three options with a BCR of 8.3
- Option 16 is second best with a BCR of 7.4
- Option 14 has a BCR of 5.2

With regard to other scheme objectives, the evidence in PCF Stage 1 shows that in terms of:

- **Treating noise important area's (IA's) where practical** – new sections of road will be surfaced with a low noise surface for all options and opportunities will be taken to develop and include noise mitigation such as noise bunds or barriers in the design.

- Supporting sustainable travel routes promoted by Surrey County Council and Developers:
  - Option 9 would result in less traffic at the existing roundabout and thus make current NMU journeys through the junction marginally easier
  - Option 14 would modify the roundabout and thus make NMU journeys through the junction marginally longer
  - Option 16 would enable new and more segregated routes to be established.
- **Improving biodiversity within the scheme if the opportunity exists** – opportunities will be taken to enhance habitats around the junction on land taken for the scheme and by agreement with Surrey Wildlife Trust on surrounding land for all options and will help to offset some of the losses of designated land as a result of the schemes
- In addition to the environmental KPI's noted above the proposed scheme options will aim to ensure no worsening of air quality and to improve it where possible, inputting to Pilot Studies if requested and providing monitoring data.

17.6 Consideration of options for PCF Stage 2

This study has considered scheme options that progressively addressed the scheme objectives to deliberately highlight the possible trade-offs between meeting scheme objectives and achieving the scheme budget. The study has also been mindful of the uniquely important land around M25 J10, which is covered by international/national ecological designations and a small but important contributor to what makes living and working in this area attractive and is thus driving the need for growth.

This review of the evidence demonstrates that only Option 16 meets the aim of the study by providing the *free-flowing movement in all directions, together with improvements to the neighbouring Painshill interchange on the A3 to improve safety and congestion across the two sites* as specified in the RIS. Option 16 also makes the largest contribution towards meeting the core objectives. However, Option 16 would exceed the scheme budget and require the largest land take (requiring 30ha more than Option 9). The economic analysis shows that the extra expenditure, compared with Option 9, would not deliver extra benefits.

In this instance it is clear that Option 9, providing free flow opportunities for the two right turns from the A3 to the M25 as well as free flowing left turns under a permanent green signal, provides improved facilities for three quarters of movements at M25 J10 and satisfies the core objectives. Whilst Option 9 would still take approximately 17ha of land; its cost is with the expected range, although it does exceed the proposed budget.

Option 14 provides some contribution towards the traffic objectives but is forecast to have a negligible impact on safety. However, in terms of scheme constraints, it would require half the land take of Option 9 (7ha) and its forecast cost is under the expected budget.

The challenge is therefore to consider the degree to which the scheme's aim (fully free-flow) needs to be met in order to deliver the scheme objectives whilst minimising land take and offering value for money. In summary:

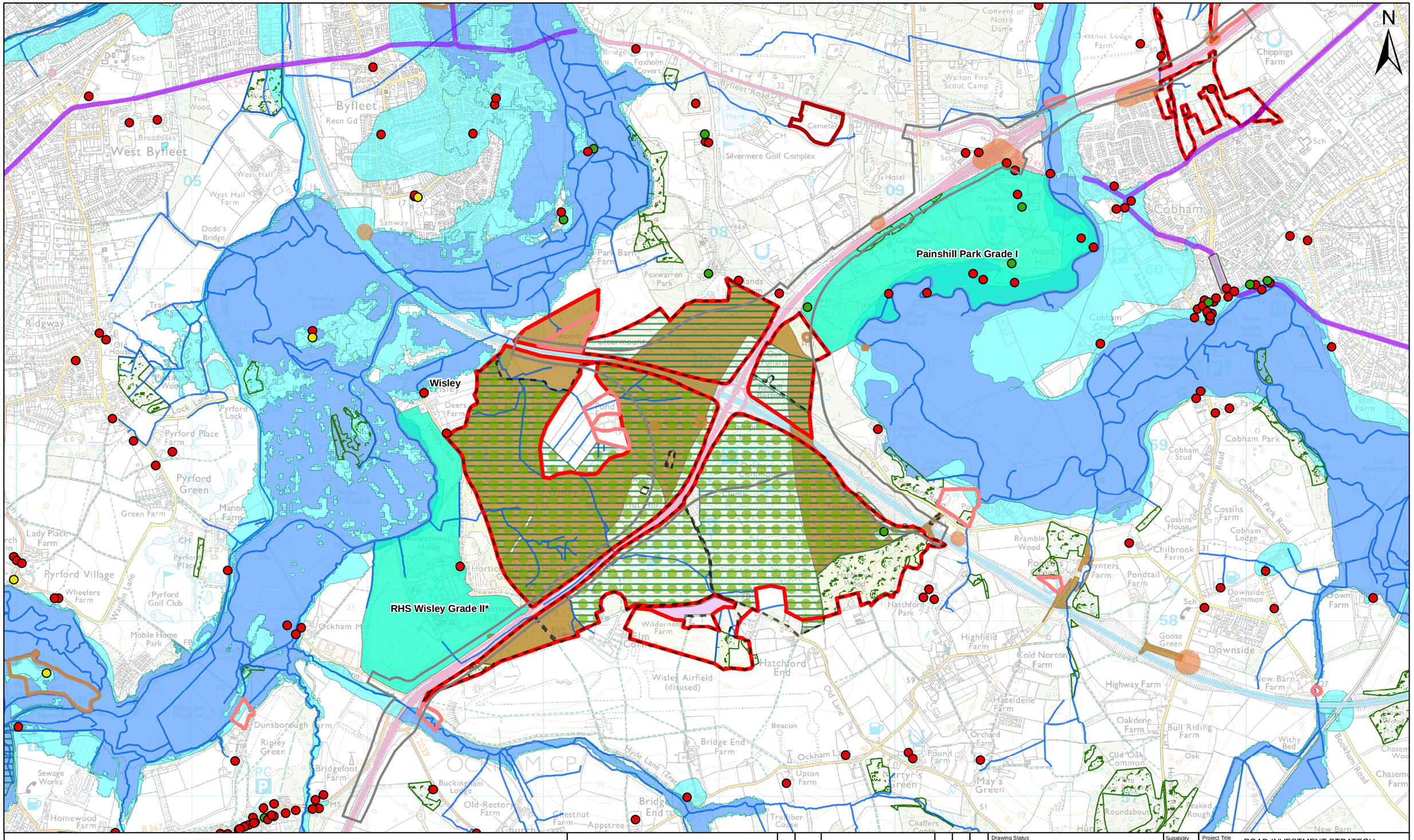
- Option 9 provides traffic and safety improvements and thus meets the core objectives without quite meeting the study aim. Whilst it will require 17ha of land it

is expected cost is within the expected cost range although it exceeds the target cost. **Option 9 should proceed to PCF Stage 2.**

- Option 14 provides some traffic improvements but negligible safety improvements and thus only partially meets the core objectives. However, its expected cost is within the scheme budget. **Option 14 should proceed to PCF Stage 2.**
- Option 16 meets the study aim and core objectives but it exceeds the budget and requires the most land. **Option 16 should proceed to PCF Stage 2**.

Appendices

Appendix A Environmental Constraints



- Scheme Area Boundary
- Grade I listed building
- Grade II listed building
- Grade II* listed building
- PCM Links
- Detailed River Network (DRN)
- Land Fill Site (Authorised)
- Land Fill Site (Historic)
- Scheduled Monument
- Important Areas for Noise
- Local Nature Reserve (LNR)
- Common Land
- Cobham Air Quality Management Area
- Site of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)
- Ancient Woodland
- Parks & Gardens
- Flood Zone 3
- Flood Zone 2
- Access Land
- Land with Apparent Public Access

CLIENT NAME: Highways England

LICENCE NUMBER: 100018928

Metres

0 125 250 500 750 1,000

Rev.	Date	Description	By	Chk'd	App'd
P05	01.12.16	ADDITION OF REDHILL BOTTOM SSSI	JVR	SW	NW
P04	11.10.16	ADDITION OF SCHEME BOUNDARY	JVR	SW	NW
P03	08.07.16	AMMENDMENTS AS OF 30.06.16	JVR	AS	NW
P02	15.01.16	COMMON LAND DATA ADDED	JVR	HM	NW
P01	24.09.15	ISSUED FOR INFORMATION	AT	HM	NW

Drawing Status: REVIEW AND COMMENT

Suitability: S3

ATKINS
Elizabeth House
28 Baddow Road
Chelmsford
Essex
CM2 0DG
Tel: +44 (0) 1245 245245
Fax: +44 (0) 1245 345010
www.atkinsglobal.com

Client: highways england

Project Title: ROAD INVESTMENT STRATEGY M25 J10

Drawing Title: ENVIRONMENT CONSTRAINTS MAP Page 1 of 1

Scale	Designed	Drawn	Checked	Authorised
1:20000	AT	AT	HM	NW
Original Size	Date	Date	Date	Date
A3	01/12/16	01/12/16	01/12/16	01/12/16

Drawing Number: Project HE551522 - Originator ATK - Volume EGN - Location M25J10 - Type DR - Role EN - Number 0001

Project Ref. No.: 5145620

Revision: P05

Appendix B Non-motorised user report

Road Investment Programme

M25 J10 / A3 Wisley Interchange Improvements

NMU Context Report

Highways England

31 May 2016

Notice

This document and its contents have been prepared and are intended solely for Highways England's information and use in relation to the M25 J10 / A3 Painshill to Ockham study.

Atkins Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

This document has 23 pages including the cover.

Document history

Job number:			**Document ref:**			
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 1.0	Draft report	AP	JH	DW	AC	02/06/16

Client signoff

Client	Highways England
Project	Road Investment Programme
Document title	M25 J10 / A3 Wisley Interchange Improvements, NMU Context Report
Job no.	5145620
Copy no.	
Document reference	5145620-DOC-001

Table of contents

Tables

Figures

1. Introduction

In December 2014 the Department for Transport (DfT) published its Road Investment Strategy (RIS) for 2015-2020. The RIS sets out the list of schemes that are to be delivered by Highways England by 2020. A number of schemes have been identified to be constructed within the plan period including the improvement to M25 J10 / A3 Wisley Interchange.

The M25 J10 / A3 Wisley Interchange lies in the south west quadrant of the M25 London Orbital Motorway. At J10 the A3, a key radial route from London to Portsmouth, crosses the M25 motorway. In addition to M25 J10, it has been recognised that adjacent junctions on the A3 (Painshill Interchange to the north and Ockham Interchange to the south) are also pinch-points. Together with M25 J10 / A3 Wisley Interchange, these junctions in the current configurations restrict traffic flow through the area and a holistic package of interventions targeting all these junctions is likely to be required to improve junction performance.

Atkins Ltd have been commissioned to undertake PCF Stage 1: Option Identification for M25 J10 / A3 Wisley Interchange Scheme. PCF1 entails detailed analysis to develop options (initially identified in PCF Stage 0) to be taken to public consultation, assess those options in terms of environmental impact, traffic forecasts and economic benefits and refine the cost estimate of options (including an allowance for risk).

Government policy encourages the consideration of the needs of Non-Motorised Users (NMU) when undertaking scheme design. The Design Manual for Roads and Bridges (DMRB) V5 S2 Part 5 “Non-Motorised User Audits (HD42/05)” provides a standard for undertaking audits of NMUs on trunk roads. The first stage of an NMU Audit is to undertake a Context Report which summarises all relevant information on existing patterns of use by NMUs in the local area of a scheme and identifying issues and opportunities and setting objectives.

A Context Report is then followed by Audit Reports at regular stages (preliminary design, detailed design, and post-opening) which provide detail on how the scheme design incorporates the requirements of NMUs in response to the scheme objectives.

2. Scheme options description

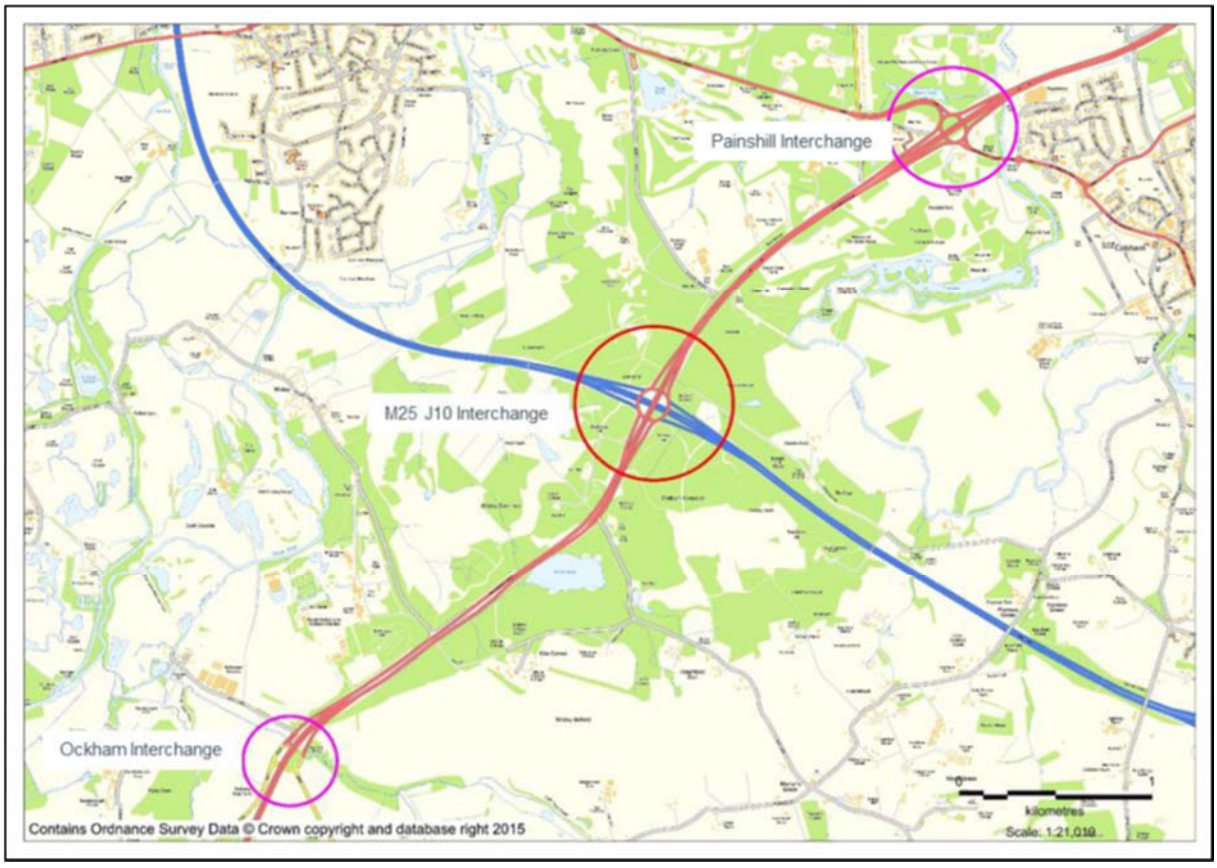
2.1. Background

The M25 J10 / A3 Wisley Interchange (Figure 2-1) forms the confluence of the radial route (A3) between Surrey, Hampshire and Greater London with the orbital route (M25) between Kent, East and West Sussex, Surrey, Berkshire and onward destinations. The junction itself does not serve an immediate urban conurbation or act as a significant trip attractor, however, proposed developments in the area, such as the development of Wisley Airfield, could increase trip generation in the immediate vicinity in the future.

The M25 J10 / A3 Wisley Interchange is located within Surrey, on the eastern edge of the borough of Guildford and is also in close proximity to the boroughs of Elmbridge and Woking. Together these boroughs have a population of over 375,000. These boroughs have strong and diverse economies; attracting offices and business premises of multi-national companies as well as local retail and business centres. There are relatively high levels of commuting into London and Heathrow Airport and surrounding ancillary businesses serve as a major source of employment in the area.

In a broader context, the M25 J10 / A3 Wisley Interchange area is on the eastern side of the Enterprise M3 Local Enterprise Partnership (LEP) area which has a population of 1.6 million and sustains 740,000 jobs. High levels of housing and employment growth are planned for the wider area.

Figure 2-1 Study area



Vehicles queueing daily on the A3 on the approach to M25 Junction 10 cause congestion on junctions to the south of J10 and as far back as the Ripley interchange. Due to congestion, traffic has a problem accessing the M25 clockwise, however this is being addressed through a separate scheme (SMART motorways M25 J10-16). Queuing and congestion continues north on the A3 at Painshill and this often extends to the main carriageway at the Painshill junction. Traffic leaving the A3 at Painshill is often prevented from doing so because of local network congestion from the A245 Seven Hills Road junction that is signal controlled. These

are all on the London-bound carriageway and predominantly over the duration of the peak periods. There is a tidal effect on the A3 southbound during the PM peak period for traffic joining the A3 from the A245. There are similar issues with traffic entering and leaving the A3/M25 at Wisley. This congestion is predicted to be a barrier to growth with the Enterprise M3 LEP specifically highlighting the M25 J10 / A3 Wisley Interchange as a part of the transport network where projected increases in traffic would cause further congestion and delays.

The area around M25 J10 / A3 Wisley Interchange has the highest recorded collision rate[1] across the network nationally.

RHS Gardens Wisley is located off the A3 just to the south of the M25 J10 / A3 Wisley Interchange. There are several heavily used layby's used along this stretch of the A3 used predominantly by HGVs and also some areas where HGV's park illegally, both north and south of M25 J10 / A3 Wisley Interchange.

A proposed residential development at Wisley Airfield adjacent to the A3 at Ockham is anticipated to generate a significant number of additional trips on the network. There is also a stated intention to provide either primary or secondary school facilities in the area which is likely to further increase trip generation in the area.

The current challenges of the M25 J10 / A3 Wisley Interchange include:

- Congestion leading to delay and disruption of journeys on the strategic road network;
- Poor resilience resulting in frequent disruption and unreliable journey times;
- Safety concerns;
- High use of lay-bys, including illegal stopping on A3; and
- Congestion in the area is suggested to be a barrier to economic growth.

2.2. Description

During PCF Stage 0 and PCF1, a rigorous scheme identification and evaluation process has resulted in three shortlisted options in answer to the identified challenges. The following proposed scheme options were identified to be taken forward for further design and assessment:

- **Option 9** – Dedicated left turns plus two free-flow right turns A3 to M25 J9 and A3 to M25 J11, Painshill and A3 D4AP;
- **Option 14** - Elongated + dedicated left filters Painshill and A3 D4AP; and
- **Option 16** (formerly Option 10 in PCF 0) - Free-flow (as M25 J12), Painshill and A3 D4AP.

2.2.1. Option 9 – Dedicated left turns plus two free-flow right turns A3 to M25 J9 and A3 to M25 J11, Painshill and A3 D4AP

This option is based on providing half of the movements of the standard four-level free-flow interchange. The option consists of free-flow right turns from the A3 Northbound to the M25 anticlockwise and from the A3 southbound to the M25 clockwise. Free-flow left turns from the A3 northbound to the M25 clockwise and the A3 southbound to the M25 anticlockwise are also provided. The right turns are provided on a large long span viaduct passing close to the centre of the existing junction with intermediate supports to fit within the constraints of the existing layout. All other vehicle movements will be carried out on the existing roundabout. New segregated NMU routes would be required. This option would be provided with dual 4 (D4) upgrade to the A3 carriageway. The proposed A3 dual 4 all purpose (D4AP) upgrade option would also include widening of the A245 from two to three lanes between the Painshill Interchange and the junction with Seven Hills Road. The widening would take place symmetrically on the existing line of the A245.The Painshill improvements would also improve conditions on the A3 northbound.

[1] Highways Agency, M25 to Solent Route Strategy, Evidence Report, April 2014.

2.2.2. Option 14 - Elongated + dedicated left filters, Painshill and A3 D4AP

This option modifies the existing roundabout by creating new structures over the M25 and reusing the existing structures under the A3. The circulatory carriageway under the A3 would be widened to 4 lanes with provision of 5 lanes of circulatory carriageway where unconstrained by the existing structures. Right turns would be carried out on the modified roundabout and left turns would use dedicated left filter lanes. Slip roads would be realigned to aid construction sequencing. NMU facilities would remain largely unchanged but minor upgrades may be required. The D4AP would aid weaving and merging on the A3 as all as providing an opportunity to address side road access, lay-by provision and walking and cycling routes. The proposed A3 D4AP upgrade option would also include widening of the A245 from two to three lanes between the Painshill Interchange and the junction with Seven Hills Road. The widening would take place symmetrically on the existing line of the A245. The Painshill improvements would also improve conditions on the A3 northbound.

2.2.3. Option 16 - Free-flow (as J12), Painshill and A3 D4AP

Junction 10 free-flow (similar to the arrangements at M25 J12) with A3 Ockham to Painshill as D4 plus Painshill improvements. This would provide free-flow opportunities for all movements, thus potentially removing all delay from the junction. The design is compact, thus minimising land take and environmental impact.

The D4AP would aid weaving and merging on the A3 as all as providing an opportunity to address side road access, lay-by provision and walking and cycling routes. The proposed A3 D4AP upgrade option would also include widening of the A245 from two to three lanes between the Painshill Interchange and the junction with Seven Hills Road. The widening would take place symmetrically on the existing line of the A245. The Painshill improvements would also improve conditions on the A3 northbound.

The reconstructed junction would also provide an opportunity to further address walking and cycling provision across the A3 and M25.

3. Strategic objectives

This section provides an overview of NMU related policies and plans within the vicinity of the scheme.

3.1. DfT single departmental plan 2015 to 2020

One of four objectives in the DfT's current departmental plan is to ensure "Safe, secure and sustainable transport".

3.2. Enterprise M3 SEP

According to Policy 18 (sustainable transport) walking and cycling will be encouraged by providing high quality, safe and direct routes.

3.3. Highways England Delivery Plan 2015 – 2020

In terms of future schemes, a feature included in the Key Performance indicators (KPIs) demonstrated in the 2015 – 2020 Delivery Plan is associated with the consideration of Vulnerable Road Users (VRUs) and the incorporation of measures (within a scheme) enabling them to continue to use the network as in the current situation.

4. Existing situation

4.1. Motorised vehicles (MV)

In this section, 2014 modelled output of turning movements/flows in M25 J10 / A3 Interchange and the existing speed limits in the area are presented.

4.1.1. Peak and off-peak MV flows along the trunk route

The tables below present the 2014 peak and off peak turning movements/traffic flows in M25 J20 / A3 Interchange.

The red cells highlighted represent the flows that affect the NMU movements at Junction 10, as these MV turns intersect with NMU flows accommodated in the existing cycle route shared used paths (BOAT according to Rights of Way terminology) (see Figure 4-3).

Table 4-1 07:00 - 08:00 (AM) Traffic flows at M25J10 / A3 Interchange

	M25 West	M25 East	A3 North	A3 South
M25 West	8	4938	1138	1010
M25 East	4406	10	495	1112
A3 North	1311	378	14	2416
A3 South	1553	1237	2898	46

Table 4-2 08:00 - 09:00 (AM) Traffic flows at M25J10 / A3 Interchange

	M25 West	M25 East	A3 North	A3 South
M25 West	12	4480	948	1091
M25 East	4406	15	357	1057
A3 North	1173	354	27	2849
A3 South	1429	1187	2309	56

Table 4-3 10:00 - 16:00 (IP) Traffic flows at M25J10 / A3 Interchange

	M25 West	M25 East	A3 North	A3 South
M25 West	17	4442	748	827
M25 East	4342	34	344	1028
A3 North	849	403	23	1496
A3 South	946	889	1479	73

Table 4-4 17:00 - 18:00 (PM) Traffic flows at M25J10 / A3 Interchange

	M25 West	M25 East	A3 North	A3 South
M25 West	3	5057	1159	1094
M25 East	4312	6	500	1318
A3 North	857	474	14	2724
A3 South	1130	985	2712	39

4.1.2. Speed of motor vehicles

National speed limits apply on the M25 (70 mph), A3 (70 mph) and the M25 J10 / A3 Interchange circulatory (60 mph).

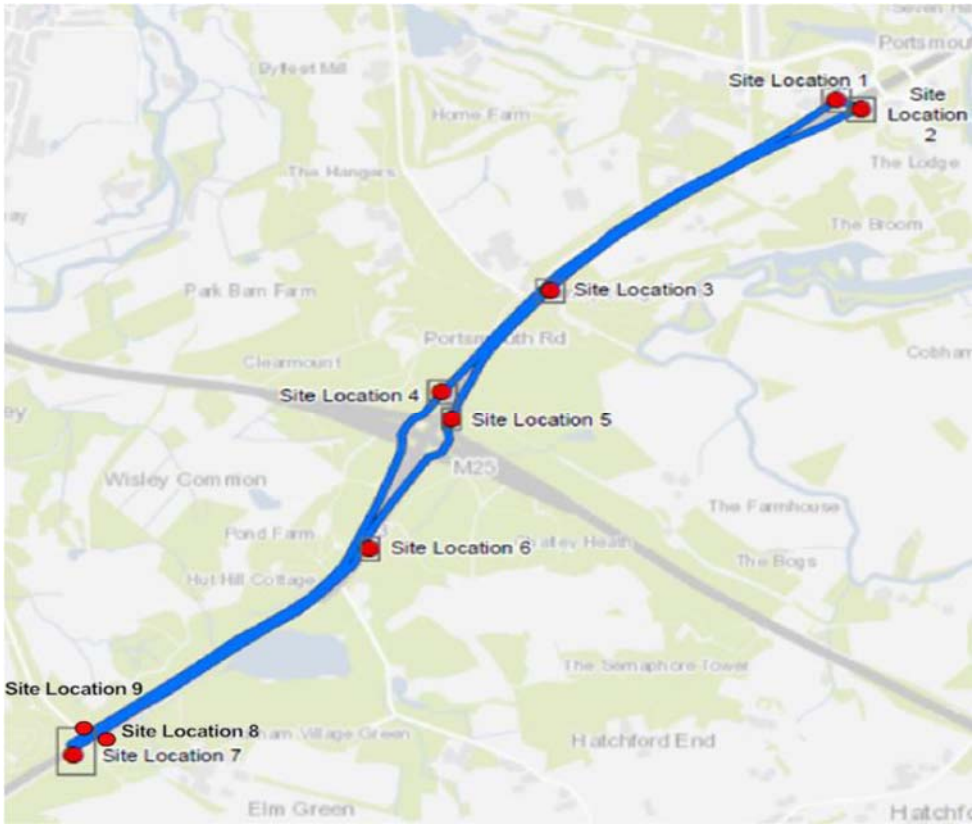
All the entrances onto the interchange are signalised. These points are where the motorised and non-motorised movements intersect. Considering the high speed limits in the wider junction area, the signalised crossings support the non-motorised route's continuity and enable the user's safe crossing.

4.2. Non-Motorised Users (NMU)

As part of the *"Integrated M25 DBFO Network Pedestrians, Cyclists & Equines Study" (2015),* 12 hour daily video camera surveys on a Wednesday, Thursday and Saturday in November 2014 were undertaken.

Survey camera locations were chosen to capture the most possible information with regards to NMU movements. These locations can be seen in Figure 4-1**Error! Reference source not found.**. The survey area covers the A3 from A3 Painshill Interchange up to A3 in Wisley Lane and Elm Lane including the M25 J10 / A3 Interchange area.

Figure 4-1 Camera locations in the Wider M25 J10 / A3 Interchange Area



Source: Integrated M25 DBFO Network Pedestrians, Cyclists & Equines Study (2015)

The total number of NMU movements (pedestrians and pedal cycles on/off road) recorded during the 12-hours surveys (Wednesday, Thursday and Saturday in November 2014) is presented in Table 4-5.

Table 4-5 All NMU movements recorded

	Wednesday	Thursday	Saturday
Number of NMU movements	120	153	67

Thursday 20th November 2014 had the highest number of NMU movements observed across the survey period and the results can be seen in Table 4-6.

Table 4-6 NMU movements recorded per location

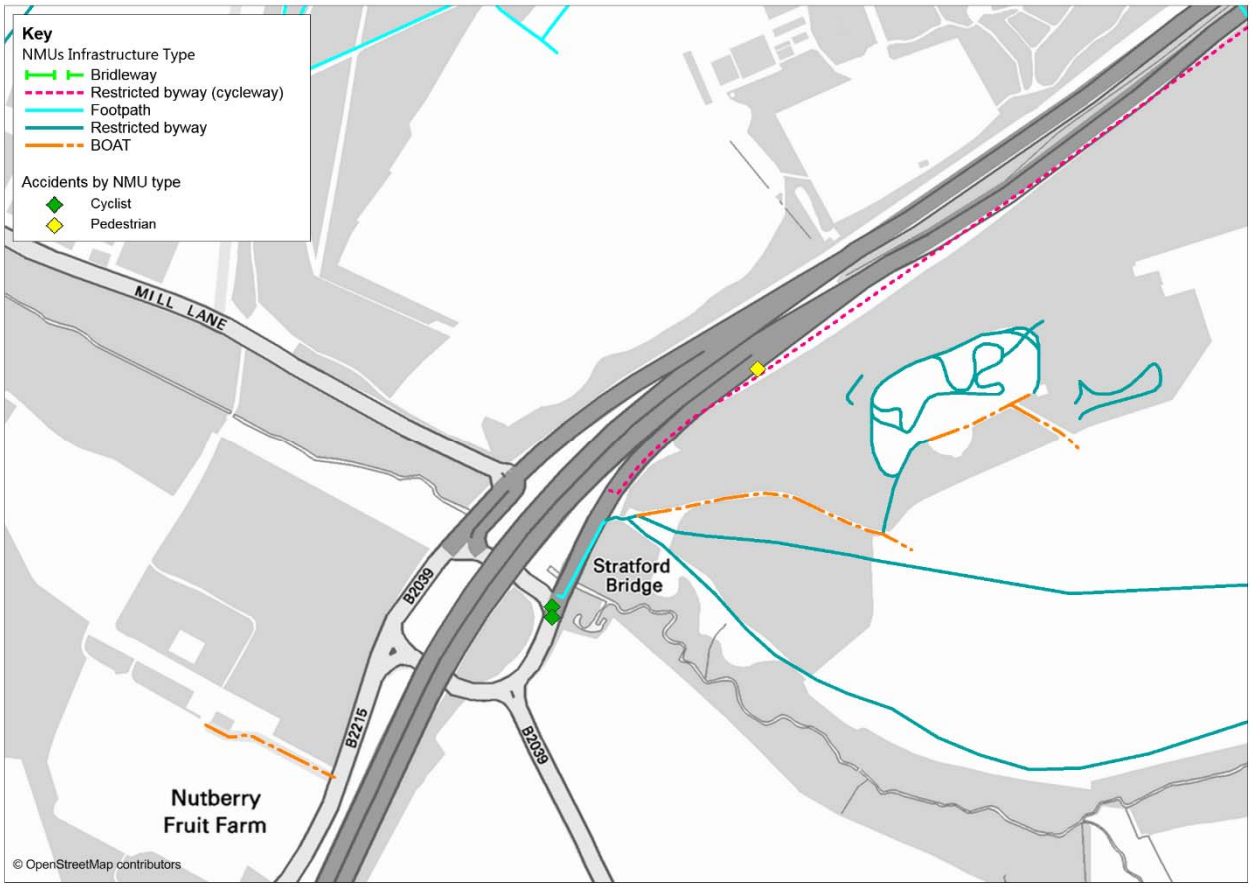
		Number of movements			
		Thursday	Thursday	Thursday	Thursday
Location	NMUs type	North	South	East	West
1	P/C	0	0		
	P/C road	1	0		
	Pedestrian	21	8		
	Total	**22**	**8**		
2	P/C			0	0
	P/C road			0	1
	Pedestrian			1	1
	Total			**1**	**2**
3	P/C	4	0		
	P/C road	0	2		
	Pedestrian	0	0		
	Total	**4**	**2**		
4	P/C	4	5		
	P/C road	1	0		
	Pedestrian	0	2		
	Total	**5**	**7**		
5	P/C			7	3
	P/C road	0	0	0	0
	Pedestrian			3	1
	Total	**0**	**0**	**10**	**4**
6	P/C	5	2	0	0
	P/C road				
	Pedestrian	1	0		
	Total	**6**	**2**	**0**	**0**
7	P/C			9	2
	P/C road				
	Pedestrian			15	19
	Total			**24**	**21**
8	P/C	2	6		
	P/C road	0	2		
	Pedestrian	5	4		
	Total	**7**	**12**		
9	P/C	1	0		
	P/C road				
	Pedestrian	8	7		
	Total	**9**	**7**		
	Grand Total	**53**	**30**	**35**	**27**

4.3. NMU accident records

The review of road traffic accident data can identify trends in collisions or injuries that can influence the behaviour of NMUs; including choice of route, or in some cases avoidance of travel.

2009 – 2013 accident data derived from Highways England were used to identify any accidents cluster or trends in the study area. The dataset does not include further information about the accident conditions, description and casualties so detailed analysis was not possible as part of this study. Three NMU related accidents were identified and are illustrated in Figure 4-2. Two cyclist (entering southbound or crossing the circulatory carriageway) and one pedestrian collisions were reported. All the three accidents occurred in at or in close proximity to the A3 Ockham Interchange. There are insufficient collisions to identify trends, however it is evident that two collisions involving cyclists took place on the Ockham interchange and this may warrant further investigation.

Figure 4-2 NMU accidents within the M25 J10 / A3 interchange scheme area of scope



4.4. Existing Rights of Way (RoW) routes

4.4.1. Definition

The types of routes which are considered 'Public Rights of Way' are presented in Table 4-7. The terms included in the Table 4-7 is a mix of information deriving from several sources such as Government UK[2], Ordnance Survey[3] and NatureNet[4] (all of them are stemming from Countryside and Rights of Way Act 2000).

Table 4-7 Public rights of way definitions

Type	Definition
Footpath	If the path is used for walking only, it is a footpath. Footpaths are legally protected route that the public can travel along by foot. These are different from footways (the pavement alongside a road), in that it means the whole width of the highway. Footpaths are usually just tracks, and are rarely surfaced or lit. They are open to walkers, runners and users of mobility vehicles or powered wheelchairs.
Bridleway	Bridleways are legally protected routes that the public can use on foot or on horseback. Cyclists are permitted to use the bridleways, although through the Countryside Act 1968 there is no obligation to facilitate the cyclists on the routes and they must give way to other users. Horse drawn vehicles are not permitted.
Byway open to all traffic (BOAT)	These are open to all forms of traffic; pedestrians, horse riders, cyclists and car and other motor vehicle drivers.
Restricted byway	On these routes there are restrictions on how you can travel. Individuals are permitted to use the route on foot, horseback, bicycle or horse drawn carriage. Motorised vehicles are not allowed along this route.
Permissive path	It is possible for landowners to allow access over their land without dedicating a right of way. These accesses are called permissive paths. To the user they are often indistinguishable from normal highways. Landowners have granted permission for the route to be used by the public but they also have the right to withdraw that permission if they choose. They can also specify which user groups are permitted to use these routes, which can include cyclists, equestrians and pedestrians.
Access land	This is an area where public have a right of access on foot (walking, running, climbing) under the Countryside and Rights of Way Act 2000. Although there may be footpaths and trails running across this land, there is no legal obligation for users to follow them. There are a number of exempted activities associated with Access land including cycling, horse riding, camping, driving a vehicle and walking animals (other than dogs, which have to be kept on a leash at certain times). The land can be used for these activities if expressly permitted by the landowner. On Ordnance Survey they are referred as Open Access Land.
Common land	Common land is private land over which both the landowners and commoners and members of the public have rights. The Countryside and Rights of Way Act 2000 introduced a right of access on foot over common land, which is a type of Access land under the Act. Each common often has its own rules with regards to permitted activities.
Green lane	This term has no legal meaning, but is sometimes used to describe Unclassified County Roads, which may have similar rights as on BOATs. They are sometimes referred to on Ordnance Survey mapping as Other Routes with Public Access and shown with either green or red dots.

[2] https://www.gov.uk/right-of-way-open-access-land

[3] https://www.ordnancesurvey.co.uk/blog/2011/08/rights-of-way/

[4] http://naturenet.net/row/rowdefinitions.html

The Rights of Way Network within the M25 J10 / A3 Interchange study area has been identified using OpenStreetMap[5], Google Maps[6] and the Surrey County Council Interactive Map[7].

In Figure 4-3, Figure 4-4 and Figure 4-5 the NMU infrastructure (derived from OpenStreetMap) is presented.

Figure 4-3 M25 J10 / A3 Interchange Wider Area NMUs Infrastructure

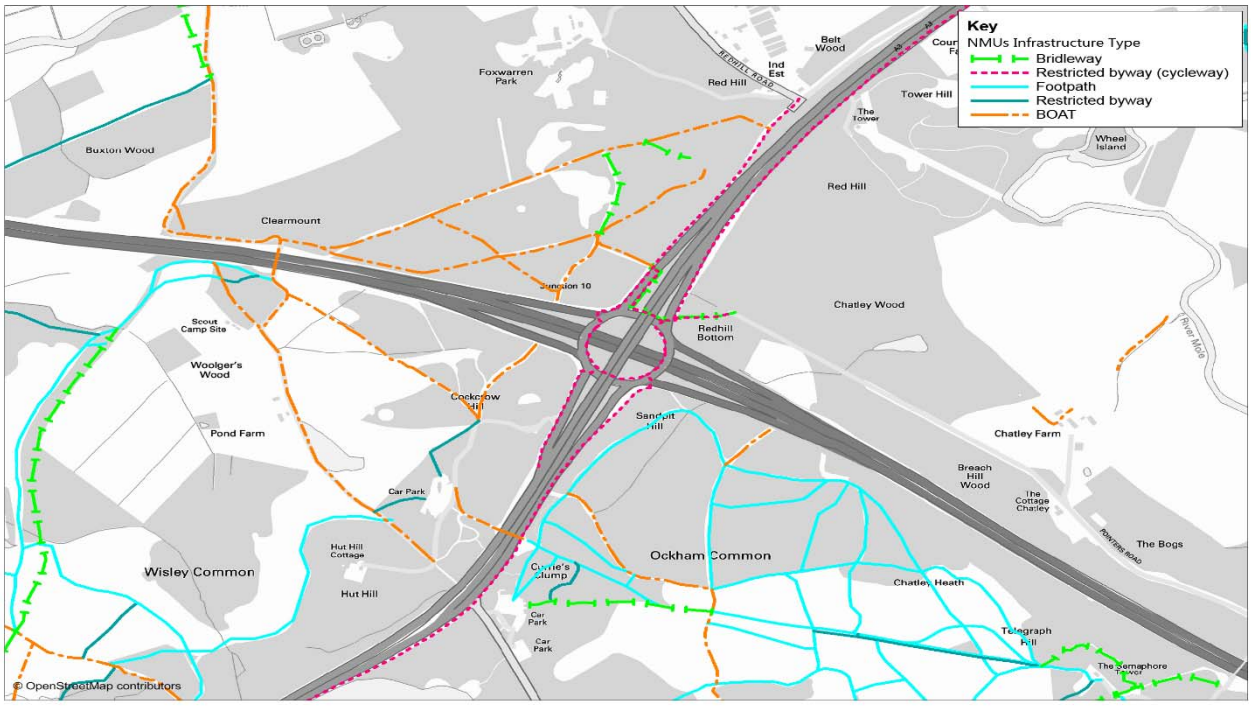
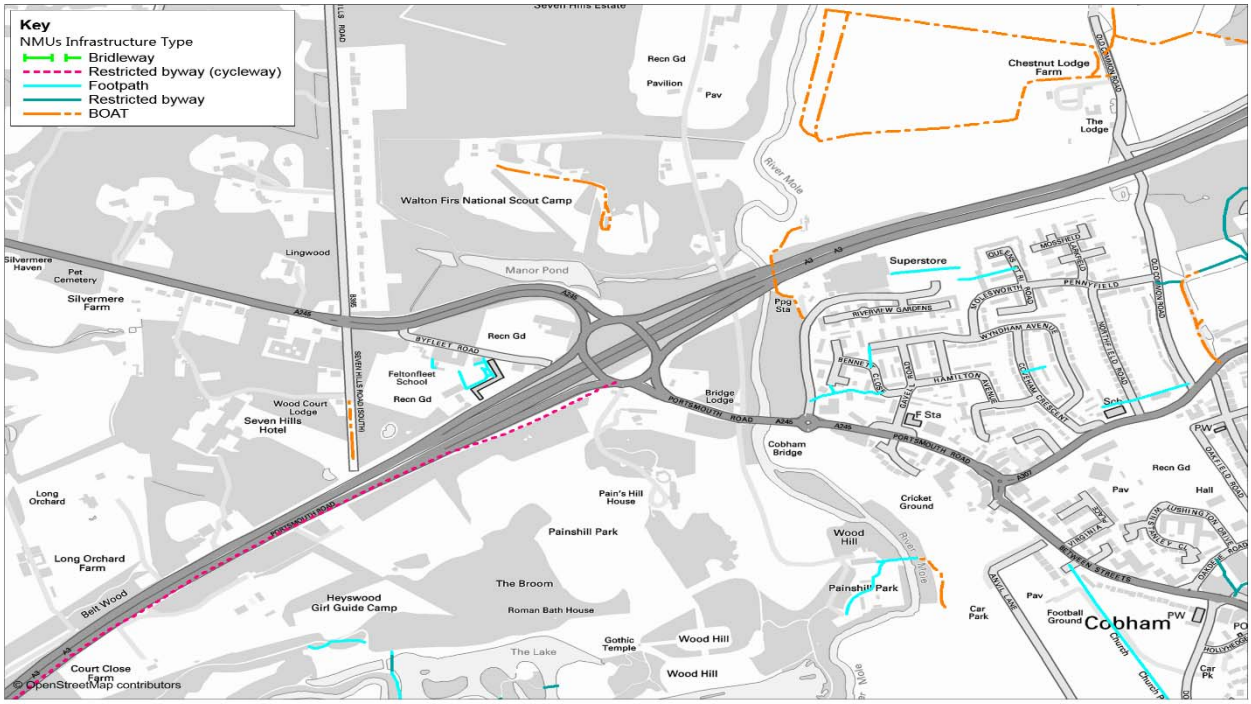


Figure 4-3 shows the NMU infrastructure network in the wider M25 J10 / A3 Interchange area. Considering the land use in the local area (Wisley and Ockham Commons) as well as existing trip generators (Wisley RHS Gardens), it can be assumed that the NMU infrastructure mainly accommodates leisure movements. This is supported by the generally low flows of NMUs observed during the survey period (see Section 4.2). NMU infrastructure in the vicinity of the junction includes shared use paths, footways, paths, tracks and bridleways. There is also a Pegasus crossing at M25 J10 and a bridleway travelling east to west.

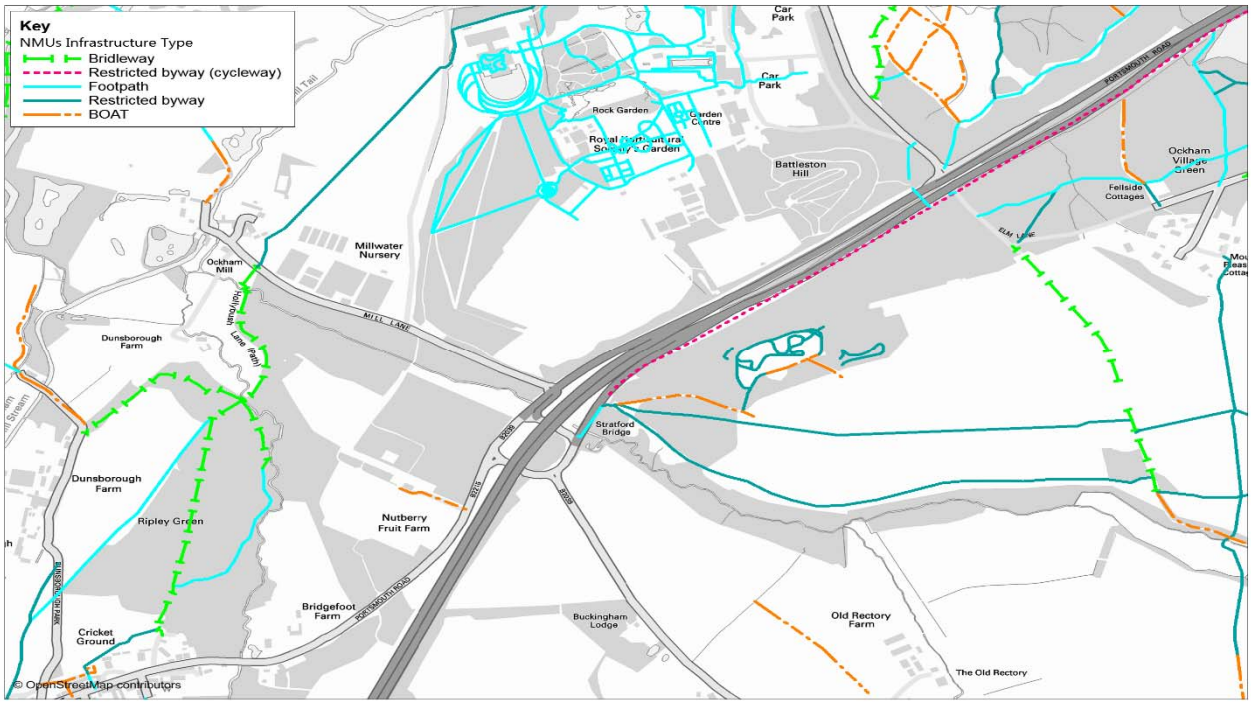
[5] https://www.openstreetmap.org/export#map=12/51.3062/-0.3605
[6] https://www.google.co.uk/maps/@51.3283424,-0.4444701,13.5z
[7] http://surreymaps.surreycc.gov.uk/public/viewer.asp

Figure 4-4 A3 Painshill Interchange wider area NMU infrastructure



In Figure 4-4 can be seen that the BOAT (shared use path) from the M25 J10 / A3 Interchange extends to the A3 Painshill Interchange to the North.

Figure 4-5 A3 Ockham Interchange wider area NMU infrastructure



In Figure 4-5 it can be seen that the same BOAT (shared use path) from the M25 J10 / A3 Interchange extends south to the A3 Ockham Interchange.

While provision for cycling does exists and there is an attempt to provide a cycling network, lack of continuity exists and the paths and crossing conditions are poor at various points of the study area.

4.5. NMU desire lines

There are two principal types of desire lines: utility desire lines and recreational desire lines.

- **Utility desire lines** are considered to be the desire lines associated with a direct need. This can be a need to work, shop, attend school or visit specific locations for a specific purpose. Usually, this type of desire line is a connection between the place of residence (source) and the location to be visited (destination). In this context, often users will take the perceived quickest route; sometimes this is the route with the shortest distance. Generally, it is this type of desire line which will see users making injudicious crossings of roads, where the risk is considered (by the individual user) to be less than the benefit gained in terms of time or distance.
- A **recreational desire line** tends to be circular walking, jogging, running or cycling route, or sometimes a return journey along a given corridor. Generally this type of use is much more informal, often will be carried out by people who have a detailed knowledge of the area. Unsafe NMU activity can be less prevalent in this user group, with the exception of when a user is unfamiliar with the routes or areas, and comes upon an obstruction which would require the user to turn back or take a risk to pass the obstruction encountered.

In second level of classification, desire lines are distinguished in two types:

- An **established desire line** is considered to be one for which reasonable facilities to accommodate NMU movements exist.
- A **potential desire line** is one for which barriers currently exist, although these barriers may not necessarily prevent its active use.

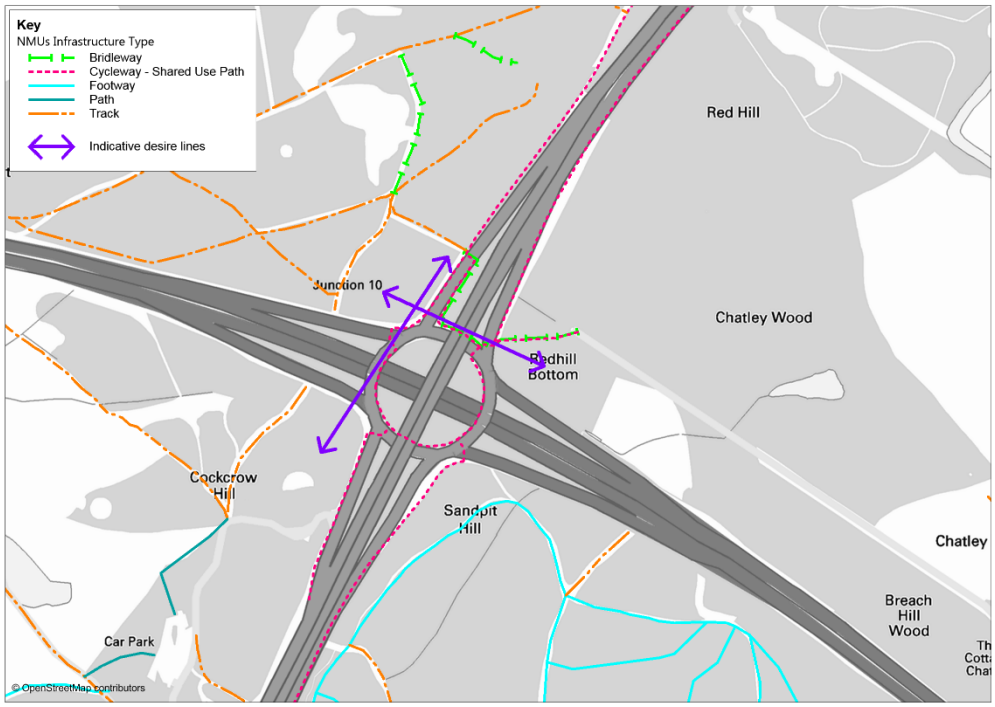
An effort to identify the desire lines of the NMUs in the study area was made based on the survey presented in Table 4-5 and Table 4-6.

Based on these results no clear desire lines can be identified. The low number of NMU movements in the M25 J10 / A3 Interchange area (Locations 4 and 5) do not enable a clear representation of desire lines to be deduced.

In an effort to identify the type of desire lines existing in the wider area, a ‘light touch’ analysis was carried out, resulting to high level initial conclusions to be drawn. The relatively low NMU flow figures deriving from the survey, in conjunction with the two-tier desire lines classification presented above and the land use types within the wider scheme area, could indicate that NMU established recreational desire lines exist in the area.

These indicative desire lines can be identified based on a high level analysis of the NMU flows survey results. In particular, from the figures recorded in Locations 4 (North of M25 and West of A3) and 5 (North of M25 and East of A3) a westbound flow crossing the A3 can be identified (10 movements). In addition, an indication of a southbound flow exists originating from the north-west quadrant of the junction to the south-west quadrant, probably heading to the Wisley Common. These indicative desire lines can be seen in Figure 4-6.

Figure 4-6 Indicative desire lines in M25 J10 / A3 Interchange



Slightly higher movement figures are observed in the south part of the survey area; in particular, at A3 in Wisley Lane and Elm Lane where a pedestrian bridge enables the A3 crossing movements (Locations 7,8, and 9). The highest number of movements are observed on the footbridge which accommodates the A3 cross-movements, and provides a parallel access to the Wisley RHS Gardens.

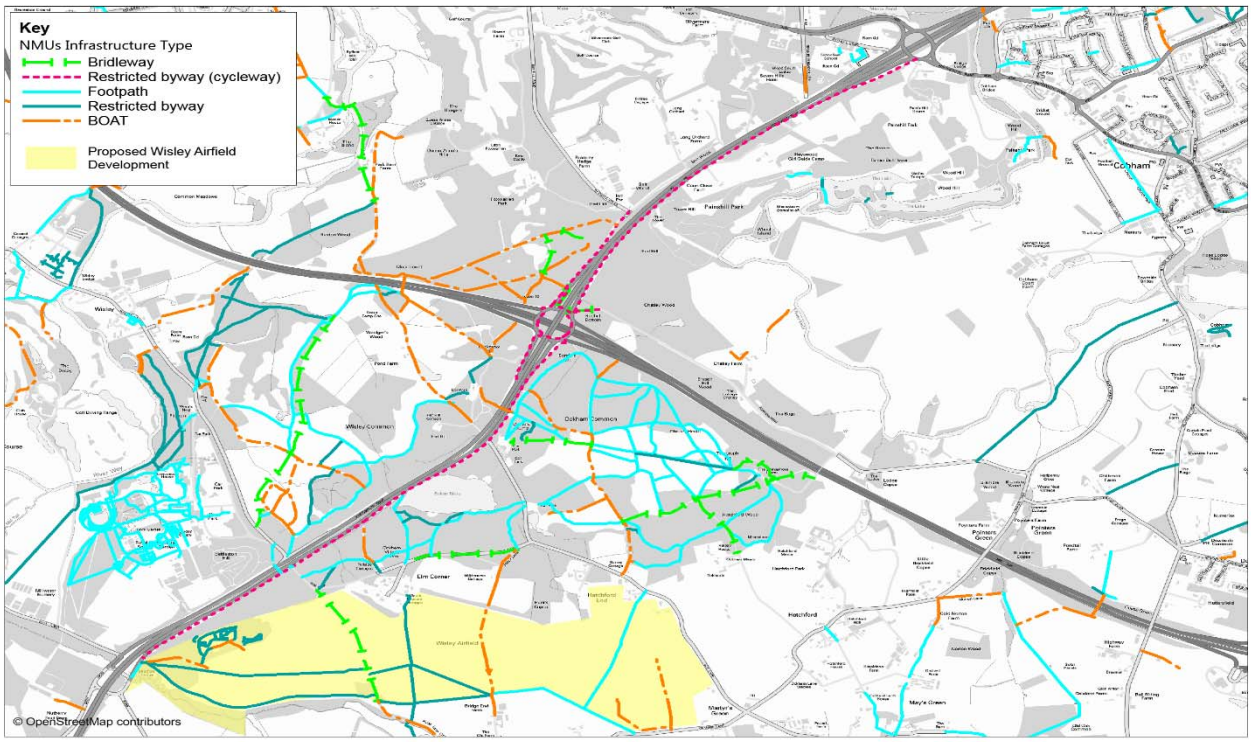
5. Existing and future trip generators

No major trip generators have been identified in the vicinity of the M25 J10 / A3 Interchange. Wisley RHS Gardens are located south of the M25 J10 /A3 Interchange. According to the survey carried out as part of the "*Integrated M25 DBFO Network Pedestrians, Cyclists & Equines Study*" *(2015)* these facilities do not attract a considerable number of NMU movements. A car park allows the visitors to park their vehicles adjacent to the facilities and it is assumed that this is the predominating form of access to and from the facilities, rather than active travel.

A residential development is proposed in the old Wisley Airfield site. According to the latest Outline Planning Permission[8] (rejected on April 2016), this will include up to 2,068 dwellings, a primary/secondary school, community provision, nursery provision, health facility, a local centre (incorporating food & drink, retail, a visitor centre and offices), employment area, 8 travellers pitches, sports and recreational facilities (incorporating a floodlit sports pitch and pavilion).

The proposed development site[9] can be seen in Figure 5-1.

Figure 5-1 Wisley Airfield proposed development site



The development is not anticipated to generate any considerable increase in NMU movements crossing through M25 J10 / A3 Interchange. On the contrary, the NMU movements generated due to the proposed development are likely to add pressure in the Rights of Way around the A3 Ockham Interchange, as a number of movements is likely to be attracted by community facilities located in Ripley and vice versa. Since A3 Ockham Interchange is where all the accidents in the area of scope have been observed from 2009 to 2013 the future additional potential NMU movements are likely to increase the risk of accidents in the wider junction area if measures are not taken.

[8] http://www2.guildford.gov.uk/publicaccess/applicationDetails.do?activeTab=documents&keyVal=_GUILD_DCAPR_157858&documentOrdering.orderBy=date&documentOrdering.orderDirection=descending

[9] Wisley Airfield, Summary of Development Proposals, Updated Information, January 2016

6. Conflict points

Obstacles and obstructions to desire lines can include natural and manmade features, including hills, rivers, busy roads and railways. Accessibility problems can also be significant barriers to movement for those who have special requirements. There are a number of areas around the M25 J10 / A3 Interchange and the wider area where tactile paving, and/or dropped kerbs are of poor quality, or stepped access is the only means of accessing areas. Barriers to movement can present major safety issues for some of the most vulnerable road users, either resulting in risky behaviour or avoidance of travel. The latter can be a cause of social isolation.

As part of the *"Integrated M25 DBFO Network Pedestrians, Cyclists & Equines Study" (2015)* a NMU assessment was carried out. The assessment evaluated whether improvements to infrastructure were required to comply with the Disability Discrimination Acts (DDA) 1995 and 2005. In this context, the following were considered:

- Suitability of facility (pedestrian, cycle or equine);
- Width of facility;
- Dropped kerbs;
- Tactile Paving;
- Crossing safety;
- Surface condition; and
- Maintenance.

To ensure that highway infrastructure is DDA compliant (now supplanted by the Equality Act 2010), in March 2010 the Highways Agency published a Design Compliance Assessment Guide. The type of infrastructure assessed in this NMU study is aligned with the content of this guide.

Figure 6-1 presents the NMU conflict assessment route. The issues identified during the NMU conflict assessment are presented in Table 6-1 and highlighted in Figure 6-1.

Figure 6-1 M25 J10 / A3 Interchange NMU assessment area

Source: Integrated M25 DBFO Network Pedestrians, Cyclists & Equines Study (2015)

The highlighted in red cells could be considered as conflict points and as potential barriers to the NMUs movement.

Table 6-1 Issues observed during the NMU assessment

Ref	Issues observed
1	Footway leads to the junction
2	Bus stop is not to standard
3	Bus stop is not to standard
4	Footpath doesn't have any sign or path signs
5	Bridleway intersects junction and cycle path - there are possible conflicts
6	Bridleway intersects junction and cycle path - there are possible conflicts
7	Cyclists using A3 main cycle path required to cut across slip road to access shared footpath – increase hazards
8	Access to shared footpath - condition and maintenance poor
9	Cyclists using overbridge path are required to cut across slip road to access shared footpath – increase hazard
10	No tactile paving at crossing
11	No tactile paving at crossing
12	Bus stop and footbridge are not protected. Footpath is very narrow - cyclists cannot pass. Not suitable for shared use
13	Footbridge is stepped – barrier for people with special requirements
79	Shared use path not compliant. Condition and maintenance poor.
126	Sign advises cyclists to use dedicated crossing but no crossing exists. Insufficient room for crossing, sign to be removed

The conflict points presented in the table above can be managed by providing appropriate crossings and routes for NMUs to either avoid the conflict or manage it to an acceptable level of risk. This is exactly the purpose of the *"Integrated M25 DBFO Network Walking and Cycling Improvements, A3 – Painshill to Ockham" (2015) Business Case* which was developed following the guidance from the *"Integrated M25 DBFO Network Pedestrians, Cyclists & Equines Study" (2015)*. According to this, "improvements on the pedestrian and cycling facilities on the M25/A3 Junction 10 where recommended in order to comply with the Disability Discrimination Act (DDA) on the network".

Conflict points are also predicted to arise from all the three proposed scheme options, as outlined below:

Option 9 - Dedicated left turns plus two free-flow right turns A3 to M25 J9 and A3 to M25 J11, Painshill and A3 D4AP:

- The scheme cuts across the cycle route-shared use path and bridleway in the north-east quadrant of the M25 J10 / A3 Interchange.
- The scheme cuts through the track and path in the south-west quadrant of the Interchange.
- The scheme's dedicated left turns cut off the cycle route–shared use paths alongside the A3 south and north from the Interchange.

Option 14 - Elongated plus dedicated left filters, Painshill and A3 D4AP:

- The scheme cuts across the cycle route – shared use paths alongside the A3 in, south and north from the M25 J10 / A3 Interchange.
- The scheme cuts across a short section of the existing tracks, paths, cycle route-shared use paths and bridleways in all the quadrants around the Interchange.

Option 16 - Free-flow (as J12), Painshill and A3 D4AP:

- The scheme cuts across the cycle route – shared use paths alongside the A3 in, south and north from the M25 J10 / A3 Interchange at a greater extent than Option 14
- The scheme cuts across a great part of the existing tracks, paths, cycle route-shared use paths and bridleways in all the quadrants around the Interchange

The aforementioned scheme related conflict points will be taken into consideration for the next stages of the option development process. The final scheme option will be developed to ensure that provision for pedestrians and cyclists is maintained or further improved.

7. Summary and recommendations

All the entrances of the M25 J10 / A3 Interchange are signalised. All the North-Southbound NMU routes are crossing the Interchange through these points. Considering the high speed limits in the wider junction area, the signalised crossings support the non-motorised route's continuity and enable the user's safe crossing.

An extensive network of NMUs infrastructure exists in the wider area of M25 J10 / A3 interchange linking all the surrounding quadrants as well as allowing the NMU north-south (and vice versa) movements between the A3 Painshill Interchange and A3 Ockham Interchange. The existing NMU infrastructure type mix in the area of scope (according to OpenStreetMaps website) is:

- Footway
- Path
- Track
- Cycleway - Shared Use Path
- Bridleway

The camera based survey results derived from *"Integrated M25 DBFO Network Pedestrians, Cyclists & Equines Study" (2015)*, are not strong enough to enable us to identify distinct NMU desire lines in the area. However, these results in conjunction to the areas land uses and the existing Rights of Way could lead us to the conclusion that the desire lines are recreational and established. This means that the use of the NMU infrastructure is carried out for informal leisure purposes.

Under the existing conditions a number of conflict point concerning the existing NMU infrastructure have been identified which are not prevent their active use.

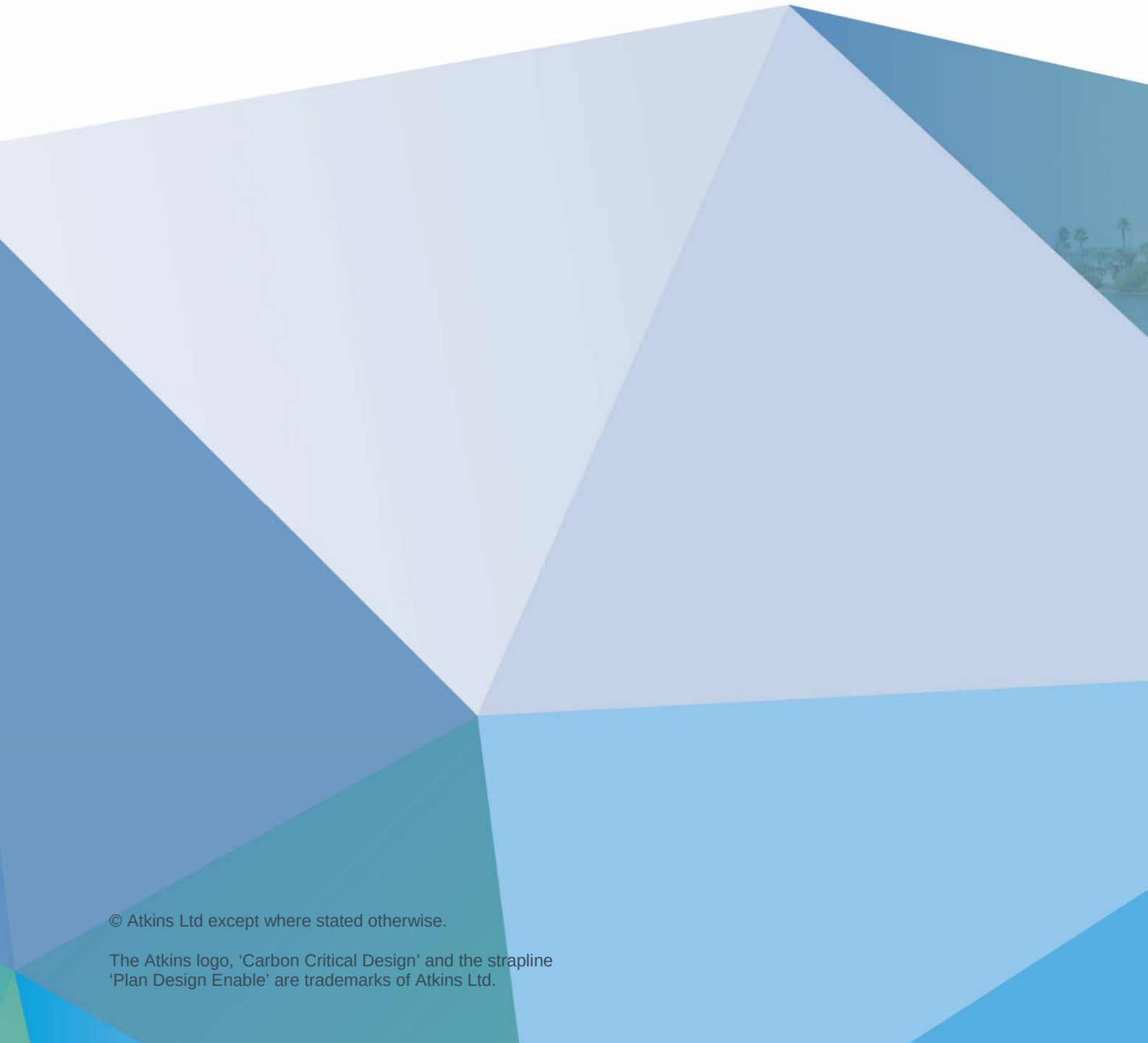
All the aforementioned scheme related conflict points will be taken into consideration for the next stages of the option development process. The final scheme option will be developed to ensure that provision for pedestrians and cyclists is maintained or further improved.

In the context of identifying NMU desire lines it is recommended:

- Additional NMUs flows survey to be carried out, including more recording locations; and
- Contact local walking and cycling groups and incorporate their input in the study.

Contact name
Atkins company name
Office address

Email
Telephone
Direct telephone
Fax



Appendix C Technology equipment schedule

ITS Equipment on A3

Category	Variant	Geog
MIDAS	Loop Site - Main Carriageway	0123A
MIDAS	Loop Site - Exit Slip Rd	0125J
MIDAS	Loop Site - Main Carriageway	0131B
MIDAS	Loop Site - Exit Slip Rd	0128L
Category	**Variant**	**Geog**
Structures - Cantilevers	MS3 Cantilever	0104A
Structures - Cantilevers	MS3 Cantilever	0117A
Structures - Cantilevers	MS3 Cantilever	0143B
Structures - Cantilevers	MS3 Cantilever	0152B
Category	**Variant**	**Geog**
Closed Circuit TV	Camera 1st Generation	5085B
Closed Circuit TV	Camera 2nd Generation	5099B
Closed Circuit TV	Camera 1st Generation	5106A
Closed Circuit TV	Camera 1st Generation	5113B
Closed Circuit TV	Camera 2nd Generation	5152B
Category	**Variant**	**Geog**
Cabinets	Elec Supply Un-meter	0117A
Cabinets	Elec Supply Un-meter	0123A
Cabinets	Elec Interface (Un-Meter)	5088B
Cabinets	Elec Interface (Un-Meter)	5096B
Cabinets	Elec Interface (Un-Meter)	5105A
Cabinets	Elec Interface (Un-Meter)	5114B
Cabinets	Elec Interface (Un-Meter)	5170A
Cabinets	Haldo (Un-Meter)	2632
Cabinets	Haldo (Un-Meter)	2633
Category	**Variant**	**Geog**
ANPR	Camera	2632
ANPR	Camera	2632
ANPR	Camera	2633
ANPR	Camera	2633

ITS Equipment on M25

Category	Variant	Geog
MIDAS	Loop Site - Main Carriageway	4700A
MIDAS	Loop Site - Main Carriageway	4700B
MIDAS	Loop Site - Main Carriageway	4704A
MIDAS	Loop Site - Main Carriageway	4704B
MIDAS	Loop Site - Main Carriageway	4707A
MIDAS	Loop Site - Main Carriageway	4708B
MIDAS	Loop Site - Main Carriageway	4712A
MIDAS	Loop Site - Main Carriageway	4713B
MIDAS	Loop Site - Main Carriageway	4717A
MIDAS	Loop Site - Main Carriageway	4717B
MIDAS	Loop Site - Main Carriageway	4721A
MIDAS	Loop Site - Main Carriageway	4722B
MIDAS	Loop Site - Main Carriageway	4727A
MIDAS	Loop Site - Main Carriageway	4727B
MIDAS	Loop Site - Main Carriageway	4732A
MIDAS	Loop Site - Main Carriageway	4732B
MIDAS	Loop Site - Main Carriageway	4737A
MIDAS	Loop Site - Main Carriageway	4737B
MIDAS	Loop Site - Main Carriageway	4742A
MIDAS	Loop Site - Main Carriageway	4742B
MIDAS	Loop Site - Entry Slip Rd	4722M
MIDAS	Loop Site - Entry Slip Rd	4727K
MIDAS	Loop Site - Exit Slip Rd	4707J
MIDAS	Loop Site - Exit Slip Rd	4712J
MIDAS	Loop Site - Exit Slip Rd	4717J
MIDAS	Loop Site - Exit Slip Rd	4721J
MIDAS	Loop Site - Exit Slip Rd	4727L
Category	**Variant**	**Geog**
Message Sign	2x12 Message Sign V2	4727B
Message Sign	2x12 Message Sign V2	4734A
Message Sign	2x12 Message Sign V2	4734B
Message Sign	2x12 Message Sign V2	4741A
Message Sign	2x12 Message Sign V2	4741B
Message Sign	2x12 Verge Type D	4704B
Message Sign	2x12 Verge Type D	4712B
Message Sign	2x12 Verge Type D	4717A
Message Sign	2x12 Verge Type D	4721A
Message Sign	2x12 Verge Type D	4722B

Category	Variant	Geog
Signal	AMI Enforcement	4741A1

Category	Variant	Geog
Signal	AMI Enforcement	4741A2
Signal	AMI Enforcement	4741A3
Signal	AMI Enforcement	4741A4
Signal	AMI Enforcement	4741B1
Signal	AMI Enforcement	4741B2
Signal	AMI Enforcement	4741B3
Signal	AMI Enforcement	4741B4
Signal	AMI Non-Enforcement	4700A1
Signal	AMI Non-Enforcement	4700A2
Signal	AMI Non-Enforcement	4700A3
Signal	AMI Non-Enforcement	4700A4
Signal	AMI Non-Enforcement	4704B1
Signal	AMI Non-Enforcement	4704B2
Signal	AMI Non-Enforcement	4704B3
Signal	AMI Non-Enforcement	4704B4
Signal	AMI Non-Enforcement	4708A1
Signal	AMI Non-Enforcement	4708A2
Signal	AMI Non-Enforcement	4708A3
Signal	AMI Non-Enforcement	4708J1
Signal	AMI Non-Enforcement	4713B1
Signal	AMI Non-Enforcement	4713B2
Signal	AMI Non-Enforcement	4713B3
Signal	AMI Non-Enforcement	4713B4
Signal	AMI Non-Enforcement	4717A1
Signal	AMI Non-Enforcement	4717A2
Signal	AMI Non-Enforcement	4717A3
Signal	AMI Non-Enforcement	4717J1
Signal	AMI Non-Enforcement	4721A1
Signal	AMI Non-Enforcement	4721A2
Signal	AMI Non-Enforcement	4721A3
Signal	AMI Non-Enforcement	4721J1
Signal	AMI Non-Enforcement	4721J2
Signal	AMI Non-Enforcement	4722B1
Signal	AMI Non-Enforcement	4722B2
Signal	AMI Non-Enforcement	4722B3
Signal	AMI Non-Enforcement	4723M1
Signal	AMI Non-Enforcement	4723M2
Signal	AMI Non-Enforcement	4725K1
Signal	AMI Non-Enforcement	4725K2
Signal	AMI Non-Enforcement	4727B1
Signal	AMI Non-Enforcement	4727B2
Signal	AMI Non-Enforcement	4727B3
Signal	AMI Non-Enforcement	4727L1
Signal	AMI Non-Enforcement	4727L2

Category	Variant	Geog
Signal	AMI Non-Enforcement	4734A1
Signal	AMI Non-Enforcement	4734A2
Signal	AMI Non-Enforcement	4734A3
Signal	AMI Non-Enforcement	4734A4
Signal	AMI Non-Enforcement	4734B1
Signal	AMI Non-Enforcement	4734B2
Signal	AMI Non-Enforcement	4734B3
Signal	AMI Non-Enforcement	4734L1
Category	**Variant**	**Geog**
Closed Circuit TV	Camera	4706A
Closed Circuit TV	Camera	4712B
Closed Circuit TV	Camera	4724B
Closed Circuit TV	Camera	4725B
Closed Circuit TV	Camera	4732B
Closed Circuit TV	Camera	4741A
Category	**Variant**	**Geog**
Telephone	354 Pod	4700A
Telephone	354 Pod	4700B
Telephone	354 Pod	4706A
Telephone	354 Pod	4706B
Telephone	354 Pod	4713A
Telephone	354 Pod	4713B
Telephone	354 Pod	4724A
Telephone	354 Pod	4724B
Telephone	354 Pod	4734A
Telephone	354 Pod	4734B
Telephone	354 Pod	4740A
Telephone	354 Pod	4740B
Category	**Variant**	**Geog**
Meterology	Visibility Sensor VPF730	4699A
Meterology	Visibility Sensor VPF730	4726B
Meterology	Visibility Sensor VPF730	4741A
Category	**Variant**	**Geog**
N/A	Lucy Cabinet (Un-meter)	4703A
N/A	Lucy Cabinet (Un-meter)	4725K
N/A	Lucy Cabinet (Un-meter)	4723J
N/A	Lucy Feeder Pillar	4725K

Category	Variant	Geog
N/A	Cabinet 609 EB (Un-meter)	4750B

Category	Variant	Geog
N/A	Cabinet 609 EB (Un-meter)	4733B
N/A	Cabinet 609 EB (Un-meter)	4745B
N/A	Cabinet 609 EI (Metered)	4711A

Third party Equipment

Asset Type	Asset ID	Monitoring Location
TAME - loops	30350141	A3 Southbound- South of M25 Junction 10
TAME - loops	30350142	A3 Northbound- South of M25 Junction 10
TMU - loops	5534 (03-034)	A3 southbound exit for B2039 A3 southbound between B2039 and A247
ANPR- Cameras	2632 (05-532)	A3 northbound between B2039 and M25 A3 southbound within the M25 junction
TMU - loops	6001 (05-001)	A3 northbound exit for M25 A3 northbound within the M25 junction
TMU - loops	6002 (05-002)	A3 southbound exit for M25 A3 southbound within the M25 junction
TAME - loops	30350391	A3 N&S Portsmouth Road - Painshill
TMU - loops	6003 (05-003)	A3 northbound exit for A245 A3 northbound within the A245 junction
TMU - loops	6004 (05-004)	A3 southbound exit for A245 A3 southbound within the A245 junction
TAME - loops	30351152	M3 J2-1 E&W bound
TAME - loops	30351136	A3 NB Painshill – Esher Common
TAME - loops	30351135	A3 SB Painshill – Esher Common

Appendix D Option drawings

DO NOT SCALE

Millimetres 100 0 10

RIPLEY

LOCAL ACCESS:
- 2 WAY CARRIAGEWAY
- 3.65m LANES
- 2.5m VERGE
- TO BE PROVIDED ADJACENT TO CARRIAGEWAY WITH VISUAL SCREEN/ENVIRONMENTAL BARRIER

A3 OCKHAM PARK JUNCTION

EXTENT OF SCHEME

EXTENT OF SCHEME

6079 OCKHAM PARK SOUTH UNDERBRIDGE

6078 OCKHAM PARK NORTH UNDERBRIDGE

SEGREGATED SOUTHBOUND DIRECTION CLOSED OFF

6089 STRATFORD BROOK CULVERT SOUTH

OCKHAM RETAINING WALL

B2215 PORTSMOUTH ROAD

B2039 OCKHAM ROAD NORTH

MILL LANE

ROSE LANE

ROSE LANE OVERBRIDGE

A3

LONDON

GUILDFORD & PORTSMOUTH

0 100 200 300 400 500 600 700 800 900 1000 1040

MAINLINE AS EXISTING THREE LANE LAYOUT

SLIP ROAD AS EXISTING TWO LANES

SLIP ROAD AS EXISTING TWO LANE LAYOUT

SLIP ROAD UPGRADED FROM ONE TO TWO LANES

MAINLINE AS EXISTING THREE LANE LAYOUT

FOR CONTINUATION REFER TO SHEET 2

RHS GARDEN WISLEY

This map is based on Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways England 100019928, 2015.

Scale 1:2500

50m 0m 50m 100m 150m

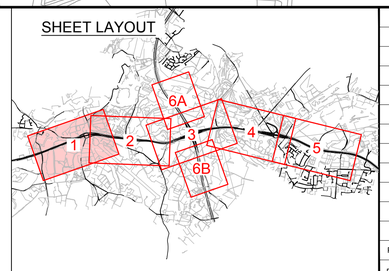
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT
A3 CORRIDOR
SHEET 1 OF 6

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	**Date**	**Date**	**Date**	**Date**
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 0161

Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156474\HE551522-ATK-HGN-M25J10-DR-D-0161.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:44am

DO NOT SCALE

Millimetres 0 10 100

RHS GARDEN WISLEY

FOR CONTINUATION REFER TO SHEET 1

A3 CARRIAGEWAY UPGRADED TO D4AP. FOR CROSS SECTION SEE IAN 149 TABLE 4-1. PRIORITY 9 WITH 0.7m HARDSTRIP.

MERGE UPGRADED TO TD 27 TYPE F MERGE

PROPOSED SINGLE SPAN GANTRY SPAN 25m

WISLEY LANE

LOCAL ACCESS:
- 2 WAY CARRIAGEWAY
- 3.65m LANES
- 2.5m VERGE
- TO BE PROVIDED ADJACENT TO CARRIAGEWAY WITH VISUAL SCREEN/ENVIRONMENTAL BARRIER

A3 DIRECT ACCESS / EGRESS TO WISLEY LANE AND LAYBY CLOSED

PROPOSED SINGLE SPAN GANTRY SPAN 25m

PROPOSED RETAINING WALL LENGTH 180m

PROPOSED SUPER SPAN GANTRY SPAN 50m

FOR CONTINUATION REFER TO SHEET 3

A3

DIVERGE UPGRADED TO TD 27 TYPE D DIVERGE

6050 WISLEY FOOTBRIDGE. EXISTING FOOTBRIDGE TO BE REPLACED. NEW SPAN 55m

ELM LANE

ACCESS / EGRESS TO ELM LANE TO BE CLOSED AND DIVERTED TO OLD LANE

MERGE UPGRADED TO TD 27 TYPE F MERGE

MAINLINE UPGRADED TO D4AP. FOR CROSS SECTION SEE IAN 149 TABLE 4-1. PRIORITY 9 WITH 0.7m HARDSTRIP.

MAINLINE AS EXISTING TWO LANE LAYOUT THROUGH JUNCTION

BOLDER MERE

OLD LANE

FORMER WISLEY AIRFIELD
(SUBJECT TO DEVELOPMENT)

ELM LANE

ELM LANE TO BE CONNECTED TO OLD LANE VIA HATCH LANE OR BOAT (BYWAY OPEN TO ALL TRAFFIC)

HATCH LANE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Scale 1:2500
50m 0m 50m 100m 150m

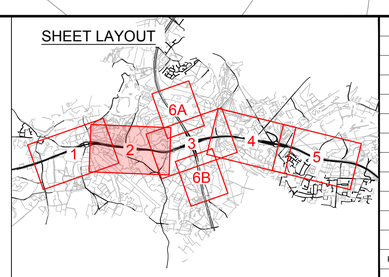
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION
Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT
A3 CORRIDOR
SHEET 2 OF 6

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	**Date**	**Date**	**Date**	**Date**
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 0162

Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156474\IHE551522-ATK-HGN-M25J10-DR-D-0162.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:44am

DO NOT SCALE

Millimetres 100 10 0

HEATHROW

M25

FOR CONTINUATION REFER TO SHEET 6 - VIEW A

M25 JUNCTION 10 / A3 WISLEY INTERCHANGE

BRIDGE STRUCTURE SPAN 62m

BRIDGE STRUCTURE SPAN 30m

NEW CULVERT REQUIRED. LENGTH 130m ASSUME 900mm Dia.

IL2A

ALL SLIP ROADS: PAVEMENT TO BE REMOVED, OR PUNCTURED AT 1m SPACINGS WITH 0.5m HOLES AND PLANTED. ROUNDABOUT PAVEMENT AND BRIDGE STRUCTURES TO REMAIN IN-SITU

TUMULUS: ANCIENT MONUMENT

IL2A

TYPE E DIVERGE

FOR CONTINUATION REFER TO SHEET 2 (SEE BOXED NOTE BELOW)

TUNNELLED STRUCTURE (HEADING & BENCH OR BOX JACKED) APPROX LENGTH 65m

6152 WISLEY INTERCHANGE SOUTH UNDERBRIDGE (LEVEL 2)

3533 WISLEY INTERCHANGE WEST UNDERBRIDGE (LEVEL 2)

BRIDGE STRUCTURE LENGTH 100m MAX SPAN 20m

15186 REDHILL RETAINING WALL

FOR CONTINUATION REFER TO SHEET 4 (SEE BOXED NOTE BELOW)

A3

BOLDER MERE

ACCESS / EGRESS TO OLD LANE TO BE REMOVED AND DIVERTED VIA OCKHAM LANE AND OCKHAM ROAD NORTH TO OCKHAM PARK JUNCTION

OLD LANE

6156 COCKROW FOOTBRIDGE. EXISTING FOOTBRIDGE TO BE REPLACED. TOTAL SPAN 90m.

6100 WISLEY INTERCHANGE NORTH UNDERBRIDGE (LEVEL 2)

3514 WISLEY INTERCHANGE A3 UNDERBRIDGE (LEVEL 3)

3512 WISLEY INTERCHANGE EAST UNDERBRIDGE (LEVEL 2)

TUNNELLED STRUCTURE (HEADING & BENCH OR BOX JACKED) APPROX LENGTH 45m

IL2A

PROPOSED SUPER SPAN GANTRY SPAN 35m

TYPE E DIVERGE

BRIDGE STRUCTURE LENGTH 100m MAX SPAN 20m

EARTHWORKS MAX HEIGHT 2m 0-10m RETAINING WALL AT TOE-LENGTH 80m

IL2A

NEW CULVERT REQUIRED.

ALL SLIP ROADS: PAVEMENT TO BE REMOVED, OR PUNCTURED AT 1m SPACINGS WITH 0.5m HOLES AND PLANTED. ROUNDABOUT PAVEMENT AND BRIDGE STRUCTURES TO REMAIN IN-SITU

BRIDGE STRUCTURE SPAN 29m

NEW CULVERT REQUIRED.

BRIDGE STRUCTURE SPAN 62m

FOR CONTINUATION REFER TO SHEET 6 - VIEW B

M25

GATWICK

Scale 1:2500

50m 0m 50m 100m 150m

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

NOTES

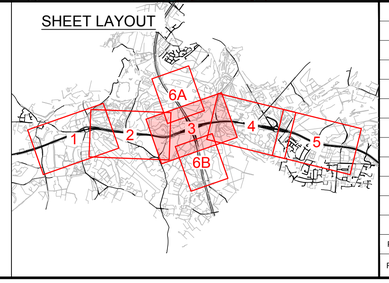
1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

JUNCTION 10 OPTIONS VARY FOR SHEET 3 (AND SHEET 6). PRINCIPLE OF A3 D4AP OUTWITH JUNCTIONS IS CONSISTENT FOR EACH OPTION. VARIATION OCCURS IN MERGE/DIVERGE LAYOUT ARRANGEMENTS ONLY.

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT A3 CORRIDOR WITH OPTION 16 (CYCLIC FREEFLOW) SHEET 3 OF 6

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	**Date**	**Date**	**Date**	**Date**
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 0163

Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156474\IHE551522-ATK-HGN-M25J10-DR-D-0163.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:43am

DO NOT SCALE

Millimetres 0 10 100

A3/A245 PAINSHILL JUNCTION

A245 UPGRADED WITH 3 LANES IN EACH DIRECTION

MAINLINE AS EXISTING THREE LANE LAYOUT THROUGH JUNCTION

A245 BYFLEET ROAD

SEVEN HILLS ROAD

NEW TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT TO ALLOW FOR ADDITIONAL LANE FROM SEVEN HILLS JUNCTION TO PAINSHILL JUNCTION ROUNDABOUT

NEW TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT TO ENABLE DEDICATED LEFT TURN LANE

NEW TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT TO ENABLE POTENTIAL DEDICATED LEFT TURN LANE

FOR CONTINUATION REFER TO SHEET 5

FOR CONTINUATION REFER TO SHEET 3

MERGE UPGRADED TO TYPE G TWO LANE GAIN

MAINLINE AS EXISTING TWO LANE LAYOUT THROUGH JUNCTION

MAINLINE UPGRADED TO D4AP FOR CROSS SECTION SEE IAN 149 TABLE 4-1 PRIORITY 9 WITH 0.7m HARDSTRIP

DIVERGE UPGRADED TO TYPE D

FELTON FLEET SCHOOL

6073 PAINSHILL INTERCHANGE WEST OVERBRIDGE

6075 PAINSHILL NORTH-WEST RETAINING WALL

6070 CONVENT LANE UNDERBRIDGE

6072 PAINSHILL INTERCHANGE EAST OVERBRIDGE

4.1m LOCAL ACCESS TO BE PROVIDED ADJACENT TO CARRIAGEWAY WITH VISUAL SCREEN/ENVIRONMENTAL BARRIER

A3

3800 3900 4000 4100 4200 4300 4400 4500 4600 4700 4800 4900 5000 5100 5200 5300 5400 5500 5600

EXTENT OF SCHEME

6074 PAINSHILL SOUTH-WEST RETAINING WALL

PROPOSED SUPER SPAN GANTRY SPAN 45m

4.1m LOCAL ACCESS TO BE PROVIDED ADJACENT TO CARRIAGEWAY WITH VISUAL SCREEN/ENVIRONMENTAL BARRIER

10m OF EXISTING RETAINING WALL TO BE RENEWED

OFFSIDE SLIP ROAD WIDENING, EARTHWORKS TO BE MODIFIED

RIVER MOLE

A245 PORTSMOUTH ROAD

MAINLINE UPGRADED TO D4AP FOR CROSS SECTION SEE IAN 149 TABLE 4-1 PRIORITY 9 WITH 0.7m HARDSTRIP

AS EXISTING THREE LANE LAYOUT THROUGH JUNCTION

MERGE UPGRADED TO TYPE F

PAINSHILL PARK

Scale 1:2500

50m 0m 50m 100m 150m

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

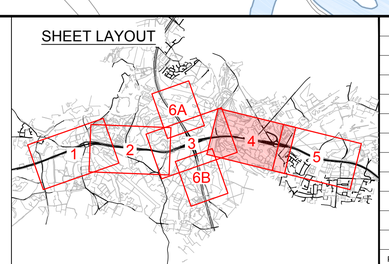
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION

Suitability: S2

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT A3 CORRIDOR SHEET 4 OF 6

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size: A1	Date 19/09/16	Date 19/09/16	Date 19/09/16	Date 20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 0164

Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156474\HE551522-ATK-HGN-M25J10-DR-D-0164.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:43am

DO NOT SCALE

Millimetres 0 10 100

MAINLINE AS EXISTING THREE LANE LAYOUT THROUGH JUNCTION

FOR CONTINUATION REFER TO SHEET 4

EXISTING TYPE B MERGE

6069 RIVER MOLE UNDERBRIDGE

EXTENT OF SCHEME

A3

5400 5500 5600 5700 5800 5900 6000 6100 6200 6300 6400 6500 6600

LONDON

GUILDFORD & PORTSMOUTH A3

ELVEDEN ROAD OVERBRIDGE

6068 OLD COMMON ROAD SUBWAY

RIVER MOLE

A245 PORTSMOUTH ROAD

COBHAM

Scale 1:2500

50m 0m 50m 100m 150m

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

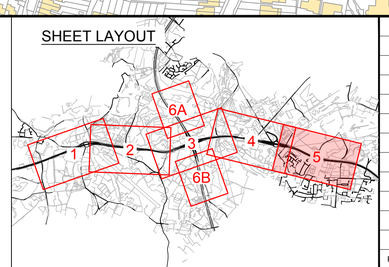
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT
A3 CORRIDOR
SHEET 5 OF 6

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size: A1	Date: 19/09/16	Date: 19/09/16	Date: 19/09/16	Date: 20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 0165

Project Ref. No.: 5145620

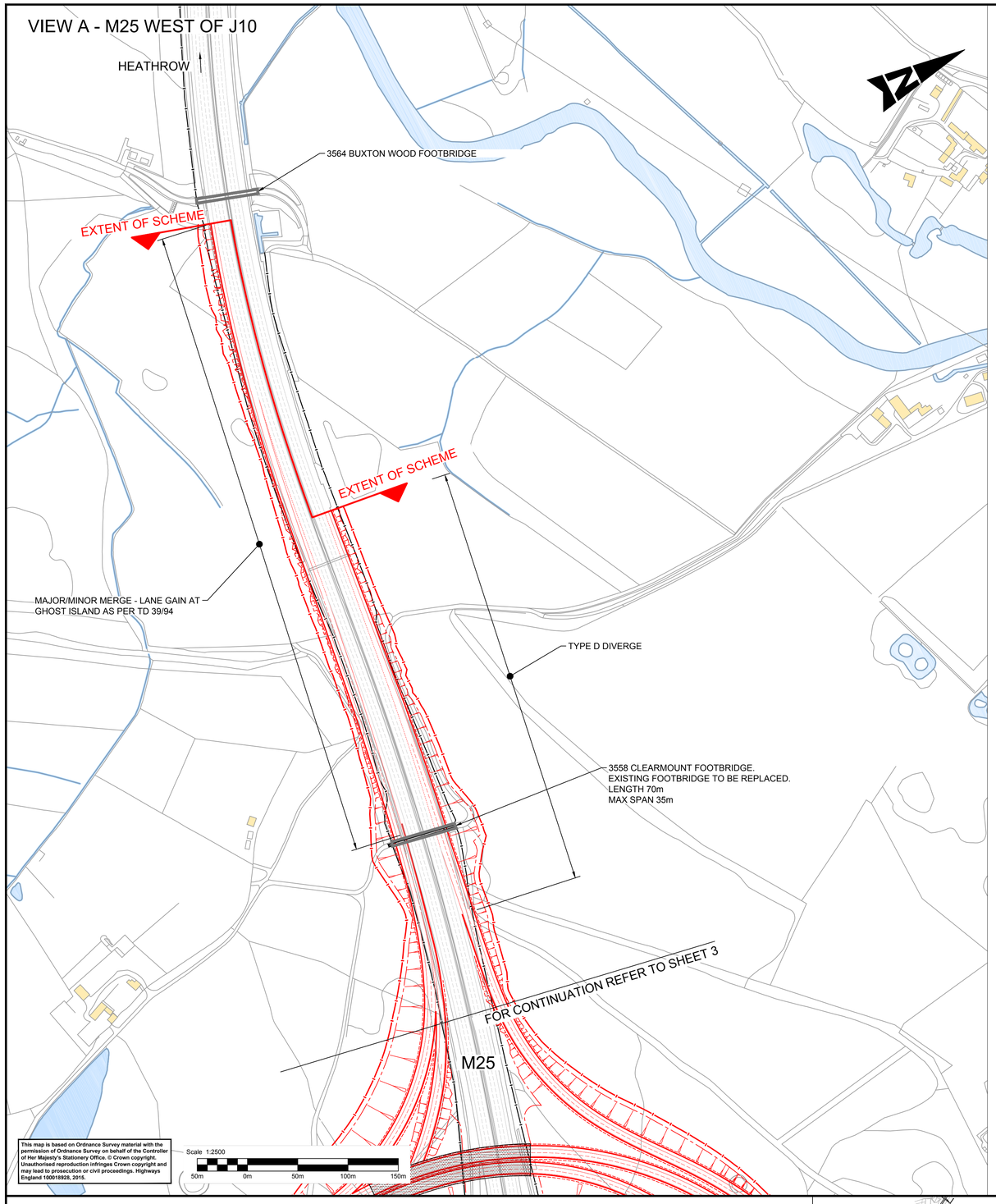
Revision: P01

D:\projectwise\d0156474\HE551522-ATK-HGN-M25J10-DR-D-0165.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:43am

DO NOT SCALE

Millimetres 100 0 10

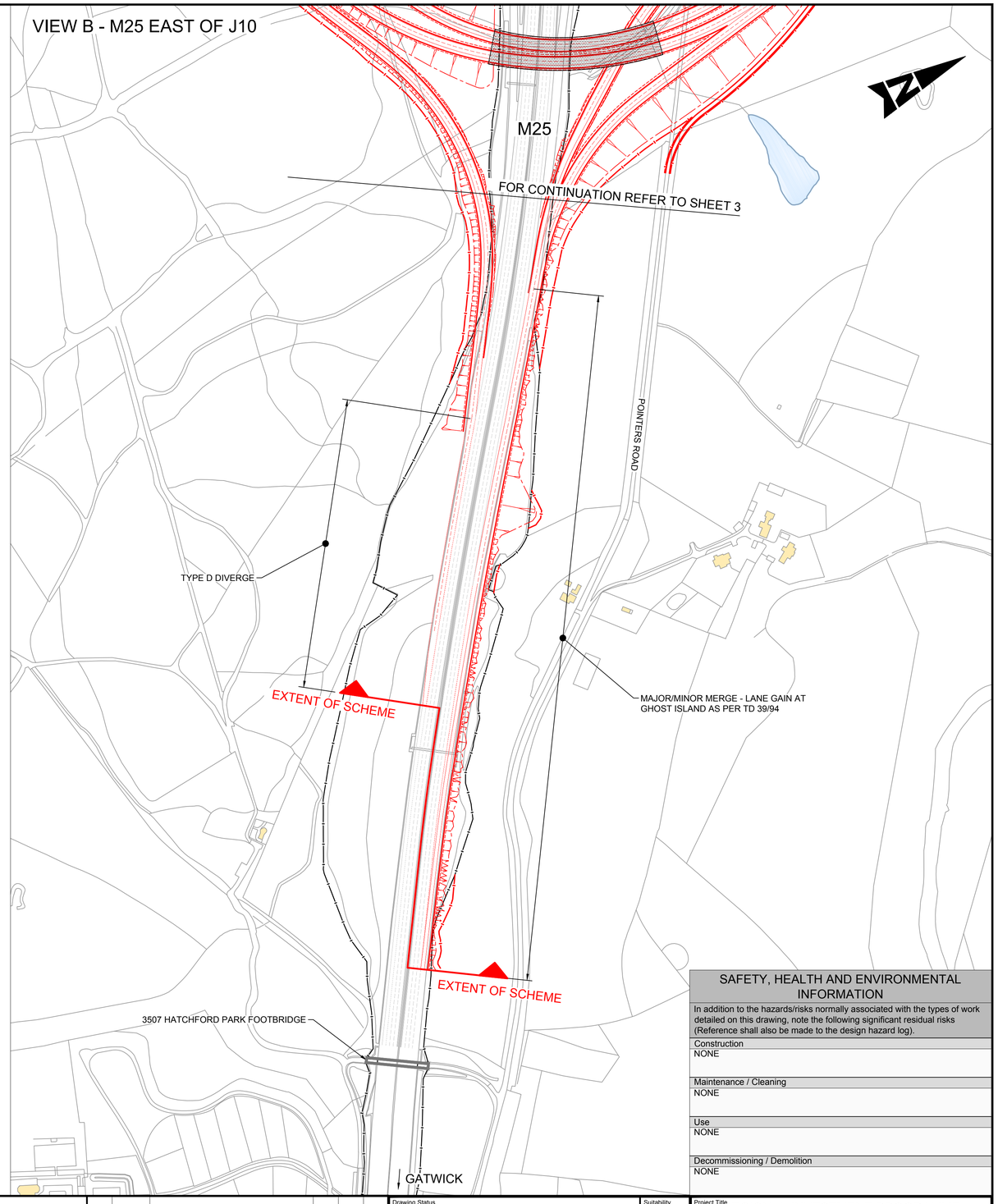
VIEW A - M25 WEST OF J10



Scale 1:2500

50m 0m 50m 100m 150m

VIEW B - M25 EAST OF J10



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

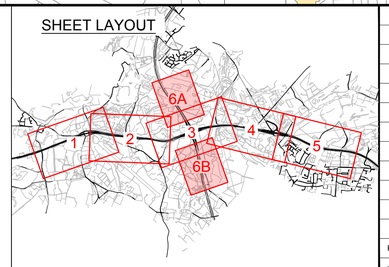
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT A3 CORRIDOR WITH OPTION 16 (CYCLIC FREEFLOW) SHEET 6 OF 6

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size: A1	Date: 19/09/16	Date: 19/09/16	Date: 19/09/16	Date: 20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 0166

Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156474\HE551522-ATK-HGN-M25J10-DR-D-0166.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:43am

DO NOT SCALE

Millimetres 0 10 100

M25 JUNCTION 10 / A3 WISLEY INTERCHANGE

HEATHROW

M25

FOR CONTINUATION REFER TO SHEET 2 - VIEW A

BRIDGE STRUCTURE. SPAN 45m

5 LANES

3533 WISLEY INTERCHANGE WEST UNDERBRIDGE (LEVEL 2)

TUMULUS: ANCIENT MONUMENT

4 LANES

REDUCTION OF HARDENED VERGES TO ENABLE 1 LANE CARRIAGEWAY WIDENING THROUGH EXISTING STRUCTURE

FOR A3 UPGRADE SEE Drg. No. HE551522-ATK-HGN-M25J10-DR-D-0162
NOTE: TIE-IN LOCATION VARIES WITH DIFFERING OPTIONS

DIVERGE TYPE E

MERGE SIMILAR TO TYPE E

15186 REDHILL RETAINING WALL

A3

BOLDER MERE

2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900 4000 4100

4 LANES

REDUCTION OF HARDENED VERGES TO ENABLE 1 LANE CARRIAGEWAY WIDENING THROUGH EXISTING STRUCTURE

6156 COCKROW FOOTBRIDGE.

6100 WISLEY INTERCHANGE NORTH UNDERBRIDGE (LEVEL 2)

5 LANES

DIVERGE TYPE E

FOR A3 UPGRADE SEE Drg. No. HE551522-ATK-HGN-M25J10-DR-D-0164
NOTE: TIE-IN LOCATION VARIES WITH DIFFERING OPTIONS

6152 WISLEY INTERCHANGE SOUTH UNDERBRIDGE (LEVEL 2)

5 LANES

3514 WISLEY INTERCHANGE A3 UNDERBRIDGE (LEVEL 3)

3512 WISLEY INTERCHANGE EAST UNDERBRIDGE (LEVEL 2)

5 LANES

BRIDGE STRUCTURE. SPAN 45m

OLD LANE

EXTENT OF SCHEME

POINTERS ROAD

FOR CONTINUATION REFER TO SHEET 2 - VIEW B

M25

GATWICK

N

Scale 1:2500
50m 0m 50m 100m 150m

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

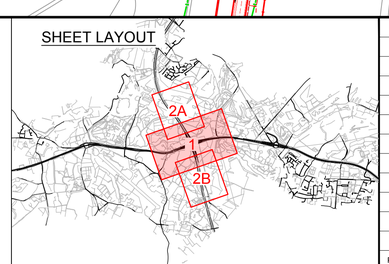
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION
Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT OPTION 14 - ELONGATED ROUNDABOUT WITH REALIGNED M25 SLIPS SHEET 1 OF 2

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size: A1	Date: 19/09/16	Date: 19/09/16	Date: 19/09/16	Date: 20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 0141

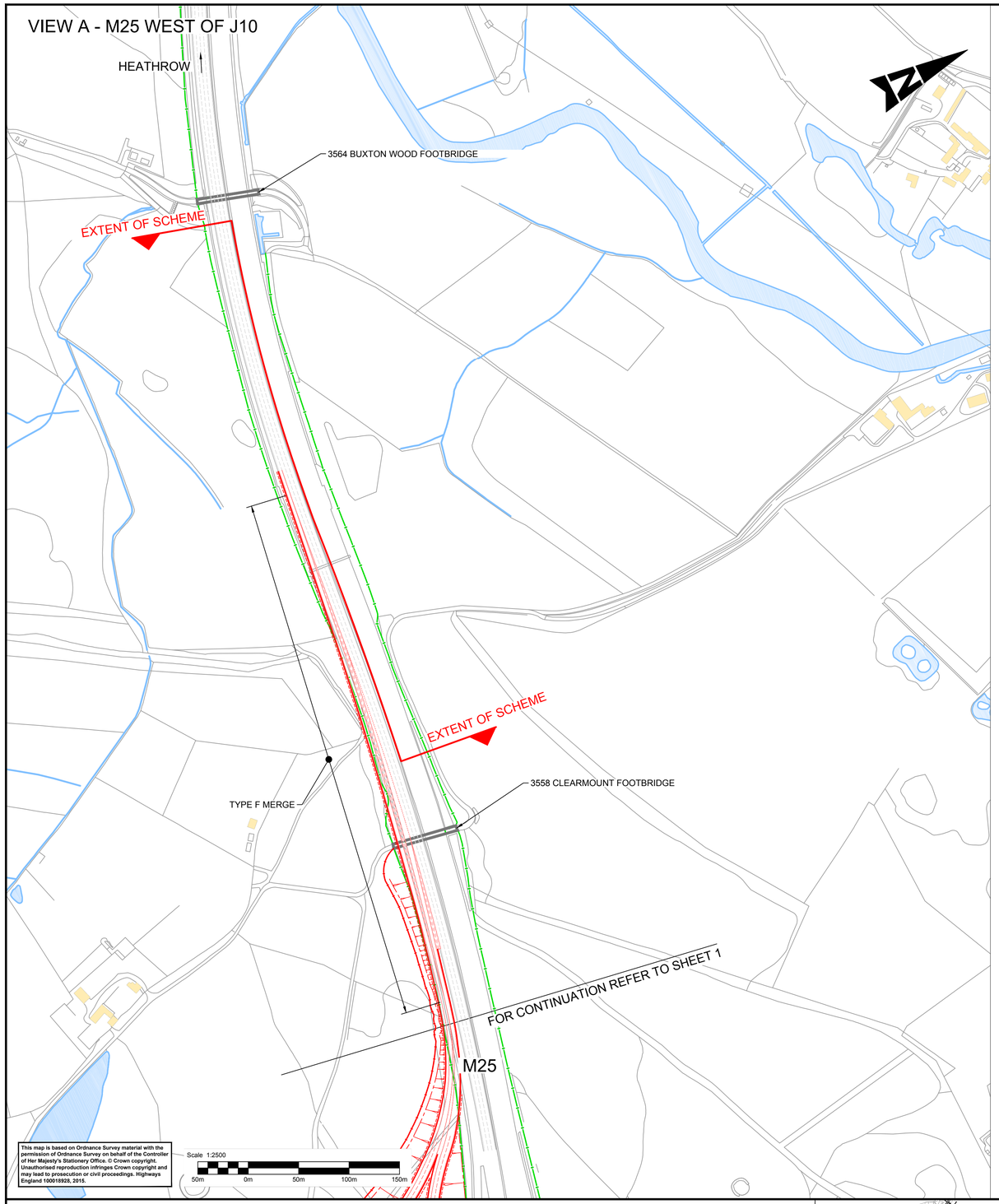
Project Ref. No.: 5145620
Revision: P01

D:\projectwise\d0156474\HE551522-ATK-HGN-M25J10-DR-D-0141.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:44am

DO NOT SCALE

Millimetres 0 10 100

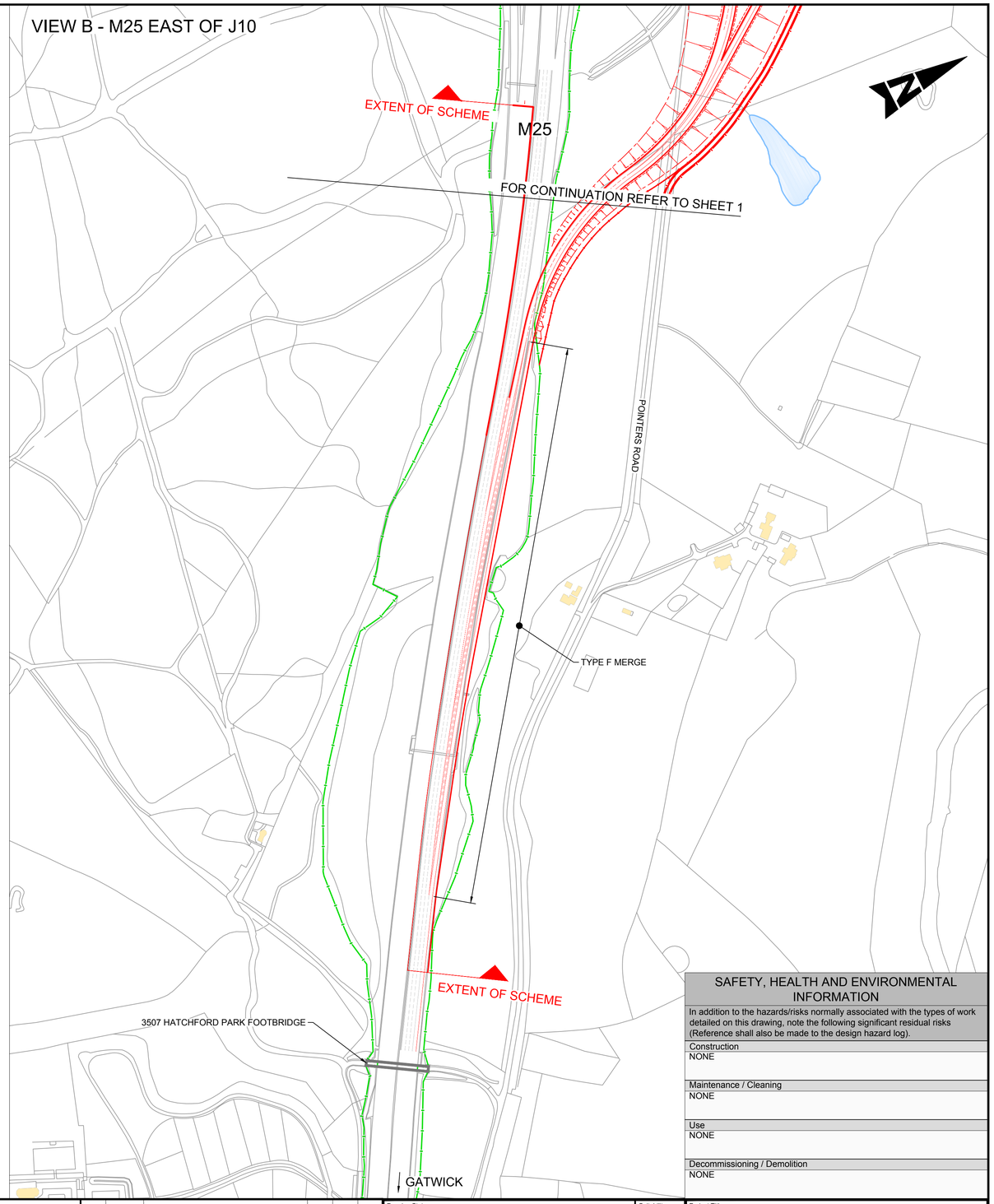
VIEW A - M25 WEST OF J10



Scale 1:2500

50m 0m 50m 100m 150m

VIEW B - M25 EAST OF J10



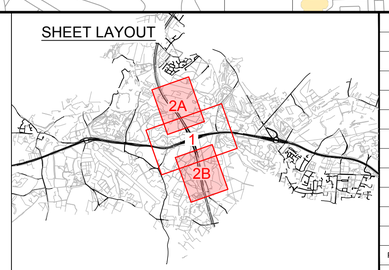
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Drawing Status: FOR INFORMATION
Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT
OPTION 9
4 LEVEL, FREEFLOW IN 2 DIRECTIONS
SHEET 2 OF 2

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	Date	Date	Date	Date
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume
HE551522 - ATK - HGN -
M25J10 - DR - D - 0092
Location | Type | Role | Number

Project Ref. No.: 5145620
Revision: P01

D:\projectwise\d0156474\IHE551522-ATK-HGN-M25J10-DR-D-0092.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:44am

DO NOT SCALE

Millimetres 100 10 0

M25 JUNCTION 10 / A3 WISLEY INTERCHANGE

HEATHROW

M25

FOR CONTINUATION REFER TO SHEET 2 - VIEW A

POSSIBLE NEW CULVERT REQUIRED.

IL2A

TYPE E DIVERGE

TUMULUS: ANCIENT MONUMENT

3533 WISLEY INTERCHANGE WEST UNDERBRIDGE (LEVEL 2)

6100 WISLEY INTERCHANGE NORTH UNDERBRIDGE (LEVEL 2)

BRIDGE STRUCTURE. TOTAL LENGTH 310m.

15186 REDHILL RETAINING WALL

A3

BOLDER MERE

FOR A3 UPGRADE SEE Drg. No. HE551522-ATK-HGN-M25J10-DR-D-0162
NOTE: TIE-IN LOCATION VARIES WITH DIFFERING OPTIONS

6156 COCKROW FOOTBRIDGE.

OLD LANE

BRIDGE STRUCTURE. TOTAL LENGTH 310m.

6152 WISLEY INTERCHANGE SOUTH UNDERBRIDGE (LEVEL 2)

3514 WISLEY INTERCHANGE A3 UNDERBRIDGE (LEVEL 3)

3512 WISLEY INTERCHANGE EAST UNDERBRIDGE (LEVEL 2)

IL1A

POSSIBLE NEW CULVERT REQUIRED.

FOR A3 UPGRADE SEE Drg. No. HE551522-ATK-HGN-M25J10-DR-D-0164
NOTE: TIE-IN LOCATION VARIES WITH DIFFERING OPTIONS

TYPE E DIVERGE

FOR CONTINUATION REFER TO SHEET 2 - VIEW B

M25

GATWICK

POINTERS ROAD

Scale 1:2500

50m 0m 50m 100m 150m

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

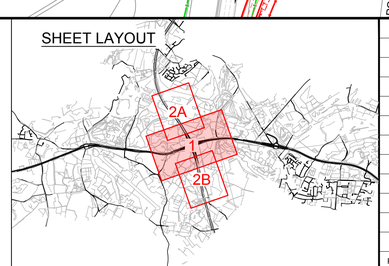
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT
OPTION 9
4 LEVEL, FREEFLOW IN 2 DIRECTIONS
SHEET 1 OF 2

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size: A1	Date: 19/09/16	Date: 19/09/16	Date: 19/09/16	Date: 20/09/16

Drawing Number Project: HE551522 - ATK - HGN - M25J10 - DR - D - 0091
(Originator | Volume | Location | Type | Role | Number)

Project Ref. No.: 5146520

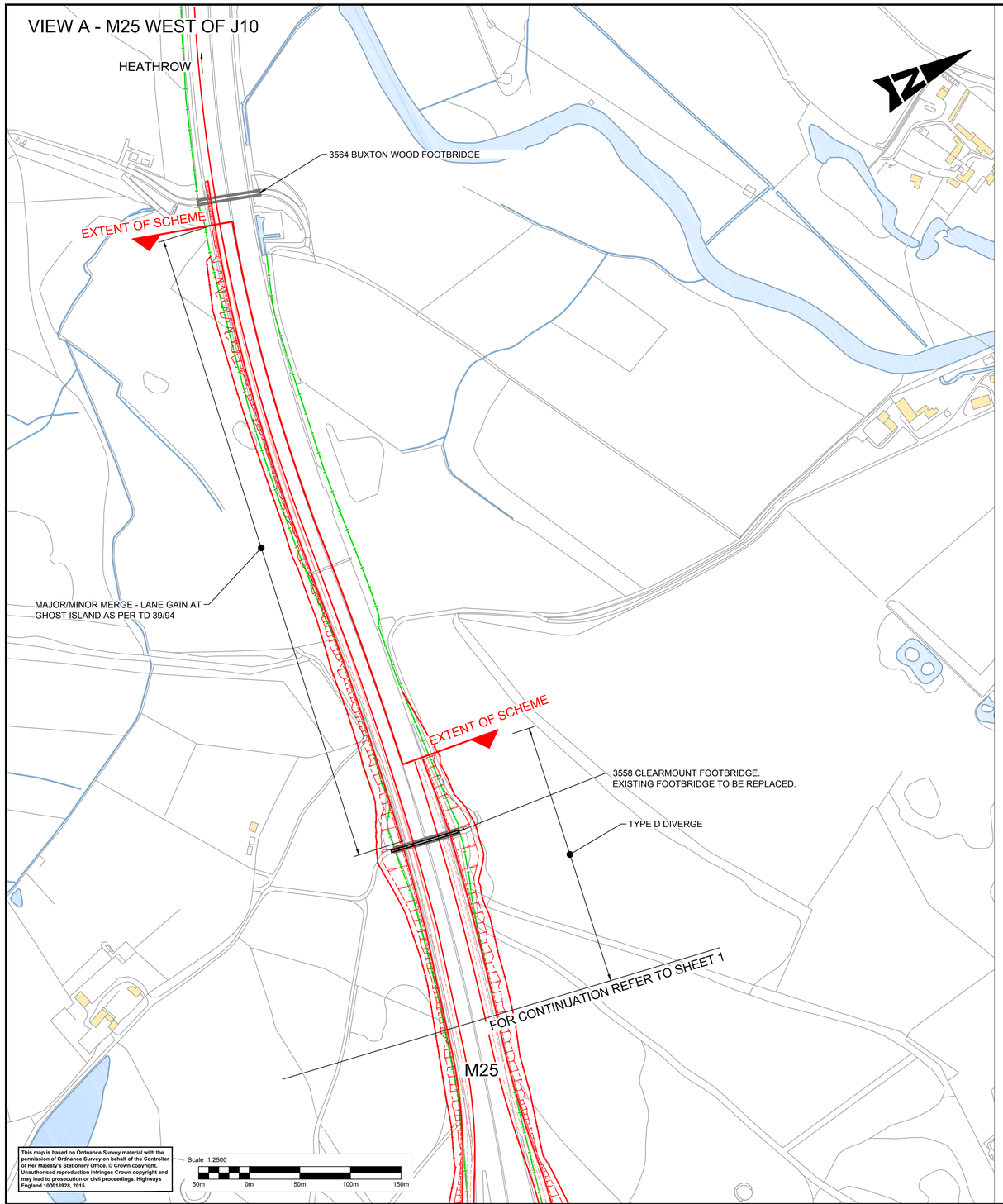
Revision: P01

D:\projectwise\d0156474\HE551522-ATK-HGN-M25J10-DR-D-0091.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:45am

DO NOT SCALE

Millimetres 100 0 10

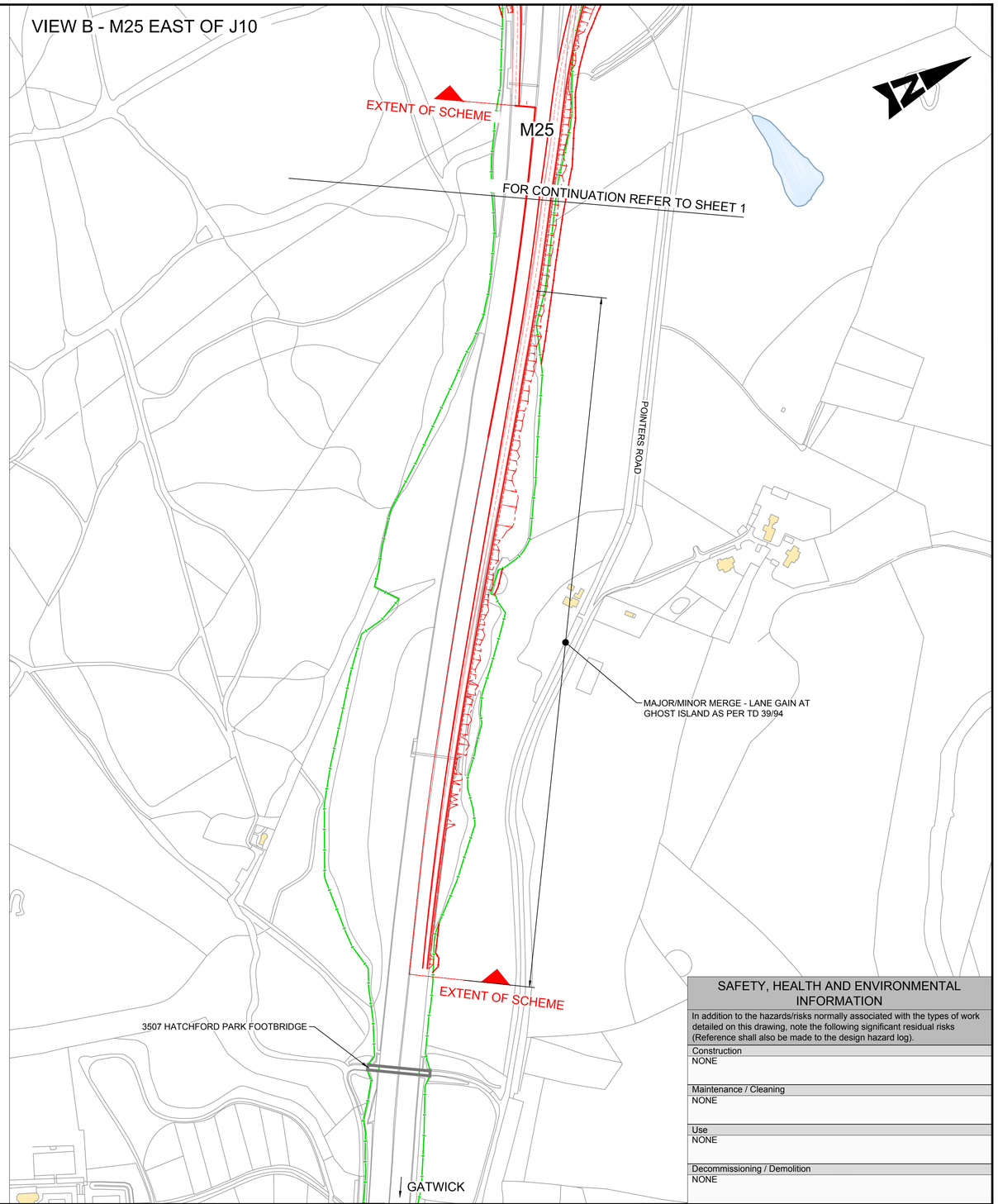
VIEW A - M25 WEST OF J10



Scale 1:2500

50m 0m 50m 100m 150m

VIEW B - M25 EAST OF J10



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

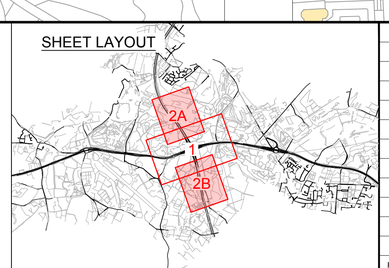
NOTES

1. LINK ROADS SHOWN AS IL1A ARE DETERMINED FROM TD 22/08. IT WOULD BE PROPOSED TO PROVIDE ALL LINK ROADS WITH AN IL2A CROSS-SECTION IN ORDER TO FUTURE PROOF AND MAXIMISE FLEXIBILITY.
2. FOR CROSS-SECTIONS IL1A & IL2A REFER TO TD 27/05, FIGURE 4-16.
3. UNLESS SPECIFIED OTHERWISE, MERGE AND DIVERGE TYPES ARE AS PER TD 22/06.
4. UNLESS SPECIFIED OTHERWISE, EARTHWORKS SLOPES TO BE 1(V) : 4(H)

KEY

- EXISTING OVERBRIDGE STRUCTURES
- EXISTING UNDERBRIDGE STRUCTURES
- EXISTING RETAINING WALLS
- EXISTING HIGHWAY BOUNDARY (INDICATIVE ONLY)
- PROPOSED HIGHWAY WORKS
- EXISTING WATERWAYS
- EXISTING BUILDINGS

SHEET LAYOUT



Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: GENERAL ARRANGEMENT OPTION 14 - ELONGATED ROUNDABOUT WITH REALIGNED M25 SLIPS SHEET 2 OF 2

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size: A1	Date: 19/09/16	Date: 19/09/16	Date: 19/09/16	Date: 20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 0142

Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156474\HE551522-ATK-HGN-M25J10-DR-D-0142.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:44am

DO NOT SCALE

Millimetres 100 0 10

RIPLEY

A3 OCKHAM PARK JUNCTION

B2215 PORTSMOUTH ROAD

A3

LONDON

GUILDFORD & PORTSMOUTH

ROSE LANE

WILL LANE

B2039 OCKHAM ROAD NORTH

MINOR REALIGNMENT TO SUIT WIDENED SLIP ROAD

FOR CONTINUATION REFER TO SHEET 2

RHS GARDEN WISLEY

Scale 1:2500

50m 0m 50m 100m 150m

NOTES:

1. PROPOSED NMU ROUTE ALIGNMENTS SHOWN ALLOW FOR THE POTENTIAL WIDENING OF THE A3 (AS SHOWN). THIS WIDENING IS OPTIONAL, AND SUBJECT TO DESIGN DEVELOPMENT.
2. FOOTBRIDGES AND SUBWAYS ARE INDICATIVE.

LEGEND:

- EXISTING FOOTPATH / FOOTWAY
- EXISTING SHARED USE ROUTE
- EXISTING BRIDLE WAY
- EXISTING HIGHWAY BOUNDARY
- EXISTING CYCLE LANE
- PROPOSED FOOTPATH / FOOTWAY
- PROPOSED SHARED USE ROUTE
- PROPOSED EQUESTRIAN ROUTE
- PROPOSED HIGHWAY BOUNDARY
- PROPOSED NEW WORKS
- PROPOSED STRUCTURE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: EXISTING AND PROPOSED NMU ROUTES SHEET 1 OF 5

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	Date	Date	Date	Date
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - ENM - M25J10 - DR - D - 0161

Project Ref. No.: 5146520

Revision: P01

D:\projectwise\d0156464\HE551522-ATK-ENM-M25J10-DR-D-0161.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:45am

DO NOT SCALE

Millimetres 0 10 100

RHS GARDEN WISLEY

FOR CONTINUATION REFER TO SHEET 1

FOR CONTINUATION REFER TO SHEET 3

A3

WISLEY LANE

ELM LANE

MINOR REALIGNMENT TO SUIT WIDENED CARRIAGEWAY

MINOR REALIGNMENT TO SUIT WIDENED CARRIAGEWAY

BOLDER MERE

OLD LANE

FORMER WISLEY AIRFIELD
(SUBJECT TO DEVELOPMENT)

ELM LANE

HATCH LANE

Scale 1:2500

50m 0m 50m 100m 150m

NOTES:

1. PROPOSED NMU ROUTE ALIGNMENTS SHOWN ALLOW FOR THE POTENTIAL WIDENING OF THE A3 (AS SHOWN). THIS WIDENING IS OPTIONAL, AND SUBJECT TO DESIGN DEVELOPMENT.
2. FOOTBRIDGES AND SUBWAYS ARE INDICATIVE.

LEGEND:

- EXISTING FOOTPATH / FOOTWAY
- EXISTING SHARED USE ROUTE
- EXISTING BRIDLE WAY
- EXISTING HIGHWAY BOUNDARY
- EXISTING CYCLE LANE
- PROPOSED FOOTPATH / FOOTWAY
- PROPOSED SHARED USE ROUTE
- PROPOSED EQUESTRIAN ROUTE
- PROPOSED HIGHWAY BOUNDARY
- PROPOSED NEW WORKS
- PROPOSED STRUCTURE

Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: EXISTING AND PROPOSED NMU ROUTES SHEET 2 OF 5

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size: A1	Date: 19/09/16	Date: 19/09/16	Date: 19/09/16	Date: 20/09/16

Drawing Number: HE551522 - ATK - ENM - M25J10 - DR - D - 0162
(Project | Originator | Volume | Location | Type | Role | Number)

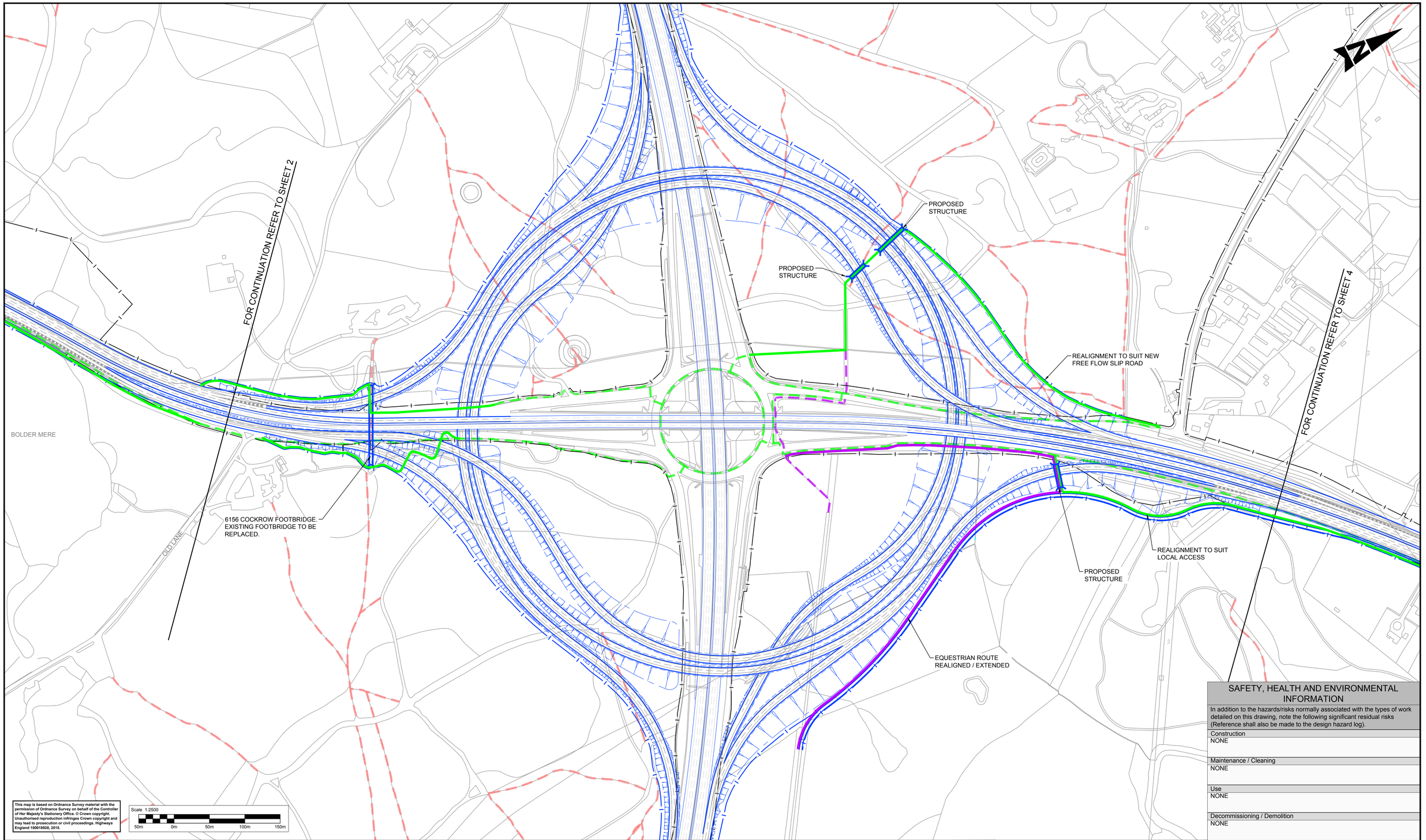
Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156464\HE551522-ATK-ENM-M25J10-DR-D-0162.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:45am

DO NOT SCALE

Millimetres 0 10 100



Scale 1:2500

50m 0m 50m 100m 150m

NOTES:

1. PROPOSED NMU ROUTE ALIGNMENTS SHOWN ALLOW FOR THE POTENTIAL WIDENING OF THE A3 (AS SHOWN). THIS WIDENING IS OPTIONAL, AND SUBJECT TO DESIGN DEVELOPMENT.
2. FOOTBRIDGES AND SUBWAYS ARE INDICATIVE.

JUNCTION 10 OPTIONS VARY FOR SHEET 3. PRINCIPLE OF A3 D4AP OUTWITH JUNCTIONS IS CONSISTENT FOR EACH OPTION. VARIATION OCCURS IN MERGE/DIVERGE LAYOUT ARRANGEMENTS ONLY.

LEGEND:

- EXISTING FOOTPATH / FOOTWAY
- EXISTING SHARED USE ROUTE
- EXISTING BRIDLE WAY
- EXISTING HIGHWAY BOUNDARY
- EXISTING CYCLE LANE
- PROPOSED FOOTPATH / FOOTWAY
- PROPOSED SHARED USE ROUTE
- PROPOSED EQUESTRIAN ROUTE
- PROPOSED HIGHWAY BOUNDARY
- PROPOSED NEW WORKS
- PROPOSED STRUCTURE

Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
M25 J10 IMPROVEMENT

Drawing Title: EXISTING AND PROPOSED NMU ROUTES
OPTION 16
CYCLIC FREEFLOW
SHEET 3 OF 5

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	**Date**	**Date**	**Date**	**Date**
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - ENM - M25J10 - DR - D - 0163

Project Ref. No.: 5146520

Revision: P01

D:\projectwise\d0156464\HE551522-ATK-ENM-M25J10-DR-D-0163.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:45am

DO NOT SCALE

Millimetres 0 10 100

A245 BYFLEET ROAD

SEVEN HILLS ROAD

FELTON FLEET SCHOOL

FOR CONTINUATION REFER TO SHEET 3

FOR CONTINUATION REFER TO SHEET 5

NMU ROUTE REALIGNMENT TO UTILISE LOCAL ACCESS

RIVER MOLE

A245 PORTSMOUTH ROAD

PAINSHILL PARK

Scale 1:2500

50m 0m 50m 100m 150m

NOTES:

1. PROPOSED NMU ROUTE ALIGNMENTS SHOWN ALLOW FOR THE POTENTIAL WIDENING OF THE A3 (AS SHOWN). THIS WIDENING IS OPTIONAL, AND SUBJECT TO DESIGN DEVELOPMENT.
2. FOOTBRIDGES AND SUBWAYS ARE INDICATIVE.

LEGEND:

- EXISTING FOOTPATH / FOOTWAY
- EXISTING SHARED USE ROUTE
- EXISTING BRIDLE WAY
- EXISTING HIGHWAY BOUNDARY
- EXISTING CYCLE LANE
- PROPOSED FOOTPATH / FOOTWAY
- PROPOSED SHARED USE ROUTE
- PROPOSED EQUESTRIAN ROUTE
- PROPOSED HIGHWAY BOUNDARY
- PROPOSED NEW WORKS
- PROPOSED STRUCTURE

Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: EXISTING AND PROPOSED NMU ROUTES SHEET 4 OF 5

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	**Date**	**Date**	**Date**	**Date**
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - ENM - M25J10 - DR - D - 0164

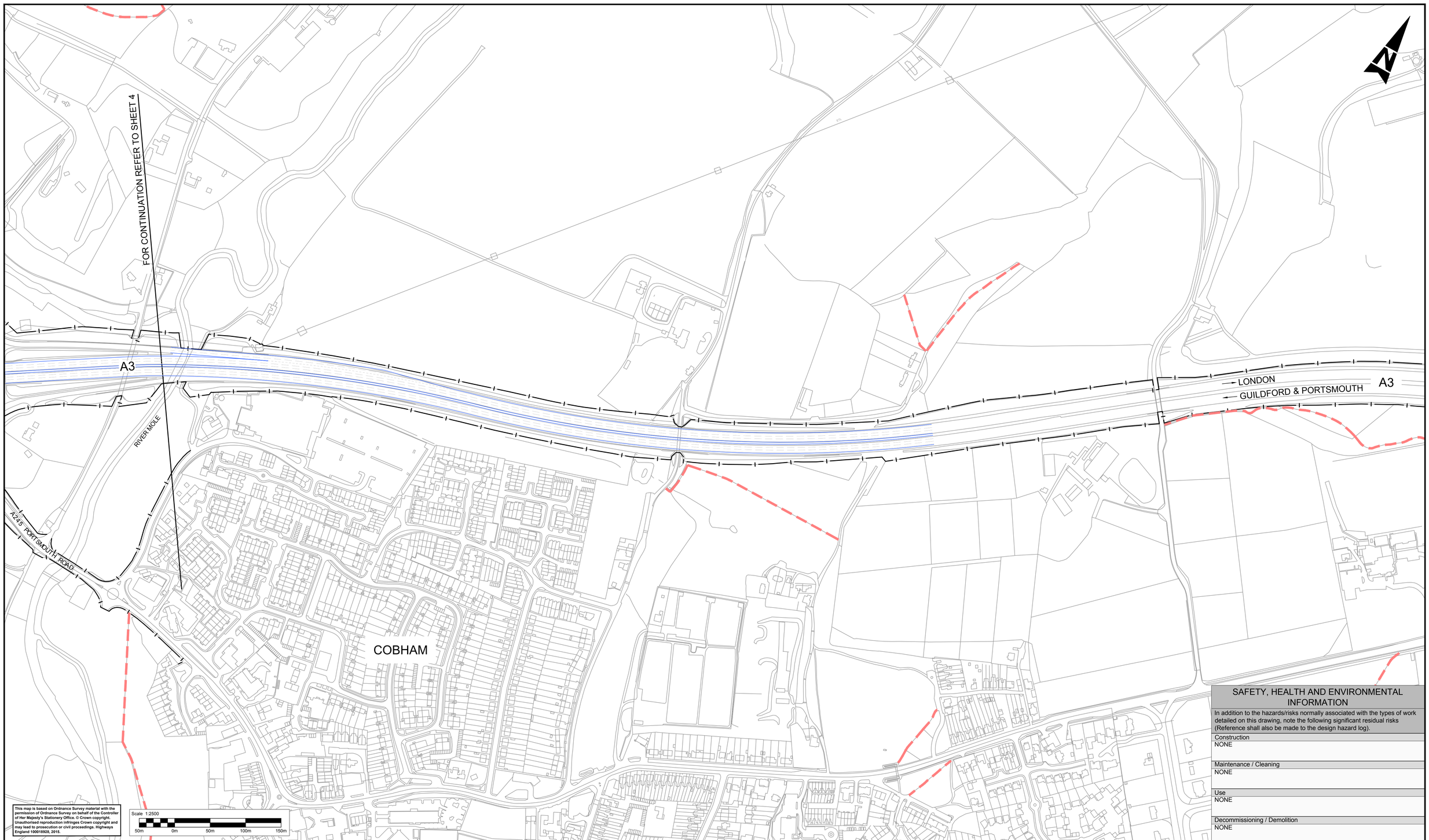
Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156464\HE551522-ATK-ENM-M25J10-DR-D-0164.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:45am

DO NOT SCALE

Millimetres 0 10 100



Scale 1:2500

50m 0m 50m 100m 150m

NOTES:

1. PROPOSED NMU ROUTE ALIGNMENTS SHOWN ALLOW FOR THE POTENTIAL WIDENING OF THE A3 (AS SHOWN). THIS WIDENING IS OPTIONAL, AND SUBJECT TO DESIGN DEVELOPMENT.
2. FOOTBRIDGES AND SUBWAYS ARE INDICATIVE.

LEGEND:

- EXISTING FOOTPATH / FOOTWAY
- EXISTING SHARED USE ROUTE
- EXISTING BRIDLE WAY
- EXISTING HIGHWAY BOUNDARY
- EXISTING CYCLE LANE
- PROPOSED FOOTPATH / FOOTWAY
- PROPOSED SHARED USE ROUTE
- PROPOSED EQUESTRIAN ROUTE
- PROPOSED HIGHWAY BOUNDARY
- PROPOSED NEW WORKS
- PROPOSED STRUCTURE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: EXISTING AND PROPOSED NMU ROUTES SHEET 5 OF 5

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	**Date**	**Date**	**Date**	**Date**
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - ENM - M25J10 - DR - D - 0165

Project Ref. No. 5145620

Revision P01

D:\projectwise\d0156464\HE551522-ATK-ENM-M25J10-DR-D-0165.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:45am

DO NOT SCALE

Millimetres 0 10 100

FOR A3 UPGRADE NMU ROUTES SEE SKETCH
No. HE551522-ATK-ENM-M25J10-SK-D-0010
NOTE: TIE-IN LOCATION VARIES WITH DIFFERING OPTIONS

PROPOSED STRUCTURE

FOR A3 UPGRADE NMU ROUTES SEE SKETCH
No. HE551522-ATK-ENM-M25J10-SK-D-0012
NOTE: TIE-IN LOCATION VARIES WITH DIFFERING OPTIONS

BOLDER MERE

OLD LANE

6156 COCKROW FOOTBRIDGE. EXISTING FOOTBRIDGE TO BE REPLACED.

N

Scale 1:2500
50m 0m 50m 100m 150m

NOTES:

1. PROPOSED NMU ROUTE ALIGNMENTS SHOWN ALLOW FOR THE POTENTIAL WIDENING OF THE A3 (AS SHOWN). THIS WIDENING IS OPTIONAL, AND SUBJECT TO DESIGN DEVELOPMENT.
2. FOOTBRIDGES AND SUBWAYS ARE INDICATIVE.

LEGEND:

- EXISTING FOOTPATH / FOOTWAY
- EXISTING SHARED USE ROUTE
- EXISTING BRIDLE WAY
- EXISTING HIGHWAY BOUNDARY
- EXISTING CYCLE LANE
- PROPOSED FOOTPATH / FOOTWAY
- PROPOSED SHARED USE ROUTE
- PROPOSED EQUESTRIAN ROUTE
- PROPOSED HIGHWAY BOUNDARY
- PROPOSED NEW WORKS
- PROPOSED STRUCTURE

Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

Drawing Status: FOR INFORMATION
Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
M25 J10 IMPROVEMENT

Drawing Title: EXISTING AND PROPOSED NMU ROUTES
OPTION 14
ELONGATED ROUNDABOUT
REALIGNED M25 SLIPS

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size: A1	Date: 19/09/16	Date: 19/09/16	Date: 19/09/16	Date: 20/09/16

Drawing Number: HE551522 - ATK - ENM - M25J10 - DR - D - 0141
(Project | Originator | Volume | Location | Type | Role | Number)

Project Ref. No.: 5145620
Revision: P01

D:\projectwise\d0156464\HE551522-ATK-ENM-M25J10-DR-D-0141.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:46am

DO NOT SCALE

Millimetres 0 10 100

REALIGNED LOCAL ACCESS

PROPOSED STRUCTURE

BOLDER MERE

FOR A3 UPGRADE NMU ROUTES SEE SKETCH
No. HE551522-ATK-ENM-M25J10-SK-D-0010
NOTE: TIE-IN LOCATION VARIES WITH DIFFERING OPTIONS

6156 COCKROW FOOTBRIDGE. EXISTING FOOTBRIDGE TO BE REPLACED.

OLD LANE

FOR A3 UPGRADE NMU ROUTES SEE SKETCH
No. HE551522-ATK-ENM-M25J10-SK-D-0012
NOTE: TIE-IN LOCATION VARIES WITH DIFFERING OPTIONS

PROPOSED STRUCTURE

ALTERNATIVE EQUESTRIAN ROUTE INCORPORATED INTO UPGRADED SHARED USE ROUTE

REALIGNMENT TO SUIT LOCAL ACCESS

ALTERNATIVE EQUESTRIAN ROUTE REMOVES REQUIREMENT FOR 1 NO. PROPOSED STRUCTURE**

EQUESTRIAN ROUTE REALIGNED / EXTENDED

PROPOSED STRUCTURE**

Scale 1:2500
50m 0m 50m 100m 150m

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommissioning / Demolition
NONE

NOTES:

1. PROPOSED NMU ROUTE ALIGNMENTS SHOWN ALLOW FOR THE POTENTIAL WIDENING OF THE A3 (AS SHOWN). THIS WIDENING IS OPTIONAL, AND SUBJECT TO DESIGN DEVELOPMENT.
2. FOOTBRIDGES AND SUBWAYS ARE INDICATIVE.

LEGEND:

- EXISTING FOOTPATH / FOOTWAY
- EXISTING SHARED USE ROUTE
- EXISTING BRIDLE WAY
- EXISTING HIGHWAY BOUNDARY
- EXISTING CYCLE LANE
- PROPOSED FOOTPATH / FOOTWAY
- PROPOSED SHARED USE ROUTE
- PROPOSED EQUESTRIAN ROUTE
- PROPOSED HIGHWAY BOUNDARY
- PROPOSED NEW WORKS
- PROPOSED STRUCTURE

Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION
Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
M25 J10 IMPROVEMENT

Drawing Title: EXISTING AND PROPOSED NMU ROUTES
OPTION 9
4 LEVEL
FREEFLOW IN 2 DIRECTIONS

Scale	Drawn	Checked	Approved	Authorised
1:2500	SA	RM	PJ	KB
Original Size	**Date**	**Date**	**Date**	**Date**
A1	19/09/16	19/09/16	19/09/16	20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - ENM - M25J10 - DR - D - 0091

Project Ref. No.: 5145620

Revision: P01

D:\projectwise\d0156464\HE551522-ATK-ENM-M25J10-DR-D-0091.dwg: Plotted by: arro9099 Date: Sep 20, 2016 - 11:46am

DO NOT SCALE

Millimetres 100 10 0

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

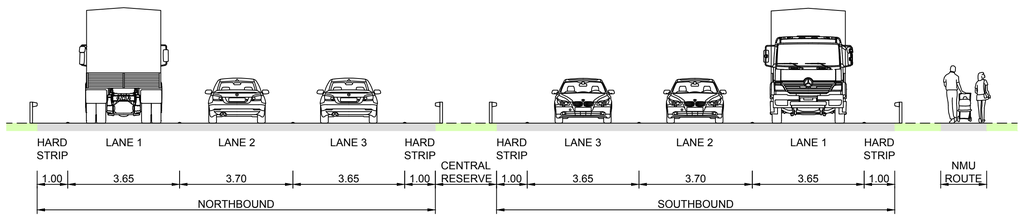
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

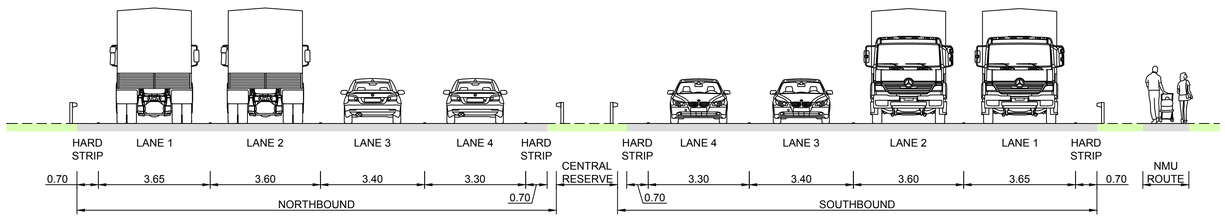
Decommissioning / Demolition
NONE



TYPICAL EXISTING CROSS-SECTION BETWEEN M25 JUNCTION 10 AND PAINSHILL JUNCTION

N.T.S

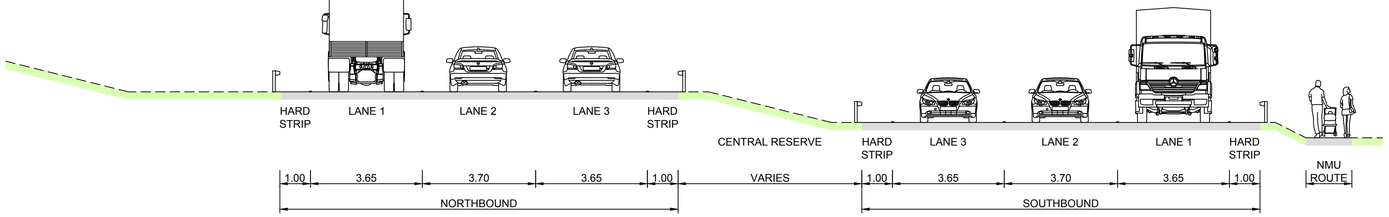
EXISTING DUAL 3 LANE CARRIAGEWAY
EXISTING DIMENSIONS ARE APPROXIMATE / INDICATIVE ONLY, AND ARE SUBJECT TO TOPOGRAPHICAL SURVEY.



TYPICAL PROPOSED CROSS-SECTION BETWEEN M25 JUNCTION 10 AND PAINSHILL JUNCTION

N.T.S

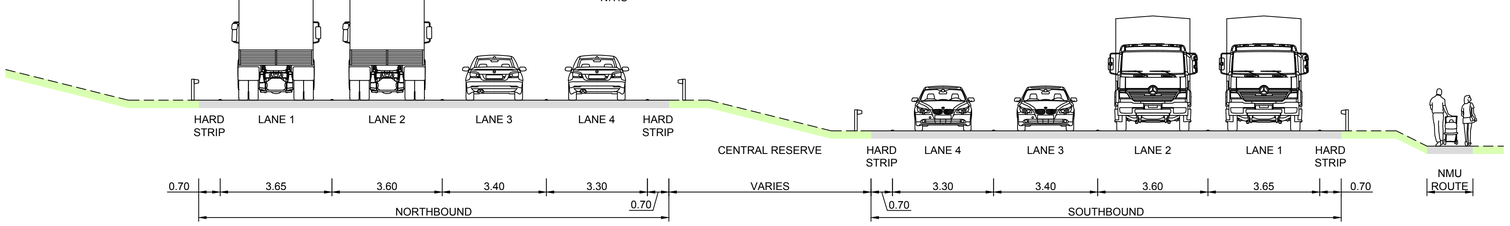
A3 UPGRADED TO D4AP
CROSS-SECTION DIMENSIONS AS PER IAN 149 TABLE 4-1, PRIORITY 9 WITH 0.7m HARD STRIP



TYPICAL EXISTING CROSS-SECTION BETWEEN OCKHAM JUNCTION AND M25 JUNCTION 10

N.T.S

EXISTING DUAL 3 LANE CARRIAGEWAY
EXISTING DIMENSIONS ARE APPROXIMATE / INDICATIVE ONLY, AND ARE SUBJECT TO TOPOGRAPHICAL SURVEY.



TYPICAL PROPOSED CROSS-SECTION BETWEEN OCKHAM JUNCTION AND M25 JUNCTION 10

N.T.S

A3 UPGRADED TO D4AP
CROSS-SECTION DIMENSIONS AS PER IAN 149 TABLE 4-1, PRIORITY 9 WITH 0.7m HARD STRIP

Scale 1:100
4m 3m 2m 1m 0m 2m 4m

Rev.	Date	Description	By	Chk'd	App'd
P01	20/09/16	ISSUED FOR STAGE 1 T.A.R	SA	RM	PJ

Drawing Status: FOR INFORMATION
Suitability: S2

ATKINS
Epsom Gateway
Ashley Avenue
Epsom
Surrey
KT18 5AL
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME M25 J10 IMPROVEMENT

Drawing Title: TYPICAL CROSS-SECTIONS A3 OCKHAM JUNCTION TO M25 J10 AND M25J10 TO PAINSHILL JUNCTION

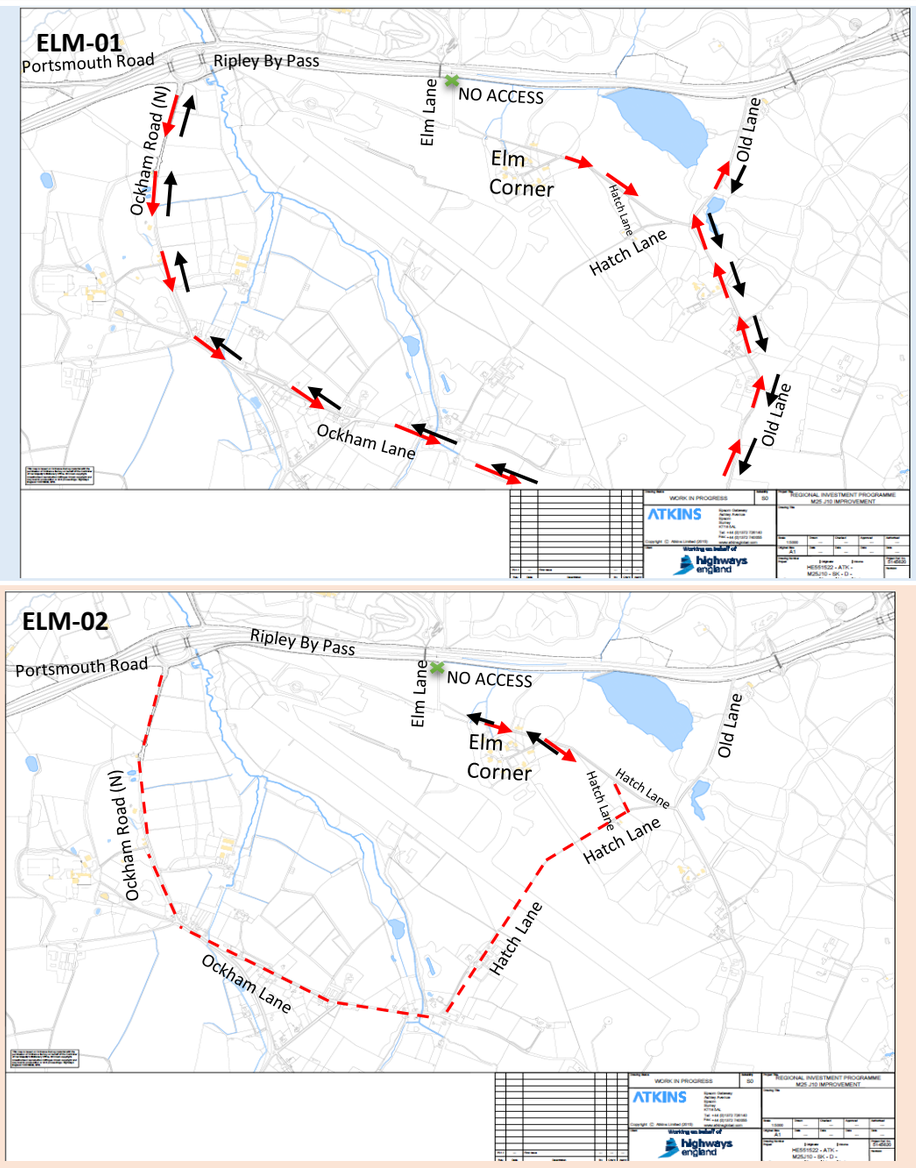
Scale	Drawn	Checked	Approved	Authorised
1:100	SA	RM	PJ	KB
Original Size: A1	Date: 19/09/16	Date: 19/09/16	Date: 19/09/16	Date: 20/09/16

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551522 - ATK - HGN - M25J10 - DR - D - 1001

Project Ref. No.: 5145620
Revision: P01

Plotted by: arro9099 Date: Sep 20, 2016 - 11:42am

Elm Lane closure options



ELM-01

Access with Elm Lane at A3 to be stopped-up. Access to Elm corner properties via Old Lane, Ockham Lane, Ockham Road(N) to Ockham Junction.

Implications

- (+) Elm Lane direct access to A3 closed in safer option than retaining Junction.
- (-) longest diversion route for Elm Corner residents.
- (-) Elm Lane to Old Lane link to be re classified as public highway.
- (-) Cost to upgrade link to a highway.
- (-) Possible environmental issues to upgrade Elm Lane through Ockham Common.
- (-) Access to A3 Southbound not possible from Ockham Junction. Access Southbound via Ockham, Guileshill Lane and Hungry Hill Lane to Clandon Rod Junction.

ELM-02

Access with Elm Lane at A3 to be stopped-up.Access to Elm corner properties via Hatch Lane, Ockham Lane, Ockham Road (N) to Ockham Junction.

Implications

- (+) Elm Lane direct access to A3 closed in safer option than retaining Junction.
- (-) Elm Lane to Old Lane link to be re classified as public highway.
- (-) Cost to upgrade link to a highway.
- (-) Access to A3 Southbound not possible from Ockham Junction. Access Southbound via Ockham, Guileshill Lane and Hungry Hill Lane to Clandon Rod Junction.

ELM-03

Access/egress to A3 from Elm Lane to be stopped-up. Traffic to be re-routed along new link road running parallel to A3 Southbound carriageway. To connect to Ockham Junction by 'T' Junction at Ockham Road (N). This option could also connect to Options WIS-03 to WIS-08 inclusive.

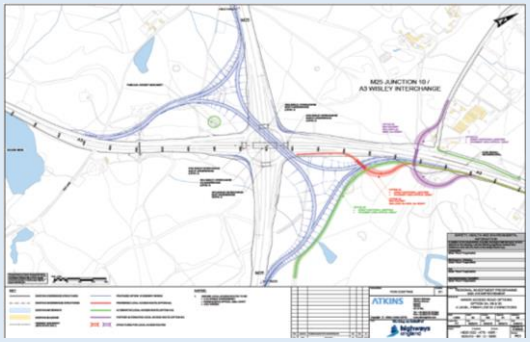
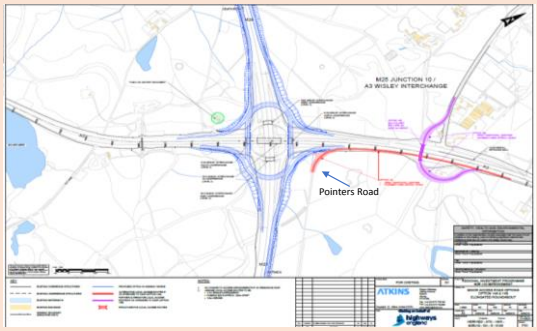
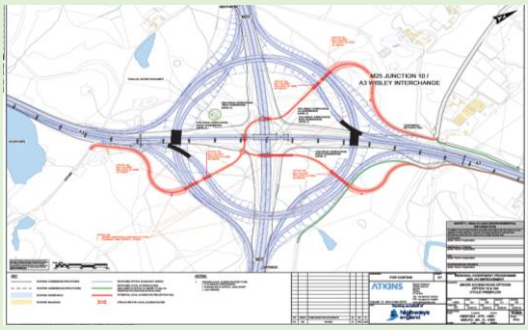
Implications

- (+) Elm Lane direct access to A3 closed in safer option than retaining Junction.
- (+) Sortest route to Ockley Junction to access A3.
- (+) Link road require land take however it is less environmentally sensiive area however it is commonland.
- (-) Link road approximately 900m. High construction cost.
- (-) Culvert requested over stream.
- (-) Access to A3 Southbound not possible from Ockham Junction. Access Southbound via Ockham, Guileshill Lane and Hungry Hill Lane to Clandon Rod Junction.

ELM-04

ELM-04

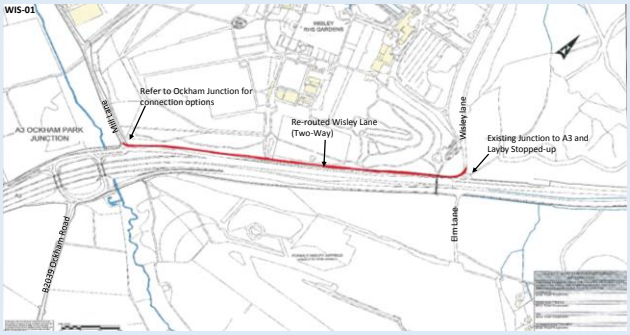
Access with Elm Lane at A3 to be stopped-up and discussion with Wisley Airfield developer (should the site gain consent) about access for this movement.

J10 Selected Options	A245 Work	D3AP &D4AP	Local Road Option
Option-9- 4 LEVEL, FREE-FLOW IN 2 DIRECTIONS (Semi-Grade Separated) provides free-flow turns from the A3 onto the M25 in both directions. The right turns from the A3 to the M25 would be achieved through the construction two viaducts, each over 300m long, at a fourth level over the existing 3 level interchange.The left and right turns off the M25 onto the A3 would use the existing roundabout. Dedicated left turn filter lanes would be provided from M25 slips to A3 slips at the roundabout junction.  	Yes	D3AP to D4AP	9A (Red route) - Direct access from Charwell House, Court Close Farm, Heysood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and connect into existing southbound off slip (A3 mainline diverge closed off)
	Yes	D3AP to D4AP	9B (Green route) - Direct access from Charwell House, Court Close Farm, Heysood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and connect into Pointers Road.
	Yes	D3AP to D4AP	9C (Purple route) - Direct access from Charwell House, Court Close Farm, Heysood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and connect into Redhill Road via underpass beneath A3 Trunk Road.
Option-14- ELONGATED ROUNDABOUT (Signalised Junction) involves elongating the existing roundabout. At the points where the A3 passes over the roundabout, the existing bridges would be unchanged. However, in order to achieve the elongation of the roundabout and provide additional capacity, new bridges will be required to carry the extended roundabout across the M25. The circulatory carriageway under the A3 will be widened to four lanes, and five lanes of circulatory carriageway will be provided where unconstrained by the existing structures. Right turns on and off the M25 would use the modified roundabout, whilst left turns would use dedicated left filter lane.  	Yes	D3AP to D4AP	14A (Red route) - Direct access from Charwell House, Court Close Farm, Heysood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and connect into Pointers road.
	Yes	D3AP to D4AP	14B (Purple route) - Direct access from Charwell House, Court Close Farm, Heysood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and connect into Redhill Road via underpass beneath A3 Trunk Road.
Option-16- CYCLIC FREEFLOW (Grade Seprated Junction) Comprises free-flow left and right turns on and off the M25 and A3 in both directions. New structures would be provided over the M25 and under the A3, and excavations would be carried out whilst maintaining traffic flow. The exiting roundabout would not be used for any A3 or M25 manoeuvre but may be retained for local access or non-motorised user purposes.  	Yes	D3AP to D4AP	16 (Green route southside) - Direct access from Charwell House, Court Close Farm, Heysood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and connect Pointers Road.
	Yes	D3AP to D4AP	16A (Red route) - North-east quadrant: Direct access from Charwell House, Court Close Farm, Heysood Campsite and Electricity Sub-Station to the A3 southbound carriageway to be stopped up and rerouted via a new service road adjacent to A3 southbound carriageway and passes over (or under) link roads to connect to existing southern roundabout structure. South-east quadrant: New service road from existing roundabout to cross link roads and turn right with reverse curve. Runs adjacent to Southbound slip road to connect into Old Lane. North-west quadrant: Existing northern roundabout stucture utilised with service road to cross link roads and turn right with reverse curve. Runs adjacent to A3 northbound slip road to connect into Redhill Road.

Wisley Lane Alternative Options

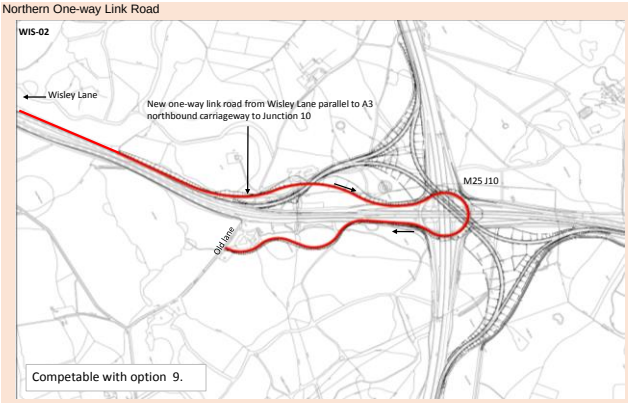
On the northbound carriageway between Ockham Junction and M25 J10 there is the junction with Wisley Lane, which leads to RHS Garden Wisley. There is no access between Wisley Lane and the southbound A3. There is only a small length of diverging lane off the A3 into Wisley Lane. Traffic coming from Wisley Lane travels some 100m on a 'slip-road' before merging. This slip-road is also used as a bus stop and a layby. On the J10 northbound off-slip there is an access road gated track to Park Barn Farm.

Northern Two-way Link Road



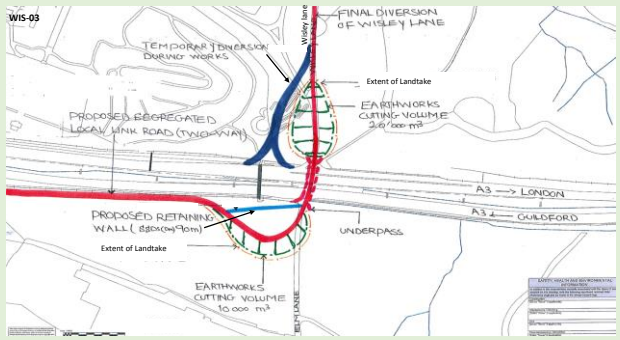
WIS-01
Wisley Lane junction with the A3 stopped-up. New two-way link road routed parallel to A3 southbound carriageway to Ockham Junction. Refer to Ockham Junction options for all alternative connexion proposals thereto.
Implications
• (+) Route to Wisley, Pyrford, West Byfleet and A3 northbound (M25 London) via Ockham Junction for local access.
• (-) Landtake from RHS Garden Wisley and possible resultant removal of sequoia (redwood) trees.
• (-) No direct access/egress between the A3 and Wisley Lane.
• (+) Reduced conflict on A3 due to weaving, diverging and merging traffic movements for Wisley Lane.
• (+) Safer entry to A3 for merging traffic from Wisley Lane using the on-slip. This would be enhanced further with D4AP lane gain.
• (-) Motorists exiting RHS Garden Wisley and travelling southbound would have to detour via Junction 10 (Options 9 & 14) or Painshill Junction (Option 16) to make a 'U' turn.

Northern One-way Link Road



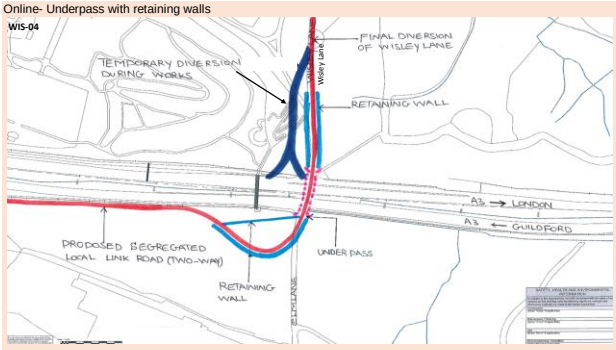
WIS-02
Wisley Lane junction with the A3 stopped-up. New one-way link road routed from Ockham Junction parallel to A3 northbound carriageway to Wisley lane providing access. New one-way link road routed from Wisley Lane parallel to A3 northbound carriageway to Junction 10 providing access. This option would only work for Options 9 where 'U' turn movement possible.
Implications
• (+) Route to Wisley, Pyrford, West Byfleet and A3 northbound (M25 London) retained for local access.
• (-) Motorists coming from Wisley Lane and travelling southbound would have to detour via Painshill Junction for Option 16 to make a 'U' turn or Junction 10 for option 9, 14.
• (-) Landtake from RHS Garden Wisley and possible resultant removal of sequoia (redwood) trees.
• (-) No direct access/egress between the A3 and Wisley Lane.
• (+) Reduced conflict on A3 due to weaving, diverging and merging traffic movements for Wisley Lane.
• (+) Safer entry to A3 for merging traffic from Wisley Lane using Junction 10.
• (-) Landtake required from Wisley Common.

Online-Underpass in Cutting



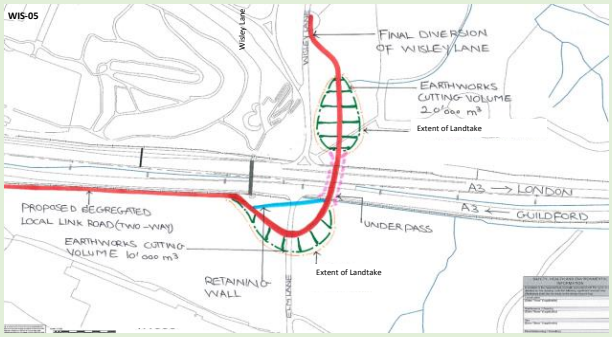
WIS-03
Wisley Lane routed under A3 carriageways. Underpass would be jacked in segments to avoid lane closures and eliminate disruption to A3 traffic. The alignment would then turn southwards and run parallel to the A3 southbound carriageway and connect into Ockham Junction. The depth of earthworks cutting on the approaches to the underpass would extend to approximately eight metres. A retaining wall would be required on the eastern side between the A3 and reverse curved alignment of the new link road. A temporary diversion of Wisley Lane to maintain connexion to the A3 during construction of the underpass shall be required. This could be aligned either side of the proposed earthworks dependant on temporary land acquisition.
Implications
• (-) Landtake required for permanent and temporary works.
• (+) Safer entry to A3 from Ockham Junction slip road.
• (-) Extended journey time for southbound traffic coming from Wisley Lane.
• (-) High cost of structures and extended duration of construction time.
• (-) Additional long-term maintenance costs for structures and drainage pump etc.

Online- Underpass with retaining walls



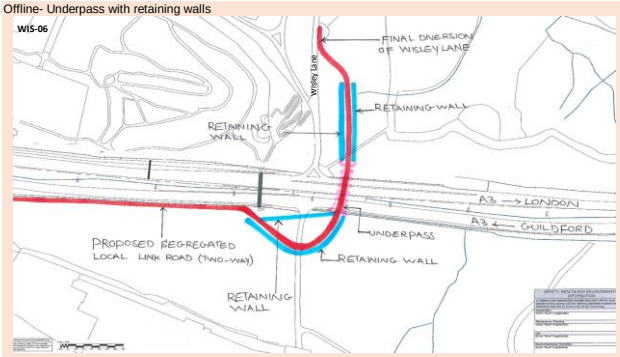
WIS-04
This layout is similar to Option WIS-03 except earthworks are replaced by retaining walls. Landtake would be reduced but this will need to be compared against costly piling works.
Implications
• As Option WIS-03.
• (+) Reduced landtake
• (-) Higher cost than option WIS-03

Offline- Underpass in Cutting



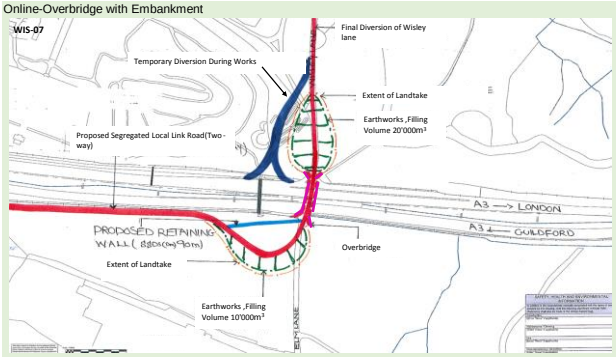
WIS-05
This layout is similar to Option WIS-03 except Wisley Lane is realigned on the approach to the A3 such that earthworks are offline and the existing road remains in-situ and provides continuous access/egress to the A3 during construction works.
Implications
• As Option WIS-03.
• (+) No temporary diversion required.
• (+) Redundant existing corridor could be offered by negotiation to adjacent landowner (eg. RHS Garden Wisley).
• (+) Reduced disruption to Wisley Lane users during construction.

Offline- Underpass with retaining walls



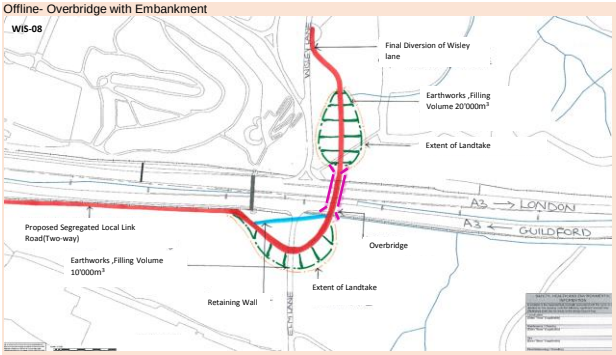
WIS-06
This layout is similar to Option WIS-05 except earthworks are replaced by retaining walls. Landtake would be reduced but this will need to be compared against costly piling works.
Implications
• As Option WIS-03 & WIS-04.
• (-) Higher cost than option WIS-05.

Online-Overbridge with Embankment



WIS-07
This layout is similar to Option WIS-03 except the underpass is replace by an overbridge and earthworks become embankments. Bridge abutments and ramps could be built off-line and a pre-cast deck craned in with an overnight closure of the A3.
Implications
• (-) Landtake required for permanent and temporary works.
• (+) Safer entry to A3 from Ockham Junction slip road.
• (-) Extended journey time for southbound traffic coming from Wisley Lane.
• (-) High cost of structures and extended duration of construction time.
• (-) Additional long-term maintenance costs for structures

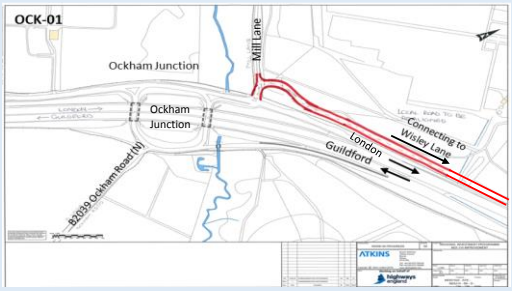
Offline- Overbridge with Embankment



WIS-08
This layout is similar to Option WIS-05 except the underpass is replace by an overbridge and earthworks become embankments. Bridge abutments and ramps could be built off-line and a pre-cast deck craned in with an overnight closure of the A3.
Implications
• As Option WIS-07.
• (+) No temporary diversion required.
• (+) Redundant existing corridor could be offered by negotiation to adjacent landowner (eg. RHS Garden Wisley).
• (+) Reduced disruption to Wisley Lane users during construction.

Ockham Junction Alternative Options

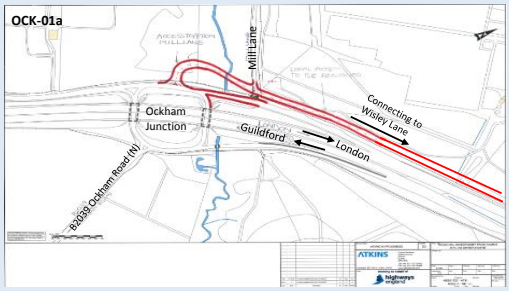
Ockham Junction is approximately 2.5km to the south of M25 Junction 10 where it provides local connection to Ripley (B2215 Portsmouth Road), Ockham (B2039 Ockham Road (N)) and surrounding areas.Ockham Junction has north facing slips roads to the A3 only. The next junction to the south (Clandon) has only a northbound off-slip (to Ripley,Woking & Dorking) and a southbound on-slip (to Guildford & Portsmouth). The A3 is a D3AP road (dual carriageway with 3 lanes in each direction) either side of, and over, the junction. This junction is a 'square' shaped non-signalised roundabout.



OCK-01
Wisley Lane stopped-up at junction with the A3 and realigned the run parallel to the A3 northbound carriageway. On the approach to Mill Lane the realignment bends to the right and connects into the existing Mill Lane junction with the northbound slip road. Right and left turns are provided as per existing layout. Mill Lane would become the minor road and give way junction where connecting to the new realigned Wisley Lane.

Implications

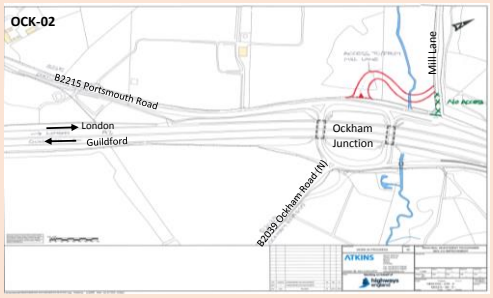
- (+) Minimum landtake.
- (+) Route to Wisley, Pyrford, West Byfleet and A3 northbound (M25 London) via Ockham Junction for local access.
- (+) Local traffic from above have additional access to Ockham Junction and B2215 to Ripley and B2039 to Ockham.
- (-) Landtake from RHS Garden Wisley and possible resultant removal of sequoia (redwood) trees.
- (-) Additional traffic on roundabout.
- (-) Additional right turners at new junction to slip road increases potential conflict.



OCK-01a
Wisley Lane stopped-up at junction with the A3 and realigned the run parallel to the A3 southbound carriageway. On the approach to Mill Lane the realignment veers to the right and connects into the existing Ockham roundabout on the western side to form a new arm. Mill Lane junction with the northbound slip road would be stopped-up and form the minor arm of a 'T' junction with the new realigned Wisley Lane.

Implications

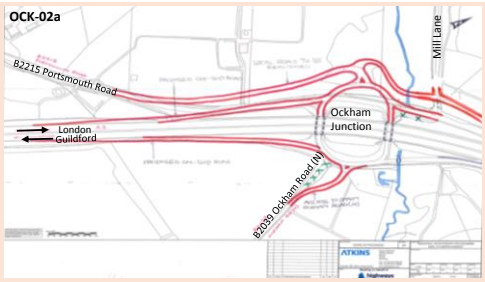
- (+) Small area of landtake.
- (+) Route to Wisley, Pyrford, West Byfleet and A3 northbound (M25 London) via Ockham Junction for local access.
- (+) Local traffic from above have additional access to Ockham Junction and B2215 to Ripley and B2039 to Ockham.
- (-) Landtake from RHS Garden Wisley and possible resultant removal of sequoia (redwood) trees.
- (-) Additional traffic on roundabout.
- (+) Removal of existing junction to slip road creates a safer layout.
- (-) Local stream/ditch to be culverted.
- (-) Connexion of new arm of north side of roundabout required.



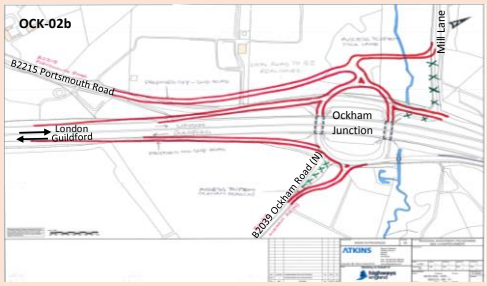
OCK-02
Assumed RHS Garden Wisley traffic could be rerouted to public car park via Mill Lane. Mill Lane junction with the northbound slip road would be stopped-up. Mill Lane to be realigned with a reverse curve to connect into the existing Ockham roundabout on the western side to form a new arm.

Implications

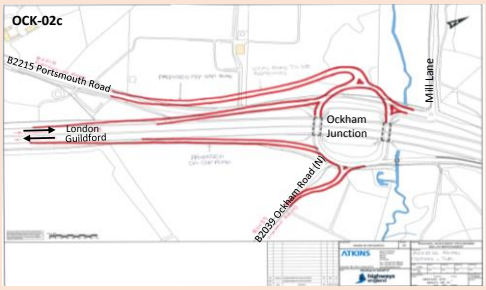
- (+) Small area of landtake.
- (+) Removal of existing junction to slip road creates a safer layout.
- (-) Local stream/ditch to be culverted.
- (-) Connexion of new arm of north side of roundabout required.
- (-) No access to RHS Garden Wisley unless current direct access from the A3 is maintained.
- Route to the villages of Wisley, Pyrford and Byfleet severed.
- (-) Access to Wisley village and Wisley Sewage Treatment Works severed. Dialogue required with Thames Water. Re-routing via Pyrford would require crossing restricted width (single vehicle) hump back bridge at River Wey Navigation canal lock. Bridge also has a 7.5t weight restriction.
- (-) Stakeholder meeting with RHS Garden Wisley concluded this option is not viable.



OCK-02a
Realignment of Wisley Lane and Mill Lane junction as Option OCK-01a above. South facing slip roads added to Ockham roundabout. B2215 Portsmouth Road realigned to connect into Ockham roundabout on the western side to form a new arm. Wisley Lane would connect to the B2215 as a minor arm of a 'T' junction to the west of the roundabout. B2039 to be aligned locally to connect centrally to the eastern side of the roundabout.
Implications
• (+) Improved junction provision provides movement in all directions.
• (+) Motorists visiting RHS Garden Wisley would avoid Ripley High Street and village.
• (+) Motorists exiting RHS Garden Wisley and travelling southbound would avoid having to detour via Junction 10 (Options 9 & 14) or Painshill Junction (Option 16).
• (-) Additional landtake.
• (-) Extended works programme and temporary traffic management for construction of new slip roads.
• (-) Improvements likely to generate a significant increase of traffic to roundabout.
• (+) Layout would benefit access to new development of Wisley Airfield.
• (-) Possible increase of rat running through local villages.



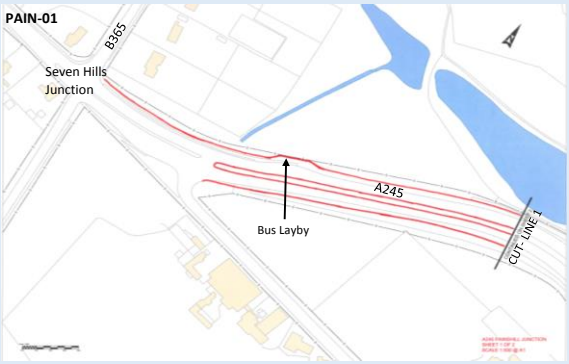
OCK-2b
Layout as Option OCK-02a with the exception of only Mill Lane connecting to the B2215 as a minor road 'T' junction to the west of the roundabout. A realigned Wisley Lane was not proposed as Mill Lane was assumed to become the main public access to RHS Garden Wisley.
Implications
• As Option OCK-02a.
• (-) Largest landtake of Ockham options.
• (-) No access to RHS Garden Wisley from A3 unless current direct access is retained.
• (-) Route from A3 to the villages of Wisley, Pyrford and West Byfleet severed.
• (-) Access to Wisley village and Wisley Sewage Treatment Works severed. Dialogue required with Thames Water. Re-routing via Pyrford would require crossing restricted width (single vehicle) hump back bridge at River Wey Navigation canal lock. Bridge also has a 7.5t weight restriction
• (-) Stakeholder meeting with RHS Garden Wisley concluded this option is not viable.

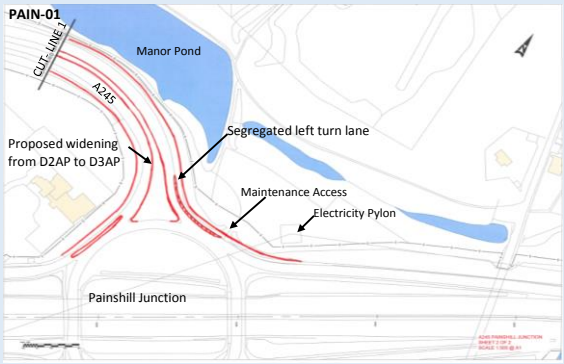


OCK-02c
Layout as Option OCK-02b with the exception of only Mill Lane which would unchanged from its existing layout.
Implications
• As Option OCK-02a and OCK-02b.
• (-) No access to RHS Garden Wisley from A3 unless current direct access is retained.

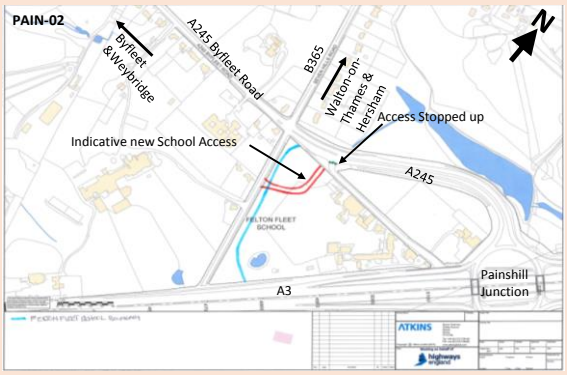
Painshill Alternative Options

Painshill Junction is approximately 2km to the north of M25 Junction 10 on the A3, where it crosses the A245. This junction is the principle access point to the trunk road network for many surrounding settlements, including Cobham (via A245 east), Byfleet and Weybridge (via A245 west) and Walton-on-Thames and Hersham via B365 Seven Hills Road.





PAIN-01
A245 D3AP Lane 1 for A3 northbound. Lanes 2 & 3 for Cobham and A3 southbound with traffic signals at Painshill Roundabout. Alternative option to provide a segregated left turn lane for the A3 northbound (as TD 51/03, Fig.2/1).from the A245 Eastbound direction.
Implications
- (+) Free-flow for A3 northbound traffic.
- (+) Increased green time on other arms of roundabout.
- If physical segregation is adopted, maintenance access to electricity pylon may need relocating.



PAIN-02
The existing entry/exit to Felton Fleet School is directly from the A245 westbound and via a central reserve opening for right turn movements from A245 eastbound. There is a yellow box junction at the opening on the westbound carriageway. The primary option is to retain a similar arrangement with D3AP. The alternative option is to stop-up the school entrance/exit and realign the access road to within the school grounds to connect into Seven Hills Road (South) at an adequate distance from the traffic signals. The connexion could be either a simple 'T' junction or mini roundabout. Seven Hills Road (South) is a no through road providing access to Hilton Hotel, a veterinary surgery and a private dwelling.
Implications
- (+) Safer access to school.
- (+) Less conflict and delays on A245 caused by right turners.
- (+) Regulated access/egress from traffic signalised junction providing turning movements in all directions.
- Dialogue and buy in from school required.
- (-) Realigned road would reduce sports field and take out trees.

Appendix E Detailed Engineering Assessment for Structures

Structures

Option 9

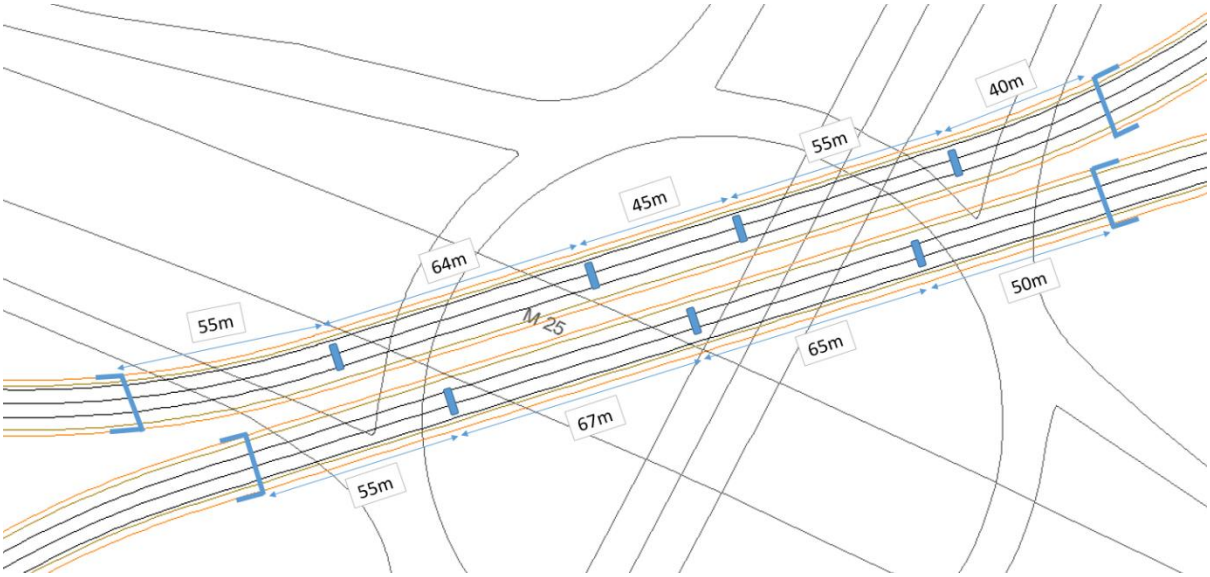
Detailed Engineering Assessment for Structures

Option 9 is for a four level layout with free-flow in two directions. The option consists of two structures spanning over the highest level of the existing interchange to provide free-flow right turns from the A3 northbound to the M25 anticlockwise and from the A3 southbound to the M25 clockwise. The right turns are provided on large medium span viaducts (approximately 260m in length) passing close to the centre of the existing junction with intermediate supports to fit within the constraints of the existing layout.

Each individual new free-flow turn would carry two lanes of traffic, and comply with the standards of TD 27/05 for dimensions of cross-section components for rural motorway connector roads. As a result it is assumed that these link roads would be 15.1m wide to incorporate two 3.65m wide lanes, a 3.3m hard shoulder, a 1m hard strip, a 1.5m nearside verge and a 2m offside verge.

The span arrangement shown in Fig 1 is considered to be the optimal solution for the viaducts. The position of the link roads has been chosen such that for the A3 northbound to M25 anticlockwise link road there is sufficient space to locate a pier between the M25 clockwise verge and the existing roundabout, whilst still allowing for a pier to be located between the M25 anticlockwise verge and the A3. This minimises the maximum span length to 67m. The position of link road for A3 southbound to M25 clockwise has also been optimised to achieve uniform span lengths which is favourable in terms of aesthetics and for the launched construction method proposed. The space between the structures is 8.6m, which will be advantageous if the link roads are constructed under two separate schemes.

Figure 1 Option 9 span arrangement



This solution does not require a pier in the M25 central reserve. Introducing a central reserve pier would not generate any significant benefits as the maximum span would simply be governed by the adjacent spans and still be of a similar magnitude.

With a span length of 67m a steel composite ladder beam deck is preferred. A steel box girder would also be possible with improved aesthetics but higher construction costs. The span length is beyond the range for which a precast beam and slab deck could be utilised. The use of a post tensioned concrete box girder deck would also be possible for this span length but would lead to a deck depth approximately 1m deeper than the steel composite beam deck. As well as increasing costs it would raise the link road carriageway level and therefore require taller abutments and embankments on the approach to the structure. The resulting elevated vertical alignment would also result in Departures from Standard for vertical crest curves and forward stopping sight distance imposed by land take and environmental issues. Methods to construct the box girder would include a cast in-situ travelling formwork or the use of precast segmental segments placed using an overhead gantry. However, these are not economical for the short length of viaduct being constructed. A concrete box deck type would also have a longer construction time and so this deck option has been discounted.

Pier supports under the steel ladder beam deck could take the form of individual columns under each beam connected by a crosshead. Alternatively a leaf pier could be used with a maximum width at deck soffit level, reducing in width as it approaches ground level to minimise the footprint. An example of this pier form is shown in Fig 2 and is assumed in the span arrangement sketches.

Figure 2: Proposed tapered pier form for steel composite ladder beam deck

A launched construction is recommended as this is known to be achievable and also has less complexity in tying in with existing geometric constraints and minimising traffic management. The link road between abutments has been changed to a straight alignment to enable this construction method. There would be some scope to re-introduce a curved alignment in the end spans to reduce land take for the interchange, either by horizontal jacking of the deck, craning in the final span, or designing the deck cantilevers to suit the curved plan alignment. An advantage of launching is that it generally concentrates the construction operation to a dedicated launching site, which in this case would be located outside the existing junction. This means that as a construction method it causes minimal disruption to road users as carriageways below

can remain open during launching provided fail safe systems are in place to prevent the fall of objects.

The deck could also be launched with edge protection and permanent formwork already in place, which would be advantageous in terms of minimising the need to work at height. The concrete slab could be poured in-situ, or precast in order to minimise the access required during construction. It may also be possible to launch the deck with the slab already in place for spans behind the leading span. Launching will require a piled jacking platform and should be carried out from the North-East corner of the existing roundabout as the South-West corner is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), local nature reserve and is also part of Wisley Common. Similarly the site office for launching operations should be located in this corner in the portion of land which is outside of the SSSI, common land, SPA and local nature reserve boundary. Following launching the paint system would require repairs unless weathering steel was adopted, although this would increase the girder weight and therefore the size of the launch.

An alternative to launching would be to crane the estimated 78t girders into position. Cranes with sufficient lifting capacity are available for this. However, the capacity of the lift would depend on the lifting height, outreach and whether the crane was mobile or on outriggers, which in turn is affected by construction site details such as access to the site, temporary works and craning platforms. As the proposed bridge deck passes over the existing A3, J10 roundabout and M25 mainline all at different levels to a maximum height of 20m, it is likely that the lifting height and radius will be significant, and therefore the lifting arrangement will have a significant impact on whether this span option can be craned into position or not. Details of the construction site however are not yet developed so the craned construction method remains only a possibility at feasibility stage.

Option 9 proposals will require piers and foundations to be constructed between the M25 mainline and the existing J10 roundabout. Piled foundations need to be located to ensure there are no clashes with existing structure foundations. In particular the wingwalls for Wisley Interchange West (Structure Key 3533) may require modifications to avoid clashing with the pier. Interfacing with existing constraints would be simplified by moving the viaduct structure to pass directly over the centre of the existing interchange, although there would be an associated increase in span length as the M25 and A3 would be crossed over in the same span.

Access to the pier locations could be gained from the M25 mainline with the use of narrow lanes and closing the hardshoulder. This arrangement would provide a construction width of 2.85m assuming an existing cross-section of 15.1m, 1.3m temporary barrier working width and proposed narrow lanes of 3.00m, and 3.25m for lane 1. Any remaining required construction width would need to be accommodated for within the verges, with earthworks required to level the 1:2.5 side slopes present. A width of approximately 4.5m would be required from the back of barrier working width to the closest pile to accommodate the piling rig. Locating the rig adjacent to the carriageway as opposed to the other side of the piled foundation would minimise the amount of earthworks to level the site.

An issue with accessing the site from the M25 is that earthworks would be required to level the side slopes and create a temporary access track adjacent to the M25 for access and egress of construction traffic. Once initial earthworks have taken place using access from the M25 an access track could then be built to enable access from the J10 roundabout for the remainder of construction. This would then minimise the requirement for traffic management on the M25 mainline and also be preferable for delivery of materials to the site.

Based on statutory undertakers C2 enquiries there do not appear to be any significant constraints in terms of services and utilities which would be difficult to divert. A 600mm deep ditch is located in the verge in each quadrant of the roundabout which forms part of the highway drainage system, and would need diversion prior to the works.

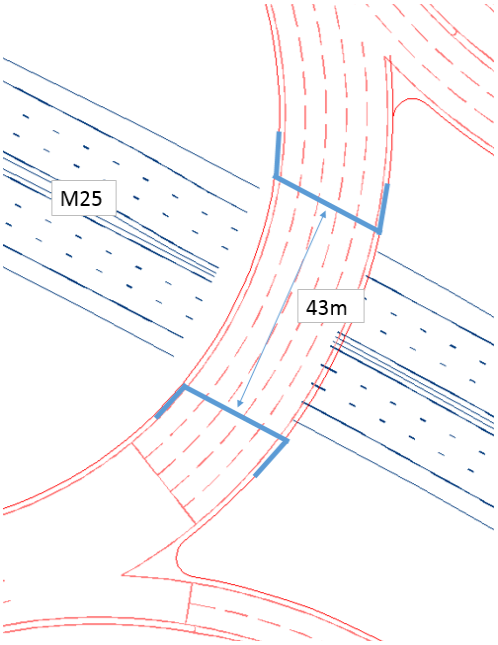
Other span arrangements, deck types and construction methods have also been investigated but were discounted for a various reasons as reported in the Structures Options Technical Note, document reference (Atkins), dated April 2016.

Option 14

The elongated roundabout option requires reuse of the existing underbridges under the A3. Two new overbridges over the M25 mainline will be required spanning 43m The decks are assumed to be 20.25m wide to allow for a cross section comprising 5 no. 3.65m wide lanes and 2 no. 1.0m wide hardstrips. In addition the bridge will be widened to provide forward stopping sight distance and possibly accommodate an NMU route on one side The option layout was designed assuming that structures would span the M25 mainline only and not the existing slips, meaning that the new slips will need to be constructed first. The option to span over the existing slips was considered as it would allow more flexibility in the construction sequence. However, due to the raised level of the existing slips the new roundabout would also need to be raised and so the tie in with existing A3 underbridges could not be achieved. Span arrangements spanning over the M25 mainline and slip roads were therefore not progressed further.

For the overbridges over the M25 a 43m single span precast beam and slab deck has been chosen in preference to the steel girder to eliminate the need to maintain a steel corrosion protection system (see Fig 3). The use of weathering steel was considered but is not the preferred material choice due to its aesthetic disadvantages. If lifting or delivery of beams becomes an issue then the steel girder deck would offer the advantage of being easier to transport, as it can be spliced on site and also easier to crane into positon.

Figure 3 Option 14 - M25 overbridge span length



Both the proposed M25 overbridge structures are located beyond the extents of the current interchange and therefore the site is not constrained by existing structures. Craning the 43m long precast beams in 130t lifts is therefore the preferred construction method. This would be achieved by a 1000t crane such as a LTM1800. Including the outriggers and crane platform this would have a plan area of 16m x 16m, which could be accommodated between the new M25 slip road and M25 carriageway, resulting in a lifting radius of 31m. Prior to the lift the existing slip road would need to be closed and earthworks undertaken to the level the site for the crane platform. This lift itself can be carried out during overnight closures of the M25 carriageway.

The elongated roundabout option proposes to reuse the existing underbridges under the A3. From as-built drawings the minimum spacing between abutments faces at the existing underbridges is 18m. Currently, three lanes pass through the underbridges. In this option the carriageway is widened to four lanes. Allowing 3.65m for each lane, and 1m on each side for a hard strip, the total width of the carriageway cross-section is 16.6m (Fig 4 and 5). The current underbridges are therefore wide enough to accommodate the proposed new carriageways, leaving 1.4m remaining as provision for NMU route. This restriction would be less than the standard 3.0m width for combined footway/cycleways as well as having a 0.5m buffer zone between MNUs and the traffic. Widening of the carriageway would require one of the three lanes to be closed during construction.

The minimum headroom for both existing underbridges is 5.21m based on as-built information. However, a wider carriageway would result in a headroom less than 5.21m due to the carriageway crossfall. It is therefore possible that the reduction in headroom could result in the need for a departure from TD 27/05, although it is greater than the maintained headroom of 5.03m. Alternatively the carriageway vertical alignment could be lowered to provide 5.3m headroom at the structure. These works would need to avoid clashing with the existing buried abutment foundations. As the minimum depth to the top of the foundation is approximately 1.0m there is sufficient depth to allow lowering of the carriageway level. Soffit lighting would also need to be

altered to suit the amended carriageway arrangement. Review of SMIS data has not identified any other reasons why these existing structures could not be retained.

Figure 4 Comparison of proposed carriageway layout and current underbridge dimension for Option 14

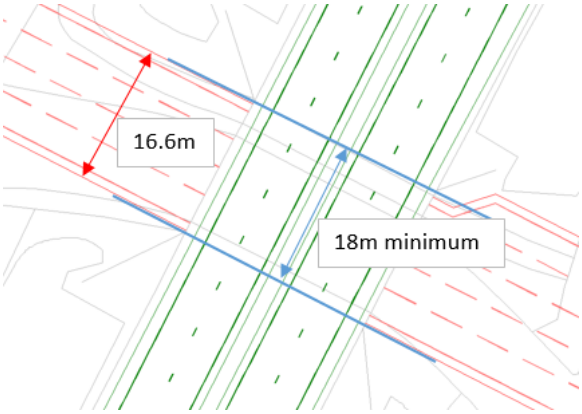
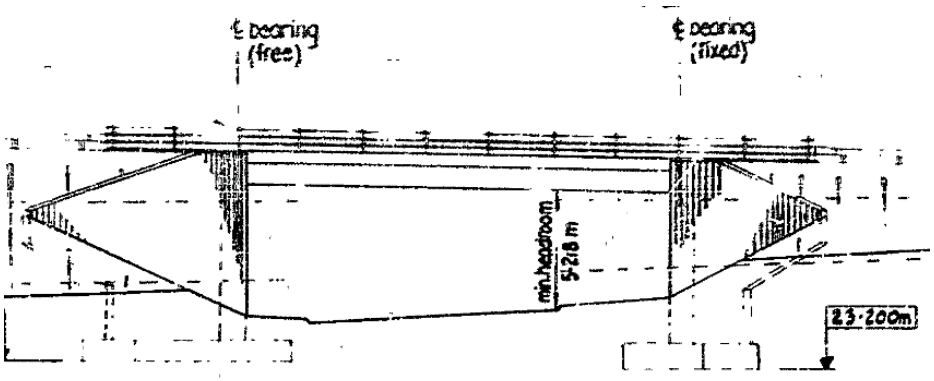


Figure 5 As built elevation for existing south underbridge proposed to be retained



Based on statutory undertakers C2 enquiries there do not appear to be any significant constraints in terms of services and utilities which would be difficult to divert.

Other span arrangements, deck types and construction methods have also been investigated but were discounted for various reasons as reported in the Structures Options Technical Note, document reference (Atkins), dated April 2016.

Option 16

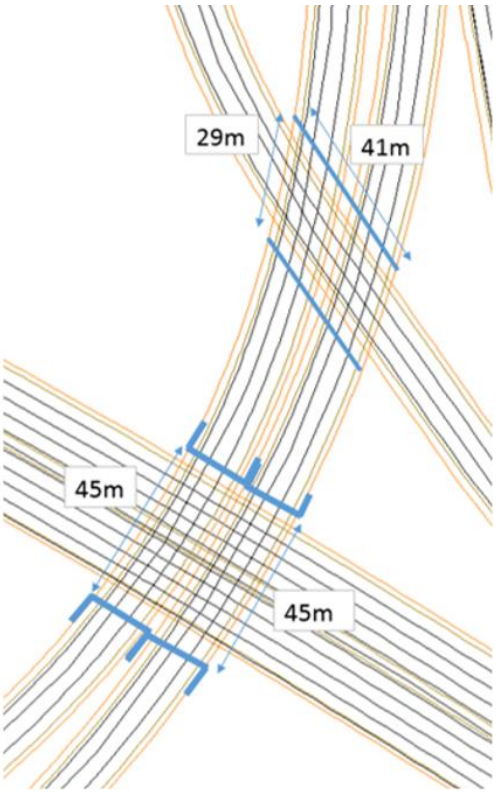
This option is for a cyclic layout providing free-flow for all traffic movements, based upon Figure 5/4.2c of TD 22/06. Each link road will carry two lanes of traffic, and therefore the deck widths are assumed to be 15.1m wide as for Option 9. Option 16 consists of four locations where a set of structures is required. In this section these locations are referred to as the north, south, east and west quadrants. The east and west quadrants require a structure to carry two cyclic link roads over the M25 and its proposed new on-slip. The north and south quadrants require a structure to carry the new A3 on-slip over two new cyclic link roads, as well as a separate structure to carry those cyclic link roads under the existing A3. Four bridges and two underpass structures are proposed. Two bridges will be 45m in span and two bridges will be 30m in span (see Fig 6). The underpasses span 15m and are 36m in length.

East and west quadrant structures:

The recommended structural arrangement is to have separate structures spanning over the M25 mainline and the new on slip with an embankment in between. This is preferred to a single multi-span structure as it replaces part of the structure with embankment fill to reduce costs. If the span crossing the M25 spanned the mainline only, a span of 45m would be sufficient. Due to phasing of the works it may instead be preferable to keep the existing M25 slips operational during construction. This would increase the span over the M25 from 45m to 62m.

Separate single span overbridges carry the link roads over the new M25 on slip. The structure has a 29m span in the east quadrant and a 30m span in the west quadrant. Due to the 34° skew angle it is likely non integral abutments will be required.

Figure 6 Option 16 – Proposed span arrangement for east and west quadrant structures



A steel composite multi girder deck is the preferred deck type as it allows the deck depth to be minimised and the girders can be craned as braced pairs for all spans

during overnight M25 closures. For the longest 62m span the lift size would be 152t assuming a pair of braced beams, reducing to 84t for a 45m span over the mainline only. The size of the lift could be halved by splicing the beams at the quarterpoints, with the crane located in the verge as for Option 14.

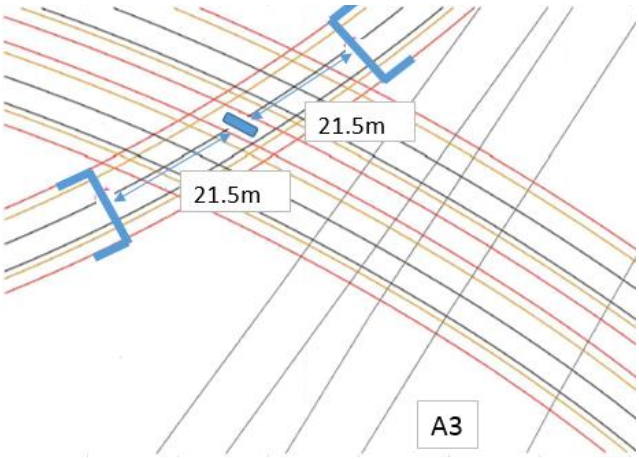
Modifying the carriageway layout so that the slips have a constant radius across both structures in each quadrant was investigated. This would be advantageous in terms of making launched construction methods possible. Due to the cyclic nature of this option, modifying the carriageway alignment at one quadrant affects the alignment at all other quadrants and leads to a significant change in the option layout, so it may be preferable to over-widen the deck to achieve constant curvature.

Span arrangements which utilise a pier in the M25 central reserve were investigated but discounted as they require central reserve works, and would not offer significant advantages over options without a central reserve pier, as these spans are already sufficiently short to allow the deck beams to be craned into place.

North and south quadrant structures:

The preferred option for the structure carrying the new A3 on slip over two new cyclic link roads is for a two span overbridge. Each span is 21.5m long in the north quadrant and 24m long in the south quadrant which is sufficiently short to enable 1.4m deep precast beams to be used (see Fig 7). This is preferable to steel girders as it eliminates the need to maintain a steel corrosion protection system. Weathering steel was considered as a possible material but the aesthetic disadvantages are significant.

Figure 7 Option 16 – Proposed overbridge span arrangement for north and south quadrants



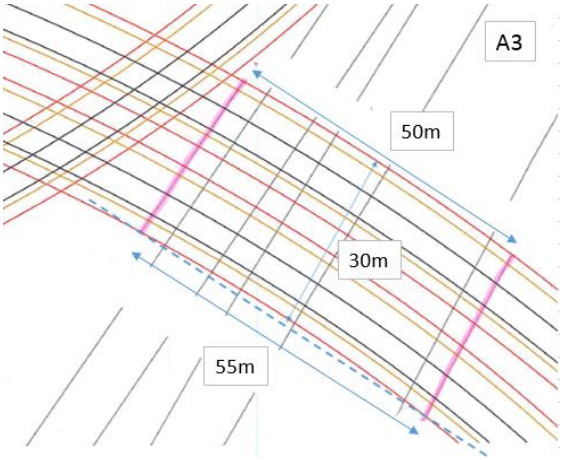
A possible modification to this option would be to remove the central pier resulting in a single span structure with a maximum span length of 48m. To provide sufficient headroom a shallower steel multi-girder deck would be required which is not preferred over a two span precast option. Furthermore, the pier would be constructed prior to the new link road being opened and hence would not cause disruption to road users.

Due to the short span lengths of the overbridges, the preferred construction method is for craning the deck beams. In this option, all structures are located a significant distance away from the existing junction resulting in few constraints which would limit lifting operations. Alternative methods to construct the decks would not be economical due to the short structure lengths.

A separate underbridge structure carries the two cyclic link roads under the extent of the A3 including its existing slips. The length of the structure at its longest point is 55m and its width is 30m in both the north and south quadrants (see Fig 8). If the

underbridge only spanned under the A3 mainline the length of the box could be reduced to 36m and 32m in the south and north quadrants respectively. This would be more economical, as the sections of the bridge under the existing slips would be redundant once the new interchanged is opened, although there would be increased complexity in phasing the works as the existing slip roads would need to be diverted around the work site.

Figure 8 Option 16 – Proposed underbridge arrangement for north and south quadrants crossing the A3 and the existing A3 slip roads.



The minimum vertical clearance to the top of the box would be 1.8m based upon a headroom of 5.4m and a roof slab depth of 1.0m. This is sufficient to jack the box under the A3 to enable construction to proceed with minimal traffic management, although would need to be reviewed once ground conditions are known. Due to the width of the box it would be necessary to jack two separate boxes, each with a width of approximately 15.0m. If the structure were to only span under the mainline the box would need to jacked as a series of structures to limit the size of the work site and therefore the diversion of the existing slips.

To reduce the size of jacking operations the abutments could be jacked first with the deck then being jacked under a weekend closure of the A3. Alternatively the box could be constructed by more conventional cut and cover methods, with the installation of a secant pile wall and propping followed by excavation and construction of the base and roof slabs. This would need to be facilitated by constructing the new link roads first so that the A3 mainline can be diverted onto the new link roads. Due to the disruption this would cause the jacked box option is therefore preferred. A further possibility would be to utilise carriageway ramping plates which are currently being used to span over joint replacement schemes elsewhere on the Network. This would enable piling and abutment construction works to take place during night closures, with the ramps then reinstated to allow the carriageway to be opened during the day. This option would require further investigation into whether the span of the ramps is sufficient to span over the works.

Currently the overbridges over the slip roads in the east and west quadrants cross the constraints at a skew angle of 34°. Similarly, in the north and south quadrants the overbridges have a skew angle of 26° and 42° respectively. Although it would be structurally advantageous to reduce these skews to shorten the span length and allow the use of integral abutments, changes to the alignment would result in greater land take for this cyclic arrangement. Furthermore, even with a skew the spans are sufficiently short to enable the beams to be craned into position. Therefore reduction

of the skews has not been investigated at this stage, but could be revisited if non integral structures pose a strategic maintenance problem.

Based on statutory undertakers C2 enquiries there do not appear to be any significant constraints in terms of services and utilities which would be difficult to divert.

Other span arrangements, deck types and construction methods have also been investigated but were discounted for various reasons as reported in the Structures Options Technical Note, document reference (Atkins), dated April 2016.

Opportunities for optimisation of structural arrangements.

The following opportunities have been identified to optimise the structural arrangements, and could be investigated further within subsequent stages of design: -

In order to launch the spans for Option 9, the structure must be straight or have a near constant radius. Currently the link roads are straight between abutments in order that the entire structure can be launched. However, this leads to greater land take in order to merge the link roads with the M25 and A3. If the launching sites were located at the penultimate pier the link roads would only need to be straight between these sites, reducing land take. The land taken in the south-west quadrant is SSSI, SPA and common land. Therefore reducing land take here would be particularly advantageous. Reducing land take in the north-east quadrant is of less importance, as only part of the land taken is SSSI. If this option were to be pursued, the outer most spans could then be craned into position, although temporary traffic management on the existing roundabout would be required to provide space for the launching site.

Another way to reduce the land take for Option 9 would be to put the link roads on a constant radius between the abutments, which can still be launched. This has been investigated in the development of the options, but was not taken forward as it leads to a 10m increase in the span length due to greater skew angle at which constraints are crossed. This option could be revisited if reduction in land take becomes particularly advantageous.

To reduce the span lengths and deck depth in all options, it may be possible to locate the piers and abutments closer to the edge of existing carriageways, combined with the use of collision protection barriers. A 4.5m clearance has currently been allowed for. Sufficient space would still be required in order to locate the foundations of the supports, and extensive traffic management may be required in order to construct the foundations due to the reduction in clearance.

The assumption has been made that this scheme will be carried out separately to the proposed M25 Smart Motorway Scheme. However, if they are carried out simultaneously then works in the M25 central reserve would be less of a disadvantage, and options which require M25 central reserve piers should be reconsidered where they reduce the maximum span length.

Annex B of TD 27/05 outlines the relaxations and Departures from Standards that, with appropriate justification, may be adopted. These reduce the width of the link roads and therefore construction costs and materials. Reduced carriageway widths can also reduce the effects of skew and lead to better pier positions, which in turn can result in optimised span lengths and reduced deck depths. This can lower material costs and therefore Relaxations and Departures from Standard should be considered during design development.

Table 1 below shows these relaxations/departures in the order that they must be adopted, and the reduction in cross-section that each brings.

Table 1 Hierarchy of relaxations and departures to TD27/05 for cross-sections

		Onside verge	Hard shoulder	Lane 1	Lane 2	Hard strip	Offside verge	Relaxation /Departure	Total width
Standard		1.5m	3.3m	3.65m	3.65m	1m	2m	-	15.1m
Reduce verge width		0.6m	3.3m	3.65m	3.65m	1m	0.6m	R	12.8m
Reduce hard shoulder width		0.6m	3m	3.65m	3.65m	1m	0.6m	R	12.5m
Reduce hard shoulder width		0.6m	2.5m	3.65m	3.65m	1m	0.6m	D	12m
Reduce hard shoulder width		0.6m	2m	3.65m	3.65m	1m	0.6m	D	11.5m
Reduce hard shoulder width		0.6m	1m	3.65m	3.65m	1m	0.6m	D	10.5m
Reduce lane 2 width		0.6m	1m	3.65m	3.6m	1m	0.6m	D	10.45m
Reduce lane 1 and 2 width		0.6m	1m	3.6m	3.5m	1m	0.6m	D	10.3m

Summary of preferred structural arrangements

A summary of the preferred structure types and arrangements is given in the Table 2 below.

Table 2 Preferred structure types

Option	Structure	Span arrangement	Deck type and depth	Deck width	Typical pier / abutment height	Construction method
9	Link A (A3 southbound to M25 clockwise)	55m – 61m – 50m – 53m – 40m	Steel ladder beam deck, 3.3m deep	15.1m	19.2m (max)	Incremental launching
	Link B (A3 northbound to M25 anticlockwise)	55m – 67m – 65m – 50m	Steel ladder beam deck, 3.3m deep	15.1m	19.2m (max)	Incremental launching
14	East overbridge structure	43m	Precast beam and slab integral with abutments, 2.5m deep	20.25m	5.5m	Lifting of beams with insitu deck
	West overbridge structure	43m	Precast beam and slab integral with abutments, 2.5m deep	20.25m	5.5m	Lifting of beams with insitu deck
	North underbridge	Existing structure				
	South underbridge	Existing structure				
16 (spanning over existing	East quadrant structures	62m – fill – 29m	Steel composite girder, integral for structure over M25 only, 2.5m deep	15.1m for each link road	6.5m	Lifting of beams with insitu deck

Option	Structure	Span arrangement	Deck type and depth	Deck width	Typical pier / abutment height	Construction method
slip roads)	West quadrant structures	62m – fill – 30m	Steel composite girder, integral for structure over M25 only, 2.5m deep	15.1m for each link road	5.8m	Lifting of beams with insitu deck
	North quadrant structures	55m long box	2 no. 15m wide concrete boxes	55m	7.4m	Jacked beneath A3
		21.5m – 21.5m overbridge	Non integral precast beam and slab, 1.4m deep	15.1m	6.0m	Lifting of beams with insitu deck
	South quadrant structures	55m long box	2 no. 15m wide concrete boxes	55m	7.4m	Jacked beneath A3
		24m – 24m overbridge	Non integral precast beam and slab, 1.6m deep	15.1m	6.0m	Lifting of beams with insitu deck
16 (spanning over mainline only)	East quadrant structures	45m – fill – 29m	Steel composite girder, integral for structure over M25 only, 1.8m deep	15.1m for each link road	7.2m	Lifting of beams with insitu deck
	West quadrant structures	45m – fill – 30m	Steel composite girder, integral for structure over M25 only, 1.8m deep	15.1m for each link road	6.5m	Lifting of beams with insitu deck
	North quadrant structures	32m long box	2 no. 15m wide concrete boxes	32m	7.4m	Jacked beneath A3
		21.5m – 21.5m overbridge	Non integral precast beam and slab, 1.4m deep	15.1m	6.0m	Lifting of beams with insitu deck
	South quadrant structures	36m long box	2 no. 15m wide concrete boxes	36m	7.4m	Jacked beneath A3
		24m – 24m overbridge	Non integral precast beam and slab, 1.6m deep	15.1m	6.0m	Lifting of beams with insitu deck

Appendix F Cost estimates

Option 9 (Estimate 6)

ECONOMICS INFORMATION FOR THE WHOLE PACKAGE

PROJECT NAME:	PROJECT STAGE:	1
PROJECT SCOPE:		
- The consultant (Atkins) will have options ready by 02/05/16 and we need estimates delivered 2 months later (24/06/16) - we recognise that this is less than your 12 week window - can you advise how we should proceed? - An early meeting with Benchmark to establish the detail required is requested.		

IF YOU HAVE ANY QUESTIONS REGARDING THE INFORMATION PROVIDED PLEASE CONTACT CommercialServicesDivision@highwaysengland.co.uk

REBASED 2010 CALENDAR YEAR PROFILES FOR ECONOMIC CALCULATIONS - ALL COSTS ARE IN THE FACTOR COST UNIT OF ACCOUNT

The expenditure profiles are based upon cost estimates for each financial year prepared in 2014 Q1 prices and then inflated to outturn costs using HA projected construction related inflation. These costs have then been rebased to 2010 calender year profiles for economic calculations, using the GDP-deflator series as published in the WebTAG Databook.
The costs exclude all recoverable VAT. All historic costs have been removed - previous years and an approximate of this years spend that occurs in the past.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total (Excl Hist)
PREPARATION EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£693,080	£1,430,455	£4,018,549	£6,728,105	£1,516,453	£0	£0	£0	£0	£0	£0	£14,386,641
SUPERVISION EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£1,616,010	£3,340,966	£742,276	£0	£0	£0	£0	£5,699,252
WORKS EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£62,889,845	£85,008,223	£17,915,656	£0	£0	£0	£0	£165,813,724
LANDS EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£3,547,997	£0	£0	£0	£0	£0	£0	£3,547,997
TOTAL EXPENDITURE FORECAST (ALL COSTS INCLUDED)	£0	£0	£0	£0	£0	£0	£693,080	£1,430,455	£4,018,549	£6,728,105	£69,570,304	£88,349,189	£18,657,933	£0	£0	£0	£0	£189,447,614

PREPARATION EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	5%	10%	28%	47%	11%	0%	0%	0%	0%	0%	0%	100%
SUPERVISION EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	28%	59%	13%	0%	0%	0%	0%	100%
WORKS EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	38%	51%	11%	0%	0%	0%	0%	100%
LANDS EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%
TOTAL EXPENDITURE FORECAST (ALL COSTS INCLUDED)	0%	0%	0%	0%	0%	0%	0%	1%	2%	4%	37%	47%	10%	0%	0%	0%	0%	100%

Option 14 (Estimate 10)

ECONOMICS INFORMATION FOR THE WHOLE PACKAGE

PROJECT NAME:	PROJECT STAGE:	1
PROJECT SCOPE:		
- The consultant (Atkins) will have options ready by 02/05/16 and we need estimates delivered 2 months later (24/06/16) - we recognise that this is less than your 12 week window - can you advise how we should proceed? - An early meeting with Benchmark to establish the detail required is requested.		

IF YOU HAVE ANY QUESTIONS REGARDING THE INFORMATION PROVIDED PLEASE CONTACT CommercialServicesDivision@highwaysengland.co.uk

REBASED 2010 CALENDAR YEAR PROFILES FOR ECONOMIC CALCULATIONS - ALL COSTS ARE IN THE FACTOR COST UNIT OF ACCOUNT

The expenditure profiles are based upon cost estimates for each financial year prepared in 2014 Q1 prices and then inflated to outturn costs using HA projected construction related inflation. These costs have then been rebased to 2010 calender year profiles for economic calculations, using the GDP-deflator series as published in the WebTAG Databook.
The costs exclude all recoverable VAT. All historic costs have been removed - previous years and an approximate of this years spend that occurs in the past.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total (Excl Hist)
PREPARATION EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£695,432	£1,386,933	£3,425,450	£5,794,053	£1,295,848	£0	£0	£0	£0	£0	£0	£12,597,715
SUPERVISION EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£1,602,262	£3,312,541	£735,961	£0	£0	£0	£0	£5,650,764
WORKS EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£38,841,701	£60,906,856	£14,219,398	£0	£0	£0	£0	£113,967,956
LANDS EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£2,605,865	£0	£0	£0	£0	£0	£0	£2,605,865
TOTAL EXPENDITURE FORECAST (ALL COSTS INCLUDED)	£0	£0	£0	£0	£0	£0	£695,432	£1,386,933	£3,425,450	£5,794,053	£44,345,675	£64,219,397	£14,955,360	£0	£0	£0	£0	£134,822,299

PREPARATION EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	6%	11%	27%	46%	10%	0%	0%	0%	0%	0%	0%	100%
SUPERVISION EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	28%	59%	13%	0%	0%	0%	0%	100%
WORKS EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	34%	53%	12%	0%	0%	0%	0%	100%
LANDS EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%
TOTAL EXPENDITURE FORECAST (ALL COSTS INCLUDED)	0%	0%	0%	0%	0%	0%	1%	1%	3%	4%	33%	48%	11%	0%	0%	0%	0%	100%

Option 16 (Estimate 14)

ECONOMICS INFORMATION FOR THE WHOLE PACKAGE

PROJECT NAME:	PROJECT STAGE:	1
PROJECT SCOPE:		
- The consultant (Atkins) will have options ready by 02/05/16 and we need estimates delivered 2 months later (24/06/16) - we recognise that this is less than your 12 week window - can you advise how we should proceed? - An early meeting with Benchmark to establish the detail required is requested.		

IF YOU HAVE ANY QUESTIONS REGARDING THE INFORMATION PROVIDED PLEASE CONTACT CommercialServicesDivision@highwaysengland.co.uk

REBASED 2010 CALENDAR YEAR PROFILES FOR ECONOMIC CALCULATIONS - ALL COSTS ARE IN THE FACTOR COST UNIT OF ACCOUNT

The expenditure profiles are based upon cost estimates for each financial year prepared in 2014 Q1 prices and then inflated to outturn costs using HA projected construction related inflation. These costs have then been rebased to 2010 calender year profiles for economic calculations, using the GDP-deflator series as published in the WebTAG Databook.
The costs exclude all recoverable VAT. All historic costs have been removed - previous years and an approximate of this years spend that occurs in the past.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total (Excl Hist)
PREPARATION EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£692,582	£1,453,272	£4,810,022	£7,856,054	£1,704,799	£0	£0	£0	£0	£0	£0	£16,516,730
SUPERVISION EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£1,348,620	£3,376,759	£2,037,008	£100,343	£0	£0	£0	£6,862,730
WORKS EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£71,045,758	£127,455,155	£67,714,590	£3,310,294	£0	£0	£0	£269,525,797
LANDS EXPENDITURE PROFILE	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£4,804,024	£0	£0	£0	£0	£0	£0	£4,804,024
TOTAL EXPENDITURE FORECAST (ALL COSTS INCLUDED)	£0	£0	£0	£0	£0	£0	£692,582	£1,453,272	£4,810,022	£7,856,054	£78,903,202	£130,831,914	£69,751,598	£3,410,637	£0	£0	£0	£297,709,281

PREPARATION EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	4%	9%	29%	48%	10%	0%	0%	0%	0%	0%	0%	100%
SUPERVISION EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	49%	30%	1%	0%	0%	0%	100%
WORKS EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	26%	47%	25%	1%	0%	0%	0%	100%
LANDS EXPENDITURE PROFILE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%
TOTAL EXPENDITURE FORECAST (ALL COSTS INCLUDED)	0%	0%	0%	0%	0%	0%	0%	0%	2%	3%	27%	44%	23%	1%	0%	0%	0%	100%

Appendix G AST

Appraisal Summary Table

Date produced:	20th October 2016

Contact:	
Name	Hugh Coakley
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	M25 J10 / A 3 Wisely Interchange, Option 9
Description of scheme:	Option 9 consists of free flow right turns from the A3 Northbound to the M25 anticlockwise and from the A3 southbound to the M25 clockwise. Free flow left turns from the A3 northbound to the M25 clockwise and the A3 southbound to the M25 anticlockwise are also provided. Produced as a product in PCF1

Impacts		Summary of key impacts	Assessment				
			Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	· The percentage of total TEE benefit during normal operation attributable to changes in consumers journey times and vehicle operating costs is 48%. · The total vehicle hours saved by business users in opening year during normal operation is not available at PCF Stage 1. For all vehicles and trip purposes combined: · See Tables 8.1-8.4 in the Traffic Forecasting Report for a summary of the opening year peak and inter-peak journey time changes in seconds by route. · Peak hour journey time changes during construction in minutes are not available at PCF Stage 1	Value of journey time changes(£000s): 626089 Net journey time changes (£000s) 0 to 2min: 358369; 2 to 5min: 243869; > 5min: 147876			N/A	£615 million (PV) (including vehicle operating cost and delays in construction)	Not assessed at PCF Stage 1.
	Reliability impact on Business users	Not assessed.	Not assessed.			N/A	N/A	
	Regeneration	Not assessed.	Not assessed.			N/A	N/A	
	Wider Impacts	Not assessed.	N/A			N/A	N/A	
Environmental	Noise	Major increases in the Opening year (at least 5dB) and Design year (at least 10dB) are predicted on the new links from the A3 to M25, and the M25 eastbound off slip road. The New links will bring the carriageway closer to receptors at Pond Farm, Chatley Farm, Court Close Farm, Foxwarren Park and Silvermere Equestrian Centre	Not assessed at PCF stage 1.			Preliminary Basic Noise Level calculations indicate that a total of 943 households are located within 600m of road links that are expected to experience an increase in noise (for both the opening year and forecast years). It should be noted that this calculation does not account for the cumulative impact from all road links however and similarly does not account for the potential masking of those increases by nearby links with greater flows and noise levels, consequently this information is provided for indicative purposes only. Detailed noise modelling enabling detailed noise impact calculations, and NPV calculations, will be undertaken at PCF Stage 3 in accordance with appropriately proportionate assessment techniques.	Not assessed at PCF Stage 1.	Not assessed at PCF Stage 1.
	Air Quality	This option is not located within any AQMAs, although it is expected to lead to an increase in traffic on a number of roads in the vicinity of J10, which could potentially lead to an increase in pollutant concentrations at receptors near the ARN, including those within the M25 AQMA and within the Cobham AQMA. It is likely to adversely affect the designated ecological sites which surround J10. However, it is expected to lead to a decrease in traffic on the M25 east of Junction 10, the A245 west of Painshill Interchange and Wisley Lane with a potential decrease in pollutant concentrations at receptors near these roads.	Not assessed at PCF stage 1.			At Stage 1 it was found that 166 sensitive receptors could potentially experience an improvement in air quality whilst 4294 could potentially experience a deterioration. This will be assessed in greater detail at a later stage.	Not assessed at PCF stage 1.	Not assessed at PCF stage 1.
	Greenhouse gases	Full assessment of Greenhouse Gases has not yet been undertaken, however professional judgement suggests that the scheme is likely to lead to an overall increase in emissions based on the expected increases in traffic outweighing the decreases in traffic. Conversly, changes in Greenhouse gases have been evalutated through TUBA assessments of the strategic modelling outputs. Whilst there are reservations about how robust these assessments are the emmissions which have reduced as a result of a reduction in vehicle delay outwieghs any that created by increases in traffic flow.	Change in non-traded carbon over 60y (CO2e): -148946 Change in traded carbon over 60y (CO2e): 484			Adverse	£11.348 million PV	
	Landscape	This option would conflict with the local landscape character as new elements could conflict with the key attributes of local landscape including landform and presence of woodland areas. Whilst some elements could be integrated into landscape through environmental design measures, the pattern of road infrastructure would be considerably extended, which would diminish the sense of place and would compromise some of the functionality and qualities of adjacent woodland and Commons.	N/A			Moderate Adverse	N/A	
	Townscape	Assessed under landscape.	N/A			Neutral	N/A	
	Historic Environment	Impacts on the historic environment are likely to be in the form of setting impacts on scheduled monuments, registered parks and gardens and listed buildings, as a result of construction. Large adverse effects are recorded on one scheduled monument as a result. Large adverse effects are recorded on two registered park and garden, and one listed building as a result of creating an Dual Four Lane All Purpose road (D4AP) on the A3.	N/A			Large Adverse	N/A	
	Biodiversity	This option would involve approximate land take of 17 ha, of which 11 ha is designated as Thames Basin Heaths SPA and 16 ha is designated as Ockham and Wisley Commons SSSI and Ockham and Wisley LNR. Land designated as SPA and SSSI in the south west quadrant would be lost including woodland habitat and a small area of recently regenerated heathland habitat. This regenerated heathland area has the potential to support all three qualifying Thames Basin Heaths SPA bird species (Dartford warbler, nightjar and woodlark). The removal of woodland that acts as a sound buffer between the M25/A3 and the regenerating heathland area is likely to lead to increased noise levels within the SPA habitat, and decrease the potential value of the newly regenerated heathland area. The habitat loss in the north east quadrant would involve some land designated as SSSI but the woodland block immediately to the north of the M25 is outside the SSSI boundary. The south east quadrant, which supports the established heathland habitat, where all qualifying SPA species were recorded during surveys in 2016, would be avoided. SPI and legally protected species are likely to be present and further habitat and species surveys are ongoing to identify the location of protected and notable species and areas of ecological value. The woodlands support bats and badgers and the heathlands support SPA qualifying bird species and reptiles, with the southeast quadrant known to support the rare sand lizard.	N/A			Very Large Adverse	N/A	
	Water Environment	Potential increased discharge and associated pollutant runoff to the associated tributaries of the River Mole and the River Mole owing to the increase in impermeable areas to accommodate carriageway widening. 3 new watercourse crossing over tributaries within the River Mole catchment. Direct morphological changes to the watercourses (such as new culverts or realignments) and changes in drainage patterns and potential indirect implications for the River Mole WFD status. Works are adjacent to Boldermere WFD lake, potential pollution risk. Bisects the Wisley Commons SSSI, a component part of Thames Basin Heaths SPA. Any modifications to drainage, watercourses within the site and changes of water levels may have potential implications for the sites status. Cuttings and earthworks present a potential mechanism for impacts on groundwater level and quality. Crosses areas defined as Secondary A Aquifers, potential effects may be associated with cuttings and will most likely require piling. Earthworks, cutting and piling may affect the flow of groundwater in the Secondary Aquifer, indirectly affecting surface water features and abstractions which are dependent upon groundwater inputs. Works may introduce new pollutant pathways to the underlying Aquifer. There is also currently a very high risk priority outfall to draining to surface water nearby which could be an opportunity for improvement.	N/A			Large Adverse	N/A	
Social	Commuting and Other users	The M25 at Junction 10 is one of the busiest roads in the country, and one of the aims of the scheme to reduce congestion at the junction and improve journey times for all users. '· The percentage of total TEE benefit during normal operation attributable to changes in commuter journey times and vehicle operating costs is 52% · The total vehicle hours saved by commuters in opening year during normal operation is not available at PCF Stage 1. For all vehicles and trip purposes combined: · See Tables 8.1-8.4 in the Traffic Forecasting Report for a summary of the opening year peak and inter-peak journey time changes in seconds by route. · Peak hour journey time changes during construction in minutes are not available at PCF Stage 1.	Value of journey time changes(£000s): 683370 Net journey time changes (£000s) 0 to 2min: 353940; 2 to 5min: 180424; > 5min: 207311			N/A	£653 million (PV) (including vehicle operating cost and delays in construction)	Not assessed at PCF Stage 1.
	Reliability impact on Commuting and Other	Not assessed.	Not assessed.			N/A	N/A	
	Physical activity	No significant effects have been identified for any of the PRoWs during operational phase. It is assumed the effect on the shared cycleway and footpath along the A3 there will be a slight beneficial effect to this NMU route on operation. Likely increase in numbers of walkers and cyclists along the A3 shared footpath and cycleway due to improvements in amenity of that NMU route. Average journey times for pedestrians and cyclists are likely to remain the same.	Not assessed at PCF stage 1.			Beneficial	N/A	
	Journey quality	Impact on motorised traveller's views from the road will depend on the design and landscaping mitigation but it is assumed a loss of current woodland screening and common will be required. No significant effects have been identified for any PRoWs during operation while the effect on the shared cycleway and footpath along the A3 will be a slight beneficial effect, however setting and amenity will be effected due to loss of woodland screening and common. Driver stress and frustration is expected to reduce during operation through increased traffic flows and a more efficient road network.	N/A			Slight beneficial	N/A	
	Accidents	The junction has a high number of accidents currently (the area around M25 J10 has the highest recorded collision rate across the network nationally), and reducing accidents is one of the key objectives of the scheme. The proposed left turn lanes and/or free flowing movements would reduce the potential for vehicle conflicts, and the additional lanes on the A3 would allow for safer merging.	N/A			N/A	£40.00 million (PV)	Not assessed at PCF Stage 1.
	Security	Any changes to pedestrian / cyclist facilities at the junction may have an impact on security due to changes in visibility and lighting.	Not assessed at PCF stage 1.			Neutral		
	Access to services	No public transport element to scheme	N/A			Neutral	N/A	N/A at PCF Stage 1
	Affordability	One of the aims of the scheme to reduce congestion at the junction and improve journey times for all users, which may have positive cost impacts.	Not assessed at PCF stage 1.			N/A	N/A	N/A at PCF Stage 1
	Severance	The scheme aims to reduce congestion at the junction, which is likely to increase speed and flow. Although the existing road already causes a high level of severance, faster moving traffic could make it difficult for pedestrian to cross the road. There are pedestrian, cyclist and equestrian crossings at M25 J10, and the present configuration has been identified as a barrier to encouraging active travel, and identified as having substandard cycling facilities along the A3 southbound. Some of these facilities may be improved by changes to the junction and along the length of the A3.	Not assessed at PCF stage 1.			N/A	N/A	N/A at PCF Stage 1
	Option and non-use values	As no new transport options will be created by this scheme, option values have not been considered.	Not assessed			Not assessed (Unmonetised)	N/A (Unmonetised)	
Public Account	Cost to Broad Transport Budget	Highways England capital investment costs of £157 million (2010 prices, PV)	The costs of capital investment, operating and maintenance are funded by Central Government.			N/A	£156.9 million (PV)	
	Indirect Tax Revenues	Scheme leads to increased vehicle operating costs. This feeds through to overall increased indirect tax revenues.				N/A	£13.5 million (PV)	

Appraisal Summary Table

Date produced:	20th October 2016

Contact:	
Name	Hugh Coakley
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	M25 Junction 10 / A3 Wisley Interchange Option 14
Description of scheme:	Option 14 modifies the existing roundabout by creating new structures over the M25 and reusing the existing structures under the A3. The circulatory carriageway under the A3 would be widened to 4 lanes, 5 lanes of circulatory carriageway would be provided where unconstrained by the existing structures. Right turns would be carried out on the modified roundabout and left turns would use dedicated left filter lanes. Produced as a product in PCF1

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	· The percentage of total TEE benefit during normal operation attributable to changes in consumers journey times and vehicle operating costs is 48%. · The total vehicle hours saved by business users in opening year during normal operation is not available at PCF Stage 1. For all vehicles and trip purposes combined: · See Tables 8.1-8.4 in the Traffic Forecasting Report for a summary of the opening year peak and inter-peak journey time changes in seconds by route. · Peak hour journey time changes during construction in minutes are not available at PCF Stage 1	Value of journey time changes(£000s): 423650 Net journey time changes (£000s) 0 to 2min: 324961 / 2 to 5min: 167917 / > 5min: 134929	N/A	£407 million (PV) (including vehicle operating cost and delays in construction)	Not assessed at PCF Stage 1.
	Reliability impact on Business users	Not assessed.	Not assessed.	N/A	N/A	
	Regeneration	Not assessed.	Not assessed.	N/A	N/A	
	Wider Impacts	Not assessed.	N/A	N/A	N/A	
Environmental	Noise	Major noise increases in the Opening year (at least 5dB) and the Design year (at least 10dB) are predicted on new links from M25 eastbound to A3 northbound, A3 northbound and westbound M25, and a new section of the M25 eastbound on slip road.	Not assessed at PCF stage 1.	Preliminary Basic Noise Level calculations indicate that a total of 903 households are located within 600m of road links that are expected to experience an increase in noise (for both the opening year and forecast years). It should be noted that this calculation does not account for the cumulative impact from all road links however, and similarly does not account for the potential masking of those increases by nearby links with greater flows and noise levels, consequently this information is provided for indicative purposes only. Detailed noise modelling enabling detailed noise impact calculations, and NPV calculations, will be undertaken at PCF Stage 3 in accordance with appropriately proportionate assessment techniques.	Not assessed at PCF stage 1.	Not assessed at PCF Stage 1.
	Air Quality	This option is not located within any AQMAs, although it is expected to lead to an increase in traffic on a number of roads in the vicinity of J10, which could potentially lead to an increase in pollutant concentrations at receptors near the ARN, including those within the M25 AQMA and within the Cobham AQMA. It is likely to adversely affect the designated ecological sites which surround J10. However, it is expected to lead to a decrease in traffic on the A245 west of Painshill Interchange and Wisley Lane with a potential decrease in pollutant concentrations at receptors near these roads.	Not assessed at PCF stage 1.	At Stage 1 it was found that 143 sensitive receptors could potentially experience an improvement in air quality whilst 4317 could potentially experience a deterioration. This will be assessed in greater detail at a later stage.	Not assessed at PCF stage 1.	Not assessed at PCF Stage 1.
	Greenhouse gases	Full assessment of Greenhouse Gases has not yet been undertaken, however professional judgement suggests that the scheme is likely to lead to an overall increase in emissions based on the expected increases in traffic outweighing the decreases in traffic. Conversly, changes in Greenhouse gases have been evalutated through TUBA assessments of the strategic modelling outputs. Whilst there are reservations about how robust these assessments are the emmissions which have reduced as a result of a reduction in vehicle delay outwieghs any that created by increases in traffic flow.	Change in non-traded carbon over 60y (CO2e): -44722 Change in traded carbon over 60y (CO2e): 3240	Adverse	£6.82 million PV	
	Landscape	A slight alteration to the local landscape character is expected through the introduction of this option. Whilst some deterioration to the existing landscape features around the junction would take place, the changes would be of small scale. Environmental design measures could integrate the option into the existing landscape and over a time the alteration to the landscape would be barely perceptible.	N/A	Moderate Adverse	N/A	
	Townscape	Assessed under landscape.	N/A	Neutral	N/A	
	Historic Environment	Impacts on the historic environment are likely to be in the form of setting impacts on scheduled monuments and listed buildings, as a result of construction. A temporary large adverse effect is recorded on one scheduled monument as a result. Large adverse effects are recorded on two registered park and garden, and one listed building as a result of creating an Dual Four Lane All Purpose road (D4AP) on the A3.	N/A	Large Adverse	N/A	
	Biodiversity	This option will involve approximate land take of 8 ha, of which 3.8 ha is designated as Thames Basin Heaths SPA and 6.7 ha is designated as Ockham and Wisley Commons SSSI and Ockham and Wisley LNR. Woodland habitat would be lost from within all four quadrants. There may be the loss of a small number of veteran trees that form a tree line in the northwest quadrant. It will require the removal of some of the woodland that acts as a sound buffer between the 25/A3 and the heathland areas. This is likely to increase noise levels within the SPA habitat, and may cause a reduction in breeding density of SPA qualifying species (Dartford warbler and nightjar) and a decrease in the potential value of the newly regenerated heathland area.	N/A	Large Adverse	N/A	
	Water Environment	Potential increased discharge and associated pollutant runoff to the associated tributaries of the River Mole and the River Mole owing to the increase in impermeable areas to accommodate carriageway widening. 3 new watercourse crossing over tributaries within the River Mole catchment. Direct morphological changes to the watercourses (such as new culverts or realignments) and changes in drainage patterns and potential indirect implications for the River Mole WFD status. Works are adjacent to Boldermere WFD lake, potential pollution risk. Bisects the Wisley Commons SSSI, a component part of Thames Basin Heaths SPA. Any modifications to drainage, watercourses within the site and changes of water levels may have potential implications for the sites status. Cuttings and earthworks present a potential mechanism for impacts on groundwater level and quality. Crosses areas defined as Secondary A Aquifers, potential effects may be associated with cuttings and will most likely require piling. Earthworks, cutting and piling may affect the flow of groundwater in the Secondary Aquifer, indirectly affecting surface water features and abstractions which are dependent upon groundwater inputs. Works may introduce new pollutant pathways to the underlying Aquifer. There is also currently a very high risk priority outfall to draining to surface water nearby which could be an opportunity for improvement.	N/A	Large Adverse	N/A	
Social	Commuting and Other users	The M25 at Junction 10 is one of the busiest roads in the country, and one of the aims of the scheme to reduce congestion at the junction and improve journey times for all users. · The percentage of total TEE benefit during normal operation attributable to changes in commuter journey times and vehicle operating costs is 52% · The total vehicle hours saved by commuters in opening year during normal operation is not available at PCF Stage 1. For all vehicles and trip purposes combined: · See Tables 8.1-8.4 in the Traffic Forecasting Report for a summary of the opening year peak and inter-peak journey time changes in seconds by route. · Peak hour journey time changes during construction in minutes are not available at PCF Stage 1.	Value of journey time changes(£000s): 456288 Net journey time changes (£000s) 0 to 2min: 279887 / 2 to 5min: 128880 / > 5min: 194407	N/A	£410 million (PV) (including vehicle operating cost and delays in construction)	Not assessed at PCF Stage 1.
	Reliability impact on Commuting and Other users	Not assessed.	Not assessed.	N/A	N/A	
	Physical activity	No significant effects have been identified for any of the PRoWs during operational phase. It is assumed the effect on the shared cycleway and footpath along the A3 there will be a slight beneficial effect to this NMU route on operation. Likely increase in numbers of walkers and cyclists along the A3 shared footpath and cycleway due to improvements in amenity of that NMU route. Average journey times for pedestrians and cyclists are likely to remain the same.	Not assessed at PCF stage 1.	Beneficial	N/A	
	Journey quality	Impact on motorised traveller's views from the road will depend on the design and landscaping mitigation but it is assumed a loss of current woodland screening and common will be required. No significant effects have been identified for any PRoWs during operation while the effect on the shared cycleway and footpath along the A3 will be a slight beneficial effect, however setting and amenity will be effected due to loss of woodland screening and common. Driver stress and frustration is expected to reduce during operation through increased traffic flows and a more efficient road network.	N/A	Slight beneficial	N/A	
	Accidents	The junction has a high number of accidents currently (the area around M25 J10 has the highest recorded collision rate across the network nationally), and reducing accidents is one of the key objectives of the scheme. The scheme is forecast to produce accident savings compared to the current layout.	N/A	N/A	£1.49 million (PV)	Not assessed at PCF Stage 1.
	Security	Any changes to pedestrian / cyclist facilities at the junction may have an impact on security due to changes in visibility and lighting.	Not assessed at PCF stage 1.	Neutral		
	Access to services	No public transport element to scheme	N/A	Neutral	N/A	N/A at PCF Stage 1
	Affordability	One of the aims of the scheme to reduce congestion at the junction and improve journey times for all users, which may have positive cost impacts.	Not assessed at PCF stage 1.	N/A	N/A	N/A at PCF Stage 1
	Severance	The scheme aims to reduce congestion at the junction, which is likely to increase speed and flow. Although the existing road already causes a high level of severance, faster moving traffic could make it difficult for pedestrian to cross the road. There are pedestrian, cyclist and equestrian crossings at M25 J10, and the present configuration has been identified as a barrier to encouraging active travel, and identified as having substandard cycling facilities along the A3 southbound. Some of these facilities may be improved by changes to the junction and along the length of the A3.	Not assessed at PCF stage 1.	N/A	N/A	N/A at PCF Stage 1
	Option and non-use values	As no new transport options will be created by this scheme, option values have not been considered.	Not assessed	Not assessed	Not assessed	
Public Accounts	Cost to Broad Transport Budget	Highways England capital investment costs of £112 million (2010 prices, PV)	The costs of capital investment, operating and maintenance are funded by Central Government.	N/A	£112 million (PV)	
	Indirect Tax Revenues	Scheme leads to increased vehicle operating costs. This feeds through to overall increased indirect tax revenues.		N/A	£2.7 million (PV)	

Appraisal Summary Table

Date produced:	20th October 2016

Contact:	
Name	Hugh Coakley
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	M25 Junction 10 / A3 Wisley Interchange Option 16
Description of scheme:	Option 16 would make Junction 10 free flow (similar to the arrangements at M25 J12). This would provide free flow opportunities for all movements, thus potentially removing all delay from the junction. The design is compact, thus minimising land take and environmental impact compared with a less compact design. Produced as a product in PCF1

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	· The percentage of total TEE benefit during normal operation attributable to changes in consumers journey times and vehicle operating costs is 48%. · The total vehicle hours saved by business users in opening year during normal operation is not available at PCF Stage 1. For all vehicles and trip purposes combined: · See Tables 8.1-8.4 in the Traffic Forecasting Report for a summary of the opening year peak and inter-peak journey time changes in seconds by route. · Peak hour journey time changes during construction in minutes are not available at PCF Stage 1	Value of journey time changes(£000s): 604760 Net journey time changes (£000s) 0 to 2min: 710553; 2 to 5min: 383574; > 5min: 349733	N/A	£588 million (PV) (including vehicle operating cost and delays in construction)	Not assessed at PCF Stage 1.
	Reliability impact on Business users	Not assessed.	Not assessed.	N/A	N/A	
	Regeneration	Not assessed.	Not assessed.	N/A	N/A	
	Wider Impacts	Not assessed.	N/A	N/A	N/A	
Environmental	Noise	In both the Opening and Design years, most of the newly constructed links, and the carriageways travelling away from J10 are predicted to have major increases in road traffic noise. Major noise increases are at least 5dB in the Opening year and 10dB in the Design year. This is related to increased traffic speeds at junctions.	Not assessed at PCF Stage 1.	Preliminary Basic Noise Level calculations indicate that a total of 941 households are located within 600m of road links that are expected to experience an increase in noise (for both the opening year and forecast years). It should be noted that this calculation does not account for the cumulative impact from all road links however and similarly does not account for the potential masking of those increases by nearby links with greater flows and noise levels, consequently this information is provided for indicative purposes only. Detailed noise modelling enabling detailed noise impact calculations, and NPV calculations, will be undertaken at PCF Stage 3 in accordance with appropriately proportionate assessment techniques.	Not assessed at PCF Stage 1.	Not assessed at PCF Stage 1.
	Air Quality	This option is not located within any AQMAs, although it is expected to lead to an increase in traffic on a number of roads in the vicinity of J10, which could potentially lead to an increase in pollutant concentrations at receptors near the ARN, including those within the M25 AQMA. It is likely to adversely affect the designated ecological sites which surround J10. However, it is expected to lead to a decrease in traffic on the M25 east of J10, the A245 west of Painshill Interchange and Wisley Lane with a potential decrease in pollutant concentrations at receptors near these roads.	Not assessed at PCF Stage 1.	At Stage 1 it was found that 166 sensitive receptors could potentially experience an improvement in air quality whilst 2022 could potentially experience a deterioration. This will be assessed in greater detail at a later stage.	Not assessed at PCF Stage 1.	Not assessed at PCF Stage 1.
	Greenhouse gases	Full assessment of Greenhouse Gases has not yet been undertaken, however professional judgement suggests that the scheme is likely to lead to an overall increase in emissions based on the expected increases in traffic outweighing the decreases in traffic. Conversly, changes in Greenhouse gases have been evalutated through TUBA assessments of the strategic modelling outputs. Whilst there are reservations about how robust these assessments are the emmissions which have reduced as a result of a reduction in vehicle delay outwieghs any that created by increases in traffic flow.	Change in non-traded carbon over 60y (CO2e): -235389 Change in traded carbon over 60y (CO2e): -3151	Adverse	£14.783 million PV	
	Landscape	Option would conflict with local landscape character as important qualities of the local landscape like woodland areas, landscape pattern and landform would be permanently transformed across a relatively large area around the junction. The proposed changes would remain perceptible and significant within the local landscape character.	N/A	Moderate Adverse	N/A	
	Townscape	Assessed under landscape.	N/A	Neutral	N/A	
	Historic Environment	Impacts on the historic environment are likely to be in the form of setting impacts on scheduled monuments, registered parks and gardens and listed buildings, as a result of construction. Large adverse effects are recorded on two scheduled monuments, one registered park and garden, and one listed building as a result. Large adverse effects are recorded on two registered park and garden, and one listed building as a result of creating an Dual Four Lane All Purpose road (D4AP) on the A3.	N/A	Large Adverse	N/A	
	Biodiversity	Option will involve approximate land take of 48 ha, of which 23 ha is designated as Thames Basin Heaths SPA and 41.7 ha is designated as Ockham and Wisley Commons SSSI and Ockham and Wisley LNR. It will involve the loss of a significant amount of habitat within all four quadrants. Large areas of woodland habitat would be lost or isolated within the junction and would also require loss of a heathland glade in the northwest quadrant and a part of the regenerating heathland in the southwest quadrant. There would be removal of a significant amount of the woodland that acts as a sound buffer between the M25/A3 and the heathland areas. This is likely to lead to increase noise levels within the SPA habitat, and may cause a reduction in breeding density of SPA qualifying species (Dartford warbler and nightjar) and a decrease in the potential value of the newly regenerated heathland area.	N/A	Very Large Adverse	N/A	
	Water Environment	Potential increased discharge and associated pollutant runoff to the associated tributaries of the River Mole and the River Mole owing to the increase in impermeable areas to accommodate carriageway widening. 6 new watercourse crossing over tributaries within the River Mole catchment. Direct morphological changes to the watercourses (such as new culverts or realignments) and changes in drainage patterns and potential indirect implications for the River Mole WFD status. One new watercourse crossing over Stratford Brook. Works in close proximity to the River Wey, potential indirect effects. Works are adjacent to Boldermere WFD lake, potential pollution risk. Bisects the Wisley Commons SSSI, a component part of Thames Basin Heaths SPA. Any modifications to drainage, watercourses within the site and changes of water levels may have potential implications for the sites status. Cuttings and earthworks present a potential mechanism for impacts on groundwater level and quality. Crosses areas defined as Secondary A Aquifers, potential effects may be associated with cuttings and will most likely require piling. Earthworks, cutting and piling may affect the flow of groundwater in the Secondary Aquifer, indirectly affecting surface water features and abstractions which are dependent upon groundwater inputs. Works may introduce new pollutant pathways to the underlying Aquifer. There is also currently a very high risk priority outfall to draining to surface water nearby which could be an opportunity for improvement.	N/A	Large Adverse	N/A	
Social	Commuting and Other users	The M25 at Junction 10 is one of the busiest roads in the country, and one of the aims of the scheme to reduce congestion at the junction and improve journey times for all users. '· The percentage of total TEE benefit during normal operation attributable to changes in commuter journey times and vehicle operating costs is 52% · The total vehicle hours saved by commuters in opening year during normal operation is not available at PCF Stage 1. For all vehicles and trip purposes combined: · See Tables 8.1-8.4 in the Traffic Forecasting Report for a summary of the opening year peak and inter-peak journey time changes in seconds by route. · Peak hour journey time changes during construction in minutes are not available at PCF Stage 1.	Value of journey time changes(£): 687975 Net journey time changes (£000s) 0 to 2min: 360917; 2 to 5min: 159192; > 5min: 205172	N/A	£642 million (PV) (including vehicle operating cost and delays in construction)	Not assessed at PCF Stage 1.
	Reliability impact on Commuting and Other users	Not assessed.	Not assessed.	N/A	N/A	
	Physical activity	No significant effects have been identified for any of the PRoWs during operational phase. It is assumed the effect on the shared cycleway and footpath along the A3 there will be a slight beneficial effect to this NMU route on operation. Likely increase in numbers of walkers and cyclists along the A3 shared footpath and cycleway due to improvements in amenity of that NMU route. Average journey times for pedestrians and cyclists are likely to remain the same.	Not assessed at PCF Stage 1.	Beneficial	N/A	
	Journey quality	Impact on motorised traveller's views from the road will depend on the design and landscaping mitigation but it is assumed a loss of current woodland screening and common will be required. No significant effects have been identified for any PRoWs during operation while the effect on the shared cycleway and footpath along the A3 will be a slight beneficial effect, however setting and amenity will be effected due to loss of woodland screening and common. Driver stress and frustration is expected to reduce during operation through increased traffic flows and a more efficient road network.	N/A	Slight beneficial	N/A	
	Accidents	The junction has a high number of accidents currently (the area around M25 J10 has the highest recorded collision rate across the network nationally), and reducing accidents is one of the key objectives of the scheme. The proposed free flowing movements would reduce the potential for vehicle conflicts, and the additional lanes on the A3 would allow for safer merging.	N/A	N/A	£53.74 million (PV)	Not assessed at PCF Stage 1.
	Security	Any changes to pedestrian / cyclist facilities at the junction may have an impact on security due to changes in visibility and lighting.	Not assessed at PCF stage 1.	Neutral		
	Access to services	No public transport element to scheme	N/A	Neutral	N/A	N/A at PCF Stage 1
	Affordability	One of the aims of the scheme to reduce congestion at the junction and improve journey times for all users, which may have positive cost impacts.	Not assessed at PCF stage 1.	N/A	N/A	N/A at PCF Stage 1
	Severance	The scheme aims to reduce congestion at the junction, which is likely to increase speed and flow. Although the existing road already causes a high level of severance, faster moving traffic could make it difficult for pedestrian to cross the road. There are pedestrian, cyclist and equestrian crossings at M25 J10, and the present configuration has been identified as a barrier to encouraging active travel, and identified as having substandard cycling facilities along the A3 southbound. Some of these facilities may be improved by changes to the junction and along the length of the A3.	Not assessed at PCF stage 1.	N/A	N/A	N/A at PCF Stage 1
	Option and non-use values	As no new transport options will be created by this scheme, option values have not been considered.	Not assessed	Not assessed (Unmonetised)	N/A (Unmonetised)	
Public Accounts	Cost to Broad Transport Budget	Highways England capital investment costs of £244 million (2010 prices, PV)	The costs of capital investment, operating and maintenance are funded by Central Government.	N/A	£244 million (PV)	
	Indirect Tax Revenues	Scheme leads to increased vehicle operating costs. This feeds through to overall increased indirect tax revenues.		N/A	£22.7 million (PV)	