A14 Study: Output 2

Options recommended for further assessment (2B/2C Report)

Department for Transport

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ATKINS

Plan Design Enable

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Rev 4.1	Further amendment to Table 3					18/05/12

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1. Introduction

Purpose of this report

1.1. This is the second report from Output 2 of the A14 Study. It presents the results an assessment of a set of mode specific transport packages developed and reported in Output 2A of the Study. The output from the assessment process, as reported here, is a sub-set of these packages which are recommended for further consideration and more detailed assessment in the next part of the study (Output 3). In particular the report describes:

- the framework and approach used to assess the packages; and
- the process of selecting the best performing transport packages to take forward to Output 3.

1.2. The aim is to identify the best or better performing packages as well as those which perform least strongly, relative to one another, against the assessment criteria in the framework. In carrying out the assessment the Department for Transport's guidance on proportionality of appraisal has been followed. This means that information has been collated or developed only to a level of detail that enables a robust comparison between alternative transport packages to be made. The assessment has made best use of existing information to provide the evidence used in the framework.

1.3. The purpose of the assessment is to provide sufficient information to support a decision on which packages to take forward and which packages should be dropped.

Context and background

1.4. The 2010 Comprehensive Spending Review cancelled the planned implementation of the £1.1 billion A14 Ellington – Fen Ditton scheme (EFD scheme) as it was deemed unaffordable. As part of the Spending Review the Government set out the following position on the A14:

> *"We recognise that this corridor faces severe congestion, and that mobility along the route is critical for economic success and growth. However, the current scheme is simply unaffordable under any reasonable future funding scenario. The Department has therefore stopped the current scheme....We will undertake a study to identify cost effective and practical proposals which bring benefits and relieve congestion – looking across modes to ensure we develop sustainable proposals. This approach will also provide an opportunity for the private sector to play its part in developing schemes to tackle existing problems in the corridor..."*

1.5. The A14 Study is being undertaken in response to this commitment. The study has been commissioned in three parts. The objectives for each part being as follows:

- Output 1: seek to reconfirm our understanding of the nature, scale and importance of the problems affecting the A14 in the Huntingdon and Cambridge areas, developing a list of prioritised challenges (transport problems, and their consequences);
- Output 2: generate and sift potential interventions; and
- Output 3: develop a package of interventions to tackle the prioritised challenges which is affordable, deliverable and value for money.

1.6. The study is concerned with a core study area and a wider study area. The core study area is bounded by Ellington/Alconbury in the west and Fen Ditton in the east on the A14. The wider study area has been identified to consider freight modal shift opportunities benefitting the core study area; this captures movements between the Haven Ports, London and the South East, to the Midlands and the North via the A14 corridor.

A14 Challenge

1.7. Alongside the A14 Study, the Department for Transport (DfT) initiated the 'A14 Challenge' [1]. The A14 Challenge has two components, the first of which was a web-based survey inviting people who "use the A14, live in the area, or can help with delivery" identify what they think would work best in terms of solutions for the corridor. Views were invited on the scope for improvements to both the national and local road networks, public transport and to road and rail freight facilities.

1.8. The second component, to be considered alongside the outputs from the web-based survey, is the output from a series of engagement events led by Cambridgeshire, Suffolk and Northamptonshire County Councils to gather views on the same issues from key local stakeholders.

Study methodology

1.9. The study is being carried out in 3 stages. The stages reflect the study objectives described in the previous section. Figure 1 shows the study stages, a brief summary of the tasks in each stage and the anticipated outputs.

1.10. The first stage of the study (Output 1) has already reported [2]. It identified priority transport problems and wider challenges in the study area (and beyond). Detailed information about the problems and challenges can be found in the Output 1 Report. A summary is presented in Section 4 as part of the assessment results.

1.11. The wider challenges established the core objectives for the option development and assessment work to be undertaken in this, the second stage of the study (Output 2).

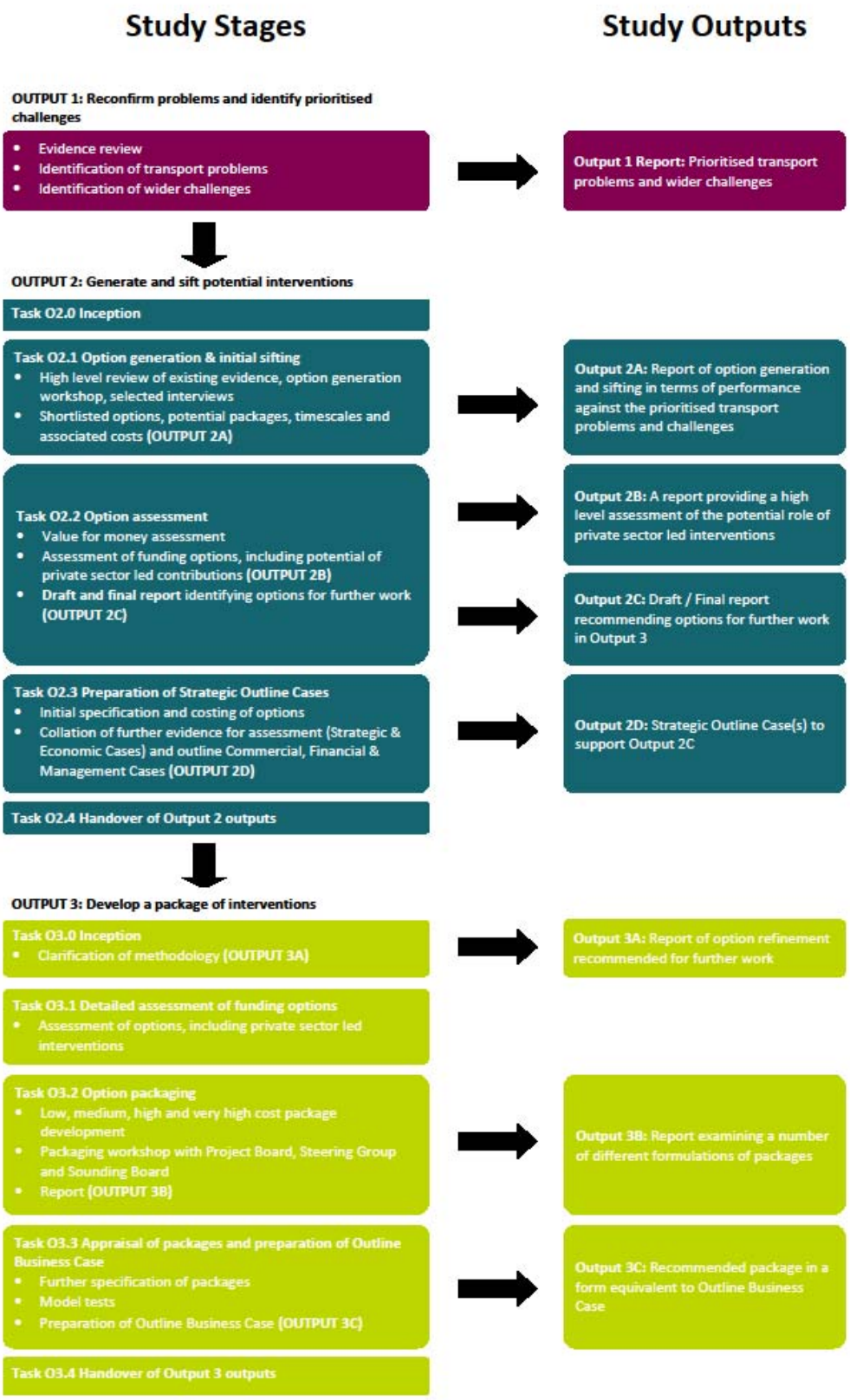
1.12. Identification and initial sifting of options was undertaken at the start of Output 2. The outputs from that phase are presented in Output 2A: Option Generation and Initial Sifting, in the form of a series of modal packages (single mode). Summary descriptions of the packages are presented at the end of this Section.

1.13. Figure 1 provides an overview of the study process. This report is Output 2C: Options Recommended for Further Assessment. It presents the output from Task 2.2 focusing on the preliminary value for money assessment of the packages identified in Output 2A.

1.14. Figure 1 also refers to Output 2B (a report providing a high level assessment of the potential role of private sector led interventions). A standalone Output 2B report will not be prepared. Instead, the findings from the assessment of funding options, including the potential of private sector led interventions, will be presented within Output 2C and Output 2D (Strategic Outline Cases for the recommended packages).

[1] http://www.dft.gov.uk/consultations/dft-20111212
[2] Steer Davies Gleave for DfT (December 2011) A14 Study Output 1 *Report*

Figure 1. A14 study process: stages and outputs



Modal packages to be assessed

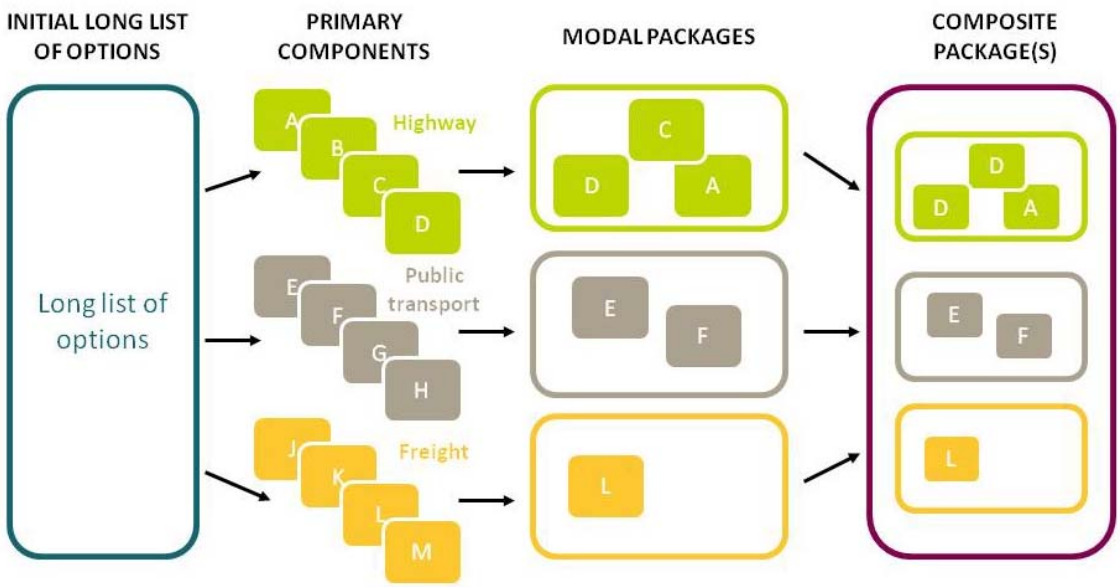
1.15. The following sections describe the modal packages assessed.

1.16. The Output 2A report describes how a long list of options (or measures) were identified and rationalised into a more generic set of 'core' and 'complementary' components, each of which was categorised into one of three 'baskets' as follows:

- highway infrastructure & management;
- public transport / travel demand management; or
- rail freight / freight demand management.

1.17. Typically, the core components in each 'basket' will work better if they are combined together. Therefore, the Output 2A report identified several realistic and credible combinations of core components *within each basket* that could work together to overcome the transport problems and thus address the wider challenges. These are referred to as 'modal packages' and it is the assessment of these modal packages which is reported on here. During Output 3 of this study, combinations of modal packages (freight, public transport and highway) will be combined into composite packages to be assessed further before selection of a preferred composite package. The process is summarised in Figure 2.

Figure 2. Packaging process



1.18. Please note that the aim of the study is to identify an optimal solution, i.e. one which addresses all of the transport problems and wider challenges, and which is also affordable. The purpose of the option generation process is to identify a number of sensible packages, with a range of costs, which can be compared and assessed to understand their likely performance. As a consequence, not all packages will fully address all the transport problems and wider consequences and, as such, would be considered to be sub-optimal but, nevertheless may offer the best compromise between outcomes and affordability.

1.19. The study process is designed to help decision makers understand the likely scale of benefits associated with a given package and the extent to which it could address the problems and challenges, in return for a given level of investment.

1.20. Please note that the descriptions relate only to the primary components of each package.

Public transport packages

1.21. The public transport packages which have been assessed are summarised in Table 1 and Figure 5 below.

Table 1. Public transport packages

Package Ref	Description
M(A)	Provision of new Park and Ride site(s) or expansion of existing Park and Ride sites in the corridor, intended to encourage modal shift of people away from car travel for those journeys in scope, particularly in the peak period.
M(B)	Provision of new or enhanced conventional bus or Busway services intended to encourage modal shift of people away from car travel, particularly in the peak period.
M(AB)	Implementation of all reasonable public transport measures intended to encourage modal shift of people away from car travel, particularly in the peak period. Provision of new Park and Ride site(s) or expansion of existing Park and Ride sites in the corridor, and provision of new or enhanced conventional bus or Busway services.

1.22. The A14 between Huntingdon and Cambridge carries a wide diversity of traffic movements in terms of both origins and destinations of journeys. In the morning peak hour the single dominant destination for trips on the section of the A14 approaching Girton (eastbound) is Cambridge (including the development areas outside the City Council boundary but excluding the Milton Rd P&R site), which accounts for approximately 1,400 vehicle trips (or 30% of the total) [3]. The remainder of the trips are serving a wide range of destinations accessed via the A14 (east) and M11 (south) corridors, as shown in Figure 3. Further west along the A14, the number of Cambridge-bound trips in the morning peak drops markedly to 460 passing Fenstanton and only 70 west of Spittals.

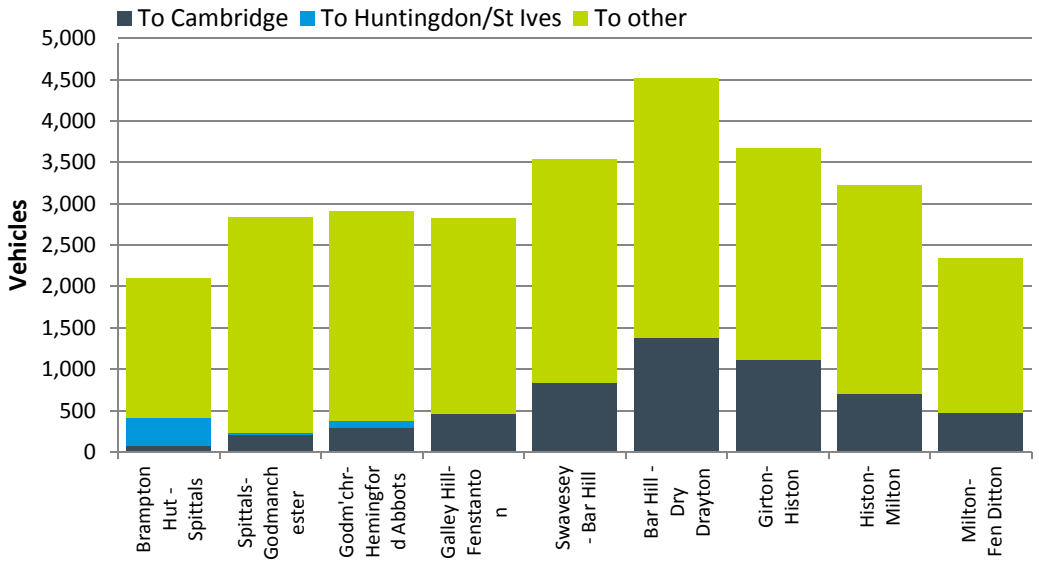
1.23. Given the diversity of both origins and destinations for the other trips using the A14 the practical potential to reduce general traffic on the A14 through better public transport is therefore constrained to these Cambridge-bound trips (plus any trips diverted from the Milton Rd Park & Ride site). The scope for use of public transport is further constrained to those trips which have a destination close to a convenient public transport service, principally the Busway services or services connecting with the Busway. The potential for attracting trips to public transport is further reduced by the fact that there are approximately 40,000 private non-residential (PNR) parking spaces in Cambridge, of which some will be provided free of charge to employees.

1.24. The Steering Group requested that further consideration was given to the potential for passenger rail enhancements to tackle the challenges on the A14. In particular, a view was expressed that improving services to Cambridge from the east would be particularly welcome (the Local Transport Plan 2011-2026 supports a new station at Soham and the proposal to increase the service between Ipswich and Peterborough to one train per hour in each direction).

1.25. Having examined the origins and destinations of traffic using the A14 [4] there appears to be very limited scope for relieving traffic on the A14 by improving rail services.

[3] Based on base year (2006, i.e. pre Busway) modelled demand matrix.
[4] As above.

Figure 3. Share of traffic – Trip destinations, 2006 base year model morning peak eastbound



Primary component M(A) - Additional /expanded Park and Ride provision

1.26. The current Park & Ride sites at St. Ives (which will soon be expanded) and Longstanton effectively intercept Cambridge-bound traffic from the Fens as it crosses the Busway alignment; whilst Milton intercepts traffic from the north and north-west. Trumpington is potentially viable for trips from the north/north-west but is less attractive due to the extra car journey distance required.

1.27. Therefore there may be potential for an additional Park & Ride site to intercept traffic from the north-west of Cambridge (i.e. from the A14 corridor itself). Whilst the St. Ives and Longstanton sites were intended to do this, anecdotal evidence suggests that they are sited too far from the A14 to be attractive to drivers using the A14. It would be preferable to locate any new site in close proximity to the A14 and where it will:

- minimise bus journey times and operating costs;
- be close to the start of the worst congestion (to maximise the perceived benefits of using Park & Ride);
- where it has the potential to intercept the most Cambridge-bound traffic; and
- where it would most reduce congestion.

1.28. The first three factors suggest that a site in the east of the corridor, say adjacent to the A14 at the Swavesey (Jn 28), Longstanton (Jn 29) or Dry Drayton (Jn 30) junctions (although a site at Jn 29 would be relatively close to the existing Longstanton site). A new Park & Ride site in the area between the Swavesey and Dry Drayton junctions would need to be served by at least four buses per hour in each direction during peak periods and would have an estimated journey time to the city centre using the Busway of 26 minutes (the current Longstanton site, being on the Busway spine, is served by up to 10 buses per hour in the peak). A new site would be well signed from the A14.

1.29. The fourth factor suggests a site further west would be more attractive (say at Huntingdon racecourse). However, according to the highway model, the number of trips heading for Cambridge at this point on the A14 is very low [5]. A site in the Godmanchester area would be passed by more trips heading for Cambridge, but still a relatively modest number which would be unlikely to make a site viable [6] and would only be likely to attract 30-45 trips in the morning peak hour.

1.30. Having said this, a site further west is potentially a more optimal location in terms of reducing traffic along a longer section of the A14. Therefore Output 3 will consider further the viability of:

[5] Less than 70 in the morning peak hour according to the 2006 base year highway model.
[6] Less than 300 trips in the morning peak hour.

- a new Park & Ride site near Brampton Hut interchange (which could serve trips to Cambridge from the north and west in highway packages both with and without Huntingdon Southern Bypass); and
- a new Park & Ride site at Alconbury.

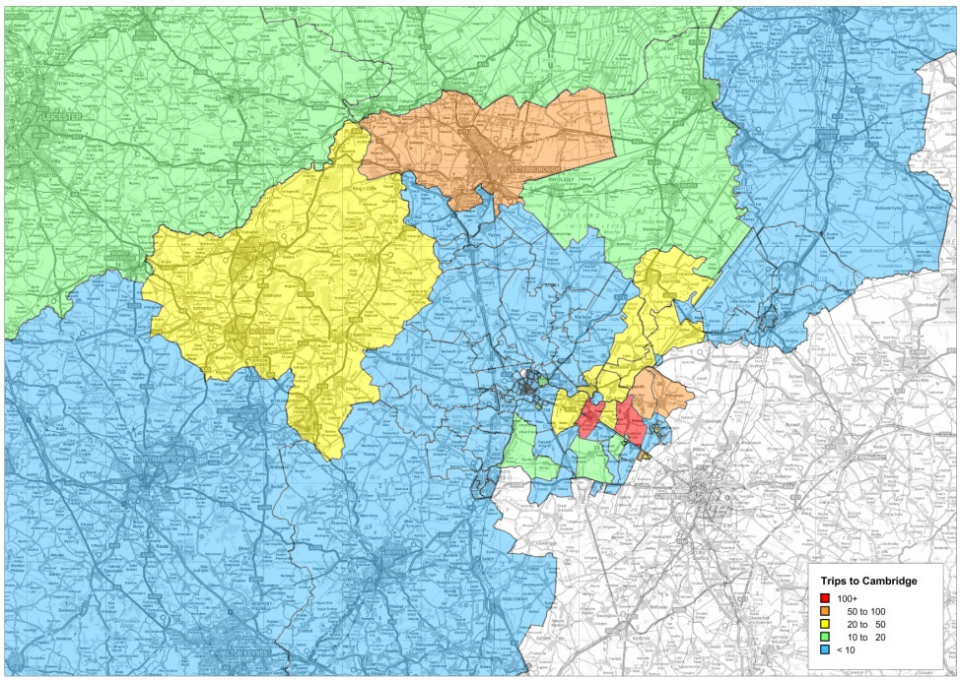
Primary component M(B) - Additional / extended bus / Busway Services

Serving existing demand

1.31. Given that there is already a good service frequency on the Busway spine, and that it is likely to continue to increase to meet demand, this primary component is intended to provide additional connectivity to settlements not directly served by Busway services. Based on an examination of trips destined for Cambridge in the morning peak hour on the A14 between Bar Hill and Dry Drayton (as shown in Figure 4) the settlements with the largest potential demand are:

- Bar Hill (approximately 120 vehicle trips to Cambridge in the morning peak hour);
- Longstanton (30 trips);
- Over (85 trips);
- Willingham (100 trips);
- Fenstanton / Fen Drayton (150 trips); and
- Peterborough area (80 trips).

Figure 4. Home origin of trips destined for Cambridge – morning peak hour (from select link Bar Hill-Dry Drayton)



Note that some of the zones on the map cover large areas and therefore represent dispersed levels of demand which will be difficult to serve effectively or efficiently by public transport.

Note also that some of the zones with the highest number of trips (e.g. Swavesey) already have direct Busway services – the base year demand shown is prior to opening of the Busway and hence some of this demand will already be using the Busway.

1.32. These five local settlements are all currently served by the Citi 5 service. This service operates every 20 minutes between Bar Hill and Cambridge (Emmanuel Street) with an hourly service extending beyond Bar Hill to serve the other settlements and terminating at St. Ives.

1.33. Based on this evidence, which it should be noted is based on highway demand prior to opening of the Busway, it is proposed that:

- the Citi 5 service is retained, possibly with an enhanced frequency but running between Cambridge and Bar Hill only all day; and
- a new service is established using the Citi 5 route between St. Ives and the Busway near Longstanton, either proceeding on the Busway directly to Cambridge or connecting with existing Busway services.

1.34. The new service may have a more limited stop than the current Citi 5 to improve journey times. The proposed service frequency is four buses per hour in the peak, and three buses per hour during the rest of the day.

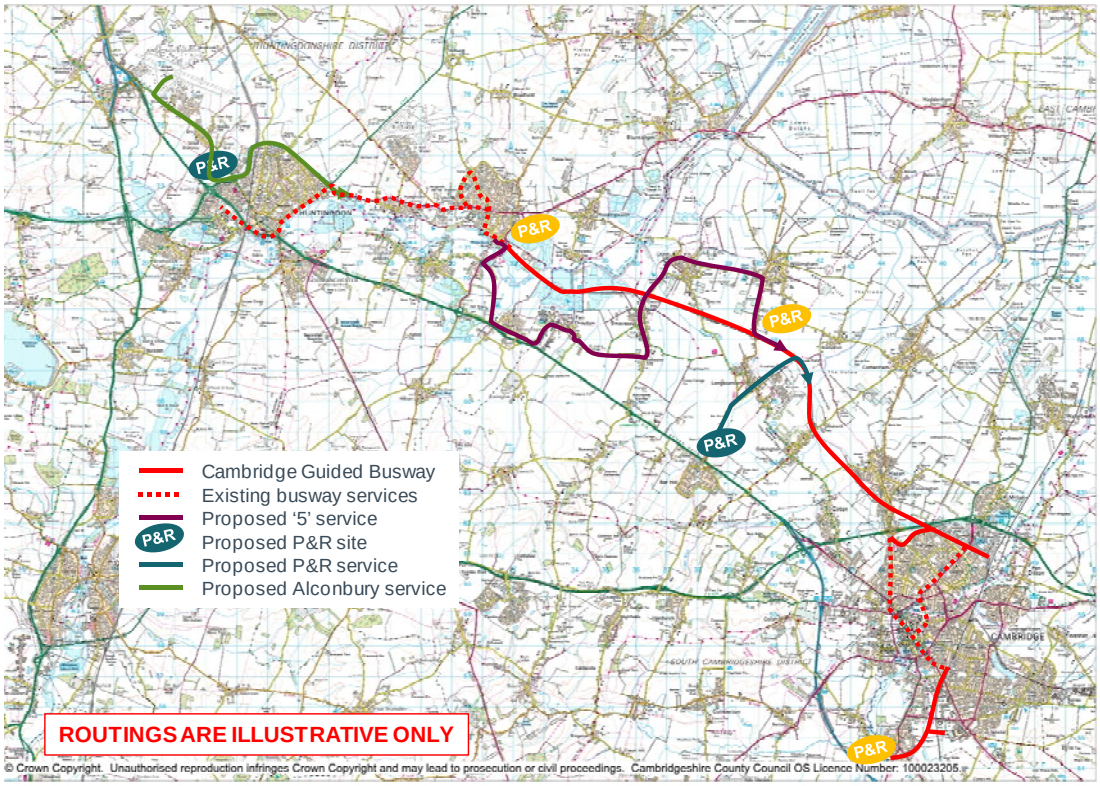
1.35. It is understood that the main local bus operator Stagecoach is already considering the potential for an express service between Peterborough and Cambridge, joining The Busway at St. Ives, therefore this has been regarded as being deliverable commercially. This could potentially be combined with the Alconbury EZ service at a later date.

Serving future demand

1.36. In time, service changes will be required to serve the new residential development at Northstowe and the enterprise zone at Alconbury. Plans to serve the former by a new Busway route through the Northstowe development are already well established and are anticipated to attract a significant modal share. They are not considered further here as it is assumed that they would be delivered as part of the Northstowe development (either commercially by private bus operators or subsidised through developer contributions).

1.37. Clearly there will be a significant increase in demand for travel to and from the new Alconbury enterprise zone which could accommodate 1,500 jobs by 2015. The enterprise zone is not currently directly served by public transport (although the 46 bus service runs along the B1043 on the western edge of the site). There is therefore potential for a new service linking the enterprise zone to Huntingdon station, and beyond to Cambridge (possibly via a new Park & Ride site close to Spittals interchange). The Enterprise Zone bid document referred to connections to Cambridge via the Busway network, so it is most likely that such a service would either be an extension of the existing Busway services to Huntingdon or an entirely new (branded) service. Urban & Civic, promoters of the Airfield site, supported by Cambridgeshire County Council, is discussing with Network Rail the possibility of serving the enterprise zone by a new station on the East Coast Main Line.

Figure 5. Proposed public transport component (indicative locations and routes only)



Primary Component M(C) - Fiscal demand management

1.38. The two public transport primary components described above could both be enhanced by the adoption of fiscal demand management measures in Cambridge, such as road user charging. By increasing direct motoring costs, a charging scheme would increase the attractiveness of existing public transport options compared to car travel, thereby reducing traffic on the A14. Such a scheme would also have the potential to raise significant revenue to reinvest in further transport improvements. It should be noted that the high level of free private non residential parking available in Cambridge for commuter traffic limits the effectiveness of public transport options and that a fiscal measure is likely to be the most effective means of mitigating this effect.

1.39. A number of potential road user charging options for Cambridge were examined as part of the Transport Innovation Fund work in 2007. For the purposes of this stage of the study, one of the more promising of those options was identified as a fiscal demand management primary component: namely a £4 Area Licence. However, a majority of members of the study Steering Group have indicated that any form of road user charging in Cambridge would be undeliverable in the foreseeable future. Fiscal demand management would need to be accompanied by very large scale investment in public transport infrastructure in Cambridge. As a consequence, most or all of the revenue stream generated by the fiscal demand management would be hypothecated to support that investment. Therefore, the package is unlikely to deliver a revenue stream for investment in strategic road infrastructure. Consequently this component will not be progressed further at this time.

Freight packages

1.40. Two freight packages have been assessed, as summarised in Table 2.

Table 2. Freight packages (core components only shown)

Package Ref	Description
O(ABCD)	Implementation of all infrastructure enhancements to provide additional operational capacity for rail freight movements. The improvements will improve the economics of rail freight versus road haulage and will therefore encourage freight to travel by rail rather than by road through the study area plus complementary measures to shift haulage of road freight away from the peak periods. Specifically: • Double-tracking of sections of the Felixstowe branch line • March bi-directional freight loop. • Strategic Rail Freight Interchanges
O(D)	Implementation of new/expanded Strategic Rail Freight Infrastructure to encourage freight to travel by rail rather than by road through the study area plus measures to shift haulage of road freight away from the peak periods.

Relationship to Felixstowe-Nuneaton Upgrade

1.41. The measures shown in Table 2 are additional to those which are assumed to delivered by Network Rail during Control Period 4 (2009/10-2013/14) or Control Period 5 (2014/15-2018/19, investment levels subject to Statement of Funds Available (SOFA) in July 2012 and High Level Output Statement (HLOS) due Summer 2013).

1.42. Those schemes for which implementation is either complete, underway or imminent are considered to form part of this study's 'do-minimum scenario. These are [7]:

- F2N loading gauge (Increase loading gauge to W10 Felixstowe to Nuneaton to allow high cube containers to be moved by rail) (complete);
- Kennett re-signalling (new signalling, including shorter signal block sections to provide additional capacity between Kennett and Bury St Edmunds) (complete);
- Nuneaton North Chord (to allow freight trains to cross the West Coast Main Line without affecting WCML services, thereby increasing freight capacity and capability);
- Ely Loops (two loops east of Ely station at Ely Dock Junction to facilitate better regulation of trains through the junctions at Ely);
- Ipswich Chord scheme - a new 1 kilometre stretch of track north of Ipswich goods yard, linking the East Suffolk and Great Eastern lines (this scheme had originally formed part of package O(A) as, although funding has been set aside in Control Period 4, it is still being considered by the Infrastructure Planning Commission; however on advice from the Department for Transport this scheme has been moved into our 'do-minimum' scenario);
- clearance to loading gauge W10 between Syston and Stoke-on-Trent to enable container traffic to/from the North West and Scotland to bypass Leicester and the WCML between Nuneaton and Crewe; and
- Ely-Soham doubling (to provide additional freight capacity), for which funding was set-aside in the Autumn statement (National Infrastructure Plan).

1.43. The first five of these seven schemes are comparable to Phase 1 of Network Rail's Felixstowe-Nuneaton Upgrade; the remaining two fall within Phase 2.

1.44. Two further Phase 2 schemes are included in our freight interventions as complementary components:

- Ely North Junction re-modelling (to increase freight capacity and permit longer freight trains) which is being implemented; and

[7] These schemes are comparable to Phase 1 of Network Rail's Felixstowe-Nuneaton Line upgrade.

- remodelling track layout in the Leicester area to provide additional capacity for freight trains between Syston and Wigston North (in combination with planned re-signalling).

1.45. The relationship between the schemes identified by Network Rail and those in this study are summarised in Table 3.

Table 3. Relationship between Network Rail schemes and A14 study freight packages

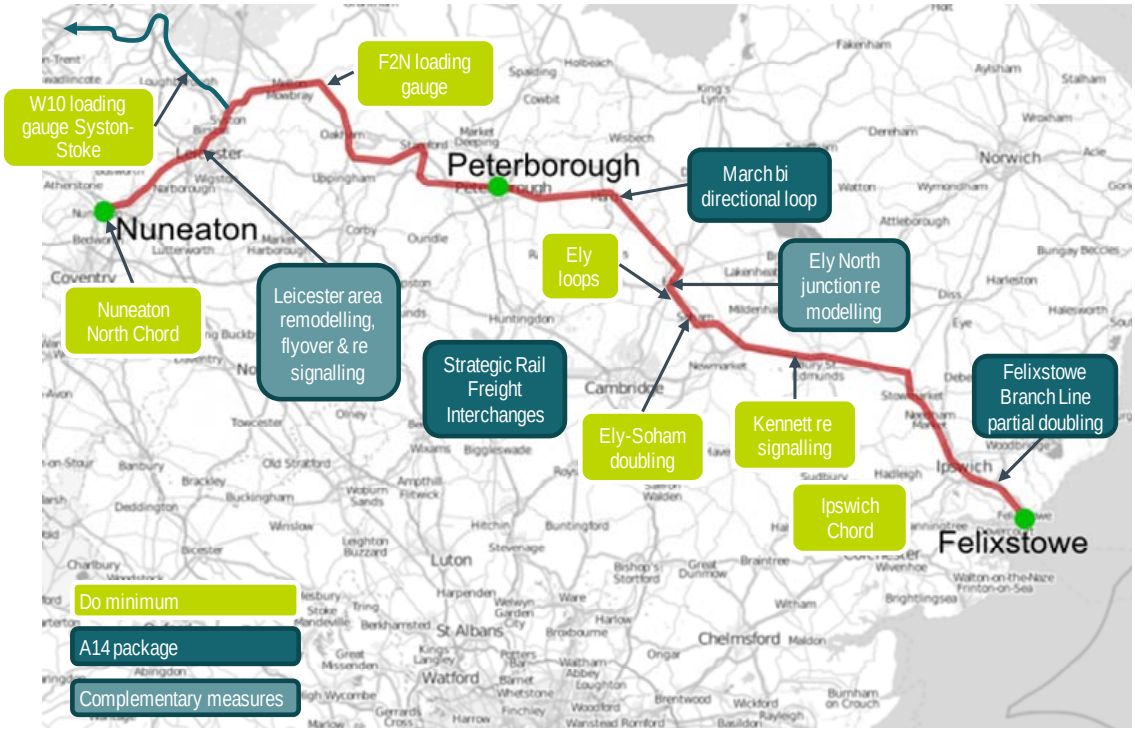
Network Rail scheme	Funding	A14 study freight packages
Phase 1		
F2N loading gauge	CP4	Do-minimum.
Kennett re-signalling	CP4	Do-minimum.
Nuneaton North Chord	CP4	Do-minimum.
Ely Loops	CP4	Do-minimum.
Ipswich Chord	CP4	Do-minimum.
Phase 2 *(enabling up to 56 trains per day in each direction by 2030)*		
Loading gauge Syston-Stoke	CP4	Do-minimum.
Leicester area remodelling, flyover and re-signalling	Eligible for SFN funding in CP5 [8]	Potentially complementary to other upgrades.
Ely North Junction remodelling [9]	Eligible for SFN funding in CP5	Complementary component.
Ely-Soham double tracking	CP4 into CP5	Do-minimum
Other schemes		
Double-tracking sections of Felixstowe Branch line	HPUK s106	Not currently a Network Rail scheme. A s106 agreement is in place to deliver this scheme. Core Component O(B).
March bi-directional freight loop	Eligible for SFN funding in CP5	Not currently a Network Rail scheme. Core Component O(C).
Strategic Rail Freight Interchanges	Private funding sources	Not currently a Network Rail scheme. Core Component O(D).

1.46. The locations of the schemes in Table 3 are shown in Figure 6.

[8] It is assumed the government will continue to provide Strategic Freight Network funding in CP5 which the industry will direct to the projects of greatest value

[9] Ely North Junction remodelling is not strictly speaking a freight scheme. The need for junction re-modelling may be triggered by increased passenger services from Kings Lynn.

Figure 6. Locations of freight schemes



1.47. The packages do not include improvements to Haughley Junction, which connects the Great Eastern Main Line north of Stowmarket to the 'cross country' route to Ely and Peterborough. It is a single lead junction, meaning that only one train at a time can pass through the junction.

1.48. Network Rail's view, sought during this study, is that, given capacity enhancement schemes recently completed or planned for implementation over the next few years, there is no requirement on capacity grounds to double-track the line through the junction (in other words, the enhancement is not required to deliver the capacity required to meet expected future demand). However, in the longer term, there may be benefits on reliability and resilience grounds of double-tracking the junction, as it would better enable network recovery following disruption. It is therefore not viewed as a current priority and it is a scheme to be delivered over the longer term.

Highway packages

1.49. Table 4 summarises the highway packages which have been assessed. For ease of reference, plans showing indicative illustrations of the highway packages are included in Appendix D.

Table 4. Highway packages

Package Ref	Description
WIDENING OPTIONS	
ACR	Online widening to add one lane in each direction between Spittals and Girton with associated measures to improve the standard throughout (e.g. metre strip) and eastbound lane control for A14/A428/Cambridge/M11 traffic. Plus a scaled-back (compared to the EFD scheme) enhancement of Girton interchange, primarily to improve movements between the A14 north and east of the junction. Would probably require enhancements to the western end of the Cambridge Northern Bypass. An important package to consider as it tests the effect of releasing capacity on the dual 2 lane section whilst retaining the overall metering effect of Spittals.
TACR	Offline improvements to provide free-flow A14-A14 movements at Brampton Hut and Spittals. Online widening to add one lane in each direction between Spittals and Girton with associated measures to improve the standard throughout (e.g. metre strip); plus a scaled-back (compared to the EFD scheme) enhancement of Girton interchange, primarily to improve movements between the

Package Ref	Description
	A14 north and east of the junction. Would probably require enhancements to the western end of the Cambridge Northern Bypass.
HACR	New alignment bypassing Brampton Hut and Spittals to provide A14-A14 free-flow. Online widening to add one lane in each direction between Spittals and Girton with associated measures to improve the standard throughout (e.g. metre strip); plus a scaled-back (compared to the EFD scheme) enhancement of Girton interchange, primarily to improve movements between the A14 north and east of the junction. Would probably require enhancements to the western end of the Cambridge Northern Bypass.
CR	Online widening to D4AP in each direction between Bar Hill and Girton with associated measures to improve the standard throughout (e.g. metre strip); plus a scaled-back (compared to the EFD scheme) enhancement of Girton interchange, primarily to improve movements between the A14 north and east of the junction. Would probably require enhancements to the western end of the Cambridge Northern Bypass.
TCR	Offline improvements to provide free-flow A14-A14 movements at Brampton Hut and Spittals. Online widening to D4AP in each direction between Bar Hill and Girton with associated measures to improve the standard throughout (e.g. metre strip); plus a scaled-back (compared to the EFD scheme) enhancement of Girton interchange, primarily to improve movements between the A14 north and east of the junction. Would probably require enhancements to the western end of the Cambridge Northern Bypass.
LOCAL ACCESS ROADS (LARs) OPTIONS	
DS	Parallel local access roads between Trinity Foot (or Galley Hill) (with lane gain/drop to east of junction) and Girton. Alternatively local access roads could extend west to Galley Hill junction. Full enhancement of Girton interchange as envisaged in EFD scheme.
TDS	Offline improvements to provide free-flow A14-A14 movements at Brampton Hut and Spittals. Parallel local access roads between Trinity Foot (or Galley Hill) (lane gain/drop to east of junction) and Girton. Alternatively local access roads could extend west to Galley Hill junction. Full enhancement of Girton interchange as envisaged in EFD scheme.
HDS	New alignment bypassing Brampton Hut and Spittals to provide A14-A14 free-flow. Parallel local access roads between Trinity Foot (or Galley Hill) (lane gain/drop to east of junction) and Girton. Alternatively local access roads could extend west to Galley Hill junction. Full enhancement of Girton interchange as envisaged in EFD scheme.
E*S	Parallel local access roads between Godmanchester and Girton. Full enhancement of Girton interchange as envisaged in EFD scheme.
ECR	Parallel local access roads between Godmanchester and Bar Hill, then online widening to D4AP in each direction between Bar Hill and Girton with associated measures to improve the standard throughout (e.g. metre strip); plus a scaled-back (compared to the EFD scheme) enhancement of Girton interchange, primarily to improve movements between the A14 north and east of the junction. Would probably require enhancements to the western end of the Cambridge Northern Bypass.
HUNTINGDON SOUTHERN BYPASS (HSB) PLUS WIDENING/LOCAL ACCESS ROADS** OPTIONS	
GB*CR(d)	Huntingdon Southern Bypass rejoining A14 between Galley Hill and Trinity Foot. A14 then widened to D3AP to Bar Hill then D4AP to Girton (and to improved standards). Scaled-back (compared to the EFD scheme) enhancement of Girton interchange to improve A14-A14 movement. Would probably require enhancements to the western end of the Cambridge Northern Bypass. In the (d) derivative, all strategic traffic uses a D3AP HSB, and the existing A14 is de-trunked/downgraded between the A1(M), Brampton Hut and Hemingford-Trinity Foot.
GB*CR(r)	As above, but in the (r) derivative, the HSB is for east-west trips only (built as D2AP), north-south trips remaining on the existing A14 through Huntingdon, meaning that a junction with the A1 would not be required.
GDS (d)	Huntingdon Southern Bypass rejoining A14 between Galley Hill and Trinity Foot and continuing widening to start of local access roads. Parallel local access roads between HSB (lane gain/drop to east of junction) and Girton. Alternatively local access roads could extend west to

Package Ref	Description
	Galley Hill junction. Full enhancement of Girton interchange as envisaged in EFD scheme. In the (d) derivative, all strategic traffic uses a D3AP HSB, and the existing A14 is de-trunked/downgraded between the A1(M), Brampton Hut and Hemingford-Trinity Foot.
GDS(r)	As above, but in the (r) derivative, the HSB is for east-west trips only (built as D2AP), north-south trips remaining on the existing A14 through Huntingdon, meaning that a junction with the A1 would not be required.
GPR(d)	Initially, parallel local access roads (of lower S2 standard) between Spittals (or Godmanchester if not feasible) and Girton. Scaled-back (compared to the EFD scheme) enhancement of Girton interchange, primarily to improve A14-A14 movement and access from the LARs to Huntingdon Road. In the longer-term, inclusion of Huntingdon Southern Bypass rejoining A14 between Hemingford and Trinity Foot. In the (d) derivative, all strategic traffic uses a D3AP HSB, and the existing A14 is de-trunked/downgraded between the A1(M), Brampton Hut and Hemingford-Trinity Foot.
GPR(r)	As above, but in the (r) derivative, the HSB is for east-west trips only (built as D2AP), north-south trips remaining on the existing A14 through Huntingdon, meaning that a junction with the A1 would not be required.
NEW ROUTE OPTIONS	
F	New D2AP (east of M11 spur) / D3AP (west of M11 spur) route from west of Brampton Hut, north of Huntingdon, St. Ives and Milton, rejoining the A14 west of the A1303. Extension of M11 from Jn 14 to new road. Junctions with A1(M), A141, A10. All strategic traffic would run via new route and the existing A14 would be de-trunked/downgraded between the A1(M) / Brampton Hut and Fen Drayton.
GL	D3AP Huntingdon Southern Bypass rejoining A14 close to Trinity Foot. Then new northern D2AP (east of M11 spur) / D3AP (west of M11 spur) route from HSB/A14 junction north of Oakington and Histon rejoining the A14 west of the A1303. Extension of M11 from Jn 14 to new road. All strategic traffic would run via the new route and the existing A14 would be de-trunked/downgraded between the A1(M) / Brampton Hut and Fen Drayton.
G(part)J (d)	Shortened Huntingdon Southern Bypass from west of Brampton Hut to the A1198 alignment. Upgraded alignment via the A1198 corridor to Caxton Gibbet, then A428 corridor to Girton. New spur road linking M11 (S) and upgraded A428 (W) at Girton. In the (d) derivative, all strategic traffic uses a D3AP HSB/A428, and the existing A14 is de-trunked/downgraded between the A1(M), Brampton Hut and Girton.
G(part)J(r)	As above, but in the (r) derivative, the HSB is for east-west trips only (built as D2AP), north-south trips remaining on the existing A14 through Huntingdon, meaning that a junction with the A1 would not be required.
K	Upgrade of A428 between A1 and M11, including new A428-A1 link to the north-east of St Neots. Also includes new / upgraded M11 Jn 13 to A428 link (if serving N-S traffic as well as E-W). All strategic traffic runs via a D3AP A428 and the existing A14 is de-trunked/downgraded between the A1(M), Brampton Hut and Spittals. May require new A14/A1 junction at Brampton Hut.

Notes to Table:

A number of the packages including the Huntingdon Southern Bypass have two derivatives where:

The '(d)' derivatives assume that the **A14 is de-trunked/downgraded** between Brampton Hut, the A1(M) and the point at which the Huntingdon Southern Bypass re-joins the existing A14 alignment (in the Hemingford-Trinity Foot area). In this derivative, the Huntingdon Southern Bypass would be D3AP standard to accommodate both north-south and east-west strategic traffic.

The '(r)' derivatives assume that the A14 is not de-trunked/downgraded but that north-south strategic traffic (and some local traffic) continues to use the existing alignment past Huntingdon whilst strategic east-west (and some local traffic) uses the Huntingdon Southern Bypass. In this derivative, the Huntingdon Southern Bypass would be D2AP standard as it would not need to accommodate as much traffic.

Both derivatives would allow for full free-flow movement for strategic traffic and so perform similarly in economic terms. The key advantage of the '(d)' derivatives is that they remove strategic north-south traffic from the vicinity of Huntingdon. However, in so doing, they do so at the expense of a longer route for strategic north-south traffic; potential overload on the A1 between Brampton Hut and Alconbury; and underuse of existing assets such as the A1 spur north of Spittals and the (to be repaired) Huntingdon viaduct.

Huntingdon railway viaduct

1.50. The withdrawal of the A14 Ellington to Fen Ditton scheme from the Highways Agency's programme has required a rethink in the maintenance strategy for the viaduct. The strategy now involves doing what is necessary to keep the structure in service, for the foreseeable future. This is necessary because at this time it is not known what the recommendations of this study will be and if they will affect the usage of the viaduct. Even if they do affect the viaduct, the timescale for their implementation is not known at this time.

1.51. As a result, the option identification process has assumed that the repair will extend the life for the foreseeable future. Notwithstanding this, a number of the core components identified would allow the existing A14 alignment through Huntingdon to be de-trunked or downgraded. However, in developing these core components no assumptions have been made about what would happen to the de-trunked or downgraded route and how this would be dealt with for example removing the viaduct structure and providing local road links. As a result, the cost estimates presented in Section 5 similarly assume no work on the viaduct. Please note however that the cost estimate for core component A does include an allowance for widening/rebuilding the viaduct.

1.52. These issues will be explored further, in subsequent stages of the study, if the relevant options are progressed.

2. Assessment framework

Introduction

2.1. An assessment framework has been developed and applied to objectively compare the performance of the transport packages. The framework is required at different stages of the study. The level of assessment detail will increase between Output 2 and Output 3 as the number of packages is reduced during Output 3, the most promising modal packages will also be combined into 'composite' multi-modal packages and further assessed. The assessment framework has been designed to accommodate this.

2.2. The DfT's guidance on proportionality of appraisal has been followed in determining the assessment framework adopted for Output 2. The framework has been developed in line with WebTAG principles, and the level of assessment undertaken is deemed sufficient to inform the decisions being made at this stage. The implication is that, when a particular impact is very unlikely to drive a decision to retain or reject a package at this stage, assessment of this impact will be undertaken during Output 3 rather than Output 2.

2.3. Assessments have been carried out in line with the Department's Transport Business Case Guidance [10]. The assessment framework is based on the Treasury's 5 Cases model[11] comprising the:

- strategic case;
- economic case;
- commercial case;
- financial case; and
- the management case.

2.4. Assessment during Output 2 will be undertaken in two stages and presented in two separate reports. The first stage will consider performance against the Economic Case and the Strategic Case only. This will be reported in Output 2C (this report). The second stage will be the preparation and reporting (in Output 2D) of outline commercial, financial and management cases for the packages recommended for further work. Final versions of the Strategic and Economic Cases will also be presented in Output 2D.

Description of the '5 Cases'

Strategic Case

2.5. The Strategic Case considers the extent to which a package will meet the specific objectives it is intended to address; and whether it is consistent with, and will contribute to, wider policy aims and objectives in transport and in other areas.

2.6. At a later stage, when preparing full Strategic Cases in Output 3, it will be necessary to identify 'measures for success' which describe what constitutes successful achievement of the named objectives. Measures for success will be identified at the start of Output 3 to guide further exploration of the performance of the packages. As an example, minimum thresholds might be set for different assessment indicators e.g. X% improvement in average journey times between A and B.

[10] http://www.dft.gov.uk/publications/transport-business-case

[11] The assessment framework is informed by the DfT's Early Assessment and Sifting Tool (EAST), and the Option Assessment Framework set out in WebTAG Unit 2.1.2C (for consultation).

Economic Case

2.7. The Economic (value for money) Case considers the likely benefits and dis-benefits of each package in terms of economic, environmental and social impacts and the packages' impacts on public accounts[12]. During Output 2, assessment of the Economic Case is focused on those economic impacts most relevant to the problems and challenges identified and articulated in Output 1.

Financial and Commercial Cases

2.8. It is proposed to present a combined financial and commercial case. The financial case examines funding arrangements and the affordability of a proposal, with a view to understanding the potential impact on central government accounts. The commercial case considers commercial viability and potential procurement approaches for a proposal.

2.9. As part of the Strategic Outline Case for those packages recommended for further work, the combined financial and commercial case will consider the fundability and affordability of an option, based on indicative outturn costs, and the potential route to market.

Management (Delivery) Case

2.10. The management case will present initial (during Output 2) considerations of:

- engineering feasibility;
- ease of implementation (planning consents, statutory approvals, etc.); and
- ease of delivery (number of delivery partners and complexity of partnerships required).

Approach to assessment of the Strategic and Economic Cases

Overview

2.11. Table 5 summarises the assessment framework for the Strategic and Economic cases. It identifies the range of impacts (1st column) against which the packages have been assessed and provides a description of:

- the specific assessment criteria to be used (2nd column);
- whether the assessment will be based on a qualitative [13] or quantitative estimate (3rd column);and
- the indicators which will be used to inform the assessment (also 3rd column);

2.12. The DfT's guidance on proportionality of appraisal has been followed in developing the assessment framework. The implication is that, when a particular impact is very unlikely to drive a decision to retain or reject a package at this stage, assessment has not been undertaken. Instead assessment will be undertaken either as part of the work to prepare Output 2D (Strategic Outline Cases) for the packages recommended for further work or during Output 3.

2.13. More detailed information on the approach to the assessment of the individual indicators within the Strategic and Economic Cases is set out in the remainder of this section.

[12] As prescribed in the Government's transport appraisal guidance (WebTAG)

[13] Qualitative assessments will use a 7 point assessment scale: large adverse, moderate adverse, slight adverse, neutral, slight positive, moderate positive, large positive. In some cases, it will be sufficient to use a 3 point scale (adverse, neutral, positive). The scale used should be sufficient to distinguish the relative impacts of different options.

Table 5. Approach to assessment of the Strategic Case and Economic Case

Impact	Assessment criteria	Assessment type/indicator(s)	Consistent across packages?	Reported in Output 2C?	Source of reporting in Output 2D (preferred packages only)
THE STRATEGIC CASE					
Business strategy	The strategic aims & responsibilities of the promoting organisation(s)	Text description. Presented jointly – DfT/CCC	Yes	Yes	Output 2C
Identified problems	Description of the identified problem (e.g. scale, timescales, key drivers).	Text description only (from Output 1 report).	Yes	Yes	Output 2C
Objectives (assessment against specific objectives derived from wider challenges identified in Output 1).	Reduce lost productive time	Quantitative estimate of the number of trips affected and journey times (employers' business trips/ HGV trips).	No	Yes	Output 2C
	Support the growth of the wider UK economy	Quantitative estimate of the number of trips affected and journey times (strategic trips).	No	Yes	Output 2C
	Support the economic growth of Greater Cambridge	Quantitative estimate of journey times (home-based work trips/ employers' business trips). Qualitative (3 or 7 point scale) estimate of housing / commercial developments unlocked.	No	Yes	Output 2C
	Improve access to labour markets and supply chains	Qualitative (3 or 7 point scale) estimate of housing developments unlocked. Quantitative estimate of journey time changes (home-based work trips).	No	Yes	Output 2C
	Improve quality of life/welfare	Quantitative estimates of journey times and congestion/queuing (home-based work trips).	No	Yes	Output 2C
	Reduce number of accidents on the A14 in the core study area	Quantitative estimate of potential change in accidents	No	Yes	Output 2C
	Reduce air quality and noise impacts	Quantitative estimate of change in traffic flow in AQMAs.	No	Yes	Output 2C
Constraints	High level internal & external constraints e.g. technological environment, in-house delivery capability, contractual etc.	Text description.	No	Yes	Output 2C
Inter-dependencies	Internal & external factors upon which the successful delivery of the project is dependent.	Text description.	No	Yes	Output 2C
Fit with wider transport & government objectives	Fit within the EU legislative framework governing transport; and with other government priorities beyond transport	Qualitative (3 or 7 point scale) and supporting text description.	No	Yes	Output 2C
Stakeholders	What consultation has taken place with relevant stakeholders?	Text description including A14 challenge and local authorities (Suffolk, Northamptonshire and Cambridgeshire) expert events.	Yes	Yes	Output 2C

Impact		Assessment criteria	Assessment type/indicator(s)	Consistent across packages?	Reported in Output 2C?	Source of reporting in Output 2D (preferred packages only)
THE ECONOMIC CASE						
Economy	Connectivity	Whether journeys will become shorter, quicker and/or cheaper.	Quantitative estimate of vehicle kms travelled, journey times, costs based on value of time/distance. Sector based analysis, strategic/local movements	No	Yes	Output 2C
	Reliability	Impact on the day to day variability in journey times or the average minutes of lateness.	Qualitative (3 or 7 point scale).	No	Yes	Output 2C
		Impact on the number of incidents.	Quantitative estimate of the change in incident rate.	No	Yes	Output 2C
	Regeneration	Not assessed. Assessment only required where an option impacts on a designated regeneration area.				
	Wider Impacts	Productivity and welfare changes.	Qualitative assessment for Output 2C. Quantitative estimate of changes in journey costs for Output 2D.	No	Yes	Output 2C Additional to 2D
Environment	Greenhouse gases	Change in CO_2 emissions.	Quantitative estimate of change in vehicle kms travelled.	No	Yes	Output 2C
	Air quality/ noise	Affects on AQMAs. Impacts on local air quality.	Qualitative text description (AQMAs) and quantitative estimate of changes in traffic flow.	No	Yes	Output 2C
	Landscape	Impact on open countryside	Quantitative estimate of new transport corridor (kilometres) in open countryside	No	Yes	Output 2C
	Townscape	Impact on centres of population	Qualitative assessment of the impact on centres of population	No	Yes	Output 2C
	Heritage	Impact on heritage designations	Quantitative assessment of the number of heritage designations affected	No	Yes	Output 2C
	Biodiversity	Impact on ecological designations	Quantitative assessment of the number of ecological designations affected	No	Yes	Output 2C
	Water environment	Impact on flood zone	Quantitative assessment of the impact on Flood Zone 3 (kilometres crossed)	No	Yes	Output 2C
Social	Social and distributional	Impacts on specific demographic groups (e.g. children, older people, disabled people, Black and Minority Ethnic communities, people without access to a car and people on low incomes).	Qualitative review of IMD/vulnerable user groups mapping.	No	Yes	Output 2C Recommend-ations for further SDI appraisal will be made during Output 3 inception phase.
	Physical activity	Potential for new walk/cycle trips and/or health benefits for existing walk/cycle trips.	Qualitative (3 or 7 point scale) assessment.	No	Yes	Output 2C
	Accidents	Change in number and severity of transport-related accidents.	Quantitative estimate of potential change in accidents	No	Yes	Output 2C
	Security	Not assessed in Output 2. Negative impacts would not lead to the elimination of an option/package at this stage.				

Impact		Assessment criteria	Assessment type/indicator(s)	Consistent across packages?	Reported in Output 2C?	Source of reporting in Output 2D (preferred packages only)
		Assessment will be undertaken in Output 3.				
	Access to goods, services, people and places	Change in ease of access to key locations (e.g. colleges, hospitals). Community impacts	Qualitative (3 or 7 point scale) assessment of change in access. Text description of community impacts.	No	Yes	Output 2C
	Affordability	Not assessed in Output 2. Negative impacts would not lead to the elimination of an option / package at this stage. Assessment will be undertaken in Output 3.				
	Severance	Effects on hindrance of movement by non-motorised modes.	Qualitative (3 or 7 point scale).	No	Yes	Output 2C
	Option values	Not assessed in Output 2. Negative impacts would not lead to the elimination of an option / package at this stage. Assessment will be undertaken in Output 3.				
Public accounts	Cost to broad transport budget	Capital cost of the package. Potential for on-going revenue generation.	Quantitative estimate of costs and potential for revenue generation.	No	Yes	Yes – carried forward from Output 2C
	Indirect tax revenues	Not assessed in Output 2. Appropriate data not available. Assessment will be undertaken in Output 3.				

Assessment evidence and presentation of assessment results

Assessment evidence

2.14. No new transport model runs have been undertaken at this stage of the study. The assessment has made best use of existing information only. In particular:

- evidence readily available in reports and datasets;
- limited use of existing ("off-the shelf") model outputs from the A14 ECI DIADEM model and the Cambridge Sub-Regional Model, and, the GBFM Freight Model, to identify baseline movements, traffic flows, and so on where these were not identified in Output 1;
- outputs from work to define a 'baseline' for future freight demand; and
- qualitative feedback from the option generation and sifting stage and from the Project Board.

2.15. Evidence presented for the cancelled A14 EFD business case has been the primary source of data. Where possible, quantitative assessments of the indicators has been undertaken. However, where there are gaps in information, information is no longer considered current, or where quantitative information is not readily available, indicators have been assessed qualitatively using professional judgement (assumptions are clearly stated).

Basis of the assessment for highway packages

2.16. The assessment of each package has been undertaken using information from the proposed A14 EFD scheme.

2.17. The assessment has been undertaken on a link basis with the A14 between Brampton Hut and Quy junction split into discrete sections according to junction location. Based on this framework a forecast 2015 Do Minimum case has then been developed using the following data for each link:

- link length;

- forecast Do Minimum Annual Average Daily Traffic (AADT) from the information presented in the Environmental Statement (October 2009) for the A14 EFD scheme. The AADT flow has been disaggregated by:
- 'local' and 'strategic' movements based on the forecast flows on the offline and local access roads from the proposed ECI scheme; and
- time period disaggregated by morning peak, inter-peak, evening peak and off-peak period;
- Data on forecast journey times from the A14 EFD scheme traffic model.

2.18. The impact of each package has been assessed by adjusting the forecast flows and speeds on each link on the A14 mainline. For the online options improvements to the capacity of the A14 have been reflected in reduced journey times. For those packages where local access roads are proposed local traffic has been assigned to the local access road while the remaining strategic traffic on the A14 has benefitted from reduced journey times. For offline options strategic traffic is assigned to the offline routes while local traffic remains on the existing A14 alignment.

2.19. Further links have been included to account for local access roads, offline sections and the impact on the existing A1 and A428 sections. A fixed trip assessment has been maintained by ensuring that in cases where traffic would assign from the existing A14 mainline it is accounted for in the offline sections.

2.20. The assessment forecast has been conducted for a single average day in 2015 by calculating the total travel time and distance travelled by time period for the Do Minimum case and each package. The benefit of each package is measured in terms of the total travel time and distance travelled difference between the Do-Minimum and the option. This allows each option to be compared to provide a measure of the forecast performance.

2.21. It should be noted that, for the package tests, the process described above has been applied to the Do-Minimum trip matrix i.e. it takes no account of the impact of variable demand. Variable demand provides an assessment of how the proposed scheme may impact on changes in travel demand taking account, for example, of the impacts of induced traffic and re-routing.

2.22. The approach is valid at this stage in the assessment process as the impact of variable demand is considered unlikely to affect the relative performance of the packages. Changes in trip patterns as a result of the packages will occur because those making the trip benefit from the change. Those packages generating the greatest benefit in the fixed trip assessment are therefore likely to cause the largest shifts in travel behaviour, adding further additional benefits.

Basis of the assessment for public transport and freight packages

2.23. At this stage of the study, assessment is limited to that which is possible using readily available information. To an extent, this has affected all packages assessed, but has particularly limited the assessment of the public transport and freight packages as there are no formal forecasts of their impacts. As a result, the assessment of these packages is, by default, in outline only with an emphasis on identifying the relative performance of packages within each basket. Where possible, initial estimates of key outcomes (such as public transport patronage) have been derived and used as the basis for what is a largely qualitative assessment of the public transport and freight packages.

Presentation of the results

2.24. A simple scoring system has been used to present assessment results (for indicators based on a qualitative / subjective assessment and for those based on a quantitative analysis). The benefits of using a simple approach such as this are that:

- it facilitates comparison;
- it helps the reviewer assimilate large amounts of data; and
- it focuses the assessment on the relative performance of the packages, rather than on consideration of absolute values which at this stage would be misleading.

2.25. The assessment focuses on the performance of the core components of a package only. Further assessment of the shortlist of packages in Output 3 will examine the performance of the packages in more detail, including the contribution made by the complementary components.

2.26. A seven point scale has been used consisting of Large, Moderate and Slight Adverse, Neutral and Slight, Moderate and Large Positive categories, consistent with the WebTAG approach.

Assessing the Strategic Case

2.27. Assessment of performance against the indicators for the Strategic Case are based on either a subjective/qualitative judgement or quantitative analysis . In some cases, the same quantitative analysis (for example of journey time savings) has been used to inform more than one indicator and therefore more than one criterion. This is not considered to be double-counting of impacts as the range and nature of the criteria reflect those in WebTAG.

2.28. Due to their nature, assessment against some criteria is common to all packages. These criteria are:

- the strategic aims and responsibilities of the promoting organisations;
- the identified problem (e.g. scale, timescales, key drivers); and,
- the consultation that has taken place with relevant stakeholders.

2.29. The following sections provide further detail on the ways in which the entries for each indicator were derived.

Performance against objectives

2.30. A mix of qualitative and quantitative indicators are used to assess the relative performance of the packages against the agreed objectives.

Reduce lost productive time

2.31. For highway packages, changes in total travel time along the study corridor relative to the Do Minimum were calculated on the basis of trip numbers and average travel time by time of day on each link. The total change in travel time across the working day was used as a proxy for the relative scale of impact of each package on productive business time.

2.32. Each package was allocated to a category from the seven point scale (of Large, Moderate or Slight Adverse or Positive effect or Neutral) on the basis of thresholds derived from the range of results produced across the range of packages. It was assumed that the boundary between Slight and Moderate Positive would fall one third of the way between the minimum and maximum reduction in time calculated across the range of packages and that the boundary between the Moderate and Large Positive categories would fall two thirds of the way between the minimum and maximum reduction calculated. The Adverse categories were allocated boundaries at the equivalent levels of increases in time but were not required as all packages resulted in time savings.

Support the growth of the wider UK economy

2.33. Changes in total travel cost in the study corridor relative to the Do Minimum were calculated for each package on the basis of trip numbers and average travel time and distance by time period on each link. Time and distance costs were converted to equivalent monetary values using the parameters adopted in the A14 EFD model for the conversion process, accounting for the proportion of trips in each time period made by cars and goods vehicles and for each journey purpose. These calculations provided an estimate of total monetary cost incurred by all trips on each link in the study corridor for each highway package. The reduction across the corridor achieved relative to the Do Minimum was then calculated, to provide an estimate of the benefit to the UK economy of reduced journey costs. The change in all day travel costs was used, focussing on strategic trips only to reflect the importance to this objective of those trips using the corridor for longer trips (for instance from the ports to the Midlands).

2.34. Packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above.

Support the economic growth of greater Cambridge

Journey times

2.35. Changes in total travel cost along the study corridor (calculated as described above) also formed the basis of this indicator. Consideration of distance costs was added to the time impacts identified in the draft framework to allow a more comprehensive understanding of the relative impacts of packages that involved rerouting. Total travel cost savings across the day for both strategic and local trips were used.

2.36. Packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above.

Housing developments unlocked

2.37. A qualitative assessment, based on professional judgement, was undertaken of the potential for each package to unlock proposed housing development sites. Consideration was given to known proposed developments including Northstowe, NIAB and West of Cambridge, Northbridge and Bearscroft Farm, and Alconbury. Consideration also given to wider development proposals e.g. St Neots where a package directly impacts on them. Packages that bring large increases in transport capacity may also facilitate wider housing growth from smaller scale and windfall sites.

Impact on commercial development

2.38. A qualitative assessment, based on professional judgement, was undertaken of the potential for each package to unlock proposed developments which contain an employment component including Northstowe, Alconbury and the Enterprise Zone, and the University site at west Cambridge. Packages that bring large increases in transport capacity may also facilitate wider employment and commercial development growth from sites elsewhere in the corridor.

Improve access to labour markets

2.39. The focus of the access to labour market criterion is on travel times experienced during peak commuting journey times. The indicator used therefore focussed on changes in travel time in the study corridor in the morning peak, focussing on local trips rather than strategic trips as they were considered more representative of commuting journeys.

2.40. As described above, total time savings were calculated by multiplying total trips on each link in the corridor by average journey time in the morning peak for each package and comparing the total with the Do Minimum total.

2.41. Packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above.

Journey times to key employment sites

2.42. A qualitative assessment was undertaken, based on professional judgement, of the likely impact of packages on travel time isochrones to key existing employment sites in Cambridge (Science and Business Parks, other destinations in the City) and Huntingdon.

Improve quality of life/welfare

2.43. The emphasis of the quality of life indicator is on journey times and particularly level of congestion experienced during commuting trips. The indicator used was therefore the change in average journey speed on trips in the study corridor during the morning peak to combine journey time changes and congestion effects in a single measure. The focus was again on local trips rather than strategic trips as they were considered more representative of commuting journeys.

2.44. Packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above.

Reduce number of accidents on the A14 in the core study area

2.45. The **potential** for some highway packages to increase accidents as a result of lengthening distances driven (on a fixed demand basis) has been reflected as a negative score for some options. However, in practise improvements to the standard of road could mitigate or outweigh the impacts of the impacts of the longer distances driven. However this is unlikely to change the balance between packages and these impacts will be quantified in Output 3.

Reduce air quality and noise impacts

2.46. The scale of impact of highway packages on air quality and noise depends largely on scale and location of changes in traffic flow.

2.47. Impacts on air quality were considered on the basis of changes from the Do Minimum in flows through Huntingdon (and therefore influencing the Huntingdon AQMA) and the additional AQMAs along the A14 corridor. To account for the relative scale of the different areas, flows in each case were weighted by distance through the area. The indicator was therefore based on the change in vehicle kilometres on links in the AQMAs, allowing for all trips across the day. It is noted that this approach does not account for changes in the central Cambridge AQMA but it was judged that the main source of differentiation between options would be the relative scale of impacts on the Huntingdon and A14 corridor areas.

2.48. Noise impacts were calculated on the basis of change in flows across the corridor, again distance weighted to take account of the relative length of each section. The indicator was therefore based on the change in vehicle kilometres on all links allowing for all trips across the day.

2.49. In each case, packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above

Constraints and interdependencies

2.50. Consideration, at a strategic level, of a range of deliverability issues for each highway package:

- environmental constraints;
- engineering constraints;
- acceptability (public/political);
- permissions / planning / orders; and
- timescales / phasing.

2.51. The information was gathered at a workshop with attendees representing the Highways Agency and Cambridgeshire County Council as well as Atkins specialists.

2.52. As part of the deliverability discussion, consideration was given to the identification of relationships with other schemes / projects; and land-use planning dependencies.

Fit with wider transport & government objectives

2.53. A qualitative assessment, based on professional judgement, was undertaken of the fit of the packages with wider European Union transport objectives and wider UK government objectives, focusing on EU TEN-T designations, potential impacts on health, the potential wider economic benefits from the interventions, and impacts on widening accessibility of education facilities.

Assessing the Economic Case

2.54. Assessment of performance against the indicators for the Economic Case are based on either a subjective/qualitative judgement or quantitative analysis .

Economy impacts

Connectivity

2.55. Impacts on distance and journey times were combined in a single measure of change in total journey cost (in monetary terms) for trips in the study corridor. As described above time and distance costs were converted to equivalent monetary values using the parameters adopted in the A14 EFD model for the conversion, accounting for the proportion of trips in each time period by cars and goods vehicles and by journey purpose. These calculations provided an estimate of total monetary cost incurred by all trips on each link in the study corridor in each package. The reduction achieved relative to the Do Minimum was then calculated, to provide an estimate of the overall improvement in journey costs. The change in all day travel costs was used, focussing separating out the impacts on strategic and local trips.

2.56. Packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above.

Reliability

2.57. Reliability comprises incident delays and daily travel time variability. Both dimensions were combined in a single indicator for each package as they are largely influenced by the same factors. The assessment was based on the INCA (Incident Delay Assessment) evaluation undertaken for the cancelled A14 EFD scheme. A qualitative assessment scale was used with the A14 EFD scheme being benchmarked as providing a value of '10'. Each of the highway packages was then assessed by judging how well it would perform compared to the A14 EFD scheme based on:

- additional capacity provided for the A14 online section;
- the length of the improvement for the A14 online section; and
- the extent of additional routes away from the existing A14 corridor coupled with the extent to which capacity is retained in the A14 corridor.

2.58. Scores less than 10 are indicative of schemes that were judged to perform less well than the A14 EFD scheme, while scores greater than 10 are schemes that would perform better than the A14 EFD scheme.

2.59. Packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above.

Wider impacts

2.60. The key influence on the scale of impacts is changes in journey costs, particularly between employment areas in close proximity to each other. The indicator used for this measure was therefore the total change from the do minimum in journey costs (accounting for distance and time effects), calculated as described above. The focus was on local trips as these have the greatest influence on agglomeration impacts.

2.61. Packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above.

Regeneration

2.62. An assessment of impacts against the regeneration criteria has not been carried out. In line with WebTAG guidance this is only relevant where an option impacts on a designated regeneration area.

Environmental impacts

2.63. Assessments against the greenhouse gas, air quality and noise criteria were supported by quantitative estimates of changes in vehicle kilometres and traffic flows.

2.64. To assess the potential impacts of the packages on the other environmental criteria, an indicator was agreed for each of the following: landscape, townscape, heritage, biodiversity and water environment. The choice of indicators reflects the availability of data and aligns with the proportional appraisal approach described above. Data to inform the heritage, biodiversity and water criteria were drawn from the environmental constraints map maintained by Cambridgeshire County Council. The outline assessment described below does not reflect potential environmental mitigation measures for any of the packages. This will be examined in Output 3.

2.65. Consideration was also given to potential environmental issues as part of the constraints and deliverability assessment undertaken for the Strategic Case (see above).

Landscape

2.66. Assessment considered the potential impact of each package on open countryside based on the length of new road alignment which would pass through open countryside. Packages with no new alignment in open countryside scored zero. The remaining packages were allocated a score of -1, -2 or -3 with boundaries between scores being one third above the lowest length and a third below the highest length (i.e. the values were split into tertiles).

2.67. The scoring did not seek to assess the value or quality of the landscape nor the impact on particular views based on topography.

Townscape

2.68. A qualitative assessment identified potential adverse or beneficial effects of each package on centres of population. The assessment considered the potential change in proximity and flow of traffic in relation to centres of population.

2.69. Broadly the rules applied were as follows:

- where a highway package included new alignment adjacent to or in the vicinity of a smaller settlement, the package scored -1;
- where a highway package would similarly affect one or more larger settlements the package scored -2;
- where a highway package would similarly affect the largest centre of population (i.e. Huntingdon), the package scored -3; and
- where the potential cumulative impact on multiple centres was thought to be severe, the package scored -3.

2.70. In the assessment, online widening was considered to have a greater impact than local access roads. The assessment included impacts on proposed centres of population such as Northstowe.

2.71. Beneficial impacts were captured as positive scores where a package has the potential to relieve a centre of population by removing traffic from its vicinity. On this basis those packages which would lead to the de-trunking of the existing A14 through Huntingdon, and therefore change the proximity and flow of traffic, received a score of +1. Packages which would result in north-south strategic traffic remaining on the existing A14 did not receive a positive score.

2.72. The adverse and beneficial scores were combined to give a net score. Scores ranged from -1 to -3.

Heritage

2.73. Assessment considered the number of designated heritage sites within one kilometre of each package alignment (based on information held by Cambridgeshire County Council). These include Scheduled Ancient Monuments, Listed Buildings and Registered Commons. At this stage in the assessment no differentiation was made as to the relative importance of the designations.

2.74. Packages with no heritage sites within one kilometre scored zero. The remaining packages were allocated a score of -1, -2 or -3 with boundaries between scores being one third above the lowest number of sites and a third below the highest number of sites (i.e. the values were split into tertiles). Scores ranged from -1 to -3.

Biodiversity

2.75. The assessment considered the number of sites with the following designations in the proximity of the package alignment:

- County Wildlife sites;
- Local Nature Reserves;
- National Nature Reserves;
- Special Areas of Conservation;
- SSSIs[14];
- Special Protection Areas; and
- RAMSAR[15] sites.

2.76. Packages with no such sites within one kilometre scored zero. Packages which directly impact (i.e. cross) one or more designated sites scored -3. Packages within one kilometre of one or more designated sites scored -2, and packages within two kilometres of one or more designated sites scored -1. Scores range from -1 to -3.

2.77. At this stage in the assessment no differentiation was made as to the relative importance of the designations (e.g. local, national or international) nor did the assessment include designations of particular species.

Water environment

2.78. Assessment considered the length of each package alignment passing through a Flood Zone 3 [16].

2.79. Packages with no alignment in Flood Zone 3 scored zero. The remaining packages were allocated a score of -1, -2 or -3 with boundaries between scores being one third above the lowest length and a third below the highest length (i.e. the values were split into tertiles).

Social impacts

2.80. Assessment of the relative performance of the packages against the social impact criteria is predominantly qualitative.

Social and distributional impacts

2.81. A qualitative assessment of the distributional impacts of the packages on vulnerable user groups has been carried out. Further information on the approach used is included in Appendix B – The definitions of vulnerable user groups are drawn from DfT Guidance[17] and include:

- children;
- older people;
- disabled people;
- black and minority ethnic communities;
- people without access to a car; and
- people on low incomes.

[14] SSSIs – Sites of Special Scientific Interest
[15] Ramsar sites are wetlands of international importance designated under the Ramsar Convention.
[16] Flood Zone 3 are those areas with a 1% per annum chance of flooding.
[17] WebTAG Unit 3.17

2.82. The assessment considered the proportion (relative to data for Cambridgeshire) and spatial distribution of each of the vulnerable user groups within a one kilometre buffer zone around each of the highway packages.

Physical activity

2.83. A qualitative assessment was undertaken on the extent to which each package would influence numbers and lengths of walking and cycling trips in the corridor.

Accidents

2.84. The **potential** for some highway packages to increase accidents as a result of lengthening distances driven (on a fixed demand basis) has been reflected as a negative score for some options. However, in practise improvements to the standard of road could mitigate or outweigh the impacts of the impacts of the longer distances driven. However this is unlikely to change the balance between packages and these impacts will be quantified in Output 3.

Access to goods, services, people and places

2.85. A qualitative assessment, based on professional judgement, was undertaken of the likely impact of the packages on accessibility to key health facilities (e.g. Addenbrookes and Hinchingbrooke hospitals), education facilities (primary and secondary in Cambridge, Huntingdon, St Ives, and some villages in corridor, and tertiary education in Cambridge including at Cambridge Regional College and the two Universities), and services which are focussed in Cambridge and Peterborough. Scoring reflects enhanced highway-based accessibility in the form of larger increments in capacity. It is noted that PT options, however, provide further accessibility benefits by also being available to households without access to a car.

2.86. Qualitative assessments of the relative performance of the packages have been carried out for the physical activity, access to goods and services and severance criteria.

Severance

2.87. A qualitative assessment, based on professional judgement, was undertaken of the likely impact of each package on the ability of those making non motorised trips to make the trips that they want to.

Social criteria not assessed at this stage

2.88. Assessment against the security, affordability and option values criteria will be presented in Output 3 as part of the Strategic Case information for those packages which are recommended for further work.

Public accounts

Cost to broad transport budget

2.89. Quantitative estimates of package costs have been used to generate a qualitative score based on ranges of costs. Similarly quantitative estimates of the potential of each package to generate revenue through tolling have been presented using a qualitative assessment score.

2.90. Outturn construction cost estimates were derived for each highway package based on the constituent core components and those complementary components identified as “mandatory” (see Appendix E of the Option Generation and Initial Sifting Report). At this stage, costs are indicative. They are presented in broad ranges to illustrate the likely order of magnitude for a particular package (see Table 8).

2.91. Basic construction costs have been derived using unit rates. In addition to basic construction costs, allowance has been included for costs associated with:

- preliminaries;
- utilities;
- land;
- environmental mitigation; and

- risk.

2.92. Costs shown are outturn estimates:

- based on 2006 prices;
- assuming a five year construction programme commencing in 2013/2014;
- assuming an opening year of 2017/18; and
- reflecting broad assumptions regarding inflation in line with those applied to the cancelled A14 EFD scheme.

2.93. An allowance for optimism bias has been made at 44% in line with DfT appraisal guidance.

2.94. Cost estimates will change as packages are refined and components are specified in more detail. As a scheme progresses it is expected that greater certainty about base construction costs will be reflected in the application of lower levels of optimism bias.

2.95. All of these factors mean that the package costs are not directly comparable with the A14 EFD scheme costs. The A14 EFD scheme was assumed to have an earlier opening year of 2015/16 (affecting the level of inflation) and would have included a much lower level of optimism bias reflecting the advanced stage of development when the scheme was cancelled.

2.96. Further, the long-term costs (and urban environment issues) associated with leaving the Huntingdon Viaduct in use have not yet been examined but will be explored for the relevant highway packages in Output 3.

2.97. Maintenance and operational costs (including toll collection costs) have not been considered at this stage, but will be as the financial case for the preferred highway package(s) is finalised in Output 3.

Potential for revenue generation

2.98. A preliminary assessment of the potential revenue generation from the tolling of new road sections within the highway packages has been made. The assessment has assumed that:

- tolling is only possible where a viable alternative for local traffic is available;
- when a toll is levied only strategic traffic would use the new sections and hence incur a charge (the proportion of traffic classed as strategic has been taken from inspection of the A14 Do Minimum highway assignments);
- the charge would be levied in peak periods only (3 hours in AM and 3 hours in PM);
- the charge is made for each passage of the route; and
- freight vehicles are charged at a toll twice that of private cars (the assessment has been undertaken based on a toll of £3/£1.50 respectively).

2.99. It is anticipated that a proportion of strategic traffic could divert onto the local alternative as well as parallel strategic routes but this would be typically in the range of 20 to 30% of strategic traffic. Further work would be required to assess the scale and effects of re-assignment due to the toll and also whether further traffic engineering measures might assist in controlling the level of reassignment.

2.100. Packages were allocated to categories from the seven point scale using the process of identifying category boundaries from the range of package results described above, based on their potential revenue generation. Scores range from 0 to 3 as clearly no package would result in a reduction in toll revenue.

Indirect tax revenues

2.101. At this stage of the study no assessment of impacts on Indirect Tax Revenues will be carried out as suitable data is not available. Further assessment against this criterion will be undertaken in Output 3.

3. Assessment of public transport packages

Introduction

3.1. This section presents the results of the assessment process. Table 6 summarises the results across all public transport packages for all indicators. The assessment is presented in a matrix format and a colour coded scoring system has been applied to facilitate comparison. Please note that the scores attributed to each package are intended to illustrate the *relative* performance of each public transport package against each of the appraisal criteria. They should not be considered as absolute, nor can they be compared to scores attributed to the highway or freight packages in other sections of this report.

3.2. Within the Strategic Case there are three areas where the assessment is common across all packages; these relate to the business strategy of the promoting organisation(s), the identified problems and stakeholder engagement. This common information is presented once in this section.

3.3. Following the summary table commentary is provided on the relative performance of the packages against each indicator. The commentary provides direction to the key findings, highlighting the strongest and weakest performers. The focus is on those areas where there is clear distinction between packages.

3.4. Recommendations about which public transport packages should be taken forward for further assessment in the next stage are presented in Section 6.

Table 6. Summary of public transport package assessment

Impact		Assessment criteria	Assessment type/indicator(s)	Option M(A)	Option M(B)	Option M(AB)
THE STRATEGIC CASE						
Business strategy		The strategic aims & responsibilities of the promoting organisation(s)	Text description.	Commentary provided in Chapter 3 - does not vary between options		
Identified problems		Description of the identified problem (e.g. scale, timescales, key drivers).	Text description only (from Output 1 report).	Commentary provided in Chapter 3 - does not vary between options		
Objectives (assessment against specific objectives derived from wider challenges identified in Output 1).		Reduce lost productive time	Quantitative estimate of the number of trips affected and journey times (employers' business trips/ HGV trips).	1	0	1
		Support the economic growth of the wider UK economy	Quantitative estimate of strategic journey times (home-based work trips/ employers' business trips).	1	0	1
		Support the economic growth of Greater Cambridge	Quantitative estimate of journey times (home-based work trips/ employers' business trips).	1	0	1
			Qualitative (3 or 7 point scale) estimate of housing developments unlocked.	0	0	1
			Qualitative (3 or 7 point scale) estimate of impact on commercial development	0	0	1
		Improve access to labour markets	Qualitative (3 or 7 point scale) estimate of impact on labour markets	1	0	1
			Quantitative estimate of journey time changes (home-based work trips).	1	0	1
		Improve quality of life/welfare	Quantitative estimates of journey times and congestion/queuing (home-based work trips).	1	0	1
		Reduce number of accidents on the A14 in the core study area	Quantitative estimate of accident benefits.	1	0	1
		Reduce air quality and noise impacts	Quantitative estimate of change in traffic flow in AQMAs.	1	1	1
Constraints		High level internal / external constraints e.g. technological environment, in-house delivery capability, contractual etc.	Text description.	Not assessed at the Stage		
Inter-dependencies		Internal/external factors upon which the successful delivery of the project are dependent.	Text description.	Not assessed at the Stage		
Fit with wider transport & government objectives		Fit within the EU legislative framework governing transport; and with other government priorities beyond transport	Qualitative (3 or 7 point scale) and supporting text description	1	1	1
Stakeholders		What consultation has taken place with relevant stakeholders?	Text description including A14 challenge and Steering Group organisations.	Commentary provided in Chapter 3 - does not vary between options		
THE ECONOMIC CASE						
Economy	Connectivity	Whether journeys will become shorter, quicker and/or cheaper.	Quantitative estimate of vehicle kms travelled, journey times, costs based on value of time/distance.	1	0	1
			Sector based analysis, strategic/local movements	1	0	1
	Reliability	Impact on incidents and the day to day variability in journey times or the average minutes of lateness.	Qualitative (3 or 7 point scale).	1	0	1
	Regeneration	Not assessed. Assessment only required where an option impacts on a designated regeneration area.		Not assessed		
	Wider Impacts	Productivity and welfare changes.	Quantitative estimate of changes in journey costs.	1	0	1
Environment	Greenhouse gases	Change in CO_2 emissions.	Quantitative estimate of change in vehicle kms travelled.	1	0	1
	Air quality/ noise	Affects on AQMAs. Impacts on local air quality.	Quantitative description of traffic flows in AQMAs on corridor* (NB excluding Central Cambridge AQMA)	1	1	1
			Quantitative estimate of changes in traffic flow along corridor	1	1	1
	Landscape, townscape, heritage, biodiversity, water environment	Potential show-stoppers (i.e. adverse environmental impact which is so high, and the scope for mitigation is so limited, that there is a very high probability that the option could not progress). If no such impacts exist then no further assessment will be	Qualitative (3 or 7 point scale) assessment of potential construction impacts; impacts on designated heritage or biodiversity sites; and strategically important views or vistas			
Social	Social and distributional	Impacts on specific demographic groups (e.g. children, older people, disabled people, Black and Minority Ethnic communities, people without access to a car and people on low incomes).	Qualitative review of IMD/vulnerable user groups mapping.	1	1	1
	Physical activity	Impacts on levels of walking and cycling	Qualitative (7 point scale) assessment of potential impacts on number and length of trips on foot and by bike	1	0	2
	Accidents	Change in number and severity of transport-related accidents.	Quantitative estimate of accident benefits.	1	0	1
	Security	Not assessed in Output 2. Negative impacts would not lead to the elimination of an option/package at this stage.		Not assessed at the Stage		
	Access to goods, services, people and places	Change in ease of access to key locations (e.g. colleges, hospitals).	Qualitative (3 or 7 point scale) assessment of change in access.	1	1	2
		Community impacts	Text description of community impacts.			
	Affordability	Affordability impacts on vulnerable user groups.	Quantitative estimate of changes in monetary costs of the journey, e.g. user charges, fares	Not assessed at the Stage		
	Severance	Effects on hindrance of movement by non-motorised modes.	Qualitative (3 or 7 point scale).	0	0	0
	Option values	Introduction of new transport options (i.e. new mode or new public transport routes) where these did not exist before.	Qualitative text description.	Not assessed at the Stage		
Public accounts	Cost to broad transport budget	Capital cost of the package.	Quantitative estimate of costs and potential for revenue generation.	<100m	<100m	<100m
		Potential for on-going revenue generation.		1	0	1
	Indirect tax revenues	Not assessed at this time. Appropriate data not available.		Not assessed at this time. Appropriate data not available.		

Performance against common indicators

Business strategy

3.5. The Study is being led by the Department for Transport in partnership with the Highways Agency and Cambridgeshire County Council. As the promoting organisations their strategic aims & responsibilities can be summarised as follows.

DfT Objectives [18]

3.6. "DfT vision is for a transport system that is an engine for economic growth but one that is also greener and safer and improves quality of life in our communities. By improving the links that help to move goods and people around, and by targeting investment in new projects that promote green growth, we can help to build the balanced, dynamic and low-carbon economy that is essential for our future prosperity."

3.7. Priorities to meet this vision are:

- delivering on high speed rail;
- securing railways for the future;
- encouraging sustainable local travel;
- tackling carbon and congestion on roads; and
- promoting sustainable aviation.

HA Objectives [19]

3.8. The HA Strategic Plan 2010-15 set a vision for the Agency to be 'The world's leading road operator'. It sets out five strategic goals to support this vision:

- to provide a service that HA customers can trust;
- a network that is a dynamic and resilient asset;
- roads that are the safest in the world;
- delivering sustainable solutions; and
- setting the standard for delivery.

Cambridgeshire County Council [20]

3.9. The Council's priorities are:

- supporting and protecting people when they need it most;
- helping people to live independent and healthy lives in their communities; and
- developing our local economy for the benefit of all.

3.10. These sit within an overall vision of: "*Creating communities where people want to live and work: now and in the future.*" Transport's contribution to this vision and priorities is set out in LTP3's five objectives, these being:

- enabling people to thrive, achieve their potential and improve their quality of life;
- supporting and protecting vulnerable people;
- managing and delivering the growth and development of sustainable communities;
- promoting improved skill levels and economic prosperity across the county, helping people into jobs and encouraging enterprise; and
- meeting the challenges of climate change and enhancing the natural environment.

[18] DfT's Business Plan 2011
[19] Local Transport Plan 2011-2026

Identified problems

3.11. The purpose of the work undertaken in Output 1 was to reconfirm the understanding of the nature, scale and importance of the problems affecting the A14 in the Huntingdon and Cambridge areas. Transport problems were identified for both the short-term and the medium to long-term. The short term transport problems are summarised as [21]:

- congestion and delay on the A14 which impacts on strategic long term movements and local traffic;
- lack of resilience in the A14 corridor, often impacting on local road traffic; and
- safety on the A14.

3.12. All of the problems are anticipated to worsen in the future as traffic growth exacerbates current transport problems.

3.13. Medium to long-term transport problems were considered in the context of future drivers of demand. Three primary drivers of demand were identified which it is determined, under a 'business as usual' scenario would exacerbate the problems and therefore the wider challenges. These drivers are:

- the background growth in private car demand that will arise as the national economy grows;
- future localised growth of employment in Cambridge and Cambridgeshire which in turn will support population growth; and
- forecast growth in freight and strategic traffic.

3.14. Given its dual role of strategic route and local road, the key challenges for the A14 corridor will be to accommodate the increasing use for freight movement that will come from the expansion of the ports and continued growth of long-distance travel north-south and east-west, whilst providing capacity for local access thus facilitating local employment and population growth. If growth in housing and employment could be accommodated without causing unacceptable impacts and costs on the transport network, it will promote economic development in an area that has high growth potential and the opportunity to contribute significantly to the national economy.

3.15. Alongside the transport problems, Output 1 identified a series of wider challenges (or non-transport consequences) associated with these problems. The identification of the wider challenges was based on an understanding of the impacts of the transport problems on policy imperatives and broader economic, social and environmental priorities, defined as [22]:

- economy – the impact of transport on encouraging economic growth; and
- social and environmental impacts – covering measures of 'well-being', including accidents, air quality and health impacts, and access to services and economic 'welfare' benefits.

3.16. Links between the transport problems and the wider challenges are summarised in the Challenge Matrix shown in Table 7 [23].

[21] A14 Study Output 1 Report, page 68, Steer Davies Gleave for the Department for Transport, plus additional text provided by the Project Board.
[22] A14 Study Output 1 Report, page 68, Steer Davies Gleave for Department for Transport
[23] Based on A14 Study Output 1 Report, page 69, Figure 6.1, Steer Davies Gleave for the Department for Transport

Table 7. Challenge matrix

Transport problems	Wider challenges						
	Supporting economic growth				Impact on quality of life (Social % Environmental impacts)		
	Lost productive time	Supporting growth in the wider UK economy	Supporting growth of Greater Cambridge	Access to labour markets	Quality of life/welfare	Accidents	Air Quality (Health) & Noise
Peak congestion and delay on A14							
Peak congestion and delay on key local roads							
Lack of resilience							
Safety							

Adapted from Steer Davies Gleave (December 2011) Figure 6.1

3.17. The following text, taken from the Output 1 report, describes each of the wider challenges [24].

Lost productive time

- This relates to congestion and associated delay caused to business and freight traffic, where under normal conditions the economic costs of delay have a direct impact on business productivity. This 'routine' delay occurs in both peak and inter-peak periods, but is worse and more significant in the peaks.
- The impact of delays associated with lack of resilience is two-fold. First, there is the direct productivity cost of unreliable journey times – delay due to incidents (additional time). Second, there can be additional costs of disruption and day to day variability in journey times when this affects the planned timing of deliveries, meetings etc. which in turn can place significant additional costs on businesses.
- The lost productive time and lost productivity will, in the absence of interventions, increase over time as traffic growth exacerbates current transport problems.

Supporting growth in the wider UK economy

- Enabling the efficient movement of people and freight, from the Channel ports (as a strategic link for North-South movements) and particularly from the Haven ports (as a strategic link for East-West movements) throughout the country. With throughput in the Haven ports forecast to increase from three million TEUs[25] to eight million TEUs by 2030[26], the A14 has a major role to play in fostering growth and generating wealth through trade.

Supporting growth of the Greater Cambridge area

- The economy in the Cambridge area has high growth potential and is of national and international significance in certain industrial sectors but this will be frustrated by a lack of housing and the ability to move people and goods around freely.
- Enabling additional housing and employment would, other things being equal, contribute positively to the local, regional and national economy due to the high-value work and growth potential that underpin the economy of Greater Cambridge.

[24] This summary is reproduced from the A14 Study Output 1 Report, page 69, Steer Davies Gleave for the Department for Transport
[25] TEU: twenty-foot equivalent unit
[26] http://www.portoffelixstowe.co.uk/PUBLICATIONS/JOURNAL/frmfuturedevelopment.aspx

- However, transport constraints mean there is a trade-off between the economic growth from additional housing and jobs, and the economic costs that the greater congestion which would come from associated traffic growth would impose upon all businesses.
- The nature of this trade-off and challenge, and the potential options that could be considered, will be different in the short-and long-term. In the short-term the key issue is the potential for identified housing development in the vicinity of the A14 to come forward given current transport constraints.
- In the longer-term the issue revolves around the further development of the existing transport and land use strategy with the aim of efficiently delivering the level of housing that would support the growth of the Greater Cambridge economy. The challenge is the extent to which affordable and cost effective interventions can be developed that mitigate the associated economic costs on the transport network while supporting growth. This implies consideration of land use *and* transport issues and options along the A14 corridor, and also across a wider area.

Access to labour markets

- The success of the Greater Cambridge economy relies on having access to a sufficiently large labour market catchment. In choosing where to work, employees trade-off factors such as job income, house prices, commuting time and quality of life factors. High house prices within Cambridge means that a number of workers have to live some distance away and commute.
- Less attractive commuting (delay and unreliability, increasing cost, plus the adverse impact on quality of life) would, other things being equal, serve to limit Cambridge and Huntingdon's effective labour market catchment and make it a less attractive place for people to work.
- There is a link between labour market access and future housing growth, as the accommodation of additional housing closer to jobs can help increase the labour market catchment while mitigating impacts on the transport network. The significant additional housing planned within Cambridge creates the potential to support a more sustainable pattern of commuting, and also cater for the high demand, particularly among the young, for housing in Cambridge. However, many workers will want and choose to live in more rural locations and disparate commuting patterns (including within households) means that the merely locating new housing near jobs will not necessarily have a marked effect in encouraging more sustainable commuting.

Welfare impacts

- Welfare impacts reflect the measure of dis-benefit associated with travel time congestion and delay, and the leisure time foregone because of this.
- In addition to the direct time costs, there is strong evidence of the additional welfare dis-benefit (frustration and annoyance) that people feel when driving in congested conditions.
- Welfare impacts can, in the medium term, have economic consequences if the impact of the quality of life from congested commuting conditions discourages people from working in the area (and is related to the labour market issue above).

Accidents

- Accidents have an economic cost (lost productivity, direct costs to NHS 27. Police) and a social cost (pain and suffering of individuals and families etc.).

[27] National Health Service

- Although the accident rate per vehicle mile on much of the route is not significantly above the average for roads built to a similar design standard, this needs to be seen in the context that the road is below the standard to which a modern road would be designed. There are sections where accident rates are much higher than would be expected for roads of a similar standard. However, because traffic flows on the route are high there are a large number of accidents and disruptive incidents that cause delay on the A14 and have knock-on effects on the surrounding network. There is therefore considerable scope to reduce accident rates and the impact of incidents through improving the standard of the road.
- As the social costs of accidents are significant, we suggest options should consider whether there is the potential to reduce accident risk and accidents in order to minimise accidents to levels below 'average' rates.

Air quality / health (and noise)

- There are four AQMAs [28] along the A14 corridor within the core study area, where the level of emissions represent a health risk for the surrounding community. The level of emissions (and noise) is related to the volume of traffic, but is also exacerbated when congestion and delay is more acute.
- An additional issue is the localised air quality and noise impacts that can occur when there is significant disruption on the A14, and traffic (including HGV) re-routes to the local network.

3.18. Further detail is provided in the Output 1 report.

Stakeholder engagement

A14 Challenge Survey

3.19. A range of specific consultation activities have been undertaken as part of the A14 Study process. These are:

- ongoing engagement with key stakeholders through the Study Steering Group and the Project Board (see Appendix A for a list of Steering Group and Project Board members);
- public consultation through the web-based survey undertaken as part of the A14 Challenge process; and
- engagement at a county level, by Cambridgeshire, Northamptonshire and Suffolk County Councils, with major A14 stakeholders to brief them on the study process and progress, and seek their views on the problems, potential solutions and options for funding improvement measures.

3.20. The Study Steering Group, supported by the Project Board, have ultimate responsibility for ratification of the study process, outputs and recommendations.

3.21. The A14 Challenge Survey invited people to identify potential solutions and scope for improvements to both the national and local road networks, public transport and to road and rail freight facilities. Using the on-line survey and via email over 220 responses were submitted.

3.22. A range of ideas, which people felt had scope to address the issues identified by Output 1, were submitted to the survey. Several themes were identified within the responses:

- freight;
- travel demand management;
- improvements to public transport and sustainable alternatives;
- demand management/sustainable travel planning;
- major improvements to existing roads;
- complementary improvements to existing roads;
- new offline sections of road;

[28] Air Quality Management Areas

- tolling new road infrastructure; and
- funding and finance suggestions.

3.23. More detail on the specific proposals can be found in Appendix C. The survey responses were reviewed by the DfT and cross-referenced to ensure that all the ideas suggested through the Challenge were reflected in the option assessment process. It should be noted however that no major infrastructure options were suggested which had not already been identified through the study.

3.24. A range of ideas relating to the enforcement of existing rules and regulations on driver behaviour and vehicles, and HGV restrictions will be considered separately by the Department.

Local engagement meetings

Cambridgeshire

3.25. As part of the A14 Challenge an Engagement Event was held by Cambridgeshire County Council for major stakeholders. The event covered two key themes: 'what are the issues and challenges for the A14?', and 'what are the solutions?'

3.26. The discussion on issues and challenges largely reflected the priority problems and challenges identified in Output 1. Additional points included:

- the widely held belief within the local community that a major highway upgrade is needed;
- tolling must be part of the suggested solution to ensure Government engagement. Alongside this there should be a non-tolled alternative for local traffic, although this contrasts with a view expressed that strategic traffic should pass freely as it supports the national economy; and
- 'four legs of funding' would be ideal for a prospective scheme – Government grants, other public borrowing, EU grants or borrowing and private sector finance.

3.27. The discussion on solutions largely reflected options already identified to date through the study process and through the A14 on-line survey.

Suffolk

3.28. In Suffolk, stakeholder input was sought through the Suffolk Chamber and Transport Infrastructure Group. Key messages arising from this included:

- Reference to a recent Suffolk Chamber of Commerce survey on tolling which had thrown up a majority in favour of the principle of tolling but accompanied by a strong degree of price sensitivity with more than 60% unwilling to pay a tariff of £5.
- The need to have an attractive solution that recognised the A14 as a nationally and internationally important strategic route. Alongside this, concern was expressed that a tolled A14 with free provision for local users would be to the detriment of the wider interest.

Northamptonshire

3.29. A stakeholder event was held in Northamptonshire. Formal feedback from this event is not currently available.

Stakeholder comments on Output 2A Report

3.30. Comments have been received from Huntingdonshire District Council, setting out its views on the packages presented in the Output 2A report. Central to the response is the position that any package which retains Huntingdon viaduct would be unacceptable to the Council; therefore its recommendation is that these packages should be rejected.

Performance against package-specific indicators

Introduction

3.31. At this stage, the assessment of performance of the public transport packages cannot be undertaken to the same level of detail or robustness as the assessment of the highway packages. This is because assessment during Output 2 is based on available information only and, in the main, robust forecasts of the impacts of the public transport packages do not exist. For the purposes of this report, we have made some broad estimates of the impacts of the primary components in terms of patronage and/or reductions in traffic on the A14 which are described in the following section. However these should be treated with caution. Where insufficient information is available to make quantitative estimates, qualitative statements are provided.

Estimates of impacts of packages

New Park & Ride site(s) – primary component M(A)

3.32. The 2006 base year highway model estimates that 1,340 vehicles in the morning peak hour on the A14 eastbound between Bar Hill and Dry Drayton are heading for Cambridge. This demand, plus any potential diversion from the Milton Road Park & Ride site, is the maximum potential in-scope market for a new site between junctions 28 and 30. It is likely that some of these trips will now have transferred to the Busway since its opening and others may have, in any event, already been using Park & Ride at Trumpington, although encouraging them to switch to a new site on this section of the A14 would improve traffic conditions on the A14 east of the site. We have assumed that 1,200 of the 1,340 trips are still making this journey.

3.33. The existing Cambridge Park & Ride sites are estimated to have an interception rate of approximately 15% of their in-scope market. Assuming a higher figure of 20% (to allow for diversion from the Milton Park & Ride site), the new site could attract 240 vehicles in the morning peak hour and perhaps the same again at other times, meaning a site with up to 500 spaces might be required (Longstanton has 350 spaces).

3.34. In the morning peak hour, 240 vehicles represents 5% of total vehicles eastbound between Bar Hill and Dry Drayton. Assuming a nominal trip length of 20 kilometres, the site could remove up to 20,000 vehicle kilometres from the road network each weekday.

3.35. Based on travel demand in the base year highway model, the second proposed site near Spittals interchange is currently anticipated to have a significantly lower demand than the site between Bar Hill and Dry Drayton. Potential demand for a site in this location will be examined further in Output 3.

New or enhanced bus services - primary component M(B)

3.36. There are 480 vehicle trips in the 2006 base year highway model (morning peak hour) travelling from Bar Hill, Longstanton, Over, Willingham, Fenstanton/Fen Drayton to Cambridge via the A14. Assuming that the new or enhanced services result in 25% of these trips switching to public transport, 120 vehicles in the peak hour, and perhaps the same again at other times, would be removed from the A14 (2-3% in the morning peak hour). Based on a nominal average journey distance of 15 kilometres, these services could remove up to 7,200 vehicles kilometres from the road network each weekday.

3.37. The model suggests 200 car trips per day on the A14 between Peterborough and Cambridge. Again assuming a 20% shift from car to bus, up to 40 vehicles and 4,000 vehicle kilometres could be removed from the A14 each weekday (assuming an average trip distance of 50 kilometres).

Strategic Case indicators

Reduce lost productive time

3.38. The ability of packages to reduce lost productive time is a function of the reduction in vehicle kilometres travelled. Package M(AB) has the potential to reduce demand on the A14 by over 10% and therefore scores highest on its ability to reduce journey times and improve journey time reliability. Package M(A) in isolation will reduce traffic by approximately 5%; whilst the effect of package M(B) is currently unknown but likely to be less significant.

Support the growth of the wider UK economy

3.39. The scoring of packages in terms of their ability to support the growth of the wider UK economy is, at this stage, the same as for the 'reduce lost productive time' criterion as they are a function of the reduction in vehicle kilometres travelled.

Support the economic growth of Greater Cambridge

3.40. Packages M(AB) and M(AB) are likely to better support the economic growth of Greater Cambridge as they will increase public transport accessibility to commercial and residential developments and generate confidence amongst developers to invest locally. All packages, in particular package M(AB) will also reduce congestion in Cambridge, thereby enhancing the productivity of existing business and attracting new investment.

Improve access to labour markets

3.41. The scoring of packages in terms of their impact on access to labour markets is, at this stage, the same as for the 'reduce lost productive time' criteria as they are a function of the reduction in vehicle kilometres travelled.

Improve quality of life/welfare

3.42. The scoring of packages in terms of their impact on quality of life and welfare is, at this stage, the same as for the 'reduce lost productive time' criteria as they are a function of the reduction in vehicle kilometres travelled.

Reduce the number of accidents

3.43. The scoring of packages in terms of their impact on accidents is, at this stage, the same as for the 'reduce lost productive time' criteria as they are a function of the reduction in vehicle kilometres travelled. However, in practise improvements to the standard of road could mitigate or outweigh the impacts of the impacts of the longer distances driven. However this is unlikely to change the balance between packages and these impacts will be quantified in Output 3.

Reduce air quality and noise impacts

3.44. Packages M(A), M(B) and M(AB) will have a negligible effect on the Huntingdon AQMA but will reduce emissions and noise levels along the southern section of the A14 between Longstanton and Cambridge.

Constraints/Interdependencies

3.45. Not assessed at this stage.

Fit with wide transport and government objectives

3.46. All three packages will potentially:

- lead to some decongestion benefits to the A14, a TEN designated route;
- lead to some increase in active travel through reduced car use and related local air pollution which may bring minor health benefits;
- have a positive impact on access to health and education facilities depending on extent / scope of improvements.

3.47. These impacts are likely to be greatest for Package M(AB) due to the higher levels of mode shift it should bring about.

Economic Case indicators

Connectivity

3.48. The ability of packages to improve connectivity is largely a function of the reduction in vehicle kilometres travelled and associated congestion on the network. Package M(A) in isolation will reduce traffic by approximately 5%; whilst the effect of package M(B) is estimated at 2-3%.

Reliability

3.49. The scoring of packages in terms of their impact on the number of incidents and the day to day variability in journey times is, at this stage, the same as for the 'connectivity' criteria as they are a function of the reduction in vehicle kilometres travelled.

Wider impacts

3.50. The scoring of packages in terms of their impact on the journey costs is, at this stage, the same as for the 'connectivity' criteria as they are a function of the reduction in vehicle kilometres travelled.

Greenhouse gases

3.51. The scoring of packages in terms of their impact on CO_2 emissions is, at this stage, the same as for the 'connectivity' criteria as they are a function of the reduction in vehicle kilometres travelled.

Air quality and noise

3.52. Packages M(A), M(B) and M(AB) will have a negligible effect on the Huntingdon AQMA but will reduce emissions and noise levels along the southern section of the A4 between Longstanton and Cambridge.

Landscape//townscape/heritage/biodiversity/water environment

3.53. None of the packages include significant infrastructure, meaning that all will have limited impacts on landscape, townscape, biodiversity or the water environment. The largest adverse impacts are likely to be caused by the proposed park & ride site(s).

Social and distributional impacts

3.54. Options enhancing levels of public transport accessibility will positively impact those people without access to a car and people on low incomes.

Physical activity

3.55. All four packages will increase levels of physical activity through shifting the balance between the relative attractiveness of travel by car and public transport.

Accidents

3.56. The scoring of packages in terms of their impact on accidents is, at this stage, the same as for the 'connectivity' criteria as they are a function of the reduction in vehicle kilometres travelled. However, in practise improvements to the standard of road could mitigate or outweigh the impacts of the impacts of the longer distances driven. However this is unlikely to change the balance between packages and these impacts will be quantified in Output 3.

Access to goods, services, people and places

3.57. Package M(AB) offers the greatest increase in public transport accessibility to key locations such as colleges and hospitals.

Severance

3.58. The packages will have no severance impacts.

Cost to transport budget

3.59. Packages M(A), M(B) and M(AB) have relatively low capital costs compared to the highway options . All three packages have ongoing operational costs although: in package M(A) these could be offset by revenue from the Park & Ride service.

Recommendations and next steps

3.60. Recommendations about which public transport packages should be taken forward for further assessment in the next stage are presented in Section 6.

4. Assessment of freight packages

Introduction

4.1. This section presents the results of the assessment of the freight packages. Table 8 summarises the results across all public transport packages for all indicators. The assessment is presented in a matrix format and a colour coded scoring system has been applied to facilitate comparison.

4.2. Within the strategic case there are three areas where the assessment is common across all packages. As noted earlier these relate to the business strategy of the promoting organisation(s), the identified problems and stakeholder engagement. This common information is presented once in Section 3.

4.3. Following the summary table commentary is provided on the relative performance of the packages against each indicator. The commentary provides direction to the key findings, highlighting the strongest and weakest performers. The focus is on those areas where there is clear distinction between packages.

4.4. Recommendations about which packages should be taken forward for further assessment in the next stage are presented in Section 6.

Freight demand forecasts

4.5. This assessment has been informed by initial forecasts of freight demand undertaken by MDS Transmodal. A separate technical note relating to these forecasts has been prepared.

Current HGV traffic

4.6. The **current heavy goods vehicle (HGV) traffic conditions** underpinning these forecasts can be summarised as follows:

1. The number of HGVs using the A14 at any particular point along its length is typically between 2,500 and 3,000 per day (AADT) per direction along most of the study corridor. The **highest flows** (of *circa* 5,000 HGVs per day per direction) **are between Cambridge and Huntingdon** (and around Ipswich). Note the average weekday flows will be above these AADT levels.
2. **HGVs account for *circa* 15-17% of all vehicles** (35% of passenger car units) on the A14 between Cambridge and Huntingdon. However, this is generally lower than anywhere else on the A14 (HGVs account for nearly 25% of vehicles approaching the M1), although this due to the high volume of car and van traffic in the study area.
3. Typically **15-25% of weekday HGV movements occur in the morning peak**, and typically 10-20% in the evening peak. Freight operators will generally seek to avoid peak periods where possible.
4. Between Cambridge and Huntingdon, **70-75% of HGV traffic is domestic** whilst the remainder is international.
5. Contrary to general perceptions, whilst this section of the A14 is an important route for Haven Ports traffic, **only 5-10% (eastbound) and 10-15% (westbound) of HGVs are LoLo [29] container traffic to/from the Haven Ports** (this rises to 60% nearer Felixstowe). On the section of the A14 between the M11 and the A1, the majority of international traffic is, in fact, RoRo traffic to/from the Dover Straits (which has more potential for alternative routes other than the A14 than the Haven Ports traffic.
6. Approximately **two-thirds of the HGV**s on the shared east/west (A14) and north/south (M11/A1(M) section of the A14 **are on east-west trade routes**. Therefore, significant proportion of freight on the M11 is travelling to or from Cambridge or to/from other routes other than the A14 (e.g. the A11).
7. Some 20 to 30% of HGVs on the Cambridge to Huntingdon section of the A14 are making journeys of under 100 km in length and a further **50-60% are making journeys of between 100 km and 300 km in length.** This suggests a mix of short to medium

[29] Lift on, lift off.

distance flows, including flows from national distribution centres in the Midlands to regional distribution centres and retail outlets in Cambridge/Huntingdon, East Anglia, Essex, east London and Kent. Flows over such distances are unlikely to be attracted to rail, unless they are between large rail-linked sites

2030 freight demand forecasts

4.7. A summary of the initial freight demand forecasts for 2030 is provided below. Forecasts have been prepared for four scenarios:

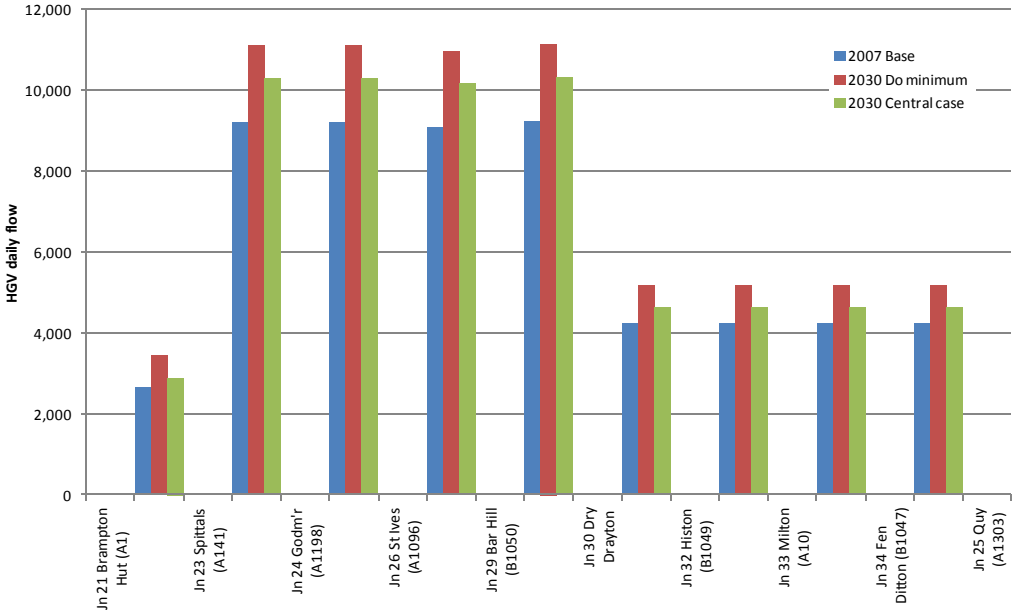
- a 'do-minimum' based on 'central case' assumptions on growth in freight demand (see Technical Note for more details);
- three 'do-something' scenarios assuming implementation of package O(ABCD):
  - a central case;
  - a low growth sensitivity test - case (A); and
  - a second low growth sensitivity test - case (B).

4.8. Please note that the forecasts are of changes in road freight demand and *not* of the impacts of these changes on general traffic conditions on the A14 (this will be examined through highway assignment modelling during Output 3 of the study).

1. In the **do-minimum** scenario in 2030, the daily flow is forecast to be approximately 11,000 HGVs eastbound and 9,500 westbound on the core section between the A14/M11 junction and Huntingdon (the higher, eastbound, flows are shown in Figure 7). This is an **increase of approximately 20% over the 2007 model base year** for most of the route (and 30% for the Brampton Hut to Spittals section). Note the daily forecast flows from the GB Freight Model are not comparable to the observed Annual Average Daily Traffic (AADT) flows in the baseline which are calculated including weekend flows.
2. In the 2030 do-something scenario (central case), the model predicts that the HGV flows on the core section will be 650 (eastbound) and 850 (westbound) lower than in the do-minimum. In other words, **package O(ABCD) is expected to reduce HGV flows by around 10% by 2030**. The effect of package O(ABCD) is therefore **equivalent to removing 40% of the growth in HGV traffic** from the 2007 base to 2030 between Huntingdon and Cambridge and approximately 60% of the growth on the Cambridge Northern Bypass.
3. In the 2030 do-something scenario low growth tests, package O(ABCD) has a slightly larger effect in reducing HGV flows by 12% (Case A) to 14% (Case B) in 2030 compared to the do-minimum.

4.9. By delivering additional capacity, the forecasts suggest that package O(ABCD) does indeed improve the competitive position of rail freight, leading to a 'modal shift' from road freight and a reduction in HGV travel.

Figure 7. Forecast daily HGV flow - eastbound



4.10. The development of Strategic Rail Freight Interchanges is likely to be a major factor in improving the competitive position of rail freight. Based on trends over the last 15-20 years, on average around one million m^2 of new warehouse floor space is built in Great Britain per year. However, much of this is replacing existing 'stock' which is life expired. On that basis, the assumed 'market response' it that there is a continual need for new warehousing and, consequently, a continual demand from the logistics market for new warehouse floor space. New warehousing is normally built by commercial property developers and then leased to retailers, their suppliers or contracted logistics specialists.

4.11. Recent experience suggests that major distributors are seeking to develop the new warehouse capacity on rail-served sites for commercial reasons. The forecasts summarised above are consistent with the most recent national rail freight demand forecasts which assume an additional 7.2 million m^2 of warehousing will be developed on rail-linked sites (or approximately 35% of the warehousing likely to be built in Great Britain over the next 20 years). Evidence from sites such as DIRFT or Hams Hall shows that locating warehousing on rail-served sites does encourage modal shift.

Table 8. Summary of freight package assessment

Impact		Assessment criteria	Assessment type/indicator(s)	Option O(ABCD)	Option O(D)
THE STRATEGIC CASE					
Business strategy		The strategic aims & responsibilities of the promoting organisation(s)	Text description.	Commentary provided in Chapter 4 - does not vary between options	
Identified problems		Description of the identified problem (e.g. scale, timescales, key drivers).	Text description only (from Output 1 report).	Commentary provided in Chapter 4 - does not vary between options	
Objectives (assessment against specific objectives derived from wider challenges identified in Output 1).		Reduce lost productive time	Quantitative estimate of the number of trips affected and journey times (employers' business trips/ HGV trips).	2	1
		Support the economic growth of the wider UK economy	Quantitative estimate of strategic journey times (home-based work trips/ employers' business trips).	0	0
		Support the economic growth of Greater Cambridge	Quantitative estimate of journey times (home-based work trips/ employers' business trips).	1	0
			Qualitative (3 or 7 point scale) estimate of housing developments unlocked.	0	0
			Qualitative (3 or 7 point scale) estimate of impact on commercial development	2	2
		Improve access to labour markets	Qualitative (3 or 7 point scale) estimate of impact on labour markets	0	0
			Quantitative estimate of journey time changes (home-based work trips).	0	0
		Improve quality of life/welfare	Quantitative estimates of journey times and congestion/queuing (home-based work trips).	0	0
		Reduce number of accidents on the A14 in the core study area	Quantitative estimate of accident benefits.	1	1
		Reduce air quality and noise impacts	Quantitative estimate of change in traffic flow in AQMAs.	1	1
Constraints		High level internal / external constraints e.g. technological environment, in-house delivery capability, contractual etc.	Text description.	Not assessed at the Stage	
Inter-dependencies		Internal/external factors upon which the successful delivery of the project are dependent.	Text description.	Not assessed at the Stage	
Fit with wider transport & government objectives		Fit within the EU legislative framework governing transport; and with other government priorities beyond transport	Qualitative (3 or 7 point scale) and supporting text description	2	2
Stakeholders		What consultation has taken place with relevant stakeholders?	Text description including A14 challenge and Steering Group organisations.	Commentary provided in Chapter 4 - does not vary between options	
THE ECONOMIC CASE					
Economy	Connectivity	Whether journeys will become shorter, quicker and/or cheaper.	Quantitative estimate of vehicle kms travelled, journey times, costs based on value of time/distance.	2	2
			Sector based analysis, strategic/local movements	0	0
	Reliability	Impact on incidents and the day to day variability in journey times or the average minutes of lateness.	Qualitative (3 or 7 point scale).	1	1
	Regeneration	Not assessed. Assessment only required where an option impacts on a designated regeneration area.		Not assessed	
	Wider Impacts	Productivity and welfare changes.	Quantitative estimate of changes in journey costs.	1	1
Environment	Greenhouse gases	Change in CO_2 emissions.	Quantitative estimate of change in vehicle kms travelled.	2	2
	Air quality/ noise	Affects on AQMAs. Impacts on local air quality.	Quantitative description of traffic flows in AQMAs on corridor* (NB excluding Central Cambridge AQMA)	0	0
			Quantitative estimate of changes in traffic flow along corridor	1	1
	Landscape, townscape, heritage, biodiversity, water environment	Potential show-stoppers (i.e. adverse environmental impact which is so high, and the scope for mitigation is so limited, that there is a very high probability that the option could not progress). If no such impacts exist then no further assessment will be undertake until Output 3.	Qualitative (3 or 7 point scale) assessment of potential construction impacts; impacts on designated heritage or biodiversity sites; and strategically important views or vistas		
Social	Social and distributional	Impacts on specific demographic groups (e.g. children, older people, disabled people, Black and Minority Ethnic communities, people without access to a car and people on low incomes).	Qualitative review of IMD/vulnerable user groups mapping.	0	0
	Physical activity	Impacts on levels of walking and cycling	Qualitative (7 point scale) assessment of potential impacts on number and length of trips on foot and by bike	0	0
	Accidents	Change in number and severity of transport-related accidents.	Quantitative estimate of accident benefits.	1	1
	Security	Not assessed in Output 2. Negative impacts would not lead to the elimination of an option/package at this stage.		Not assessed at the Stage	
	Access to goods, services, people and places	Change in ease of access to key locations (e.g. colleges, hospitals).	Qualitative (3 or 7 point scale) assessment of change in access.	0	0
		Community impacts	Text description of community impacts.		
	Affordability	Affordability impacts on vulnerable user groups.	Quantitative estimate of changes in monetary costs of the journey, e.g. user charges, fares	Not assessed at the Stage	
	Severance	Effects on hindrance of movement by non-motorised modes.	Qualitative (3 or 7 point scale).	0	0
	Option values	Introduction of new transport options (i.e. new mode or new public transport routes) where these did not exist before.	Qualitative text description.	Not assessed at the Stage	
Public accounts	Cost to broad transport budget	Capital cost of the package.	Quantitative estimate of costs and potential for revenue generation.		
		Potential for on-going revenue generation.		0	0
	Indirect tax revenues	Not assessed at this time. Appropriate data not available.		Not assessed at this time.	

Performance against package-specific indicators

4.12. The following sections describe in more detail the assessment summarised above. Please note however that, at this stage of assessment, there is limited evidence to justify difference in performance between the two packages.

Economic Case indicators

Connectivity

4.13. Changes in vehicle kilometres travelled, journey times, and costs cannot be quantified purely from the freight forecast outputs, as forecast HGV demand for the intervention scenarios (compared with the do-nothing option) would need to be considered and modelled alongside total traffic demand on the A14 (i.e. with future car, bus traffic etc.).

4.14. However, the forecasts suggest an average reduction in total daily HGV-trips passing through the core study area of between 1,500 and 2,000 (4-5%) compared with a do-nothing option. The forecasts also suggest an average reduction in total daily HGV kilometres (when measuring length of haul of HGVs in the core study area) of between 400,000 and 530,000 compared with a do-nothing option.

Reliability

4.15. Changes in the impact of incidents and the day to day variability in journey times cannot be explicitly forecast at this time. However the high number of HGVs on the A14 means that incidents, when they do occur, tend to be more difficult to resolve, meaning that incidents have a longer impact. Both packages reduce the number of HGV kilometres travelled and hence should improve reliability.

Wider Impacts

4.16. Changes in journey costs for general traffic cannot be quantified purely from the freight forecast outputs, as forecast HGV demand for the intervention scenarios (compared with the do-nothing option) would need to be considered and modelled alongside total traffic demand on the A14 (i.e. with future car, bus traffic etc.). However both packages should result in an improvement in the reliability of journey times even if the impact on average (typical) journey times is less marked.

Greenhouse Gases

4.17. Changes in CO_2 cannot be accurately quantified for traffic as a whole. However, given a mean reduction in the number of HGV kilometres travelled per day of between 400,000 and 530,000, gross daily CO_2 emissions would be expected to fall by between 384 and 515 tonnes (using current DEFRA guidelines) before other factors are considered.

Air quality and noise

4.18. Both packages will reduce HGV traffic levels in the AQMAs along the A14 including through Huntingdon and as a result would have a positive impact on air quality (and noise). Levels cannot be quantified at this stage. Note that HGV traffic in the vicinity of a local strategic rail freight interchange, such as that proposed at Alconbury, is likely to rise rather than fall.

Landscape//townscape/heritage/biodiversity/water environment

4.19. There is currently insufficient information to comment on this criterion.

Social and distributional impacts

4.20. The freight packages are not considered to have any particular social or distributional impacts.

Physical activity

4.21. No impacts expected.

Accidents

4.22. Changes in the number and severity of accidents cannot be quantified at this stage as to do this would require testing the reductions in road freight as forecast within the highway model alongside total forecast traffic demand on the A14 (i.e. with future car, bus traffic etc.). Reduction in HGV traffic, especially at peak times, would be expected to result in a reduction in the number and severity of accidents in both packages.

Access to goods, services, people and places

4.23. Negligible impacts expected, other than a reduction in the overall levels of HGV traffic will improve general traffic conditions and therefore car-based access.

Severance

4.24. Impacts of measures has not yet been assessed.

Cost to transport budget

4.25. Identified costs to the public sector (through Network Rail) during Control Period 5 is approximately £82 million. Costs were derived from a range of public documents (including the CHUMMS final report, Network Rail's Freight and London and South East Route Utilisation Strategies and the DfT's Strategic Rail Freight Network: The Longer Term Vision) and through stakeholder meetings with Network Rail and Hutchison Ports UK.

4.26. All the components of the two packages have the potential to generate revenue through track or other access charges although the revenue generated cannot be captured locally. Increased profitability of rail freight operating companies and clients remains in the private sector.

Strategic Case indicators

Reduce lost productive time

4.27. Changes in journey times of all traffic cannot be quantified at this stage as to do this would require testing the reductions in road freight as forecast within the highway model alongside total forecast traffic demand on the A14 (i.e. with future car, bus traffic etc.).

4.28. However, the forecasts suggest an average reduction in total daily HGV trips passing through the core study area of between 1,500 and 2,000 (4-5%) compared with a do-nothing option.

Support the growth of the wider UK economy

4.29. As above, strategic journey times would be reduced as a result of the transfer of freight from road to rail. However the scale and nature of these effects on HGVs and general traffic can only be assessed through further modelling.

Support the economic growth of Greater Cambridge

4.30. Journey times for home-based work trips and employer's business trips will fall, but impacts are likely to be relatively small. Similarly, a reduction in general traffic (and therefore congestion) on the highway network will assist in unlocking capacity for residential and commercial development, but the impacts are likely to be negligible other than where these developments are freight-related (as in the case of the strategic rail freight terminals).

Improve access to labour markets

4.31. Journey times for home-based work trips (and therefore labour market sizes) will fall, but impacts are likely to be negligible as typically only 15-30% of HGV movements occur in the study area during the morning peak period.

Improve quality of life/welfare

4.32. As above.

Reduce the number of accidents

4.33. Changes in the number and severity of accidents cannot be quantified at this stage as to do this would require testing the reductions in road freight as forecast within the highway model alongside total forecast traffic demand on the A14 (i.e. with future car, bus traffic etc.). Reduction in HGV traffic, especially at peak times, would be expected to result in a reduction in the number and severity of accidents in both packages.

Reduce air quality and noise impacts

4.34. Both packages will reduce HGV traffic levels in the AQMAs along the A14 including through Huntingdon and as a result would have a positive impact on air quality (and noise). Levels cannot be quantified at this stage. Note that it is possible for HGV traffic levels in the vicinity of a local strategic rail freight interchange, such as that proposed at Alconbury, to rise.

Constraints/Interdependencies

4.35. Not assessed at this stage.

Fit with wide transport and government objectives

4.36. The package of interventions promotes modal shift, with the forecasts estimating a reduction in HGV-demand compared with a do-nothing option. This should generate reductions in CO_2 emissions.

4.37. Further, a more efficient railway sector should generate cost benefits to industry, thereby increasing productivity.

Recommendations and next steps

4.38. Recommendations about which freight packages should be taken forward for further assessment in the next stage are presented in Section 6.

5. Assessment of highway packages

Introduction

5.1. This section presents the results of the assessment of the highway packages. Within the strategic case there are three areas where the assessment is common across all packages. As noted earlier these relate to the business strategy of the promoting organisation(s), the identified problems and stakeholder engagement. This common information is presented once in Section 3.

5.2. Following the summary table commentary is provided on the relative performance of the packages against each indicator. The commentary provides direction to the key findings, highlighting the strongest and weakest performers. The focus is on those areas where there is clear distinction between packages.

5.3. Recommendations about which packages should be taken forward for further assessment in the next stage are presented in Section 6.

Overall scores and ranking

5.4. Table 10 summarises the results across all highway packages for all indicators. The assessment is presented in a matrix format and a colour coded scoring system has been applied to facilitate comparison.

5.5. Table 10 includes summations of total scores for the Strategic Case and the Economic Case. The total score has been adjusted to remove any undue weighting where a criterion is informed by more than one indicator. This occurs in the following instances:

Strategic Case

- Support the economic growth of Greater Cambridge: ‘Impacts on journey costs’, ‘Housing development unlocked’ and ‘Commercial development unlocked’ are averaged; and
- Improve access to labour market: ‘Journey times to key employment sites’ and ‘Impact on commuting journey times’ are averaged.

Economic Case

- Connectivity: ‘Strategic trip costs’ and ‘Local trip costs’ are averaged.

5.6. The total scores for strategic and economic case could include decimal points. Where this is the case, they are reflected in the analysis, but not presented in Table 10 for presentational reasons.

5.7. Taking this approach means that all the criteria in Table 10 have equal weighting in the assessment process. As an example the scores for package ACR are derived as shown in Table 9.

Table 9. Example of derivation of total package scores (package ACR)

Strategic Case		Economic Case	
Reduce lost productive time	3	Connectivity	3 (Avg. of 3 and 3)
Support the economic growth of the wider UK economy	3	Reliability	1
Support the economic growth of Greater Cambridge	2.3 (Av. of 3,2,2)	Wider Impacts	3
Improve access to labour markets	2 (Av. of 2 and 2)	Change in CO2 emissions.	0
Improve quality of life/welfare	2	Affects on AQMAs - Impacts on local air quality	0
Reduce number of accidents on the A14 in the core study area	0	Noise Impact	0
Impact on AQMAs	0	Landscape	0
Noise Impact	0	Townscape	-3
Fit with wider transport & government objectives	2	Heritage	-3
Total Strategic Case Score	14.3	Biodiversity	-3
		Water environment	-1
		Social and distributional	0
		Physical activity	0
		Accidents	0
		Access to goods, services, people and places	2
		Severance	0
		Potential for on-going revenue generation.	0
		Total Economic Case Score	-1

Table 10. Summary of highway package assessment

Impact		Assessment criteria	Highway package																				
			CR	TCR	ACR	TACR	HACR	DS	TDS	HDS	GBCR(d)	GBCR(r)	GDS(d)	GDS(r)	ES	ECR	GPR(d)	GPR(r)	F	GL	G(part)J(d)	G(part)J(r)	K
THE STRATEGIC CASE																							
Business strategy		The strategic aims & responsibilities of the promoting organisation(s)	Commentary provided in Chapter 5 - does not vary between options																				
Identified problems		Description of the identified problem (e.g. scale, timescales, key drivers).	Commentary provided in Chapter 5 - does not vary between options																				
Objectives (assessment against specific objectives derived from wider challenges identified in Output 1).		Reduce lost productive time	1	1	3	3	3	1	2	2	3	3	3	3	2	2	2	3	3	3	2	2	1
		Support the economic growth of the wider UK economy	1	1	3	3	3	2	2	2	2	3	2	3	3	2	2	3	3	3	1	2	-1
		Support the economic growth of Greater Cambridge – Impacts on journey costs	1	1	3	3	3	1	2	2	2	3	2	3	2	2	2	3	3	3	2	2	1
		Support the economic growth of Greater Cambridge – Housing development unlocked	1	1	2	2	2	1	1	1	3	2	3	2	2	2	2	2	2	2	2	2	2
		Support the economic growth of Greater Cambridge – Commercial development unlocked	1	1	2	2	2	1	1	1	3	2	3	2	2	2	2	2	2	2	2	2	2
		Improve access to labour markets – Journey times to key employment sites	1	1	2	2	2	2	2	2	3	2	3	2	2	2	2	2	2	2	2	2	2
		Improve access to labour markets – Impact on commuting journey times	1	1	2	3	3	1	1	1	3	3	2	2	1	1	2	2	3	3	2	2	2
		Improve quality of life/welfare	1	1	2	3	3	1	1	1	3	3	2	2	1	1	2	2	3	3	2	2	2
		Reduce number of accidents on the A14 in the core study area	0	-1	0	-1	-1	0	-1	-1	-2	-1	-2	-1	0	0	-2	-1	-2	-1	-2	-1	-3
		Reduce air quality and noise impacts – Impact on AQMAs	0	0	0	0	0	0	0	0	2	1	2	1	0	0	2	1	3	3	3	1	3
		Reduce air quality and noise impacts – Noise Impact	0	-1	0	-1	-1	0	-1	-1	-2	-1	-2	-1	0	0	-2	-1	-2	-1	-2	-1	-3
Constraints		High level internal / external constraints e.g. technological environment, in-house delivery capability, contractual etc.	Not assessed at the Stage																				
Inter-dependencies		Internal/external factors upon which the successful delivery of the project are dependent.	Not assessed at the Stage																				
Fit with wider transport & government objectives		Fit within the EU legislative framework governing transport; and with other government priorities beyond transport	1	1	2	2	2	1	1	1	3	3	3	3	2	2	2	2	3	3	2	2	2
Stakeholders		What consultation has taken place with relevant stakeholders?	Commentary provided in Chapter 5 - does not vary between options																				
THE ECONOMIC CASE																							
Economy	Connectivity	Do journeys will become shorter, quicker &/or cheaper – *Strategic Trip Costs*	*1*	*1*	*3*	*3*	*3*	*2*	*2*	*2*	*2*	*3*	*2*	*3*	*3*	*2*	*2*	*3*	*3*	*3*	*1*	*2*	*-1*
		Do journeys will become shorter, quicker &/or cheaper – *Local Trip Costs*	*1*	*1*	*3*	*3*	*3*	*1*	*1*	*1*	*3*	*3*	*3*	*3*	*1*	*1*	*3*	*3*	*3*	*3*	*3*	*3*	*2*
	Reliability	Impact on the number of incidents and the day to day variability in journey times or the average minutes of lateness.	1	1	1	2	2	1	1	1	3	3	3	3	1	1	3	3	3	3	3	3	*3*
	Regeneration	Not assessed. Assessment only required where an option impacts on a designated regeneration area.	Not assessed. Assessment only required where an option impacts on a designated regeneration area.																				
	Wider Impacts	Productivity and welfare changes	*1*	*1*	*3*	*3*	*3*	*1*	*1*	*1*	*3*	*3*	*3*	*3*	*1*	*1*	*3*	*3*	*3*	*3*	*3*	*3*	*2*
Environment	Greenhouse gases	Change in CO_2 emissions.	0	-1	0	-1	-1	0	-1	-1	-2	-1	-2	-1	0	0	-2	-1	-2	-1	-2	-1	-3
	Air quality / noise	Affects on AQMAs - Impacts on local air quality.	0	0	0	0	0	0	0	0	2	1	2	1	0	0	2	1	3	3	3	1	*3*
		Noise Impact	0	-1	0	-1	-1	0	-1	-1	-2	-1	-2	-1	0	0	-2	-1	-2	-1	-2	-1	-3
	Landscape, townscape, heritage, biodiversity, water environment	*Potential show-stoppers (i.e. adverse environmental impact which is so high, and the scope for mitigation is so limited, that there is a very high probability that the option could not progress). If no such impacts exist then no further assessment will be undertake until Output 3.*	*-5*	*-5*	*-10*	*-10*	*-11*	*-5*	*-5*	*-6*	*-8*	*-9*	*-10*	*-11*	*-7*	*-7*	*-8*	*-9*	*-14*	*-12*	*-8*	*-9*	*-10*
	Landscape		0	0	0	0	-1	0	0	-1	-1	-1	-2	-2	0	0	-1	-1	-3	-3	-1	-1	*-1*
	Townscape		-1	-1	-3	-3	-3	-1	-1	-1	-2	-3	-2	-3	-2	-2	-2	-3	-3	-3	-2	-3	-3
	Heritage		-1	-1	-3	-3	-3	-1	-1	-1	-1	-1	-1	-1	-2	-2	-1	-1	-2	-1	-1	-1	-2
	Biodiversity		-2	-2	-3	-3	-3	-2	-2	-2	-3	-3	-3	-3	-2	-2	-3	-3	-3	-3	-3	-3	-3
	Water Environment		-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-1	-1	-1	-1	-3	-2	-1	-1	*-1*
Social	Social and distributional	Impacts on specific demographic groups (e.g. children, older people, disabled people, Black and Minority Ethnic communities, people without access to a car and people on low incomes).	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Physical activity	Impacts on levels of walking and cycling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Accidents	Change in number and severity of transport-related accidents.	0	-1	0	-1	-1	0	-1	-1	-2	-1	-2	-1	0	0	-2	-1	-2	-1	-2	-1	-3
	Security	Not assessed in Output 2. Negative impacts would not lead to the elimination of an option/package at this stage.	Not assessed in Output 2. Negative impacts would not lead to the elimination of an option/package at this stage.																				
	Access to goods, services, people and places	Change in ease of access to key locations (e.g. colleges, hospitals).	1	1	2	2	2	1	1	1	2	2	2	2	2	1	2	2	2	2	2	2	2
	Affordability	Affordability impacts on vulnerable user groups.	Not assessed at this stage																				
	Severance	Effects on hindrance of movement by non-motorised modes.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Option values	Introduction of new transport options (i.e. new mode or new public transport routes) where these did not exist before.	Not assessed at this stage																				
Public accounts	Cost to broad transport budget	Capital cost of the package. (£ million)	< 250	251-500	501-750	751-1000	501-750	501-750	751-1000	751-1000	751-1000	751-1000	> 1000	> 1000	751-1000	501-750	> 1000	> 1000	751-1000	> 1000	501-750	501-750	251-500
		Potential for on-going revenue generation.	0	0	0	0	2	3	3	3	3	1	3	3	3	3	3	3	1	1	2	1	*0*
	Indirect tax revenues	Not assessed at this time. Appropriate data not available.	Not assessed at this time. Appropriate data not available.																				

Total Scores		CR	TCR	ACR	TACR	HACR	DS	TDS	HDS	GBCR(d)	GBCR(r)	GDS(d)	GDS(r)	ES	ECR	GPR(d)	GPR(r)	F	GL	G(part)J(d)	G(part)J(r)	K
Strategic case	*Total score*	6	4	14	14	14	8	7	7	15	16	13	14	12	11	10	13	16	18	10	11	5
	Total score (rank)	19th	21st	5th	7th	7th	16th	17th	17th	4th	2nd	10th	5th	11th	13th	14th	9th	2nd	1st	14th	12th	20th
Economic case	*Total score*	-1	-4	-1	-3	-2	3	-1	-2	2	1	-1	1	2	1	2	3	-5	0	1	1	-9
	Total score (rank)	14th	19th	14th	18th	17th	2nd	12th	16th	4th	6th	12th	6th	3rd	9th	4th	1st	20th	11th	6th	9th	21st

Performance against package-specific indicators

Strategic Case indicators

Reduce lost productive time

5.8. All packages achieve a positive score in terms of forecast time savings. The 10 packages which achieve the highest scores ('large positive') are:

- ACR, TACR and HACR – 'on line' improvements which increase vehicle speeds within the existing A14 corridor;
- GBCR(d), GBCR(r), GDS(r), GDS(d), GPR(r) – similar to the proposed A14 EFD scheme in that they provide a Huntingdon Southern Bypass (HSB) and improvements to the existing A14 corridor between the HSB and Girton; and
- F and GL – offline options which provide improve journey times for strategic trips.

5.9. The poorer performing packages (which achieve a score of 'slight positive') are:

- CR, TCR and DS – these packages provide additional capacity to only relatively short sections of the existing A14 corridor; and
- K – which provides a relatively long offline improvement principally to strategic trips meaning that time savings are limited.

Support the growth of the wider UK economy

5.10. Packages achieve a score from -1 (slight adverse) to 3 (large positive) measured in terms of changes in all day travel costs for strategic traffic. The nine schemes which achieve a 'large positive' score are:

- ACR, TACR, HACR and ES – 'on line' improvements;
- GBCR(r), GDS(r), GPR(r) – similar to the proposed A14 EFD scheme but all retaining the Huntingdon Viaduct as a dual two-lane all-purpose structure to provide a route for traffic to/from the north (A1(M); and
- F and GL – offline alignments which improve journey times for strategic trips.

Support the economic growth of Greater Cambridge

5.11. This category is divided into three assessment indicators.

5.12. The first of these is based on an estimate of change in journey costs. The packages that achieve a score of large positive are the same as those which achieve a similar score for the objective 'Support the Growth of the Wider UK Economy' above.

5.13. The second and third sub-objectives relate to the how the packages release new housing development and new commercial development respectively. Further information on these criteria is provided in Appendix E. Based on professional judgement, the packages that achieve 'large positive' scores for both sub-objectives are GBCR(d) and GDS(d). In both cases this reflects the role of the packages in providing additional capacity on the existing A14 between Bar Hill and Girton, which in turn would serve the proposed Northstowe development.

5.14. All the remaining options score either 1 (slight positive) or 2 (moderate positive) and are scored as providing similar support to both types of potential development.

Improve access to labour markets

5.15. The criterion is divided into two assessment indicators.

5.16. The first of these is based on professional judgement to assess the potential change in travel times to key employment sites. Further information on this criterion is provided in Appendix E. All of the packages score positively against this criteria although two packages which include Huntingdon Southern Bypass with a de-trunked A14 through Huntingdon, GBCR(d) and GDS(d), achieve 'large positive' scores.

5.17. The second is based on a change in journey costs for local traffic in the morning peak period. The packages which achieve a score of 'large positive' are:

- TACR and HACR – online widening options;
- GBCR(d/r) – off line section to the south of Huntingdon in combination with online widening; and
- F and GL – offline options.

5.18. All cases reflect the provision of additional capacity and therefore increased speeds for local traffic, provided on the existing A14 alignment or on the shorter off-line routes.

Improve quality of life/welfare

5.19. The highway packages all score positively against this indicator, because they reduce congestion and delays, which in turn leads to more leisure time and improved quality of life.

5.20. Six packages have a 'large positive' score. These are TACR, HACR, GBCR(d), GBCR(r), F and GL, all of which address or bypass the three major congestion hotspots at Brampton Hut, Spittals and Girton interchanges, and provide capacity improvements along most (if not all) of the route.

Reduce the number of accidents

5.21. The **potential** for some highway packages to increase accidents as a result of lengthening distances driven (on a fixed demand basis) has been reflected as a negative score for some options. Consequently the online options, which do not affect distance travelled, have a neutral impact (namely CR, ACR, DS, ES and ECR) whilst the offline options have a negative impact due to the increase in travel distance caused because the new routes are longer. K causes the largest impact on travel distance and therefore has a 'large negative' impact. F and the (d) alternatives for all options with the Huntingdon Southern Bypass (GBCR(d), GDS(d), GPR(d) and G(part)J(d)) all have a 'moderate negative' impact whilst the remainder of offline options have a smaller impact on travel distance and therefore accident numbers.

5.22. However, in practise improvements to the standard of road could mitigate or outweigh the impacts of the impacts of the longer distances driven. However this is unlikely to change the balance between packages and these impacts will be quantified in Output 3.

Reduce air quality and noise impacts

5.23. The impact of the packages on air quality is largely determined by the extent to which they change traffic flow in the AQMA areas. The indicator is based on flows through the Huntingdon AQMA and those directly along the A14 corridor as they were judged most likely to vary significantly between packages. The central Cambridge AQMA is therefore not included in the assessment.

5.24. Those offline packages that remove traffic from the main corridor have a positive impact on this indicator. In particular, F and GL have a 'large positive' score as they are the only packages to remove traffic from the Girton to Milton AQMA as well as the AQMAs between Girton and Huntingdon. K and G(part)J(d) also have a 'large positive' score as they remove the majority of strategic traffic from along the length of the corridor between Girton and Huntingdon.

5.25. Other offline options have smaller positive impacts with the (d) alternatives of the packages with HSB (GBCR(d), GBS(d) and GBR(d)) having a 'moderate positive' impact, reflecting the volume of strategic traffic removed from the corridor and all others having a 'slight positive' impact.

5.26. Online options have a neutral impact in this assessment as traffic flows on the corridor do not change. However, if variable demand was taken into account, the increase in traffic due to generated demand and rerouting would lead to negative scores for online options, if not mitigated.

5.27. Noise impacts are driven by changes in traffic volume and therefore in this assessment are affected by the increase in journey distance caused by offline options. K has the largest impact on travel distance and therefore had a 'large negative' impact increase travel distance. F and the (d) alternatives for all options with the Huntingdon Southern Bypass (GBCR(d), GDS(d), GPR(d) and G(part)J(d)) all have a 'moderate negative' impact whilst the remainder have a smaller impact on traffic levels and therefore noise levels.

5.28. Again online options have a neutral impact in this assessment as traffic flows on the corridor do not change. If variable demand was taken into account, the increase in traffic due to generated demand and rerouting would lead to negative scores for online options unless mitigation measures were taken into account. It is likely to be possible to mitigate all noise impacts, although this would add cost to each package.

Constraints/Interdependencies

5.29. As described in section 2, consideration was given to a range of potential deliverability issues for each of the packages. These deliverability issues are reflected in the initial assessment of the highway packages in so far as their impacts on the alignments are known and understood. The key issues are summarised in Table 11. Further information is provided in Appendix F. It is important to note that the highway packages represent strategic route options, rather than alternative alignments of different route options (the latter being subject to assessment at a later stage).

Table 11. Summary of key deliverability issues

Package	Summary of deliverability issues
CR	No significant deliverability issues identified.
ACR	Potential showstoppers at western end in Huntingdon due to importance of environmental sites and designations and impact on surrounding townscape: Registered Commons and Listed Buildings; International and National ecology site (Portholme); Built up area with important open spaces/commons; increased impact of viaduct. Constraints between Godmanchester and Fenstanton: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington and Godmanchester; Properties abutting route around Fenstanton. Highly complex engineering issues at western end, potential for significant public and political acceptability issues associated with environmental and engineering concerns. Significant impacts during construction.
TACR	Potential showstoppers at western end in Huntingdon due to importance of environmental sites and designations and impact on surrounding townscape: Registered Commons and Listed Buildings; International and National ecology site (Portholme); Built up area with important open spaces/commons; increased impact of viaduct. Constraints between Godmanchester and Fenstanton: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington and Godmanchester; Properties abutting route around Fenstanton. Highly complex engineering issues at western end, potential for significant public and political acceptability issues associated with environmental and engineering concerns. Significant impacts during construction.
HACR	Potential showstoppers at western end in Huntingdon due to importance of environmental sites and designations and impact on surrounding townscape: Registered Commons and Listed Buildings; International and National ecology site (Portholme); Built up area with important open spaces/commons; increased impact of viaduct. Constraints between Godmanchester and Fenstanton: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington and Godmanchester; Properties abutting route around Fenstanton. Highly complex engineering issues at western end, potential for significant public and political acceptability issues associated with environmental and engineering concerns. Significant impacts during construction.
TCR	No significant deliverability issues identified.
DS	Limited impact on environmental designations between Trinity Foot and Girton. Constraints around Fenstanton if Local Access Roads extended to Galley Hill: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington; Properties abutting route around Fenstanton. Potential for greater impact than on-line widening as footprint of scheme likely to be bigger. Large number of structures at Girton interchange. Perception that local access roads may be more contentious than on-line widening.

Package	Summary of deliverability issues
TDS	Limited impact on environmental designations between Trinity Foot and Girton. Constraints around Fenstanton if Local Access Roads extended to Galley Hill: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington; Properties abutting route around Fenstanton. Potential for greater impact than on-line widening as footprint of scheme likely to be bigger. Large number of structures at Girton interchange. Perception that local access roads may be more contentious than on-line widening.
HDS	Limited impact on environmental designations between Trinity Foot and Girton. Constraints around Fenstanton if Local Access Roads extended to Galley Hill: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington; Properties abutting route around Fenstanton. Potential for greater impact than on-line widening as footprint of scheme likely to be bigger. Large number of structures at Girton interchange. Perception that local access roads may be more contentious than on-line widening.
E*S	Limited impact on environmental designations between Trinity Foot and Girton. Constraints between Godmanchester and Fenstanton: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington and Godmanchester; Properties abutting route around Fenstanton. Potential for greater impact than on-line widening as footprint of scheme likely to be bigger. Large number of structures at Girton interchange. Perception that local access roads may be more contentious than on-line widening.
ECR	Limited impact on environmental designations between Trinity Foot and Girton. Constraints between Godmanchester and Fenstanton: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington and Godmanchester; Properties abutting route around Fenstanton. Potential for greater impact than on-line widening as footprint of scheme likely to be bigger. Large number of structures at Girton interchange (but less intrusive than packages containing component S). Perception that local access roads may be more contentious than packages containing on-line widening.
GB*CR	Constraints around Fenstanton if the Huntingdon Southern Bypass ties in to the west of Fenstanton: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington; Properties abutting route around Fenstanton. New river and rail crossings required on Huntingdon Southern Bypass section. Large number of structures at Girton interchange (but less intrusive than packages containing component S). On-line widening presents more issues during construction relative to packages containing local access roads.
GDS	Constraints around Fenstanton if the Huntingdon Southern Bypass ties in to the west of Fenstanton: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington; Properties abutting route around Fenstanton. New river and rail crossings required on Huntingdon Southern Bypass section. Large number of structures at Girton interchange. Perception that local access roads may be more contentious than packages containing on-line widening.
GPR	Potential showstoppers at western end in Huntingdon due to importance of environmental sites and designations and impact on surrounding townscape: Registered Commons and Listed Buildings; International and National ecology site (Portholme); Built up area with important open spaces/commons; increased impact of viaduct. Constraints between Godmanchester and Fenstanton: Listed buildings close to the route; County Wildlife Sites abutting or in close proximity (important local wetland areas); Historic Landfill site - Conington and Godmanchester; Properties abutting route around Fenstanton. Highly complex engineering issues at western end, potential for significant public and political acceptability issues associated with environmental and engineering concerns. New river and rail crossings required on Huntingdon Southern Bypass section. Potential for greater impact than on-line widening as footprint of scheme likely to be bigger. Large number of structures at Girton interchange (but less intrusive than packages containing component S). Perception that local access roads may be more contentious than on-line widening.
F	Long route through open countryside, therefore greater probability of adverse environmental impacts and potential for showstoppers: Great Stukeley Railway Cutting SSSI; County Wildlife Sites - Wyton, Rivers Ouse and Cam; Needingworth Reserve (new wetland habitat creation area); Open countryside, impacts on views from/to several settlements and from viaducts/bridges over rivers; Wicken Fen Vision and Green Belt planning considerations; Several Flood Zone 3 areas to cross; Wyton Airfield (bomb dump), Potential impact on Historic Landfill (Ellington) Challenging structures but otherwise considered relatively straightforward in engineering terms. Lower impact during construction than on-line routes.

Package	Summary of deliverability issues
GL	Long route through open countryside, therefore greater probability of adverse environmental impacts and potential for showstoppers: County Wildlife Sites - River Cam; Open countryside, impacts on views from/to several settlements and from viaducts/bridges over rivers, Crosses guideway, proximity to edge of Northstowe development; Wicken Fen Vision and Green Belt planning considerations; Several Flood Zone 3 areas to cross. New river and rail crossings required on Huntingdon Southern Bypass section.
G(part)J	Limited impact on environmental designations. New river and rail crossings required on Huntingdon Southern Bypass section. Scope for less complicated junction arrangements depending on d/r derivative. Limited engineering constraints envisaged for section adjacent to A1198, but some constraints on A428 at Cambourne. Proximity to settlement areas, potential impacts on Papworth/Cambourne, but route follows line of existing transport corridor.
K	This package performed significantly worse than all of the other packages with net negative scores for both the Strategic and Economic Cases. Therefore deliverability issues were not assessed.

Planning/Permissions/Order

5.30. The scale of all of the highway packages, and the impact on the A14 as a trunk road, is such that it is considered highly likely that, under current legislation, development consent would need to be sought from the Major Infrastructure Planning Unit (within the Planning Inspectorate). Whilst there could be scope for packages which only contain local access road elements to seek planning consent from the local planning bodies, it is considered unlikely that, given the related impact on the A14, these would be treated as local schemes.

5.31. All of the packages are likely to require Compulsory Purchase Orders.

Timing/Phasing

5.32. Given the planning and approvals processes which will need to be followed, most packages are likely to take approximately five years from any decision to proceed to the start of construction.

5.33. A preliminary assessment has considered the potential to construct and open different elements of a package in a phased way. As a consequence, we have taken the view that major improvements which release additional capacity at the current ‘bottlenecks’ i.e. Brampton Hut, Spittals and Girton interchanges should be delivered and opened last in order to avoid moving the problems or creating new ones before other improvements are in place.

5.34. Similarly where packages contain component G (Huntingdon Southern Bypass) in combination with either on-line widening or with local access roads, this should be delivered and opened last releasing capacity at the western end of the corridor.

5.35. This does not preclude delivery in the short-term of small scale measures at key interchanges, or elsewhere, which could improve traffic conditions quickly.

5.36. For those packages which are wholly off-line, a phased construction profile could be developed, however in respect of the traffic impacts, the whole package would need to be released at the same time.

5.37. Where packages contain local access roads and associated improvements at Girton interchange, phasing would be inappropriate in terms of the traffic impacts.

5.38. Further consideration would need to be given to the ability and practicality of progressing separate elements of a package through the planning and approvals processes.

Interdependencies

5.39. At this stage in the assessment there are no known interdependencies between the potential highway packages and any other projects or scheme delivery processes. However, there are shared considerations relating to land-use planning aspirations and the desire to unlock key development sites within Cambridgeshire. This is particularly pertinent for Northstowe about which there is a general assumption that some improvement would be required on the A14 between Bar Hill and Girton. Whilst a formal planning permission for the full scale of the development has not yet been submitted, the Highways Agency requirement is likely to be one of nil-detriment in the short term. Therefore consideration should be given to phasing and likely build-out rates as part of the planning approvals process.

5.40. At this stage it is unclear as to the level of transport infrastructure improvements that development of the Alconbury Enterprise Zone may require and the likely timescales for these.

5.41. Although the former Ministry of Defence site at Waterbeach currently has no planning status, any future development is likely to impact on the Cambridge Northern Bypass section of the A14 and further consideration should be given to the treatment of this within the analysis undertaken during Output 3.

Fit with wider transport and government objectives

5.42. All packages score positively against this criterion of which six achieve a ‘large positive’ score. These are GBCR(d), GBCR(r), GDS(d), GDS(r), F and GL. All of these packages score highly by providing enhanced EU connectivity in a Trans European Network corridor, contributing positively to economic growth through removal or bypass of existing bottlenecks and remove traffic from the vicinity of Huntingdon. Further information on this criterion is presented in Appendix E.

Economic Case indicators

Connectivity

5.43. Most of the packages score strongly on connectivity which accounts for impacts on total journey costs (distance and time elements). For local trips, the packages with HSB have ‘strong positive’ scores (GBCR(r/d) GDS(r/d), GPR(r/d), G(part)J(r/d)), as do F, GL, ACR, TACR and HACR reflecting the improvements in journey time generated by the increases in capacity associated with the packages. K increases journey distance to the greatest extent, offsetting time savings and leading to a ‘moderate positive’ score. All other packages have a slight positive score.

5.44. Strategic connectivity follows a broadly similar pattern except that the increased journey length associated with some of the offline options reduces the scale of benefits, most notably for K and also the (d) alternatives for the packages with HSB (GBCR (d), GDS(d), GPR(d) and G(part)j(d).

Reliability

5.45. Reliability is influenced by increases in capacity and availability of additional alternative routes for traffic. Consequently all packages have positive scores and the most positive scores arise for the packages which provide additional offline routes (GBCR(d/r), GDS (d/r), GPR (d/r), F, GL, G(part)j(d/r) and K). HACR and TACR provide full length online widening and therefore have a ‘moderate positive’ score whilst all others have a ‘slight positive’ score.

Wider Impacts

5.46. Wider economic impacts of packages are influenced by reductions in journey costs (time and distance), particularly on local trips. Consequently the scores follow a similar pattern to those for reliability with the ‘strong positive’ scores for the packages providing the greatest increase in overall capacity (GBCR(d/r), GDS (d/r), GPR (d/r), F, GL, G(part)j(d/r), HACR and TACR). K involves greater increases in distance related costs than the other offline and full widening packages and therefore has a ‘moderate positive’ score. All other packages have a ‘slight positive’ score.

Greenhouse gases

5.47. The majority of packages have a negative score in relation to CO2 emissions. The packages which score worst are:

- GBCR(d/r), GDS(d), GPR(d), F, G(part)J(d) and K – all of which both lengthen journeys and increase average link speeds. (d) derivatives perform worse than (r) derivatives as they lengthen strategic trips to/from the A1(M).

5.48. The more modest packages with online improvements only and/or which have little effect on improving traffic speeds perform better: CR, TCR, ACR, TACR, DS, TDS, ES and ECR.

Air quality and noise

5.49. As described under the Strategic Case above, the offline options have a positive impact on air quality by removing traffic from the AQMA and a negative impact on noise by increasing overall traffic levels.

Landscape

5.50. Packages which follow the line of an existing transport corridor scored neutral for their impact on landscape: these are CR, TCR, ACR, TACR, DS, TDS, ES and ECR. All other packages include sections in open countryside and therefore received a negative score against this criterion. Packages F and GL scored the worst (-3) as they have the longest sections in open countryside.

Townscape

5.51. The assessment reflected potential impacts on centres of population. All packages were judged to have an adverse impact and therefore all received a negative score against this criterion. Packages which would have a large adverse impact on the Huntingdon (as the largest centre of population) scored -3.

5.52. The cumulative impacts of packages including a Huntingdon Southern Bypass component in conjunction with online widening or local access roads led to those packages (namely GBCR(r), GDS(r), GPR(r) and (G(part)J(r)) scoring -3. In the (d) derivatives of these packages the benefits associated with the relief for Huntingdon (provided by the detrunking of the existing A14) were off-set against the overall adverse effects and were reflected with a score of -2.

5.53. Similarly the cumulative impacts of the longer off-line packages (F, GL and K) also resulted in a score of -3.

5.54. Packages comprising shorter sections of on-line widening or local access roads received a score of -1.

Heritage

5.55. Assessment against this criterion was based upon the number of designated heritage sites within one kilometre of the approximate alignment of each package. The packages with the worst scores were those with the highest count of sites in close proximity. These were ACR, HACR and TACR, scoring -3. The majority of the other packages scored -1.

Biodiversity

5.56. Scores against this criterion were based on the proximity of packages to designated sites. The worst-scoring packages are those which pass directly through a designated site. These are ACR, TACR, HACR, GBCR(d/r), GDS(d/r), GPR(d/r), F, GL, G(part)J(d/r) and K, each of which scores -3. The remainder of the packages scored -2 as they pass within one kilometre of one or more designated sites.

Water Environment

5.57. The package with the longest length of highway in Flood Zone 3 is F, which scores -3. Three other packages score -2, namely GDS(d/r) and GL. The remainder of packages score -1. No packages score a neutral zero, since they all pass through Flood Zone 3 at some point (even if it is only for a very short length).

Social and distributional Impacts

5.58. Overall, there is very little impact on any of the vulnerable user groups. The full assessment of Social and Distributional Impacts of the highway packages is presented in Appendix B.

5.59. The areas within one kilometre of packages G(part)J(r) and G(part)J(d) contain a slightly higher concentration of people claiming the Disability Living Allowance when compared to the Cambridgeshire average, while all of the other packages have lower levels of people claiming Disability Living Allowance when compared with the Cambridgeshire average.

5.60. The areas within one kilometre of packages F and K contain significantly lower concentrations of no-car households when compared with the Cambridgeshire average.

Physical activity

5.61. All packages were judged to have a neutral effect on physical activity as they would not have a significant impact on the volumes and lengths of walking and cycling trips. The main impact of the packages is on longer distance, highway trips in the corridor and potential issues of severance can be mitigated (as discussed below).

Accidents

5.62. As described under the Strategic Case, the **potential** for some highway packages to increase accidents as a result of lengthening distances driven (on a fixed demand basis) has been reflected as a negative score for some options. Package K has a ‘large negative’ impact whilst F and the (d) alternatives for all packages with the Huntingdon Southern Bypass (GBCR(d), GDS(d), GPR(d) and G(part)J(d))) have a ‘moderate negative’ impact and all other offline options have a ‘slight negative’ impact.

5.63. However, in practise improvements to the standard of road could mitigate or outweigh the impacts of the impacts of the longer distances driven. However this is unlikely to change the balance between packages and these impacts will be quantified in Output 3.

Access to goods, services, people and places

5.64. All the packages score positively in this regard, as increased highway capacity tends to improve access for car drivers. Packages CR, TCR, DS, TDS, HDS and ECR perform less strongly than the other packages as they are smaller schemes with more limited additional capacity and potential to reduce journey times. Further information is provided in Appendix E.

Severance

5.65. All the packages were judged to have a neutral impact on severance as it would be possible to include measures to mitigate any potential issues, such as disruptions to rights of way, as part of scheme design in each case.

Cost to transport budget

5.66. An estimate of outturn costs has been generated for each of the 21 as shown (presented in broad bands) in Table 12. The way in which these costs were derived is set out in Chapter 2.

Table 12. Highway package costs

Package	Cost Range	Rank (1=cheapest)
CR	< £250m	1
ACR	£500m - £750m	4
TACR	£750m - £1bn	9
HACR	£500m - £750m	7
TCR	£250m - £500m	2
DS	£500m - £750m	8
TDS	£750m - £1bn	13
HDS	£750m - £1bn	11
ES	£750m - £1bn	12
ECR	£500m - £750m	5
GBCR(d)	£750m - £1bn	15

Package	Cost Range	Rank (1=cheapest)
GBCR(r)	£750m - £1bn	14
GDS (d)	>£1bn	21
GDS(r)	>£1bn	20
GPR(d)	>£1bn	18
GPR(r)	>£1bn	17
F	£750m - £1bn	16
GL	>£1bn	19
G(part)J(d)	£500m - £750m	10
G(part)J(r)	£500m - £750m	6
K	£250m - £500m	2

Potential for revenue generation

5.67. The packages have been assessed for their potential to generate revenue from tolling. Five packages have been determined not to be suitable for tolling (see §2.77-2.79 for explanation of methodology), and therefore assigned a neutral score. These are: CR, TCR, ACR, TACR and K.

5.68. A further four packages (HACR, DS, TDS and HDS) could potentially be suitable (particularly if dynamic tolling was to be considered), while the remaining twelve have strong potential for generating toll revenue. The sixteen packages that could be tolled have been scored based on their potential ability to generate revenue.

5.69. The packages with the largest positive scores are those which could potentially intercept the largest amount of strategic traffic (which has been determined in part by an assessment of long-distance alternatives to one or more sections of the route. These packages are DS, TDS, HDS, GBCR(d), GDS(d), GDS(r), ES, ECR, GPR(d) and GPR(r). At this stage, the assessment has not considered the practicality of tolling relatively short sections of improved alignment. In practice, it may be difficult or inappropriate to do so, such as in package DS. The potential for packages to generate toll revenue, including matters of practicality and diversionary effects, will be examined in much more detail in Output 3.

Recommendations and next steps

5.70. Recommendations about which highway packages should be taken forward for further assessment in the next stage are presented in Section 6.

6. Options recommended for further assessment

Introduction

6.1. In this section we identify those packages which perform most strongly against the assessment criteria and recommend those which should be carried forward to the next stage of the study.

Public transport and freight packages recommended for further assessment

6.2. The assessment of the public transport and freight packages (in Chapters 3 and 4 respectively) provides only limited information on the relative performance of the different packages. This is because, at this stage of the study, the assessment is limited to that which is possible using readily available information. To an extent, this has affected all packages assessed, but has particularly limited the assessment of the public transport and freight packages as there are no forecasts of their impacts. As it is not possible to properly understand their relative merits of the public transport or freight packages, either in relation to each other or to the highway packages, it would be inappropriate to reject any of them at this time. We therefore recommend that all these packages are retained for further assessment in Output 3.

6.3. During Output 3, it will therefore be necessary to:

- refine further the content and costs of the public transport package, in particular the locations of additional park & ride sites, bus service frequencies and expected journey times;
- derive more robust forecasts of the potential demand / mode shift effects of the public transport packages (based on the approach to be set out in the 3A report);
- estimate the benefits of this modal shift to both users (i.e. public transport passengers) and non-users (i.e. remaining highway demand) with and without application of a toll for strategic trips on the A14;
- confirm the rail freight enhancements on the Nuneaton to Felixstowe line, their costs and likely delivery (including re-confirmation that Haughley Junction should only be delivered in the long-term);
- assess whether the proposed measures in the freight packages will themselves trigger a need for further gauge or capacity improvements; and
- derive a view on the most likely location, timing and impacts of the proposed Strategic Rail Freight Interchanges.

Highway packages recommended for further assessment

Performance against total scores

6.4. The relative performance of the packages has been examined, taking account of:

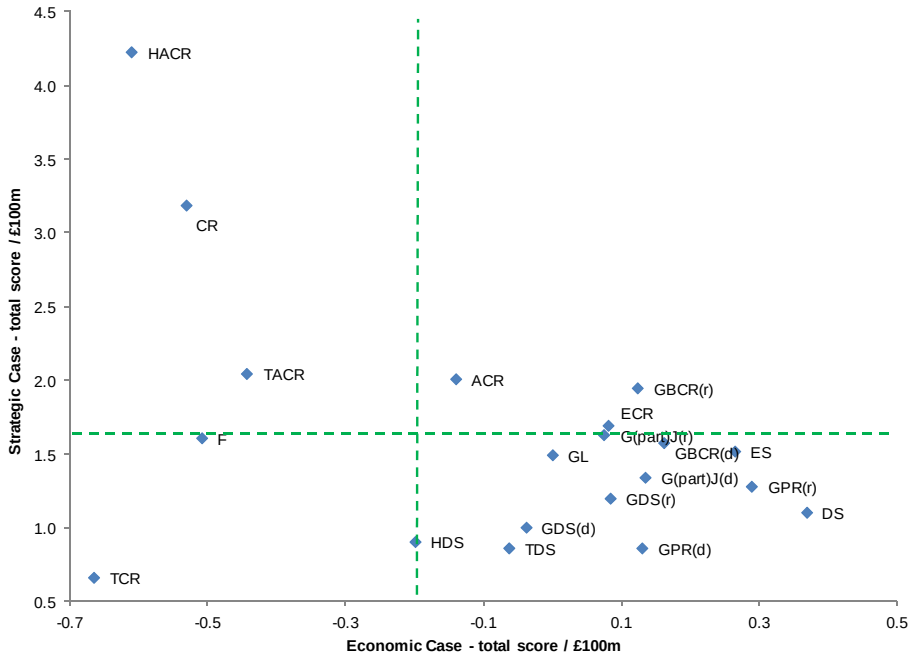
- performance against the assessment criteria for the Strategic Case;
- performance against the assessment criteria for the Economic Case;
- estimated package costs; and
- the potential for revenue generation through a toll (and therefore in combination with the above a measure of affordability).

6.5. Figure 8 shows the Strategic Case and Economic Case performance of each package. The chart shows the total points score (as shown in Table 10) per £100 million of estimated scheme cost (as summarised in Table 11). The green dotted lines represent the average scores for the highway packages shown.

6.6. At this stage, some caution should be applied to the comparison of the relative performance of the highway packages, as shown in the following charts, in particular because the packages range in scale and therefore in their ability to address the known problems and challenges. In particular:

- the smaller packages (such as DS) may score well in value for money terms as they generate a large benefit relative to their cost but are less likely to fully address the known problems and challenges (as such they tend to perform worse against hr Strategic Case); and
- the smaller packages also tend to score relatively well against the Economic case as they commonly have a lower environmental impact and therefore do not have large negative scores for environmental issues.

Figure 8. Overall performance against Strategic and Economic Case ('points per £100m')



Packages with poor economic performance

6.7. Figure 8 shows that the following packages perform poorly, and below average, relative to the other packages in terms of the Economic Case:

- CR – online widening between Bar Hill and Girton, plus scaled back improvements (compared to the EFD scheme) at Girton interchange;
- TCR – as CR plus improvements at Brampton Hut and Spittals interchanges to provide free flow A14-A14 movements; and
- TACR – as TCR with on-line widening extended to Huntingdon;
- HACR – as CR with on-line widening extended to Huntingdon plus an off-line section to bypass Brampton Hut and Spittals interchanges;
- F – new alignment from west of Brampton Hut north of Huntingdon, St. Ives and Milton, rejoining the A14 west of the A1303 plus extension of the M11 from Jn 14 to the new road; and
- K - upgrade of the A428 between A1 and M11. As an 'outlier' with very low scores for both the Strategic and Economic Cases K is not shown on the graph.

6.8. **On the basis of their poor performance against the Economic Case, relative to the other packages, it is recommended that these packages are not considered further**.

6.9. Further consideration of Figure 8 shows that the following packages have a net negative performance against the Economic Case:

- TDS/HDS – improvements to provide free flow A14-A14 movements or new alignment to by-pass Brampton Hut and Spittals interchanges plus parallel local access roads between Trinity Foot (or Galley Hill) and Girton;
- GDS (d)– Huntingdon Southern Bypass plus local access roads between Trinity Foot (or Galley Hill) and Girton and full Girton enhancement; and
- GPR(d) – Huntingdon Southern Bypass plus local access roads between Huntingdon or Godmanchester and Girton, and scaled-back Girton enhancement.

6.10. Of these TDS, HDS and GDS(d) also perform below average against the Strategic Case.

6.11. **On the basis of their net negative performance against the Economic Case it is recommended that these packages are not considered further.**

Packages ruled out on deliverability grounds

6.12. The deliverability assessment carried out as part of the Strategic Case identified a number of highway packages which are likely to have significant issues and risks associated with them. These are:

- Highway packages containing component A (namely ACR) which is online widening between Spittals and Bar Hill;
- highway packages containing component E (namely ECR and E*S): which is local access roads between Godmanchester and Bar Hill;
- highway packages containing component P (namely GPR (d/r)): parallel local access roads between Godmanchester and Girton; and
- highway package GL – Huntingdon Southern Bypass plus a new alignment north of Longstanton and Histon including a new link to the M11.

6.13. Significant environmental constraints were identified between Godmanchester and Fenstanton (therefore relevant to primary component E). These are:

- the proximity of Listed Buildings close to the route;
- County Wildlife Sites (important local wetland areas) abutting or in close proximity to the route;
- the potential impact on historic landfill sites at Conington and Godmanchester; and
- the potential impact on properties abutting the route around Fenstanton.

6.14. The potential for significant public and political acceptability issues around the potential impacts on Fenstanton was also identified.

6.15. Two options were considered for component P. For both, the same significant environmental constraints, as listed for component E above, were identified between Godmanchester and Fenstanton. One of the options extends the Local Access Roads to the west beyond Godmanchester to Spittals Interchange. With this option additional potential deliverability issues were identified at the western end in Huntingdon due to the importance of the environmental sites and designations found there and the potential impact of the package on the surrounding townscape. The constraints are:

- the proximity of, and therefore potential impact on, Registered Commons and Listed Buildings;
- the proximity of an International and National ecology site (Portholme);
- in terms of townscape, the impact on a built up area with important open spaces / commons; and
- the increased impact of the Huntingdon railway viaduct structure.

6.16. Highly complex engineering issues (at the western end) were also identified for component P as well as the potential for significant public and political acceptability issues associated with the environmental and engineering concerns.

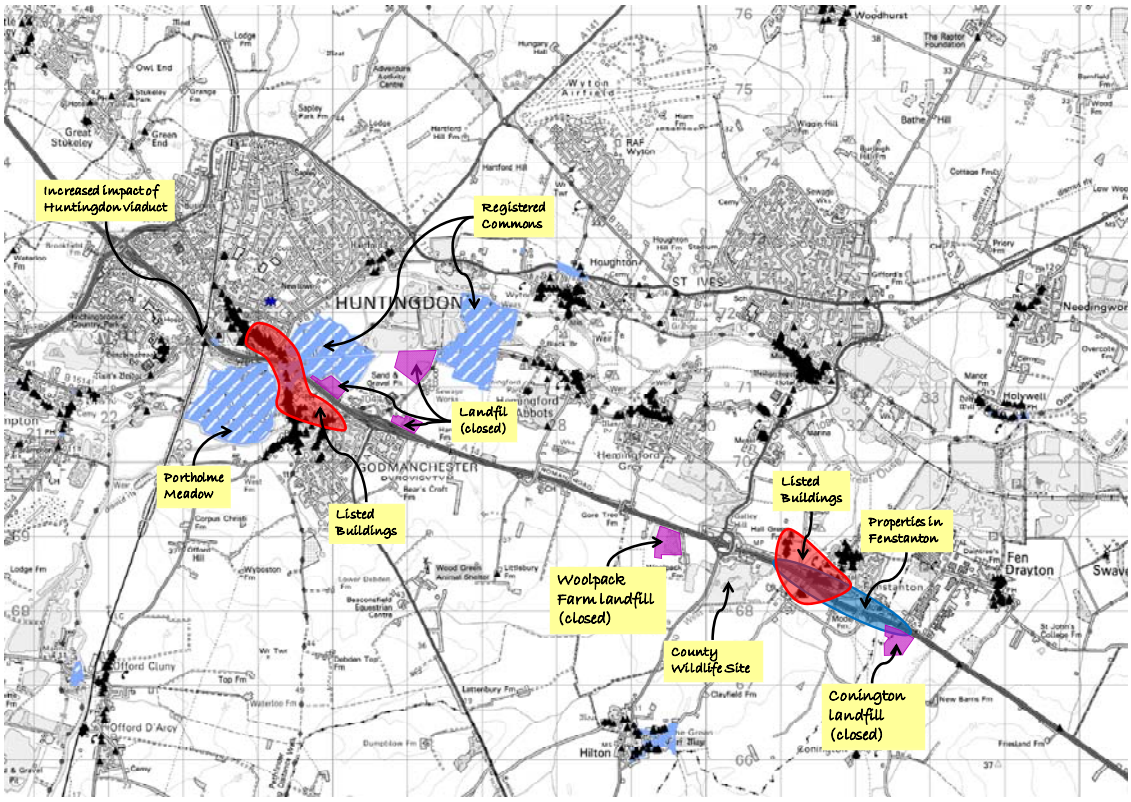
6.17. Package GL is a long route across open countryside and as such has a greater probability of adverse environmental impacts and the potential for showstoppers. Significant environmental constraints were identified, associated with component L. The constraints are:

- County Wildlife Sites (River Cam);
- the extent of the infrastructure in open countryside and the proximity to and potential impacts on views from/to several settlements and from viaducts/bridges over rivers;
- the need to cross The Busway and the proximity to the edge of the Northstowe development;
- Wicken Fen Vision and Green Belt planning considerations; and
- the potential impact on several Flood Zone 3 areas.

6.18. The potential for significant public and political acceptability issues associated with the proximity to settlements and the extent of the infrastructure in open countryside were also identified.

6.19. The key deliverability constraints in the Huntingdon – Fenstanton area are shown in Figure 9.

Figure 9. Key deliverability constraints in Huntingdon – Fenstanton area



6.20. **Taking account of the deliverability issues listed above, it is recommended that packages including primary components E, P and L are not taken forward for further assessment.**

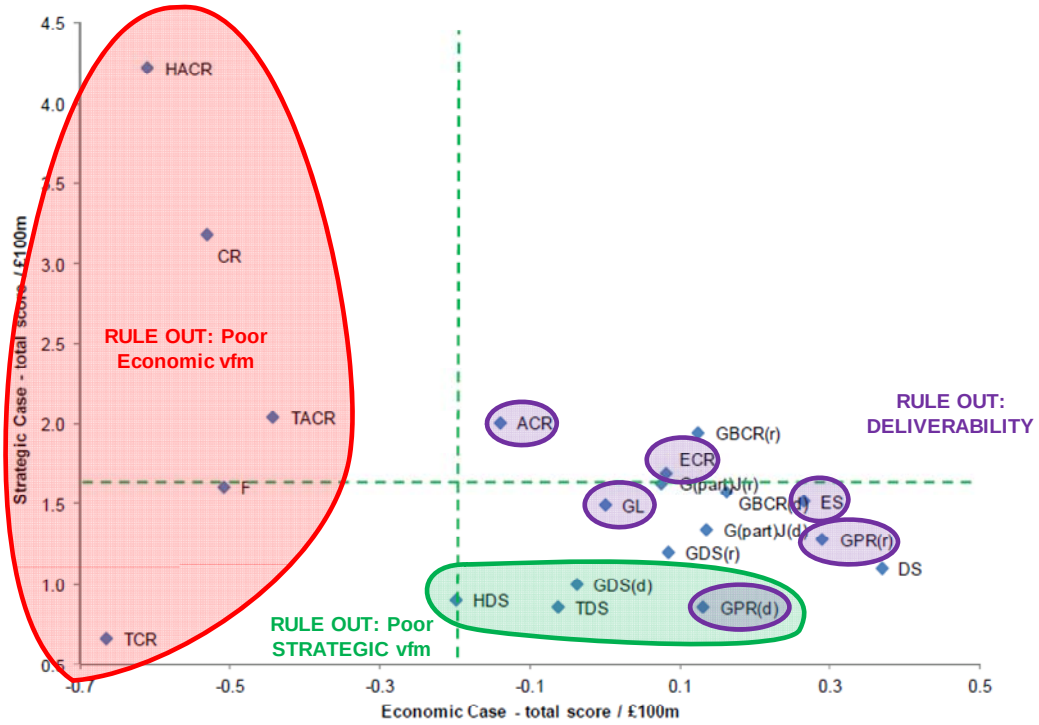
6.21. It should be noted that the deliverability issues associated with the environmental constraints identified for components E and P around Fenstanton also affect some of the remaining packages. As a result it is recommended that the following package variants are not progressed further:

- the variant of DS with Local Access Roads to Galley Hill (rather than Trinity Foot);
- the variant of GDS (r) with Local Access Roads to Galley Hill (or wherever they may tie in with a Huntingdon Southern Bypass north west of Fenstanton.

- the variant of GBCR (d/r) with Local Access Roads to Galley Hill (or wherever they may tie in with a Huntingdon Southern Bypass north west of Fenstanton

6.22. Figure 10 identifies those packages which it is recommended are not taken forward for further assessment.

Figure 10. Packages which are not recommended for further assessment ('points per £100m')



Options recommended for further assessment

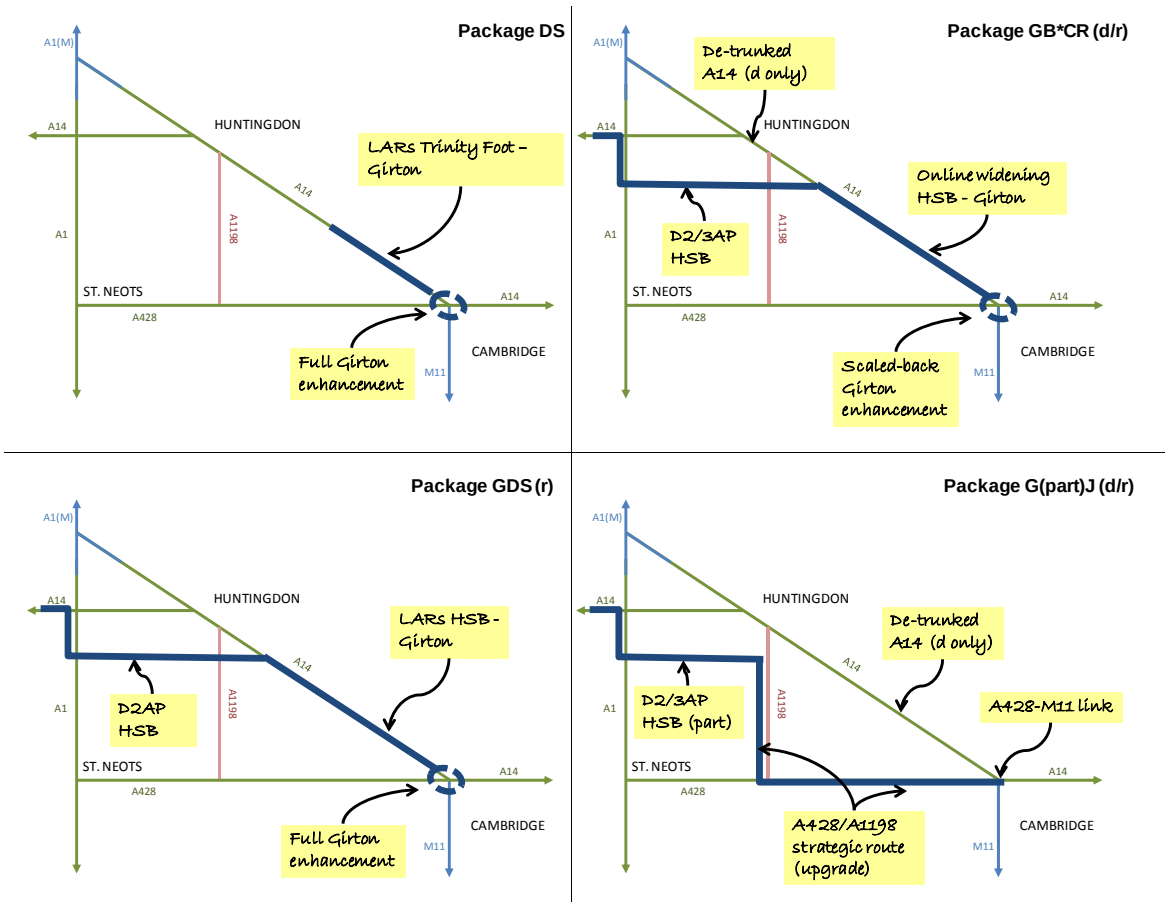
6.23. On the basis that a number of packages can be ruled out due to their performance against the Strategic Case, Economic Case or as a result of likely deliverability issues associated with significant environmental constraints, it is recommended that that the following packages are retained for further assessment in Output 3:

- DS – local access roads between Trinity Foot and Girton plus full Girton enhancement;
- GDS (r)– as DS plus a D2 Huntingdon Southern bypass with a tie in south east of Fenstanton;
- GBCR(d/r) – Huntingdon Southern bypass with a tie in south east of Fenstanton, plus online widening from the HSB to Girton and scaled-back Girton enhancement; and
- G(part)J(d/r) – Huntingdon Southern bypass (western section) plus upgraded A428 / A1198 corridor.

6.24. Whilst package DS has a strong economic performance, it has a relatively poor performance against the Strategic Case as it does not address a number of the problems and challenges identified. Therefore, it is unlikely that it would be delivered in its own right, instead forming part of a wider solution for the corridor (although perhaps on a phased basis). The package is retained at this stage to assess the contribution of the improvements represented by DS within a wider solution.

6.25. Schematic drawings of these highway packages are shown in Figure 11.

Figure 11. Highway packages recommended for further assessment



6.26. Figure 12 shows the relative performance of the packages recommended for further assessment in terms of their value for money (expressed as points scored per £100 million estimated capital cost). Note the averages have been re-calculated to reflect the remaining packages only. Figure 13 shows the relative performance in terms of total points scored.

Figure 12. Relative performance of highway packages recommended for further assessment against Strategic and Economic Cases (value for money / 'points per £100m')

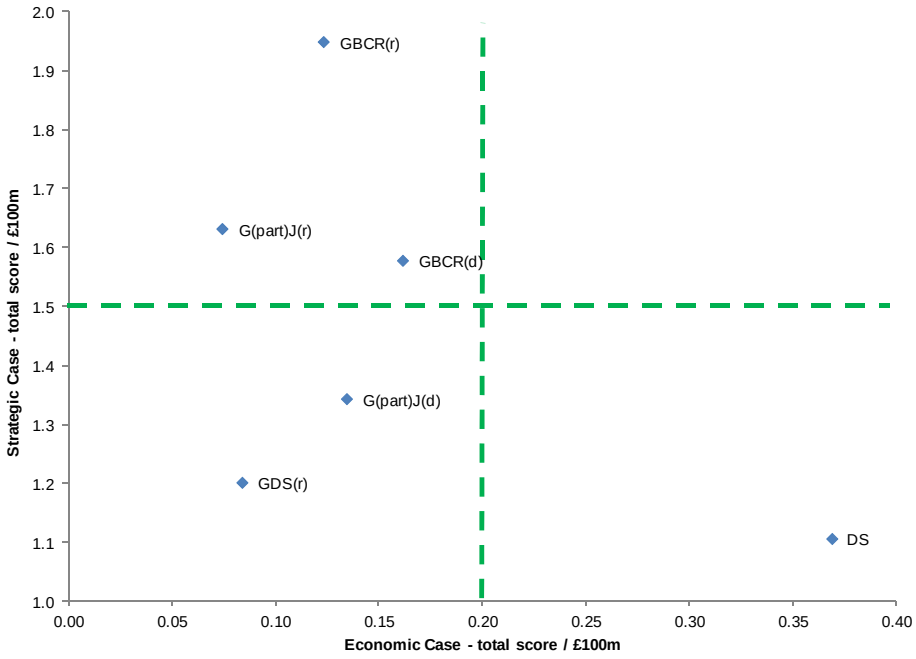
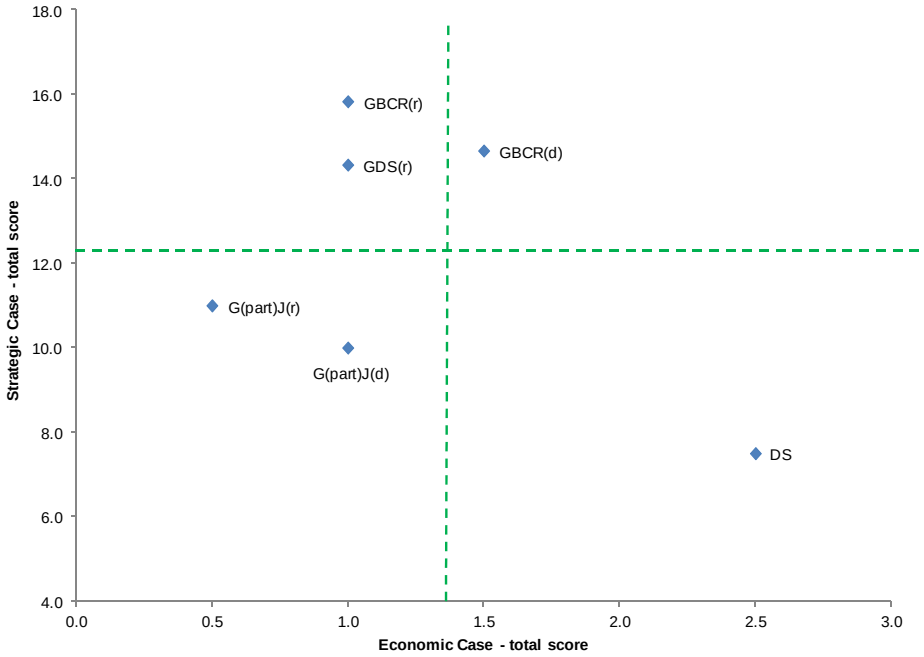


Figure 13. Relative performance of highway packages recommended for further assessment against Strategic and Economic Cases



6.27. The charts suggest that:

- Package DS performs strongly against the Economic Case in both value for money (points per £100m) terms (Figure 12) and in absolute terms (Figure 13). Despite scoring relatively poorly against the economic indicators in the Economic Case, it performs well against the environmental indicators. In part this reflects the balance between the number of indicators relating to economy and environment. However, package DS performs relatively badly against the Strategic Case as it does not address a number of the known problems and challenges.
- All of the other packages perform more weakly against the Economic Case but more strongly against the Strategic Case. All of the other packages include the Huntingdon Southern Bypass, at least in part, meaning that they will score more poorly against the environmental indicators in the Economic Case but tend to address more of the known challenges, hence scoring better in the Strategic Case.
- Package GBCR tends to perform better than package GDS, suggesting that online widening is better than local access roads when delivered in combination with the Huntingdon Southern Bypass.
- The packages with a full Huntingdon Bypass appear to perform better than package G(part)J both in the Economic and Strategic Cases. However the scores are relatively close and are within the margins of error of this level of assessment. This relative performance mirrors the conclusions of the Cambridge to Huntingdon Multi-Modal Study (CHUMMS) and the preparatory work on cancelled A14 scheme, which concluded that routes to the south involving the A428 corridor were less effective at serving strategic A14 movements than packages similar to GBC(d/r).
- The performance of the ‘r’ and ‘d’ derivatives of the packages including the Huntingdon Southern Bypass are relatively similar and within the margins of error of this level of assessment.
- The ‘r’ package derivatives tend to perform better than the ‘d’ derivatives against the Strategic Case.

Questions for Output 3

6.28. In the further consideration and assessment of these highway packages in Output 3, a number of key questions will need to be answered such as:

- Is it better to provide a dual 2-lane Huntingdon Southern Bypass and retain the existing A14 alignment through Huntingdon for traffic to/from the north (r derivatives) or provide a dual 3-lane HSB and de-trunk/downgrade the A14 through Huntingdon (d derivatives)?
- Which packages are more suitable for tolling (e.g. the r derivatives are less suitable than the d derivatives) and which packages are only affordable with tolling?
- Are local access roads preferable to online widening or vice versa? Again, in part this depends on tolling arrangements.
- How do the A428/A1198 packages perform versus the Huntingdon Southern Bypass packages?
- Is tolling required to fund the packages?
- How can tolling be used to generate revenue whilst avoiding unwanted diversion effects?

Appendices

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