Comments on Traffic Update Report

By

Cambridgeshire County Council

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Introduction

Highways England submitted to the Examining Authority a Traffic Update Report detailing the changes in Traffic Forecasts arising from updating the traffic model to CHARM3A. The County Council in its written representations commented on the CHARM2 traffic model outputs. This submission updates the position of the County Council with respect to CHARM3A.

Background

Highways England has developed a traffic model (CHARM – Cambridge to Huntingdon A14 Road Model) which is based in part on the highways element of the County Council’s Cambridge Sub-Regional Model (CSRM). Highways England has used this information as the basis for creating a new bespoke traffic model for forecasting the impact of the proposed improvement of the A14 on both the strategic and local road networks.

CHARM 3A includes a number of amendments to the previous version of the model (CHARM2). These are:

- Changes to the method used to assess growth in external to external trips;
- Introduction of new zones to better reflect the loading points of committed developments to the north of Cambridge and in St Neots;
- Refinements to the merge coding on the A14 to address PM peak validation issues;
- Adjustments to the Spittals Interchange pinch point scheme coding;
- Buffer network speeds altered to represent the increasing likelihood of congestion in the future years;
- HGV penalties applied to the Huntingdon network in both the base year and forecast year scenarios;
- Adjustment to the coding of the A1 north of Brampton Hut to rectify an incorrect speed flow curve in CHARM2; and
- Adjustments to the loading points of the Darwin Green development.

The County Council in its written representations provided as evidence a Technical Note (TN01) written by consultants to the County Council (Systra). This Technical Note has been updated and an addendum can be found in Appendix A. The County Council considers that the changes made in CHARM3A and the methodologies used to include them are reasonable. This is set out in more detail below.

Comments on CHARM3A

The County Council raised a number of concerns regarding the CHARM2 traffic modelling of traffic flows on the local highway network. All of these concerns remain
unresolved in CHARM3A. It is hoped that these issues will be addressed through the Local Impact Testing Report.

The County Council has raised a number of issues in relation to the changes made in coding of CHARM3A, and these issues were communicated to Highways England and their consultants J2A in the document reference CCC_447_LMW_260615.

The changes made to the zoning both to address the issues of trips routing via the buffer network and the need to better model the impact of planned development within the model were reasonable solutions to the issues identified.

The change to the methodology used to determine the external-to-external trips is acceptable, as are the other minor changes made to the model.

Local Impacts

Due to the variable nature of the base model validation in areas away from the A14 the performance of the base year model, and the forecast changes through time to give the do minimum/without A14 future year projections, the forecasted impacts as a result of the scheme were assessed area by area for each of the key population centres or locally sensitive areas. The areas covered by these assessments are as follows;

- Area 1: Alconbury, Little Stukeley, Great Stukeley;
- Area 2: Huntingdon, Brampton, Hartford and Godmanchester;
- Area 3: Houghton, Wyton, St Ives, Fenstanton, Fen Drayton;
- Area 4: Swavesey, Over;
- Area 5: Elsworth, Boxworth, Knapwell;
- Area 6: Papworth Everard, Hilton;
- Area 7: Bar Hill, Longstanton, Willingham, Oakington and Northstowe;
- Area 8: Dry Drayton, Madingley;
- Area 9: Girton, Histon and Impington, Cottenham, Milton; and
- Area 10: Cambridge.

The County Council has considered local network impacts in each of these areas focussed on three modelled scenarios, these being:

- the base year (2014) model;
- the future ‘without scheme’ model, also known as Do Minimum or DM (2035); and
- the future ‘with scheme’ model, known as Do Something Plus or DS+ (2035).

At this stage, and pending further modelling work, the County Council has greater confidence in the patterns of traffic flow change, rather than the exact quantum of that change (or, in some locations, the background levels of traffic flow).
In this submission, the County Council now provides a commentary, on an area-by-area basis, as to whether the updates made in CHARM3A change the County Council’s position as previously identified based on CHARM2.

**Area 1: Alconbury, Little Stukeley, Great Stukeley**

There is no significant change in either the validation or performance of Area 1 as a result of the change from CHARM2 to CHARM3A and therefore the comments made in relation CHARM2 are still valid.

**Area 2: Huntingdon, Brampton, Hartford and Godmanchester**

The level of local validation in this area is lower in CHARM3A compared to CHARM2, especially in the AM peak, with the validation still falling below normally accepted standards. Therefore, CHARM3A does not accurately reflect the base year position on this area of the local highway network.

Specific issues for the different locations within Area 2 are as follows;

**Huntingdon**

The change to the external to external trips in CHARM3A has resulted in less strategic traffic in the model overall and therefore there is less congestion and greater residual capacity on the A14 in the DM scenario. More traffic is therefore shown to remain on the A14 rather than routing through Huntingdon. As a result the level of traffic predicted to access Huntingdon Town Centre via Brampton Road between Hinchingbrooke Park Road and the Ring Road in the DM scenario is reduced from that previously projected in CHARM2.

The changes to the zones to the west of Brampton Hut have resulted in traffic from the Midlands using the A14 in CHARM3A rather than routing through the Buffer network to avoid congestion on the A14 as was the case in CHARM2. The result of this is that CHARM3A predicts more traffic using the A14 from the Midlands. In addition the change to the external to external growth factor has resulted in less strategic traffic from the A1 north.

CHARM3A also indicates that more Huntingdon local traffic will access the A14 via the Mill Common Link in the DS scenario than was projected in CHARM2. This change is the result of there being less strategic traffic and the increase level of residual capacity on the A14 in CHARM3A.

**Brampton**

The change to the external to external trips in CHARM3A has resulted in less strategic traffic in the model overall and therefore there is less congestion and greater residual capacity on the A14 in the DM scenario. Less traffic is therefore projected to use the A1514 between Church Lane, Brampton and Hinchingbrooke Park Road in the DM scenarios.
CHARM3A also indicates a reduction in Traffic using Brampton High Street than in CHARM2. This change is the result of there being less strategic traffic and the increase level of residual capacity on the A14 in CHARM3A.

**Godmanchester**

The change to the external to external trips in CHARM3A has resulted in less strategic traffic in the model overall and therefore there is less congestion and greater residual capacity on the existing A14 in the DM scenario. Traffic is therefore shown to remain on the A14 rather than routing through Godmanchester.

The level of traffic predicted to access Huntingdon Town Centre via Town Bridge in the DM scenarios is reduced with more traffic using the new Mill Common Link. This change is the result of there being less strategic traffic and the increase level of residual capacity on the A14 in CHARM3A.

**Offords/Buckden**

The change to the external to external trips in CHARM3A has resulted in less strategic traffic in the model overall and therefore there is less congestion and greater residual capacity on the existing A14 in the DM scenario. The result is that less traffic uses the B1043 and Mill Road.

**Area 3: Houghton and Wyton, St Ives, Fenstanton, Fen Drayton**

There is no significant change in either the validation or performance of Area 3 as a result of the change from CHARM2 to CHARM3A and therefore the comments made in relation CHARM2 are still valid.

**Area 4: Swavesey and Over**

There is no significant change in either the validation or performance of Area 4 as a result of the change from CHARM2 to CHARM3A and therefore the comments made in relation CHARM2 are still valid.

**Area 5: Elsworth, Boxworth, Knapwell**

There is no significant change in either the validation or performance of Area 5 as a result of the change from CHARM2 to CHARM3A and therefore the comments made in relation CHARM2 are still valid.

**Area 6: Papworth Everard, Hilton**

The change to the external to external trips in CHARM3A means that there is less strategic traffic in the model overall and therefore there is less congestion and greater residual capacity on the existing A14 in the DM scenario. The result is that less traffic uses the A1198 North of Lattenbury Bridge, and also Mill Road to avoid this congestion.
In addition there have also been changes to how the St. Neots Eastern Expansion developments are loaded on to the road network. This has been achieved by creating a new zone for the Eastern Expansion Area which means that the trips associated with these developments load on to the network on the B1428 Cambridge Road in St Neots in CHARM3A rather than in Great Gransden as was the case in CHARM2. This means that the impact of these developments is better reflected in CHARM3A than was the case in CHARM2.

**Area 7: Bar Hill, Longstanton, Willingham, Oakington and Northstowe;**
There is no significant change in either the validation or performance of Area 7 as a result of the change from CHARM2 to CHARM3A and therefore the comments made in relation CHARM2 are still valid.

**Area 8: Dry Drayton, Madingley;**
There is no significant change in either the validation or performance of Area 8 as a result of the change from CHARM2 to CHARM3A and therefore the comments made in relation CHARM2 are still valid.

**Area 9: Girton, Histon and Impington, Cottenham, Milton;**
There is no significant change in either the validation or performance of Area 9 as a result of the change from CHARM2 to CHARM3A and therefore the comments made in relation CHARM2 are still valid.

**Area 10: Cambridge**
There is no significant change in either the validation or performance of Area 10 as a result of the change from CHARM2 to CHARM3A and therefore the comments made in relation CHARM2 are still valid.

**Transport Assessment**
Chapter 3 of the Traffic Modelling Update Report provides an update on the operational assessment of the scheme and local highway network in response to the CHARM3A traffic forecasts. The County Council has the following comments to make on the revised operational assessment.

- given the issues with the validation of the model on the local highway network the use of currently available model data to undertake junction assessments is not ideal;
- there are no base year junction assessment results shown in this report which makes checking the future year models difficult as it is not possible to verify the operation in the base year; and
- there is little commentary setting out the reasons for the changes in junction operation indicated as a result of the changes made the CHARM3A.
The County Council is concerned over the improvement in operational performance of the Edison Bell Way junction. No explanation has been provided of the changes made, beyond increasing cycle time. The basis of operation of this junction and the balance between providing for NMU and traffic is currently a matter for detailed design. Highways England had previously presented the County Council with options for Traffic Optimised and NMU Optimised operation. The view of the County Council is that the final design will need to balance demand from both user groups to optimise for NMU, while limiting queue length and delay. A solution that simply increases cycle time to optimise traffic capacity is likely to increase unacceptably delay for NMU. The County Council accepts the baseline position that the existing junction is over-capacity.

The tables within the report setting out the operation of the local road network in CHARM3A need to include additional information to provide a fuller understanding of the projected impacts on the local road network. They key missing links are as follows:

- A1123 between Huntingdon and St Ives,
- A1096 between St Ives and the A14,
- B1514 Between Hinchingbrooke Park Road and Edison Bell Way,
- Huntingdon Road Cambridge South of Girton Road.

**Further Work Needed**

The County Council is actively working with Highways England in defining and evaluating Local Impact Testing. The key issues that have been identified in the work undertaken to date include:

- The use of median rather than mean journey times and the resulting underestimation of congestion and delay on the A14, with potential consequent knock-on impact on local roads. Highways England agrees with the County Council that Median journey times on the A14 are lower (in some cases significantly so) than the Mean;
- The zoning anomalies and the resulting lack of trips on parts of the local road network,
- Inclusion of uncommitted local transport schemes within the City of Cambridge; and
- Weak validation on local network

The Local Impact Testing is due to be reported by Highways England to the examining authority on the 2nd of August.
Conclusions

The CHARM3A model does not fully address the issues raised by the County Council in relation to CHARM2. CHARM3A still contains errors in zoning, and in baseline assumptions in Cambridge, the correction of which may change local traffic impacts in the areas concerned. Further, the use of Median rather than Mean Journey times on the A14 may affect the distribution of traffic between the strategic and local road networks. The County Council has agreed to the impact of these issues being the subject of Local Impact Testing, rather than a further revision to the traffic model.

The County Council will update its position on impacts on the local road network when Local Impact Testing has been completed. However, the County Council does not consider at this time that Local Impact Testing is likely to significantly improve validation performance. In consequence, validation of the model with respect to traffic on local roads in some areas will remain weak. As a result, the County Council while agreeing in the main with the sense of the change in terms of increase or reduction, and the broad patterns of traffic flow, is yet unable to agree to the quantum of change predicted by CHARM3A on local roads in the weakly validated areas.

With a traffic model of this size and complexity the County Council accepts that it would be unrealistic for the model to fully achieve WebTAG validation criteria. Therefore, the County Council is looking to understand the significance of the weak validation to assessing impacts on the local road network.

It is the intent of Cambridgeshire County Council to continue to work with Highways England so as to enable the County Council to agree the forecasted impacts on local roads for the 19 August deadline.
APPENDIX A

Technical Note 3, Forecasted impacts on local road network - Addendum
TECHNICAL NOTE 3
A14 TRAFFIC ASSESSMENT REVIEW
FORECASTED IMPACTS ON LOCAL ROAD NETWORK - ADDENDUM

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4.9 **Area 8: Dry Drayton and Madingley**

4.10 **Area 9: Girton, Histon and Impington, Cottenham and Milton**

4.11 **Areas 10: Cambridge**
1. INTRODUCTION

1.1 Background

1.1.1 SYSTRA Ltd has been commissioned by Cambridgeshire County Council (CCC) to provide support on the transport modelling and to review the traffic assessment work for the A14 Cambridge – Huntingdon Improvement Scheme.

1.1.2 Highways England (HE) has submitted a Development Consent Order (DCO) application for a £1.5bn scheme to improve the A14 Trunk Road between Huntingdon and Cambridge, over approximately 25 miles. The scheme is a Nationally Significant Infrastructure Project (NSIP) and is expected to relieve congestion on one of the busiest stretches of the strategic road network between the West Midlands and the east coast ports. It will also enable local businesses to operate more effectively, and allow a number of major residential developments to proceed.

1.1.3 The scheme is supported by Cambridgeshire County Council, but as it is expected to have considerable impacts on the local road network, they need to have confidence that the transport modelling underpinning the application is robust.

1.1.4 The transport modelling was undertaken by the consultants Jacobs, Arup and Aecom (J2A) using the Cambridge to Huntingdon A14 Road Model 2 (CHARM2).

1.2 SYSTRA involvement

1.2.1 SYSTRA have been appointed by Cambridgeshire County Council to review relevant DCO transport modelling documentation and provide advice to the council to assist them in making a representation to the DCO examination process.

1.2.2 The purpose of the review is to identify whether the modelling presented as part of the application accurately represents local network conditions and is capable of producing robust and reliable forecasts for the local highway network. The modelling has been undertaken using the Cambridge to Huntingdon A14 Road Model (CHARM2). This is a SATURN highway model, validated to a base year of 2014.

1.2.3 Following the submission of CHARM2, a further model (CHARM3A) was developed by Highways England to comply with new economic parameters published by the DfT in November 2014. CHARM3A model also included refinements to network coding and to external to external growth factors.

1.2.4 This note, Technical Note 03, is intended as an addendum to Technical Note 01. It presents a summary of any changes in the scheme’s impact on the local road network between CHARM2 and CHARM3A. The performance of the base year model and the forecasted impacts of the A14 scheme have been assessed against conclusions made from CHARM2. Only significant changes to the conclusions in TN01 are identified in this technical note. Where significant changes have not been identified the conclusions made in TN01 remain valid.

2. BACKGROUND TO CHARM2

2.1.1 No Change from Technical Note 01.
2.2 CSRM and CHARM2 Compatibility

2.2.1 No Change from Technical Note 01.

3. CHARM3A BASE YEAR MODEL

3.1 Overview

3.1.1 The general characteristics of the Charm3A model are consistent with Charm 2. However, there are some detailed changes which are described in the following sections of this Technical Note.

3.2 Geographical Extent of CHARM3A

3.2.1 No Change from Technical Note 01.

3.3 Model Zones

3.3.1 Two new zones have been added to the CHARM3A model increasing the number of zones from 384 to 386.

3.3.2 The first new zone has been added to address assignment stability as a result of trip routeing issues identified between Leicestershire and the South East. In CHARM2 trips between these zones use the M25/M1 in the ‘Do-Minimum’ scenario and the A14/A1 in the ‘Do-Something’ scenario due to congestion in the ‘Do-Minimum’ scenario which caused the buffer network to become a more attractive option. In CHARM3A this issue was resolved by dividing the Leicestershire zone in two. This is considered a reasonable amendment to the model.

3.3.3 A second new zone has been added to better represent the St Neots Eastern Expansion and Loves Farm development. This is considered a reasonable addition and improves the representation of these developments.

3.3.4 Routing issues between the East Midlands and Essex was also rectified by adjusting the external zonal demand west of the A1. To facilitate routing via the A14, some longer distance trips were moved into a zone near Kettering to ensure that there was consistent routing between DM and DS+. The traffic which is affected is external traffic which now uses the A14 to access the M11 or A14 east of Cambridge. Whilst we accept the reasoning for this change, it has led to significant changes to traffic flow on the strategic and local road networks as Section 4 discusses in further detail.

3.3.5 Adjustments to the external to external trip growth have been made. In the CHARM3A model this demand is taken from growth factors supplied by the National Trip End Model version 6.2 and the 2013 National Transport Model Road Traffic Forecasts. This is a reasonable approach and uses the most up to date information available.
3.4 Model Network

3.4.1 The following highway network changes have been incorporated into the CHARM3A modelling:

- Refinements to the merge coding on the A14 to address PM peak validation issues;
- Adjustments to the Spittals Interchange pinch point scheme coding;
- Buffer network speeds altered to represent the increasing likelihood of congestion in the future years;
- HGV penalties applied to the Huntingdon network in both the base year and forecast year scenarios;
- Adjustment to the coding of the A1 north of Brampton Hut to rectify an incorrect speed flow curve in CHARM2; and
- Adjustments to the loading points of the Darwin Green development.

3.4.2 The above changes are considered reasonable alterations to the CHARM3A networks.

3.5 Validation and Calibration

3.5.1 No significant change to validation on local roads from CHARM2 and conclusions in TN01 remain valid.

3.6 Forecasted Impacts

3.6.1 The Traffic Model includes assessment of the impacts of the proposed scheme in 2020 (the opening year) and 2035. For the purposes of this analysis the impact of the proposed scheme was reviewed in 2035 for the AM and PM peaks. This is because 2035 is considered to be the worst case scenario.

3.6.2 The Do Minimum (DM) Scenario was compared against the Do Something Plus (DS+) Scenario which included the proposed A14 scheme and also Phase 2 of the Northstowe development near Longstanton.

3.6.3 Figures 1 and 2 illustrate the CHARM3A flow changes between the 2035 DM and 2035 DS+ scenarios for the morning and evening peaks. The blue lines indicate a reduction in flow and the red lines represent an increase in traffic flow.

3.6.4 In both peaks there is a clear reduction in traffic along the de-trunked A14 through Huntingdon and some smaller reductions along parallel routes to the A14 such as the A1123. There is a corresponding increase in traffic along the new A14 and along the A1 between Brampton and Alconbury.

3.6.5 Whilst the general impacts of the scheme is the similar in both models, the impact of the scheme on the local road network in CHARM3A is less than in CHARM2, and the CHARM3A modelling forecasts that slightly less traffic will be encouraged onto the new alignment. In addition, the type of traffic using the new alignment subtly changes between CHARM2 and CHARM3A.

3.6.6 In the CHARM3A model the scheme is forecast to draw a greater number of trips away from the de-trunked A14 as it predicts that there will be a greater level of traffic using this road in the Do Minimum. These extra external trips are a result of the change to trip distribution which has forced external traffic between the Midlands and the South East to use the A14.
3.6.7 Furthermore, CHARM3A forecasts a lower level of Do Minimum traffic on many local roads to the south of the A14. This is due to the adjustments to the external to external growth which has removed some trips from the network and allowed the remaining local trips to ‘back-fill’ onto the strategic routes. This has meant that, in the Do Something+ scenario, there is less traffic for the scheme to influence and therefore less traffic moves onto the new road from these areas.

Figure 1. Flow Changes 2035 DM v 2035 DS+ Scenarios – Morning Peak
Figure 2. Flow Change 2035 DM and 2035 DS+ Scenarios – Evening Peak
4. **AREA ASSESSMENTS**

4.1 **Approach to Area Assessments**

4.1.1 The performance of the base year model and forecasted impacts of the scheme were assessed by dividing the model into ten sub areas based on key population centres. These areas, shown in Figure 3, were agreed with Cambridgeshire County Council and form the basis of this review. This approach is identical to that adopted in TN01.

4.1.2 The sub areas, shown in Figure 5 include:

- Area 1: Alconbury, Little Stukeley, Great Stukeley;
- Area 2: Huntingdon, Brampton, Hartford and Godmanchester;
- Area 3: Houghton, Wyton, St Ives, Hemingford, Fenstanton and Fen Drayton;
- Area 4: Swavesey, Over;
- Area 5: Elsworth, Boxworth, Knapwell;
- Area 6: Papworth Everard, Hilton;
- Area 7: Bar Hill, Longstanton, Willingham, Oakington and Northstowe;
- Area 8: Dry Drayton, Madingley;
- Area 9: Girton, Histon and Impington, Cottenham, Milton;
- Area 10: Cambridge

*Figure 3. Sub areas based on population centres*
4.1.4 Although WebTAG acceptability guidelines state that > 85% of sites have to meet the DMRB or GEH criteria, for the purposes of this review it was decided that if >70% of sites matched this would be an acceptable level of validation as it is difficult for all model flows to match the count data in all areas.

4.1.5 The performance of the base year model and the forecasted impacts on each area were considered together and comparisons were made to identify areas of high and low impact. The level of impact was based on how well the area validated and the forecasted impacts of the scheme based on model flow change in each area. High impact areas were considered to have large changes in traffic flow. Areas were considered low impact if they had few flow changes. The impact was rated on a scale of 1 to 11, with 11 representing the highest impact and 1 representing the lowest.

4.1.6 There has been no significant change in this analysis and conclusions made in CHARM2 remain valid.

4.1.7 The following sections provide more detail on the change between CHARM2 and CHARM3A for each area. Traffic flows on local roads in and around each area have been extracted from both models for the 2014 Base Year, 2035 Do Minimum and 2035 Do Something+ scenarios. The following sections identify where there are:

- Significant changes to the validation in each area between CHARM2 and CHARM3A
- Significant forecast year flow changes between CHARM2 and CHARM3A
- Significant changes to the projected scheme impact between CHARM2 and CHARM3A
4.2 Area 1: Alconbury, Little Stukeley, Great Stukeley

Base Year Validation

4.2.1 There is no significant change in the validation performance of Area 1 compared to CHARM2.

Forecast Impacts

4.2.2 There is no significant change in the forecasted impact of the scheme on local roads in Area 1 between CHARM2 and CHARM3A.

4.3 Area 2: Huntingdon, Brampton, Hartford and Godmanchester

Base Year Validation

4.3.1 Table 1 shows the Charm 3A validation performance for Area 2 in the morning and evening peaks. The table shows the number of validation counts within the sub area along with percentage of counts that validate. The statistics represent the total vehicle validation.

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4.3.2 The morning and evening peak validation has fallen by 13% in the AM peak and 2% in the PM peak between CHARM2 and CHARM3A. The validation remains significantly below acceptable levels.

Forecast Impacts

4.3.3 The impact of the A14 scheme differs between CHARM2 and CHARM3A across Area 2. This section provides an overview of the forecasted impacts on Huntingdon, Brampton, Hartford and Godmanchester separately. The roads selected for the analysis are shown in Figure 4.
4.3.4 The results of the analysis undertaken in Huntingdon are presented in Table 2. There are substantial differences in traffic flows within the Huntingdon area between CHARM2 and CHARM3A.

4.3.5 The changes to the zone to the west of Brampton Hut has resulted in an alteration to the type of traffic using the A14 (A2.4) between CHARM2 and CHARM3A. CHARM3A predicts more traffic will using the road from the Midlands and less traffic from the A1 north. The extra traffic from the Midlands is associated with the trip distribution adjustments J2A have made to address the routing issues between the Midlands and Essex. A consequence of this is that the scheme is forecast to remove a greater amount of traffic from the de-trunked A14 than initially predicted in CHARM2 because the scheme alignment influences the route choice of these additional trips.

4.3.6 Additionally, the preferred routing between Huntingdon Town Centre and the A14 change between CHARM2 and CHARM3A in the Do Something+ scenarios. In CHARM2, Huntingdon traffic is forecast to use the Avenue and Cambridge Road in order to access the A14 at Godmanchester (J24). However, traffic in CHARM3A is forecast to continue along the Inner Ring Road and use the new link road adjacent to Mill Common to access the A14. Consequently, CHARM3A forecasts a greater impact on traffic flows across A14 River Ouse Bridge (A2.7) as the Huntingdon traffic joins/leaves the de-trunked A14 at a more westerly point.
4.3.7 The CHARM3A modelling also forecasts a lower level of traffic along Brampton Road (A2.5 and A2.8) in the 2035 Do Minimum scenario compared to CHARM2. This is a result of lower levels of external traffic in the network using this route and also a consequence of changes in the signal timings at Brampton Hut and Spittals interchanges which have the effect of increasing capacity and reducing delay at both of these locations when compared with CHARM2.

4.3.8 These improvements mean that traffic is less likely to divert onto Brampton Road from the A14 at Brampton Hut compared to CHARM2. As a consequence, the A14 scheme is forecast to have a smaller impact on Brampton Road in CHARM3A as there is less traffic using the road in the Do Minimum scenario and therefore less traffic to for the scheme to move away.

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<td>Westbound</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>A2.7</td>
<td>A14 River Great Ouse Bridge</td>
<td>Eastbound</td>
<td>-2,444</td>
<td>-2,669</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>-2,548</td>
<td>-2,620</td>
</tr>
<tr>
<td>A2.8</td>
<td>B1514 Brampton Road, East of Edison Bell Way</td>
<td>Eastbound</td>
<td>-65</td>
<td>-214</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>-584</td>
<td>-534</td>
</tr>
</tbody>
</table>

4.3.9 Table 3 presents the CHARM3A traffic flow changes along four roads in Brampton. There are substantial differences in traffic flows within the Brampton area between CHARM2 and CHARM3A.

4.3.10 The CHARM3A modelling forecast lower Do Minimum traffic levels on Huntingdon Road (A2.12), Thrapston Road (A2.8) and Brampton High Street (A2.10) compared to CHARM2. This is a result of lower levels of external to external traffic in the network using this route and also a consequence of changes in the signal timings at Brampton Hut and Spittals interchanges which increase capacity and reduce delay at both of these locations when compared with CHARM2. This consequently means that Huntingdon traffic stays on the strategic network for longer rather than rat-running through Brampton.

4.3.11 As there is less traffic on roads through Brampton in the Do Minimum scenario the impact of the A14 scheme on the network is forecast to be lower in CHARM3A than in CHARM2.
### Hartford

4.3.12 There is no significant change in the forecasted impact of the scheme on local roads in Hartford between CHARM2 and CHARM3A and the conclusions presented in TN01 remain valid.

### Godmanchester

4.3.13 Table 4 presents the traffic flow changes in Godmanchester. There are substantial differences in traffic flows between CHARM2 and CHARM3A.

4.3.14 The CHARM3A modelling forecasts a higher level of traffic in the Do Minimum scenario on the A14 east of Godmanchester (A2.19) compared to CHARM2. This extra traffic is from the Midlands and is associated with the trip distribution adjustments J2A have made to address the routing issues between the Midlands and Essex. The traffic is external traffic which uses the A14 to access the M11 or A14 north of Cambridge. The greater amount of traffic on the A14 in the CHARM3A Do Minimum scenario results in a larger amount of traffic moving away from the de-trunked A14 as a result of the scheme.

4.3.15 Additionally, the preferred routing between Huntingdon Town Centre and the A14 change between CHARM2 and CHARM3A in the Do Something+ scenarios. In CHARM2, Huntingdon traffic is forecast to use the Avenue and Cambridge Road in order to access the A14 at Godmanchester (J24). However, traffic in CHARM3A is forecast to continue along the Inner Ring Road and use the new link road adjacent to Mill Common to access the A14. Consequently, CHARM3A forecasts a greater reduction in southbound traffic along The Avenue (A2.16) and Cambridge Road (A2.18) compared to CHARM2.

#### Table 3. Area 2 Traffic Flow Changes in Brampton

<table>
<thead>
<tr>
<th>LOCATION NUMBER</th>
<th>LOCATION</th>
<th>DIRECTION</th>
<th>2035 DM</th>
<th>2035 DS+</th>
<th>2014 BY V 2035 DM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>A2.9</td>
<td>B1514 Thrapston Road</td>
<td>Eastbound</td>
<td>-183</td>
<td>-57</td>
<td>-18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>-42</td>
<td>-192</td>
<td>92</td>
</tr>
<tr>
<td>A2.10</td>
<td>Brampton High Street</td>
<td>Eastbound</td>
<td>61</td>
<td>93</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>76</td>
<td>118</td>
<td>30</td>
</tr>
<tr>
<td>A2.12</td>
<td>B1514 Huntingdon Road</td>
<td>Eastbound</td>
<td>-233</td>
<td>-52</td>
<td>-75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>-223</td>
<td>-430</td>
<td>60</td>
</tr>
</tbody>
</table>
Table 4. Area 2 Traffic Flow Changes in Godmanchester

<table>
<thead>
<tr>
<th>LOCATION NUMBER</th>
<th>LOCATION</th>
<th>DIRECTION</th>
<th>2035 DM V 2035 DS+</th>
<th>2014 BY V 2035 DM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td>A2.16</td>
<td>B1044 The Avenue</td>
<td>Northbound</td>
<td>-633</td>
<td>-475</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Southbound</td>
<td>-202</td>
<td>-234</td>
</tr>
<tr>
<td>A2.17</td>
<td>B1043 West Street</td>
<td>Eastbound</td>
<td>15</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>115</td>
<td>197</td>
</tr>
<tr>
<td>A2.18</td>
<td>B1044 Cambridge Road</td>
<td>Eastbound</td>
<td>-264</td>
<td>-315</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>-356</td>
<td>-392</td>
</tr>
<tr>
<td>A2.19</td>
<td>A14, East of Godmanchester</td>
<td>Eastbound</td>
<td>-2,182</td>
<td>-2,559</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>-2,435</td>
<td>-2,482</td>
</tr>
</tbody>
</table>

**Buckden and The Offords**

4.3.16 Traffic flow changes in Buckden, Offord Cluny and Offord D’Arcy are presented in Table 5.

4.3.17 CHARM3A forecasts a lower level of Do Minimum traffic on many local roads to the south of the A14, including Mill Road (A2.20) This is due to the adjustments to the external to external growth which has removed some trips from the network and allowed the remaining local trips to ‘back-fill’ onto the strategic routes. Whereas in CHARM2 the type of traffic using Mill Road was a mix of strategic and local traffic, in CHARM3A the road is predominantly used by local traffic. The lower amount of traffic using this road means that the A14 scheme is forecast to have a smaller impact in CHARM3A as there is less traffic to for the scheme to shift away.

4.3.18 Similarly, the scheme is forecast to have less of an impact on the B1043 as much of the traffic using this road in CHARM2 is removed as a consequence of the revisions to external – external growth incorporated into CHARM3A.
## 4.4 Area 3: Houghton, Wyton, St Ives, Hemingford, Fenstanton and Fen Drayton

### Base Year Validation

4.4.1 There is no significant change in the validation performance of Area 3 compared to CHARM2 and conclusions presented in TN01 remain valid.

### Forecast Impacts

4.4.2 The predicted impact of the scheme on traffic flows on local roads in and around Area 3 where there is a significant change between the CHARM2 and CHARM3A models is shown in Table 6. The roads selected for this analysis are shown in Figure 5. On the majority of local roads in Area 3 there is no significant change in the forecasted impact of the scheme between CHARM2 and CHARM3A and the detail provided in TN01 remains valid.

4.4.3 However, the CHARM3A modelling forecasts a higher level of traffic in the Do Minimum scenario on the A14 west of A1096 (A3.6) and east of Fen Drayton (A3.8) compared to CHARM2. This extra traffic is from the Midlands and is associated with the trip distribution adjustments J2A have made to address the routing issues between the Midlands and Essex. The traffic is external traffic which uses the A14 to access the M11 or A14 north of Cambridge. The greater amount of traffic on the A14 in the CHARM3A Do Minimum scenario results in a larger amount of traffic moving away from the de-trunked A14 as a result of the scheme.

4.4.4 CHARM3A also rectifies a coding anomaly at the A14/Cambridge Road junction. This has resulted in an increase in northbound traffic along Cambridge Road (A3.7) as traffic from the A14 west uses Cambridge Road to access Northstowe development rather than routing via Buckingway Road as in CHARM2.
### Table 6. Area 3 Traffic Flow Changes

<table>
<thead>
<tr>
<th>LOCATION NUMBER</th>
<th>LOCATION</th>
<th>DIRECTION</th>
<th>2035 DM V 2035 DS+</th>
<th>2014 BY V 2035 DM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>A3.6</td>
<td>A14, West of A1096</td>
<td>Eastbound</td>
<td>-2,206</td>
<td>-2,596</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>-2,452</td>
<td>-2,508</td>
</tr>
<tr>
<td>A3.7</td>
<td>Cambridge Road</td>
<td>Northbound</td>
<td>247</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Southbound</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>A3.8</td>
<td>A14, East of Fen Drayton</td>
<td>Eastbound</td>
<td>-2,415</td>
<td>-2,636</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>-2,461</td>
<td>-2,344</td>
</tr>
</tbody>
</table>

### 4.5 Area 4: Swavesey, Over

#### Base Year Validation

4.5.1 There is no significant change in the validation performance of Area 4 compared to CHARM2 and conclusions presented in TN01 remain valid.
4.5.2 The likely impact of the scheme on traffic flows on local roads in and around Area 4 where there is a significant change between the CHARM2 and CHARM3A models is shown in Table 7. The roads selected for this analysis are shown in Figure 6.

4.5.3 On the majority of roads there is no significant change in the forecasted impact of the scheme on local roads in Area 3 between CHARM2 and CHARM3A and the detail provided in TN01 remains valid.

4.5.4 However, CHARM3A forecasts that Swavesey traffic will use Buckingway Road, rather than Cambridge Road or Hatton’s Road, to access the A14 once the scheme is in place. This is a more logical route than passing through Fen Drayton or Longstanton.

<table>
<thead>
<tr>
<th>LOCATION NUMBER</th>
<th>LOCATION</th>
<th>DIRECTION</th>
<th>2035 DM V 2035 DS+</th>
<th>2014 BY V 2035 DM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>A4.3</td>
<td>Buckingway Road</td>
<td>Northbound</td>
<td>-67</td>
<td>-17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Southbound</td>
<td>386</td>
<td>290</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
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<tr>
<td></td>
<td></td>
<td>81</td>
<td>136</td>
<td>-140</td>
</tr>
</tbody>
</table>
4.6 Area 5: Elsworth, Boxworth and Knapwell

Base Year Validation

4.6.1 There is no significant change in the validation performance of Area 5 compared to CHARM2 and conclusions presented in TN01 remain valid.

Forecast Impacts

4.6.2 On the majority of roads there is no significant change in the forecasted impact of the scheme on local roads in Area 5 between CHARM2 and CHARM3A, and the conclusions presented in TN01 remain valid. However, the scheme is forecast to have a slightly lower impact throughout this area as a consequence of the lower levels of external to external traffic in the CHARM3A model which results in a predicted reduction in the impact the scheme in this area.

4.7 Area 6: Papworth Everard and Hilton

Base Year Validation

4.7.1 Table 8 shows the CHARM3A validation performance for Area 6 for the morning and evening peaks. The table shows the number of validation counts within the sub area along with percentage of counts that validate. The statistics represent the total vehicle validation.

<table>
<thead>
<tr>
<th>Table 8. Area 6 Validation Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Validation Counts</strong></td>
</tr>
<tr>
<td>Validation Counts</td>
</tr>
<tr>
<td>Validation Level</td>
</tr>
</tbody>
</table>

4.7.2 In the morning peak shows the validation exceeds the 85% threshold. The performance of the evening peak is improved in CHARM3A from 67% to 83%. The CHARM3A model therefore has a good correlation with observed flows around Papworth Everard and Hilton.

Forecast Impacts

4.7.3 On the majority of roads there is no significant change in the forecasted impact of the scheme on local roads in Area 6 between CHARM2 and CHARM3A and the conclusions presented in TN01 remain valid.

4.7.4 However, CHARM3A changes made to the way the St Neots expansion and Loves Farm are represented in the model have had an impact on flows throughout the area and a lower level of Do Minimum flows are expected across multiple roads in CHARM3A. In CHARM2 the developments are part of an existing rural zone loaded near Great Gransden. In CHARM3A the developments are loaded onto the highway network via a new zone immediately east of St Neots. The distribution of the development traffic is therefore different in the two models and in CHARM3A less traffic is forecast to use the A1198 and parallel routes. This
consequently means that the scheme is forecast to have a slightly lower impact throughout this area.

4.8 Area 7: Bar Hill, Longstanton, Willingham, Oakington and Northstowe

**Base Year Validation**

4.8.1 There is no significant change in the validation performance of Area 7 compared to CHARM2 and conclusions presented in TN01 remain valid.

**Northstowe Development**

4.8.2 Whilst there is no significant change in the distribution of trips associated with the Northstowe development, CHARM3A rectifies a coding anomaly and allows all the development traffic to exit the development site in the evening peak resulting in a larger quantity of traffic on the local highway network when compared against CHARM2.

**Forecast Impacts**

4.8.3 The likely impact of the scheme on traffic flows on local roads in and around Area 7 where there is a significant change between the CHARM2 and CHARM3A models is shown in Table 9. The roads selected for this analysis are shown in Figure 7.
4.8.4 The CHARM3A model forecasts that the A14 scheme will result in a larger reduction in traffic away from the B1050 (A7.3 – A7.5) compared to CHARM2. The CHARM3A model has a higher level of traffic using the A14 in the Do Minimum scenario which results in larger delay for eastbound traffic accessing the A14 from Buckingway Road (J28) and prompts Swavesey traffic to use the B1050 via Longstanton. Since the DM traffic levels along the B1050 are higher in CHARM3A the scheme has more of an impact on this road by encouraging more direct routes for local traffic accessing the A14.

Table 9. Area 7 Traffic Flow Changes

<table>
<thead>
<tr>
<th>LOCATION NUMBER</th>
<th>LOCATION</th>
<th>DIRECTION</th>
<th>2035 DM V 2035 DS+</th>
<th>2014 BY V 2035 DM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td>A7.3</td>
<td>B1050 Northern Bypass</td>
<td>Eastbound</td>
<td>-19</td>
<td>-63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Westbound</td>
<td>31</td>
<td>39</td>
</tr>
<tr>
<td>A7.4</td>
<td>B1050 Western Bypass</td>
<td>Northbound</td>
<td>-58</td>
<td>-167</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Southbound</td>
<td>-176</td>
<td>-209</td>
</tr>
<tr>
<td>A7.5</td>
<td>B1050 Hatton’s Road</td>
<td>Northbound</td>
<td>708</td>
<td>826</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Southbound</td>
<td>693</td>
<td>296</td>
</tr>
</tbody>
</table>

4.9 Area 8: Dry Drayton and Madingley

Base Year Validation

4.9.1 There is no significant change in the validation performance of Area 8 compared to CHARM2 and conclusions presented in TN01 remain valid.

Forecast Impacts

4.9.2 There is no significant change in the forecast impacts in Area 8 compared to CHARM2 and conclusions presented in TN01 remain valid.
4.10 Area 9: Girton, Histon and Impington, Cottenham and Milton

**Base Year Validation**

4.10.1 There is no significant change in the validation performance of Area 9 compared to CHARM2 and conclusions presented in TN01 remain valid.

**Forecast Impacts**

4.10.2 The likely impact of the scheme on traffic flows on local roads in and around Area 9 where there is a significant change between the CHARM2 and CHARM3A models is shown in Table 10. The roads selected for this analysis are shown in Figure 8.

**Figure 8. Area 9 Traffic Flow Locations**

4.10.3 The CHARM3A modelling forecasts a higher level of traffic will use Bridge Road as a result of the scheme. This additional traffic originates from the A14 west (and M11) and A14 east and is caused by increases in traffic to external zones situated north of Cambridge. As the scheme increases capacity along the A14 it makes Bridge Road a more attractive route to these external zones.
### Table 10. Area 9 Flow Changes

<table>
<thead>
<tr>
<th>LOCATION NUMBER</th>
<th>LOCATION</th>
<th>DIRECTION</th>
<th>2035 DM V 2035 DS+</th>
<th>2014 BY V 2035 DM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td>A9.4</td>
<td>B1049 Bridge Road</td>
<td>Northbound</td>
<td>4</td>
<td>-34</td>
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<tr>
<td></td>
<td></td>
<td>Southbound</td>
<td>19</td>
<td>-24</td>
</tr>
</tbody>
</table>

#### 4.11 Areas 10: Cambridge

**Base Year Validation**

*4.11.1* There is no significant change in the validation performance of Area 10 compared to CHARM2 and conclusions presented in TN01 remain valid.

**Forecast Impacts**

*4.11.2* There are few significant changes to traffic flows across Cambridge and conclusions presented in TN01 remain valid. Where changes occur they are the cumulative effect of many small variations in flow across several minor roads and are generally driven by changes affecting both the Do Minimum and Do Something scenarios. The impact of the scheme is not significantly different to CHARM2.
<table>
<thead>
<tr>
<th>Version</th>
<th>Name</th>
<th>Position</th>
<th>Date</th>
<th>Modifications</th>
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<tr>
<td>1</td>
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<td>Senior Consultant</td>
<td>30/06/2015</td>
<td>Version 1</td>
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<tr>
<td></td>
<td>Approved by Duncan Irons</td>
<td>Director</td>
<td>30/06/2015</td>
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