Notes:
Do not scale from this drawing.
All contractors must visit the site and be responsible for taking and checking Dimensions.
All construction information should be taken from figured dimensions only.
Any discrepancies between drawings, specifications and site conditions must be brought to the attention of the supervising officer.

This drawing is for planning purposes only. It is not intended to be used for construction purposes. Whilst all reasonable efforts are used to ensure drawings are accurate, JTP accept no responsibility or liability for any reliance placed on, or use made of, this plan by anyone for purposes other than those stated above.

Key

- Redline boundary
- Application detailed zone. Information on highways and associated works being sought as part of the detailed component in this zone are shown for illustrative purposes only (for proposed detail refer to WSP drawings as scheduled in MKE-Dwgs-Plg-Rev 1)
- Development area
- School and playing fields (F1)
- Open space
- Open space with retained archaeology in-situ or residential (C2,C3), or sports provision (F2), subject to detailed archaeological investigation
- Transport interchange to be located within the Community Hub
- Route safeguarded for possible Mass Rapid Transit (MRT) scheme (with +/- 30m limit of deviation from centre line along route shown)
- Primary Street corridor (with +/- 30m limit of deviation from centre line along route shown)
- Grid Road corridor
- Highway corridor safeguarded for Grid Road status
- Highway corridor safeguarded for future Cranfield bypass (with +/- 30m limit of deviation from centre line along route shown)
- Road corridor
- Downgraded A509 road corridor (with +/- 30m limit of deviation from centre line along route shown)
- Existing alignment of Newport Road
- Connection to Newport Road
- Vehicular access to parcel from Grid Road
- Vehicular access to parcel from other roads (with +/- 100m limit of deviation from centre line along route shown)
- Vehicular link across green corridor (with +/- 100m limit of deviation from centre line along route shown)
- Main vehicular, pedestrian/cycle site access points
- Main vehicular, pedestrian/cycle site access points to employment area
- Main vehicular access points to schools (with +/- 100m limit of deviation from centre line along route shown)
- Public routes (retained and/or diverted routes including bridleways, public footpaths and pedestrian and cycle links) (with +/- 30m limit of deviation from centre line along route shown)
- New public routes (arrows denote key access points) (including bridleways, public footpaths and pedestrian and cycle links) (with +/- 50m limit of deviation from centre line along route shown)
- Route of proposed Redways (with +/- 30m limit of deviation from centre line along route shown)
- Location of new subway crossing
- Location of new foot/cycle crossing (with +/- 50m limit of deviation from centre line along route shown)
- Location of new at grade crossing (with +/- 50m limit of deviation from centre line along route shown)
- Location of new flood relief culvert (to also function as a pedestrian/cycle connection)
- Grade separated crossing integrated with bridge structure
- Potential for crossing of A509 / A422
- Roundabout junction to be upgraded

Note: The redline and associated area shown in this drawing are based on guidance provided by others. JTP accept no responsibility or liability for reliance placed on, or use made of, this plan by anyone for purposes other than planning.

Note: All features and areas are subject to a lateral tolerance of +/- 10m unless stated otherwise.

Note: Access arrangements into the site will need to accord with the approved detailed drawings.

Note: The site will be served by Demand Responsive Transport (DRT) with services providing pick up and drop off on non-fixed routes.

Rev	Date	Description	Drawn	Chkd
P1	31.03.21	first issue	LB	GP

Drawing Status
PLANNING

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Project
Milton Keynes East

Drawing Title
Movement and Access Parameter Plan

Scale @ A0 1:5000
Job Ref. 01312
Drawing No. 01312 _PP_02
Revision P1
Scale Bar 0 50 100 150 200 250m

Appendix A.10

TTN10 – MKE PROW STRATEGY

TRANSPORT TECHNICAL NOTE - TTN10 Public Rights of Way Strategy

DATE:	26 March 2021	**CONFIDENTIALITY:**	Restricted
SUBJECT:	Public Rights of Way Strategy		
PROJECT:	Milton Keynes East	**AUTHOR:**	Elena Cristobal
CHECKED:	Alex Smith	**APPROVED:**	Allan Norcutt

1 INTRODUCTION

1.1 CONTEXT AND BACKGROUND

1.1.1. WSP have been commissioned by Berkeley St James to provide transportation and highways advice in respect of the proposed development of part of the land to the northeast of Milton Keynes (herein referred to as 'Milton Keynes East' or MKE).

1.1.2. The 'Milton Keynes East Sustainable Urban Extension' site has been identified as an allocation for a strategic urban extension within Plan:MK and Milton Keynes Council's (MKC) aspirations for the allocation is set out within Policy SD12 of Plan:MK.

1.1.3. The MKE site is strategically located immediately north-east of Junction 14 of the M1, one of the two main motorway junctions serving Milton Keynes. It is situated approximately 3.5 kilometres north-east of Central Milton Keynes (the central business district of Milton Keynes), with relatively limited direct walking, cycling and highway links to the city centre.

1.1.4. The land allocated for the MKE development consists of several sites under different ownership as further detailed in the Transport Assessment submitted in support of the application, with Berkeley St James controlling the majority of the allocated land. The Berkeley land covers the majority of the developable area within the allocated site. It is acknowledged that other landholders will also prepare separate applications under the framework umbrella, hence why this Public Right of Way (PRoW) Strategy refers to the Berkeley St James site only.

1.1.5. Error! Reference source not found. below provides a summary of the development quantum for the application land and for the allocation as a whole.

Table 1-1 – Development Quantum – Berkeley Land and MKE Allocation

Berkeley St James Application	Allocation total (with residential uplift)
Up to 4,600 homes (including houses, flats and specialist elderly accommodation with or without care)	5,750 residential units
Circa 85Ha of employment	105 Ha of employment
A secondary school	A secondary school
Three primary schools	Up to four primary schools (assuming one is located within the Bloor land)
A community hub/centre including healthcare, retail and leisure facilities	A community hub/centre including healthcare, retail and leisure facilities
Community Space / Open Space / Burial Space	Also included in the allocation

1.2 TTN10 AIM AND PURPOSE

1.2.1. This note focuses on the public rights of way across the site and builds upon the Walking and Cycling Strategy set out in TTN9.

1.2.2. This Transport Technical Note 10 (TTN10) therefore provides an initial PRoW strategy to approach the potential required amendments of the existing PRoW network so that the movement strategy of the MKE development can be implemented in alignment with the Movement and Access Parameter Plan (included in Appendix A of TTN9).

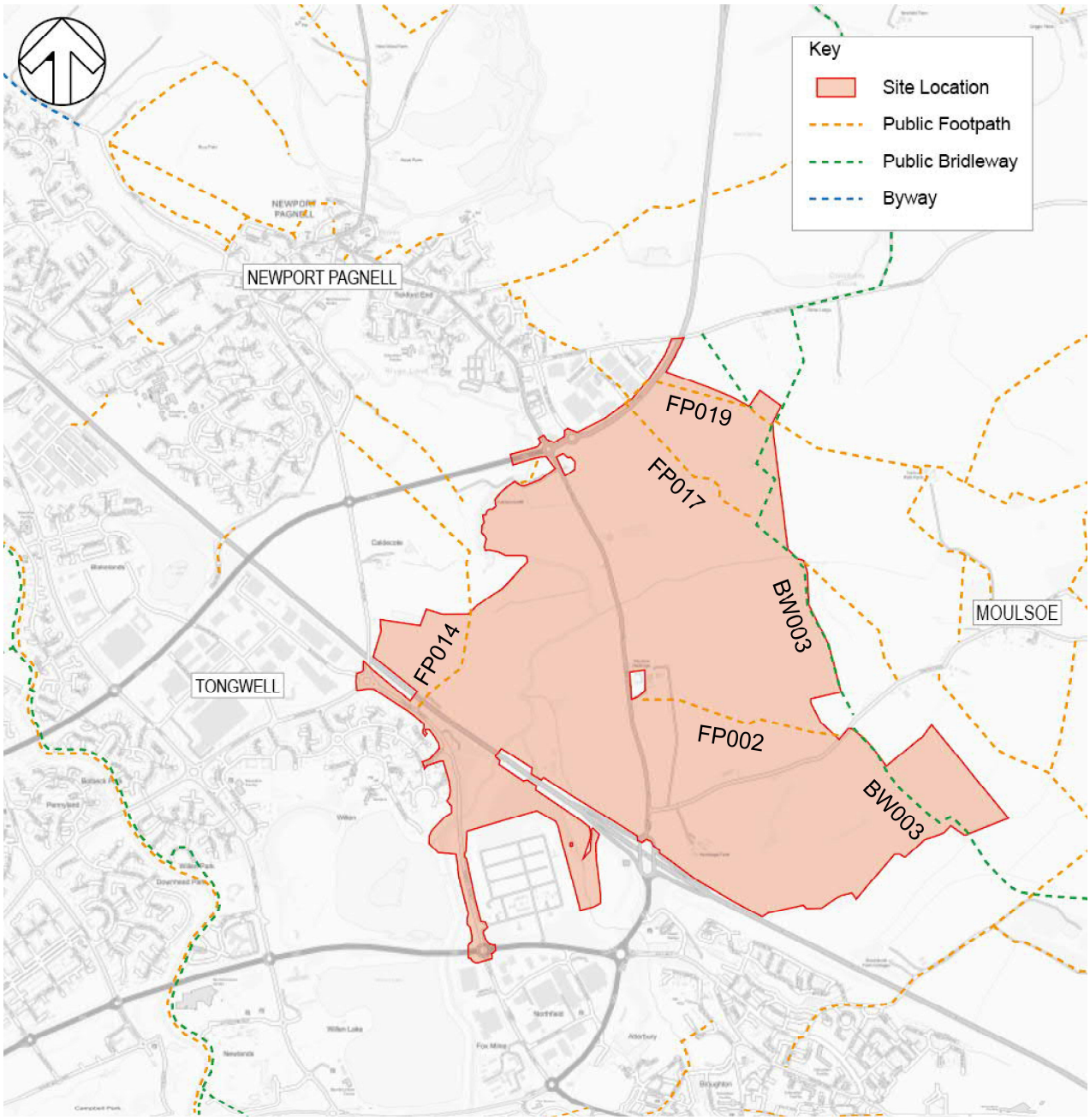
1.2.3. This strategy has been produced through a review of the existing PRoW network to connect and expand into the site reflecting the sustainable aspiration of the development, and identifies the key requirements affecting the PRoWs crossing the MKE site and the methodology to follow to make any amendments where required. In arriving at a strategy dialogue has taken place with MKCs PROW officer.

2 EXISTING PROW NETWORK

2.1.1. As illustrated in WSP's TTN9: Walking and Cycling Strategy (submitted separately in support of the MKE development), there are four public footapths and one public bridleway which connect to the site and form the basis of the walking and cycling permeability and connectivity.

2.1.2. These PRoWs are FP002, FP014, FP017, FP019 and BW003, and are illustrated in **Diagram 2-1**.

Diagram 2-1: MKE – PROW Network



Source: MKC's Mapping System, 18/02/2021

3 POTENTIAL VARIATIONS TO THE EXISTING PROW NETWORK

3.1.1. In consideration of WSP's TTN9: Walking and Cycling Strategy and the proposed Movement and Access Parameter Plan (included in Appendix A of TTN9), some amendments / extensions to the existing PRoW network are required for the implementation of the MKE development.

3.1.2. The proposed amendments and extensions are deemed necessary to enable the implementation of the walking and cycling strategy of the MKE development and are considered a betterment to the existing situation. They are summarised in **Table 3-1** below.

Table 3-1 – ProW Potential Amendments and Variations

PRoW	Potential Amendments (to be agreed as necessary with MKC)
FP002	Diversion and extension to connect into internal active travel routes. External connections not affected.
FP014	Diversion and connection to green routes contained within the site. External connections not affected.
FP017	Diversion and extensions to connect into internal active travel routes. External connections not affected.
FP019	Diversion to connect into internal active travel routes. External connections not affected.
BW003	Diversion of the northern section of the bridleway in the site. External connections not affected.

3.1.3. Whilst **Table 3-1** sets out the type of affection proposed to each of the PRoWs which currently cross the MKE development site, it should be noted that these matters will be dealt with separately with MKC as Local Planning Authority (LPA), which is responsible for Public Path Orders (PPOs) under Section 257 of the Town and Country Planning Act 1990 ('the Act').

3.1.4. In addition to the above, and for the purposes of this TTN10, the following considerations form the basis of the PRoW strategy which will be followed as part of the process to achieve planning consent and implement the MKE development:

- A PPO can only be made where the LPA (i.e. MKC) is satisfied that the PRoW variation is necessary to enable development to be carried out in accordance with a planning permission;
- Should there be agreement with MKC that a PRoW needs to be extinguished or diverted in order to facilitate the MKE development, then the application to be made is under the Town and Country Planning Act (Section 257) and will be made to MKC as LPA. The PPO application will then be done separately to the planning application, although likely to be completed in parallel following consent;
- The requirement for a PPO application will include consideration as to if and when surveys may be required to understand users demand of the affected PRoWs, once these and the extent of affection has been agreed with MKC;
- Any required PRoW extinguishment / diversion will be consulted on as part of the scheme consultation in coordination with MKC's required consultees and which will include every person having an interest in the land over which the PRoW crosses;

- Any application will demonstrate specific reasons why the PRoW needs to be extinguished / diverted, and that any diverted PRoW will not adversely affect the existing route users (e.g. travel time, environment character, etc);
- PPO applications cannot be confirmed until such time as planning permission has been granted, however these have to be in place before PRoWs are affected by the development;
- In discussion with MKCs PRoW officer, PRoW will be kept separate from redways and will follow green corridors; and
- The MKE development, in so far as it will affect PRoWs (subject to MKC's agreement), must not be started and the PRoWs will be kept open for public use, unless or until the necessary PPO has come into effect.

Appendix A.11

TTN11 – MKE OUTLINE PUBLIC TRANSPORT STRATEGY

TECHNICAL NOTE 11 – Outline Bus Strategy

DATE:	30 November 2020	**CONFIDENTIALITY:**	Restricted
SUBJECT:	MKE High Level Bus Strategy		
PROJECT:	Milton Keynes East	**AUTHOR:**	George Burnett
CHECKED:	Alex Smith	**APPROVED:**	Allan Norcutt

INTRODUCTION

This technical note aims to explain the current principles underpinning the emerging Milton Keynes East Bus Strategy. The proposed principles are not final but rather a work in progress and subject to further inputs in accordance with continuing stakeholder discussions.

The strategy is predicated around a phased hierarchical approach as follows:

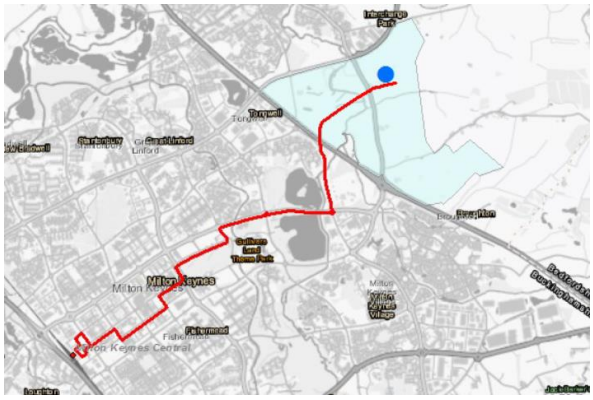
- The provision of a centrally located Multi-Modal Interchange Hub;
- A Principal Bus Route (PBR) between Milton Keynes East (MKE) and Milton Keynes Central and Rail Station (to be replaced at an unspecified date by the Mass Rapid Transit (MRT) system promoted by Milton Keynes Council);
- The diversion of a limited number of existing bus services;
- The provision of Demand Responsive Transport (DRT) services feeding into the Interchange Hub; and
- The potential conversion of the DRT services into semi-fixed or fixed route services should demand justify.

The Principal Bus Route

The bus strategy will recommend the implementation of a “principal” high frequency bus service with high level of bus priority before the introduction of the MRT.

The potential proposed routeing of the PBR is shown in the diagram below. The operation will probably be delivered by a commercial operator with initial start-up funding from the developer(s).

The strategy evaluation will calculate the expected level of funding per year required to cover the net cost of the service until it becomes sustainable, considering the cost of operation and the expected revenue from the development and other traffic generators served by the PBR.



It is expected that financial contribution required to pump prime the service will be secured via a S106 agreed with the MKE developer(s) and proportional to the impact of the development. As stated above, the relevance of the PBR will be reconsidered when the MRT is implemented and it will either be withdrawn or rerouted to avoid competing with the MRT.

TECHNICAL NOTE 11 – Outline Bus Strategy

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Future MRT

The Bus Strategy considers and support the proposed future implementation of the MRT by Milton Keynes Council (MKC). However, the PT strategy does not rely on the implementation of the MRT to sustain the use of public transport either from the beginning or during the occupation of the MKE site.

Instead the Bus Strategy proposes implementing a phased PT network which will evolve in line with occupation milestones and, if appropriate, will be underpinned by the MRT implementation milestones. The exact details are not yet finalised, but it is anticipated that the proposed network within the MKE site will adjust to prioritise feeding the MRT rather than competing with the MRT.

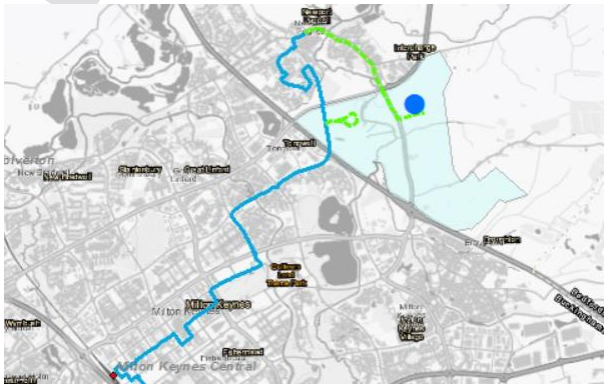
The MKE developer also expects to safeguard the required land space to accommodate the MRT infrastructures in order to introduce the MRT within the site.

It is assumed that MKC will fund the MRT, although it would be able to utilise the bus stops to be implemented on the site to support the Principal Bus Route (PBR) (see previous section). It is also assumed that the MRT will replace the PBR and would thus benefit from the income and usage already generated.

Diversion of existing services

ROUTE 1:

Subject to successful negotiations, it is intended that Route 1 will be rerouted within a development site in the adjacent land to MKE. Discussion with the adjacent developer confirms that the diversion is potentially beneficial to both sites, even if it is recognised that the diversion alone would require one additional vehicle in the existing tight schedule of route 1. The need for additional resource therefore also creates the opportunity to extend route 1 from Manor Pagnell to the MKE Transport Hub at marginal cost, optimising the additional resources required to operate route 1.



The net cost of this will be evaluated in the strategy and is expected that, ultimately, following a period of pump-priming, the additional cost of the service should be covered by the revenue generated by both developments.

TECHNICAL NOTE 11 – Outline Bus Strategy

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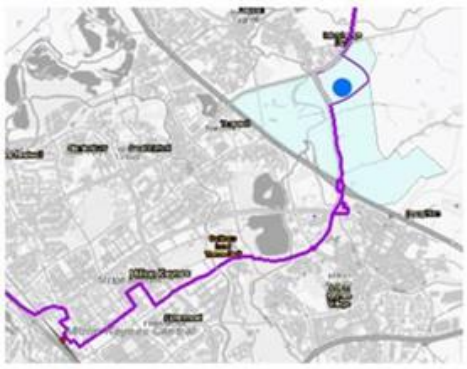
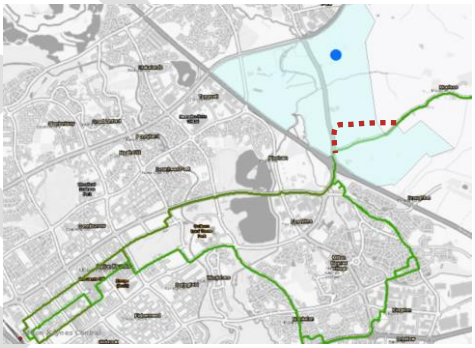
ROUTE X5:

Route X5 is a fast coach service with between Bedford, Milton Keynes, Buckingham and Oxford every 30 minutes on weekdays. It operates via London Road. Very early discussion with the operator has indicated that the X5 could stop in the MKE site, should a suitable and seamless bus stop facility be provided by the developer. These are intended be provided in the transport hub or close to it. The operator will also require good highway access through the development site, in particular as the service is operated by 15 metre long vehicles.



ROUTE C 11/ C1 / CX / C10

These services serve the south east corner of the site and will need to be rerouted via the proposed new road layout. This is anticipated to be fully supported by the operator, as it will provide the opportunity for additional revenue without significant cost. Discussions with the contracting organisation, Cranfield University and the Operator, UNO, are being undertaken with regard to this proposal.



ROUTE 24/25

Recently announced to be under threat of withdrawal, these may be partially replaced by internal bus services.

Internal Services and DRT

The bus strategy for internal movements will aim to cover both the short internal trips between the development trip generators (employment/residence) and/or the community hub and also feed the PBR (later MRT) route to facilitate trips further afield.

The internal / feeder services routeings are not yet finalised, as they are dependent on internal road layouts and occupation phasing. It is envisaged that they will start running on a demand basis (DRT) as part of a Mobility-as-a-Service (MaaS) feature to include taxi and cycle provision. If they generate sufficient usage, they could be evolved to become scheduled bus services as demand grows.

It is expected that the developer will fund these services until the demand becomes sufficiently strong and mature enough for them to be operated commercially. It is expected that this type of arrangement will allow flexibility and agility to cope with the continuous changes created by construction/occupation phases.

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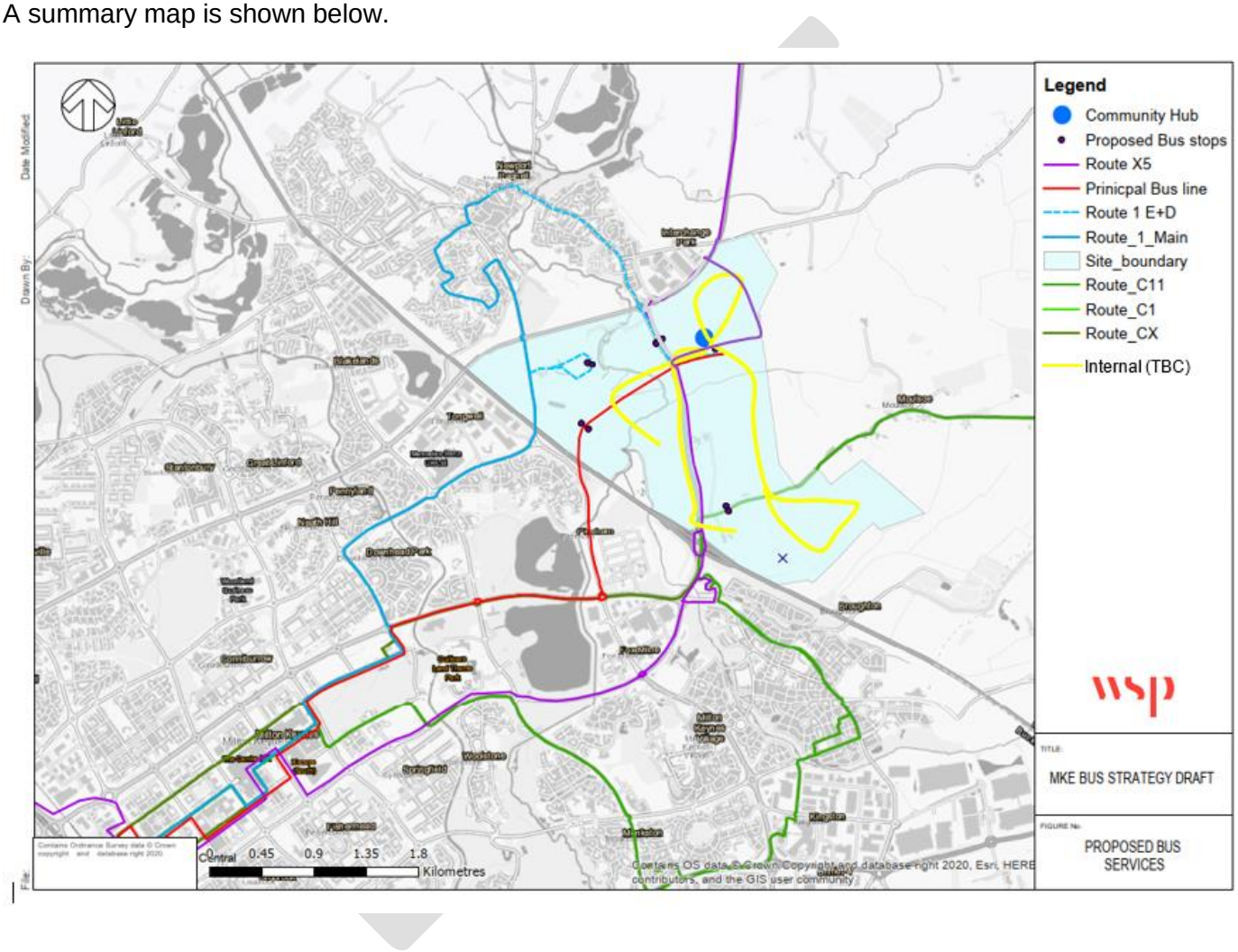
THE TRANSPORT HUB

The Community Hub is expected to create a multi-modal Transport Interchange for the MKE site, which will include public transport (scheduled services and DRT). This will create a focused point for transport modes at the heart of the site, underpinned by strong walking and cycling connections from all the areas of the development – thus reducing the need for private vehicle use.

A summary map is shown below.



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PHASING

It is appreciated that a phased approach to the provision of services is essential to maintain a careful balance between an effective service offer to early residents and the provision of excessive capacity.

Consequently, the following is an initial provisional assessment for a phased programme:

1. PBR introduced at hourly frequency on completion of first 100 dwellings;
2. PBR increased to half-hourly frequency on completion of first 250 dwellings;
3. DRT service availability for trips within site on completion of 500 dwellings;
4. PBR increased to 20 minute frequency on completion of first 500 dwellings;
5. Route X5 diverted through site on completion of first 1,000 dwellings;
6. Route 1 extended to Transport Hub from Newport Pagnell on completion of first 1,000 dwellings;
7. PBR increased to 10 minute frequency on completion of first 2,000 dwellings;
8. DRT service reviewed on completion of every 500 dwellings to assess required resources;
9. On completion of first 3,000 dwellings, a re-assessment of the DRT service to determine justification for fixed or semi-fixed bus routes; and
10. Close liaison with MKC regarding the planning and introduction of the MRT system which would replace the PBR.

The above phasing is indicative and may be changed prior and post submission, however the principles of adoption, with increases in frequency or provision as build out occurs will be applied. Whilst this will be subject to demand and uptake, it is expected that the monitoring undertaken as part of the Travel Plan for the site will include public transport use and so will form a useful tool in determining which services and areas are prioritised throughout the buildout of the development.

Appendix A.12

TTN12 – TONGWELL STREET JUNCTION DESIGN

TECHNICAL NOTE 12 – Tongwell Road Junction Review

DATE:	06 October 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Review of Tongwell Road Junction		
PROJECT:	Milton Keynes East	**AUTHOR:**	A Pearce
CHECKED:	A Smith	**APPROVED:**	A Norcutt / S Purcell

1 EXECUTIVE SUMMARY

1.1.1. In August 2020 a series of options were presented to MKC on the treatment of the section of Tongwell Street between Tongwell Roundabout and the new M1 bridge link and HIF infrastructure.

1.1.2. Upon review of those options, MKCs preference was to retain Tongwell Street for use by motorists, with a left-in / left-out junction arrangement provided where it meets the new M1 bridge link.

1.1.3. Consideration has since been given to the design of such a junction which has flagged a significant design issue. The design has shown that there would be a severe adverse camber on the left-turn out of the junction which would be a depature from highway design standards, creating a highway safety issue. This would likely fail a road safety audit, a view which has been shared by MKC highway officers, and it is therefore considered that it is not possible to deliver a left-in / left-out junction.

1.1.4. In lieu of such a junction being deliverable, consideration has been given to two alternative options, with these being either a left-in only junction; i.e. the section of Tongwell Street between Tongwell Roundabout and the new M1 bridge link becomes one-way northbound; or a signal controlled junction being introduced.

1.1.5. Whilst both options are considered to be deliverable from a highway design perspective, a signal controlled junction would be significantly more expensive to deliver and require grade separated pedestrian and cycle crossing facilities whereas the left-in only option may not. Consideration has therefore been given to the impacts of removing the left-turn out movement from the junction to ascertain whether its removal could have detrimental impacts on journey times for motorists.

1.1.6. If the left-turn out of the retained section of Tongwell Street were removed then motorists would need to take an alternative route, albeit that movement does not exist currently. Consideration has therefore been given to these alternative routes along with the travel times along each in comparison with what they would be if the left-turn out were able to be provided (either via a left-in / left-out junction or a signal controlled junction).

1.1.7. The journey times for these alternative routes have been assessed between Tongwell Roundabout and Tickford Roundabout as shown in the below figure.

TECHNICAL NOTE 12 – Tongwell Road Junction Review

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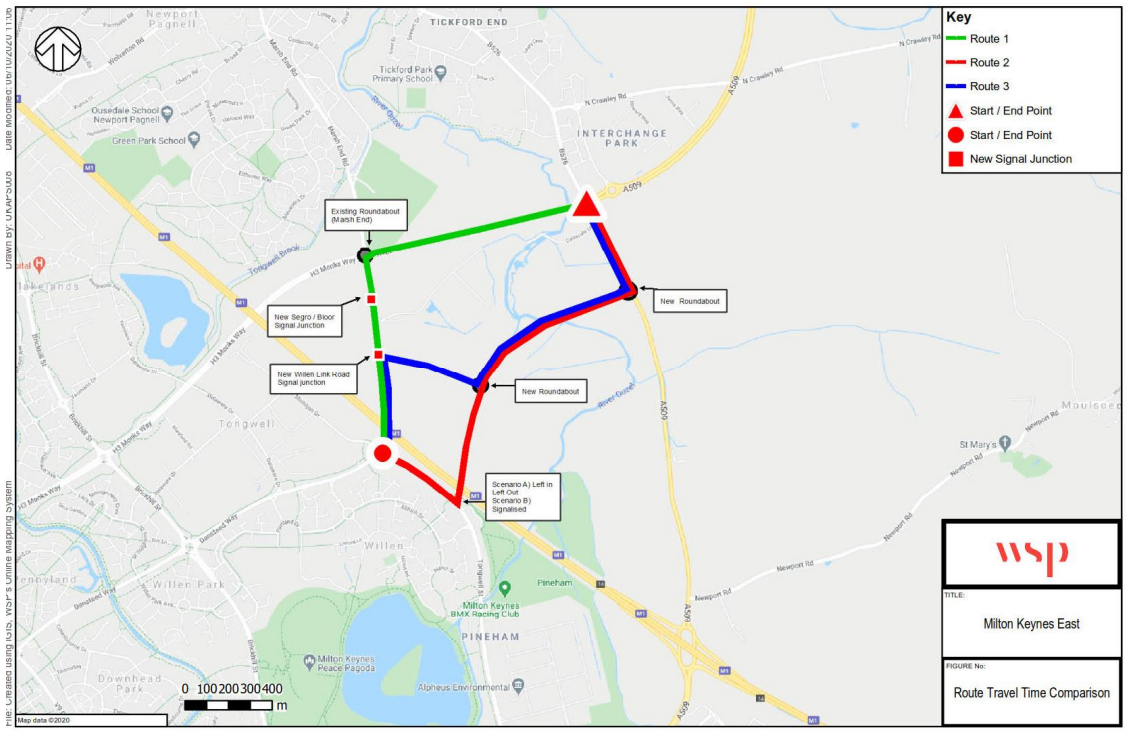
Figure 1-1 – Route Comparison



1.1.8. The assessment, summarised in Table 1-1 below, shows that the journey times via the alternative routes are comparable with what would be achieved were a signal controlled junction introduced at the retained Tongwell Street link / Link T. There is also no significant difference in what the journey time would have been were it have been possible to deliver a left-in / left-out junction.

Table 1-2 – Route Comparison Assessment Summary

Route	Link / Route	Total Travel Time (Secs)
Route 1	Willen Road, A422	227
Route 2A	Tongwell St (Left Out), new HIF infrastructure and A509 London Road	187
Route 2B	Tongwell St (Signals), new HIF infrastructure and A509 London Road	222
Route 3	Willen Road, Willen link road, new HIF infrastructure and A509 London Road	235

TECHNICAL NOTE 12 – Tongwell Road Junction Review

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1.1.9. Based on the safety concerns associated with delivering a left-in / left out arrangement and the fact that the journey times are broadly similar whether a left-turn out is provided or not it is recommended that a left-in only junction arrangement is provided at the junction of Tongwell Street with the new M1 bridge link.

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CHECKED:	A Smith	**APPROVED:**	A Norcutt / S Purcell

2 INTRODUCTION

2.1.1. WSP have been commissioned by Berkley St James to provide transportation and highways advice in respect of the proposed development of part of the land to the northeast of Milton Keynes ('Milton Keynes East' or MKE).

2.1.2. Recent discussions with Milton Keynes Council (MKC) have been held both at officer and member level over the junction form between the existing Tongwell Street and the new M1 bridge, which is being delivered as part of the MKE Housing Infrastructure Fund (HIF) package.

2.1.3. This Transport Technical Note (TTN12) specifically reviews two areas of consideration;

- The design and technical constraints of the potential junction; and
- A comparison of journey times between route options resulting from junction form.

3 TONGWELL STREET JUNCTION DESIGN

3.1 Junction Form

3.1.1. An information pack dated 21 August 2020 setting out a series of options were presented to MKC on the overarching design that could be implemented at the Tongwell Street / New M1 Bridge junction. Following consideration of those options and consultation within the Council, the leader of MKC expressed a preference for a left in/left out junction arrangement.

3.1.2. As a result, a preliminary design for this has been undertaken to ascertain whether the design is feasible, safe and practical. The design recognises that Tongwell Street currently has Grid Road status, which we understand MKC were keen to maintain, and consequently this drives the design criteria needing to be met.

3.1.3. A snapshot of the drawing is shown in Figure 3-1 below with the full sized original attached to this TN at Annex A.

TECHNICAL NOTE 12 – Tongwell Road Junction Review

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Figure 3-1 – Snapshot of SK-0042

3.1.4. The alignment design for the Tongwell Street Link and the new bridge over the M1 motorway known as 'Link T' are both designed with an 85kph (50mph) design speed, as shown in Figure 2-1 / WSP Drawing SK-0042.

3.1.5. In accordance with highway design standards, as Link T (i.e. the extension of Tongwell Street over the M1) has a constant 510m corner radii (which is the minimum required for a road with a design speed of 50mph), a 5% superelevation is applied to the road. This means that the road will crossfall from left to right at 5%.

3.1.6. There is a roundabout to the south of the Tongwell Street Link T that provides a junction with Carleton Gate. From this roundabout a vertical gradient of 2% is applied to Link T to enable sufficient clearance over the existing M1 motorway.

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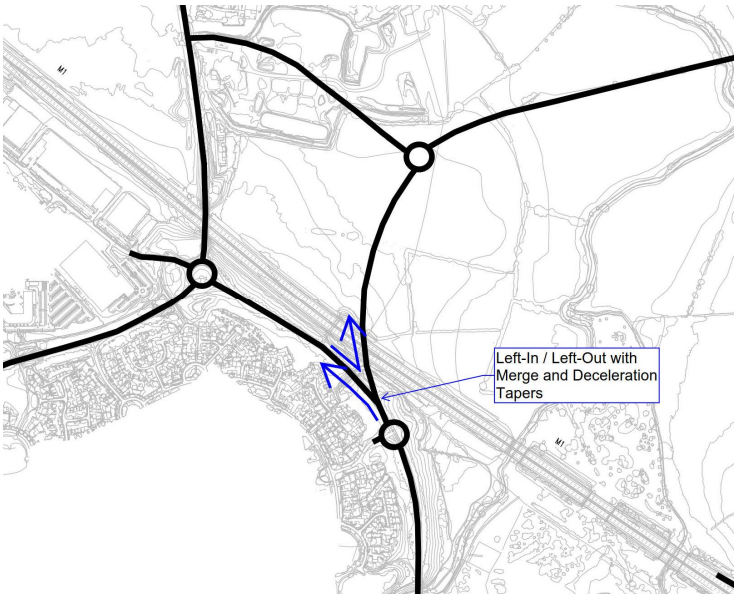
3.2 Tongwell Street Junction Options

3.2.1. There are a number of options that can be considered with the left in / left out design. Each option has been reviewed, with commentary provided for each below.

Option 1: Tongwell Street Left In/Left Out

- As the minor road (i.e. the retained section of Tongwell Street between Tongwell Roundabout and Link T) is expected to have more than an average of 600 vehicles wishing to turn left every day, a deceleration and merge taper are required to be compliant with standards. The deceleration taper is to enable vehicles wishing to turn left into the retained section of Tongwell Street to be slow down as they make the turn without impeding vehicles on Link T. Similarly the merge taper permits vehicles turning left onto Link T to accelerate up to the speed of the main road before joining that carriageway in accordance with highway design standards.
- To include a merge, the taper length required is 90m which necessitates the proposed M1 bridge to be widened by 3.5m from that currently designed. The deceleration taper length is 55m, and whilst this can be accommodated it's location is fixed and cannot be moved south because of the Carleton Gate junction.
- There is likely to be an adverse camber on the left in/left out turning manoeuvres, due to the 2% gradient along Link T and the 5% crossfall on it, as explained earlier in this note.
- Milton Keynes highways officers (and indeed WSP as the designer) have raised concerns that this will be potentially unsafe and MKC have outlined that it would be extremely unlikely that this would pass a safety audit and that they would not adopt such a junction due to the potential likelihood of HGV's overturning when turning left.

It had been flagged previously that this option may require departures from standard and further design work has confirmed this as set out above. It is therefore considered that Option 1 is undeliverable due to highway safety reasons caused by the creation of a significant adverse camber.



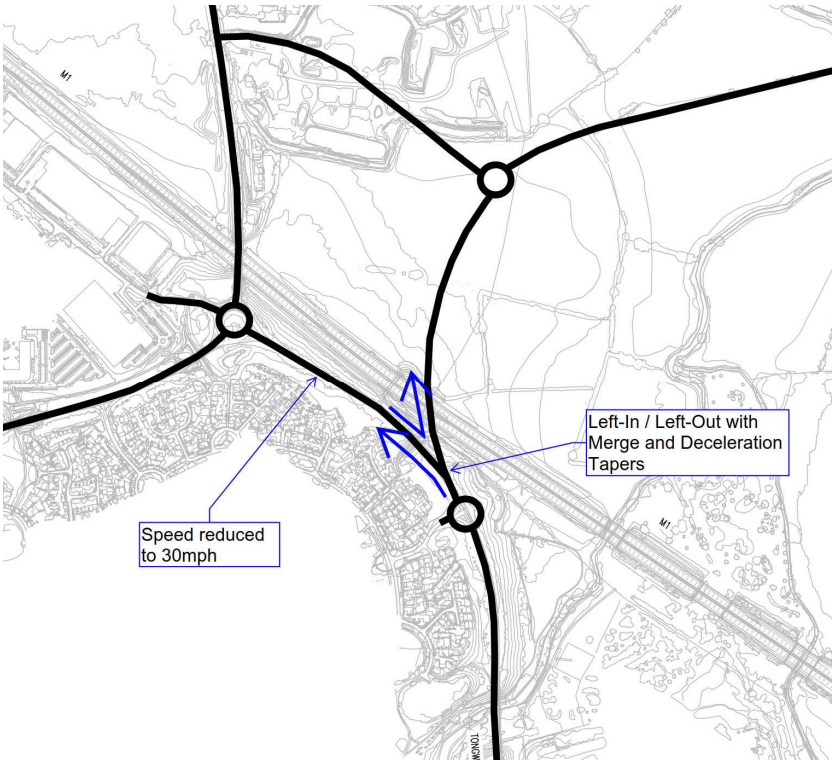
TECHNICAL NOTE 12 – Tongwell Road Junction Review

DATE:	06 October 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Review of Tongwell Road Junction		
PROJECT:	Milton Keynes East	**AUTHOR:**	A Pearce
CHECKED:	A Smith	**APPROVED:**	A Norcutt / S Purcell

Option 2: Tongwell Street Left In/Left Out with Retained Section of Tongwell Street Downgraded

- If the retained Tongwell Street link were to be downgraded to a lower 60kph (30mph) design speed then this would not change the deceration and merge taper lengths due to the 85kph (50mph) design speed on Link T. This would still result in a deceleration length of 55m and a merge taper of 90m. Therefore, this option would still require the M1 bridge to be widened by an additional 3.5m compaired to the current bridge design.
- However, as with Option 1 there is still likely to be adverse camber on the left in/left out manoeuvre, which could still cause HGV's to overturn onto their sides.

It is therefore considered that Option 2 is undeliverable due to highway safety reasons caused by the creation of a significant adverse camber.



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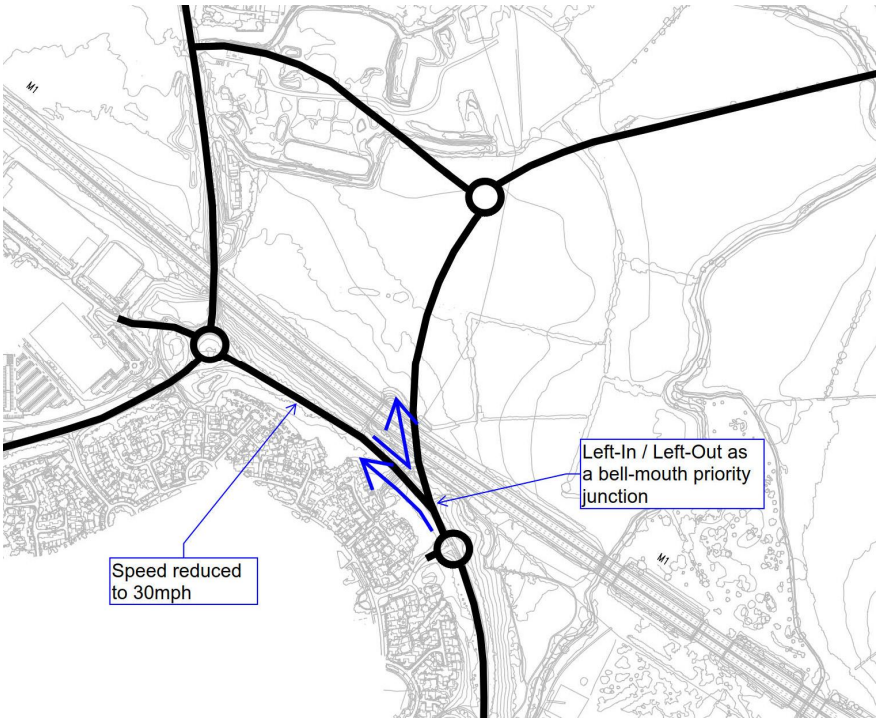
Option 3: Tongwell Street Bellmouth

- A bellmouth option that removes the need for a deceleration and merge taper has also been considered.
- This would require the retained section of Tongwell Street to be downgraded tto 30mph as per Option 2. However, the design would require a departure from design standards due to the average left turn movement out onto Link T likely to be greater than 600 vehicles per day. Milton Keynes highways officers have raised concerns that this may cause rear shunt accidents due to vehicles turning on to a 50mph dual carriageway from a stationary or near stationary start.

It is therefore considered that Option 3 is likely to be undeliverable due to highway safety reasons.



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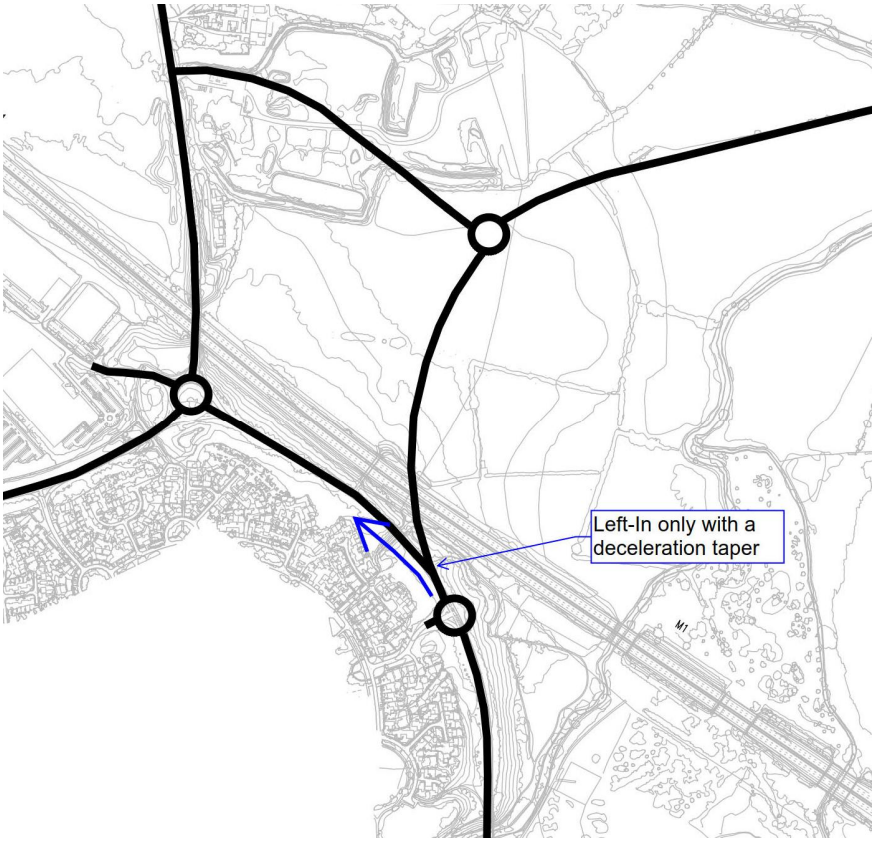
Option 4: Tongwell Street Left-In Only

- It is considered that there may be limited demand for the left-out movement from the retained Tongwell Street link onto Link T (but perhaps still over 600 vehicles per day on average).
- As a result a left-turn in only could be provided with a deceleration taper provided as per Option 1. This would mean that the retained section of Tongwell Street becomes one-way northbound.
- The currenly designed M1 bridge would not need to be widened.
- The southbound carriageway of Tongwell Street could be converted to part of the super red-way network.
- By removing the left out facility, the deceleration length can be extended and moved further north which provides the opportunity to reduce the adverse camber and potential need for departures from standard.

It is considered that Option 4 could be delivered within highway design standards.



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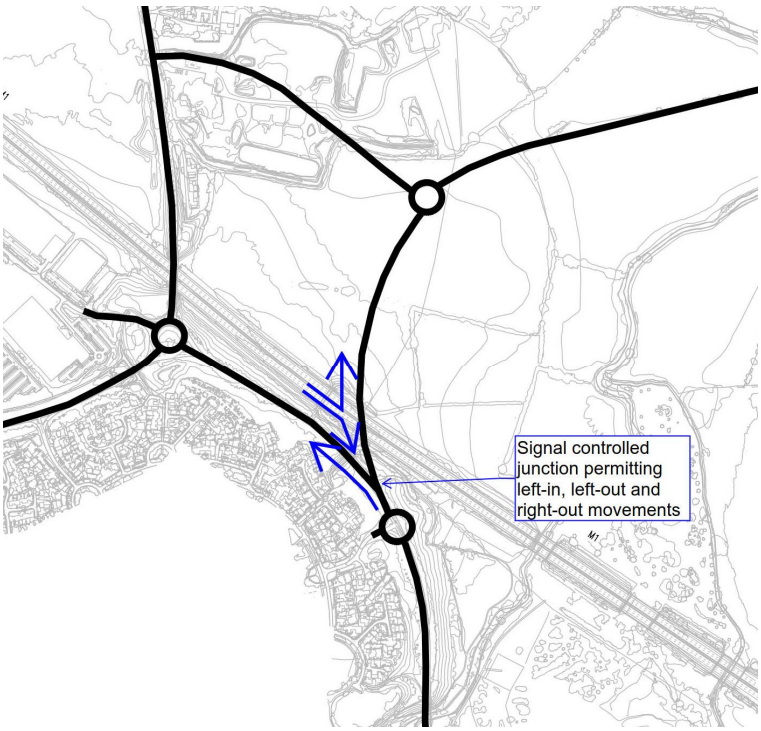
Option 5: Tongwell Street Signalised Junction

- It is considered likely that any signal arrangement would allow all movements out of Tongwell Street as a consequence of installing signals, albeit this movement would have been possible with a left-in / left-out priority junction as preferred by MKC. A right turn into the retained section of Tongwell Street from Link T would not be provided.
- This option is still likely to have a reverse curve for vehicles performing the left turning manoeuvre. However, vehicle speeds would be lower than with a left-turn out priority movement (i.e. as per Option 1) meaning that the risk of vehicles over-turning is significantlty reduced.
- By introducing signal controls this will remove the risk of rear shunting accidents on the 50mph dual carriageway. However, this could cause traffic to build up and block the Carleton Gate roundabout to the south and could increase journey times along the new grid road corridor.

It is considered that Option 5 could be delivered within highway design standards.



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3.3 Solutions / Recommendations

3.3.1. From recent disucssions with Milton Keynes highways officers, it was their view that the demand for the left turn out of Tongwell Street (onto Link T and the new M1 Bridge link) is likely to be relatively low, particularly given the alternative routes available for motorists wishing to make this manoeuvre. Depending on where motorists are seeking to travel to alternative routes include motorists routeing via Willen Road and the new Willen link which reconnects back onto the new grid road running through the MKE site or via Willen Road and the A422 and then either down the A509 London Road into the MKE site, if that is their destination, or continuing north-east along the A509 away from Milton Keynes.

3.3.2. If it were therefore accepted that these movement could be accommodated via these other routes (see Section 3 below for further detail on the comparison between these) then this would enable a left-in only junction to be delivered which would retain the section of Tongwell Street discussed and significantly reduce the proportion of the HIF funding which would otherwise need to be used to delivered a signal controlled junction.

4 JOURNEY TIME ASSESSMENT

4.1 Route Comparison

4.1.1. If the left-turn out of the retained section of Tongwell Street were removed then motorists would need to take an alternative route and the travel times along these in comparison with what they would be if the left-turn out were able to be provided has been undertaken. These journey times have been assessed between Tongwell Roundabout and Tickford Roundabout with the routes assessed including:

- Route 1 – via Willen Road and the A422
  - including the new signalised junctions being provided by Bloor; one connecting the new Willen link road into the MKE site and one providing direct access into the Bloor residential land.
- Route 2A – Tongwell Street
  - Assuming a left out could be delivered onto the new HIF infrastructure of Link T, the new grid road link over the floodplain and the A509 London Road
- Route 2B – Tongwell Street
  - Assuming a signalised junction is delivered; i.e. motorists turn left at the signals onto the new HIF infrastructure of Link T and then onto the new grid road link over the floodplain and the A509 London Road
- Route 3 – via Willen Road, the new Willen link road into the MKE site, new grid road over the floodplain and the A509 London Road
  - Utilising the new Willen link road and onto the new HIF infrastructure over the floodplain and on to the A509 London Road.

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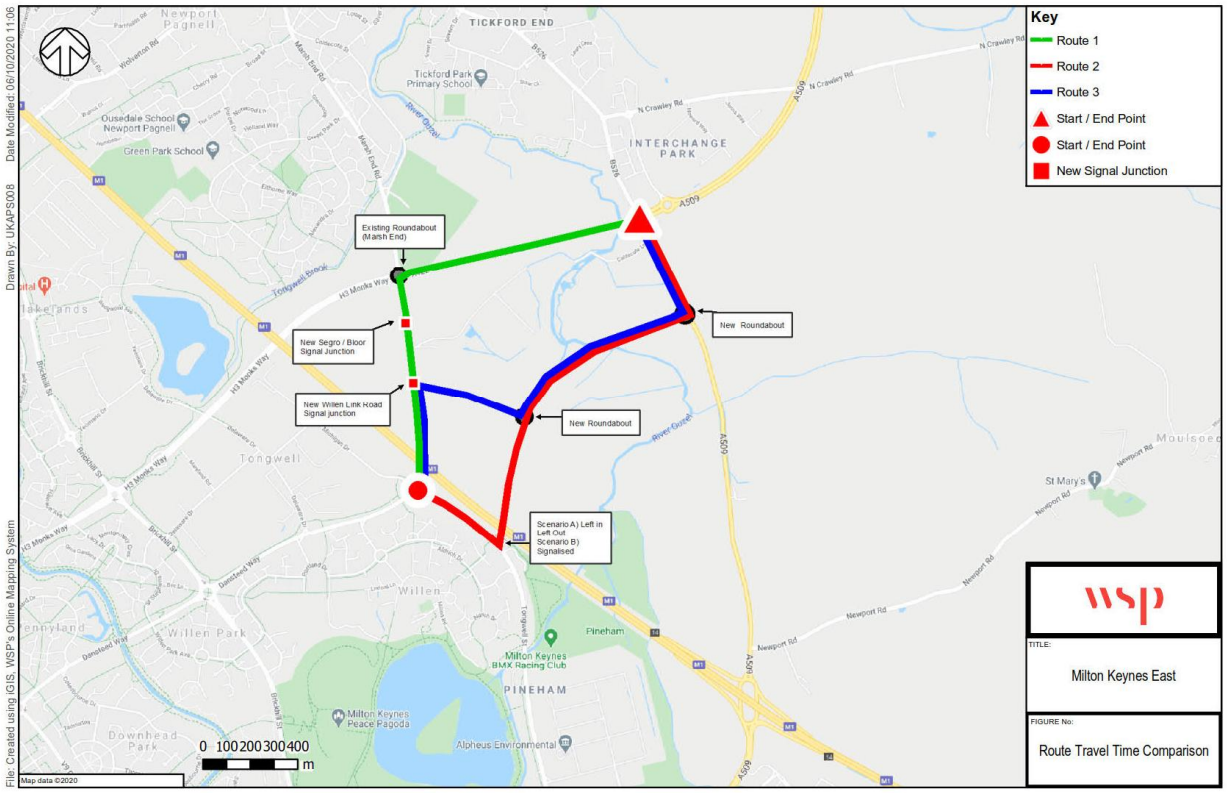
4.1.2. Figure 4-1 provides an overview of the routes selected for comparison, noting that the link positions are indicative, although measurements have been accurately measured in AutoCAD.

Figure 4-1 – Route Comparison



4.1.3. A number of assumptions have been made to allow for delays at each junction as well as the average speed along each link of the aforementioned routes. Annex B provides the excel summary table and Table 4-1 below provides a summary:

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Table 4-2 – Route Comparison Assessment Summary

Route	Link / Route	Total Travel Time (Secs)
Route 1	Willen Road, A422	227
Route 2A	Tongwell St (Left Out), new HIF infrastructure and A509 London Road	187
Route 2B	Tongwell St (Signals), new HIF infrastructure and A509 London Road	222
Route 3	Willen Road, Willen link road, new HIF infrastructure and A509 London Road	235

4.1.4. Whilst the left out option (Route 2A) shows the shortest travel time, this has to be balanced out against the safety implications of delivering this left out arrangement, which as set out earlier in this technical note is considered to be undeliverable.

4.1.5. The exercise demonstrates that the other routes result in a similar travel time and demonstrate that a signal controlled junction does not deliver much of a saving in journey time, particularly when one considers the significant costs associated with delivering it. It should also be recognised that the left-turn movement on Tongwell Street is not one which exists currently.

5 SUMMARY AND CONCLUSIONS

5.1.1. The preferential design of the Tongwell Street / Link T (M1 Bridge) junction would be to fully close access to Tongwell Street, which would minimise delay along the extension of Tongwell Street onto the new Grid Road of Link T and the new M1 Bridge, whilst simultaneously allowing better connections for pedestrians and cyclists.

5.1.2. However, acknowledging that MKC have requested that Tongwell Street remain accessible, for the reasons set out in this note it is recommended that this be a left-turn in from Tongwell Street such that the retained section of Tongwell Street between Tongwell Roundabout and Link T / the new M1 bridge link becomes one-way northbound. This is to ensure that the junction is safe.

5.1.3. Journey time assessments have been undertaken to ascertain how the travel times for motorists would be affected with the left-turn out on to Link T from Tongwell Street being removed unless a signal controlled junction is provided. This shows that the journey times via the alternative routes are comparable with that which would be realised were a signal controlled junction introduced at the retained Tongwell Street link / Link T and that there is no significant difference in what the journey time would have been were it have been possible to deliver a left-in / left-out junction.

5.1.4. As such, it is considered appropriate to remove the left out movement from Tongwell Street onto Link T, the new M1 Bridge and make this junction a left-in only arrangement.

TECHNICAL NOTE 12 – Tongwell Road Junction Review

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ANNEX A – WSP Drawing SK-0042

DO NOT SCALE

NOTES
1. ALL DIMENSIONS SHOWN IN METERS.
2. THIS DRAWING IS FOR INFORMATION PURPOSES ONLY, AND WOULD BE SUBJECT TO DETAILED DESIGN.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH TECHNICAL NOTE – TTN12 – TONGWELL JUNCTION DESIGN

TONGWELL STREET

MERGE TAPER IS REQUIRED DUE TO THE MINOR ROAD HAVING GREATER THAN 600 AADT LEFT TURNING MANOEUVRES. DUE TO LINK T ALIGNMENT A 5% CROSSFALL ALONG THE MERGE TAPER LENGTH IS REQUIRED.

LINK T 85kph (50mph) DESIGN SPEED
CENTRELINE RADII: 510m
SUPERELEVATION: 5%

BY PROVIDING A MERGE TAPER THE CURRENT BRIDGE WIDTH WOULD BE WIDENED BY 3.5m

THE CROSSFALL RATE OF CHANGE IS LIKELY TO BE GREATER THAN 1% WHICH WOULD REQUIRE A DEPARTURE FROM STANDARD

POSSIBLE DEPARTURE FROM STANDARD, WITH ADVERSE CAMBER IN THE REGION OF 2-5%. THIS COULD BE A SAFETY ISSUE AS LARGE VEHICLES MAY FLIP WHEN TURNING

TONGWELL STREET LINK 85kph (50mph) DESIGN SPEED
CENTRELINE RADII: 510m
SUPERELEVATION: 5%

SECTION OF CARRIAGEWAY TO BE HATCHED TO ASSIST WITH LARGE VEHICLE TURNING MOVEMENTS

AS TONGWELL STREET IS ASSUMED TO BE A GRID ROAD, A GRADE SEPARATED CROSSING IS ASSUMED IN THIS LOCATION

LANE WIDTHS ARE BASED ON THE INSIDE CURVE RADII IN ACCORDANCE WITH DMRB CD 123

THE CROSSFALL RATE OF CHANGE IS LIKELY TO BE GREATER THAN 1% WHICH WOULD REQUIRE A DEPARTURE FROM STANDARD

WIDENED BRIDGE WIDTH 34.1
CURRENT PROPOSED BRIDGE WIDTH 30.6
3.5 3.5 7.3 4.6 7.3 7.1 3.65 5.3
7.3
90m
55m

THIS LEFT IN/LEFT OUT JUNCTION IS DESIGNED IN ACCORDANCE WITH DMRB ANY DOWNGRADE WOULD REQUIRE A DEPARTURE FROM STANDARD

DECELERATION LENGTH IS REQUIRED DUE TO THE MINOR ROAD HAVING GREATER THAN 600 AADT LEFT TURNING MANOEUVRES. DUE TO LINK T ALIGNMENT A 5% CROSSFALL ALONG THE DECELERATION LENGTH IS REQUIRED.

M1 MOTORWAY

2% GRADIENT FROM CARLETON GATE ROUNDABOUT

CARLETON GATE ROUNDABOUT

CARTERET CLOSE

Path and Cycle Path

Subway

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P01	05/10/2020	OPL	FIRST ISSUE	A	AJN

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CLIENT: BERKELEY ST JAMES

ARCHITECT: JTP / STEPHEN GEORGE AND PARTNERS

SITE/PROJECT: MILTON KEYNES EAST

TITLE: TONGWELL STREET LINK LEFT IN LEFT OUT OPTION

SCALE @ A1:	CHECKED:	APPROVED:	
1:500	ARP	AJN	
PROJECT NO:	DESIGNED:	DRAWN:	DATE:
70057521	ARP	OPL	October 20

DRAWING No: MKE-WSP-ZZ-ZZ-C-SK-0042 REV: P01

TECHNICAL NOTE 12 – Tongwell Road Junction Review

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ANNEX B – Journey Time Assessment Outputs

Route	Link	Length (m)	Assumed Speed (mph)	Link Travel Time (seconds)	Jct	Delay (seconds)	Link	Length (m)	Assumed Speed (mph)	Link Travel Time (seconds)	Jct	Delay (seconds)	Link	Length (m)	Assumed Speed (mph)	Link Travel Time (seconds)	Jct	Delay (seconds)	Link	Length (m)	Assumed Speed (mph)	Link Travel Time (seconds)	TOTAL TRAVEL TIME (seconds)
Route 1	Willen Rd	470	40	26	New Willen Link Rd Signalled	50	Willen Rd	240	40	13	New Segro / Bloor Signalled	50	Willen Rd	200	40	11	Marsh End Rdbt	30	A422	1040	50	47	227
Route 2A	Tongwell St	400	50	18	New left turn	15	New link	470	40	26	New Rdbt	25	New Link	830	40	46	New Rdbt	25	A509	710	50	32	187
Route 2B	Tongwell St	400	50	18	Signalled	50	New link	470	40	26	New Rdbt	25	New Link	830	40	46	New Rdbt	25	A509	710	50	32	222
Route 3	Willen Rd	470	40	26	Signalled	50	New link	550	40	31	New Rdbt	25	New Link	830	40	46	New Rdbt	25	A509	710	50	32	235

Assumptions

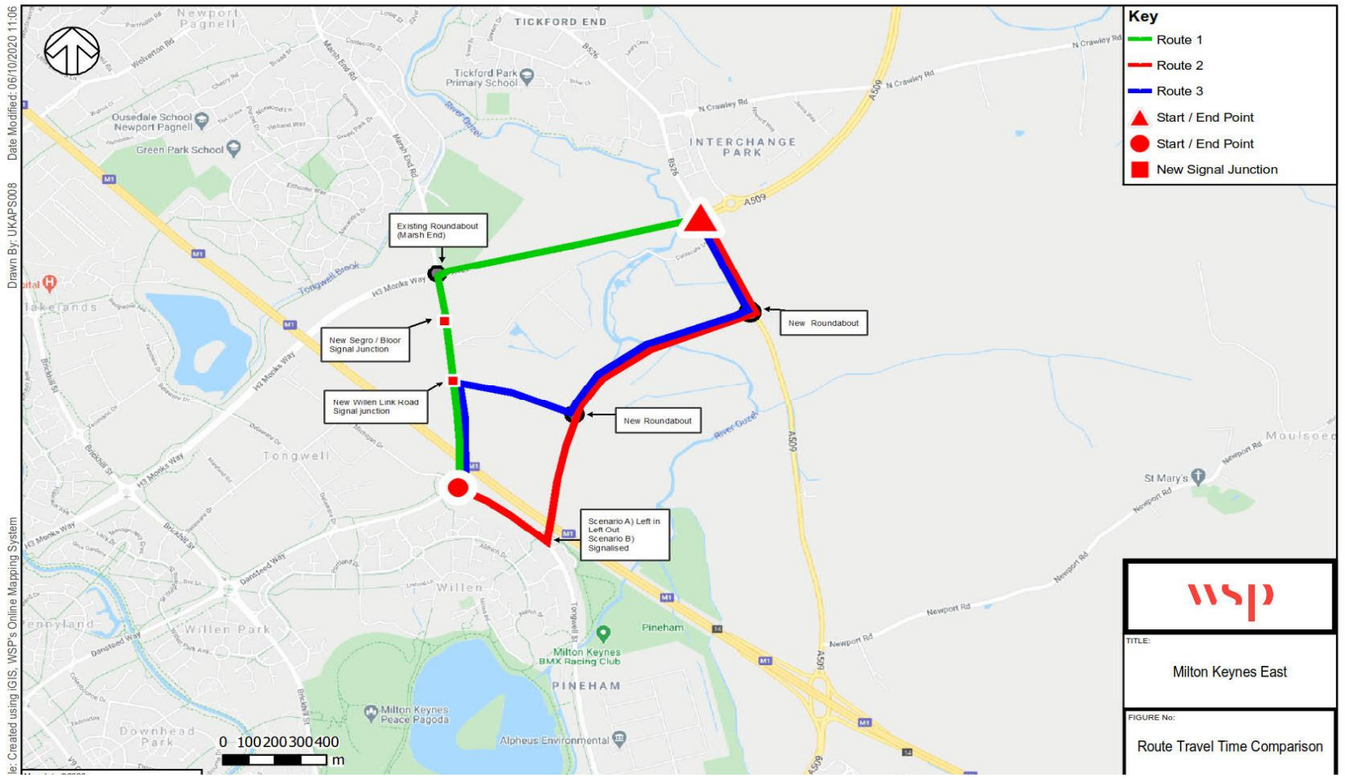
Av. Travel Speed	50 mph	if posted limit is 60mph
	40 mph	if posted limit is 50mph
	25 mph	if posted limit is 30mph

Assumed that Willen Rd posted speed limit would be reduced to 50mph and new links would have a 50mph posted speed limit

Exist Rdbt Delay	30 sec	
New Rdbt Delay	25 sec	
Signal Jct Delay	50 sec	
Left Out Delay	15 sec	
1 mile per hour	0.447038889 m/s	

Min	187
Max	235

Route Map



Appendix A.13

NOT USED

Appendix A.14

TTN14 – NEWPORT PAGNELL CONNECTIONS

TECHNICAL NOTE TTN14 – WALKING / CYCLING CONNECTIONS BETWEEN NEWPORT PAGNELL / TICKFORD AND MKE

DATE:	18 February 2021	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Pedestrian / Cycle Connections Between MKE and Newport Pagnell / Tickford		
PROJECT:	Milton Keynes East	**AUTHOR:**	A Norcutt
CHECKED:	S Purcell	**APPROVED:**	A Norcutt

EXECUTIVE SUMMARY

This technical note considers pedestrian / cycle connections between the proposed site allocation of Milton Keynes East (MKE) and Newport Pagnell / Tickford, and in particular crossing points of the A422 and A509 road corridors.

The Development Framework for MKE identifies three crossing points across the A422 / A509; the locations being across the A422 east of Marsh End Roundabout, across the A422 / A509 within the vicinity of Tickford Roundabout and across the A509 within the vicinity of Howard Way.

The crossing of the A422 east of Marsh End Roundabout is to be delivered by Bloor as part of their development, as their land forms part of the wider MKE allocation. Consequently, no further discussion around the delivery of that crossing is provided herein.

A grade separated crossing of the A509 in the form of a bridge can be delivered within the vicinity of Howard Way and would come forwards with one of the Reserved Matters Applications for the adjacent residential parcels and relies on the Eastern Perimeter Road (which runs around the eastern edge of the MKE allocation and connects the A509 with M1 J14) having been delivered first.

The provision of a crossing of the A422 / A509 within the vicinity west of Tickford Roundabout is the most challenging crossing to deliver. A number of options have therefore been considered for this and are set out in this report with an image of each provided below.

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CHECKED:	S Purcell	**APPROVED:**	A Norcutt

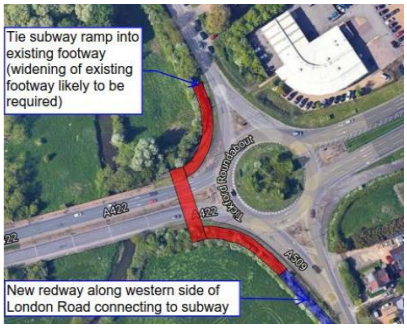
Options Considered

Option 1 – Bridge between Tickford and Renny Lodge Roundabouts

Option 2 – Bridge West of Tickford Roundabout

Option 3 – Subway between Tickford and Renny Lodge Roundabouts

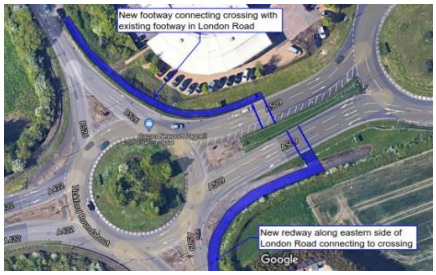
Option 4 – Subway West of Tickford Roundabout



Option 5 – Subway Route Along River Ouzel Beneath A422

Option 6 – Subway Between Tickford and Renny Lodge Roundabouts - Renny Lodge Roundabout Removed

Option 7 – At Grade Signal Crossing Between Tickford and Renny Lodge Roundabouts



Option 8 – At Grade A422 Signal Crossing West of Tickford Roundabout

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CHECKED:	S Purcell	**APPROVED:**	A Norcutt

In order to assess each of these options, a scoring matrix has been produced as shown in Table 1.

Table 1 Scoring Matrix of Crossing Options Within Vicinity of Tickford Roundabout

Option	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Bridge		**Subway**				**At Grade Signal Crossing**	
Description / Scoring Criteria	**Between Tickford and Renny Lodge Rbt's**	**West of Tickford R'bt**	**Between Tickford and Renny Lodge Rbt's**	**West of Tickford R'bt**	**Adjacent to River Ouzel Beneath A422**	**Between Tickford and Renny Lodge Roundabouts – Renny Lodge R'bt removed**	**A509 between Tickford and Renny Lodge Rbt's**	**A422 west of Tickford Rb't**
Grade-Separated Crossing	ü	ü	ü	ü	ü	ü	X	X
No third-party land required	X	X	X	X	X	ü	ü	ü
No interaction with floodplain	ü	X	ü	X	X	ü	ü	ü
No impediment to existing accesses	X	X	ü	ü	ü	ü	ü	ü
No increase in HGVs on London Rd	ü	ü	ü	ü	ü	X	ü	ü
Total Score	**ü**	**X**	**ü ü ü**	**ü**	**ü**	**ü ü**	**ü ü ü**	**ü ü ü**
Currently Deliverable?	**N**	**N**	**N**	**N**	**N**	**N**	**Y**	**Y**

TECHNICAL NOTE TTN14 – WALKING / CYCLING CONNECTIONS BETWEEN NEWPORT PAGNELL / TICKFORD AND MKE

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As shown by the scoring above, it is considered that there are numerous technical and land constraints which would prevent the ability for a bridge crossing to be provided within the vicinity of Tickford Roundabout or for a subway to be provided west of Tickford Roundabout. Similarly, the ability to use the route adjacent to the River Ouzel is considered to be undeliverable.

Whilst it is considered that a subway could be provided between the Tickford and Renny Lodge Roundabouts it would either require third-party land north of the carriageway or would require the removal of Renny Lodge Roundabout assuming the impacts along the A509 London Road (N) were acceptable and acknowledging that the latter of these solutions would attract significant costs. It is therefore considered that neither of these options are currently deliverable.

It is considered that a signal-controlled crossing is currently deliverable either across the A509 between the Tickford and Renny Lodge roundabouts or across the A422 west of Tickford Roundabout with the former being the preferred solution. Whilst not grade separated it is considered that this would provide a satisfactory and appropriate connection for pedestrians and cyclists across the A509.

This study has therefore concluded that in the context of the third crossing within the vicinity of Tickford Roundabout that either:

1. A signal-controlled crossing is currently deliverable across the A509 between the Tickford and Renny Lodge Roundabouts to provide the Non-Motorised User connection between MKE and Tickford / Newport Pagnell; or
2. A financial contribution is provided towards the future delivery of a subway beneath the A509 once land becomes available on the northern side of the A509 to enable it to be delivered.

TECHNICAL NOTE TTN14 – WALKING / CYCLING CONNECTIONS BETWEEN NEWPORT PAGNELL / TICKFORD AND MKE

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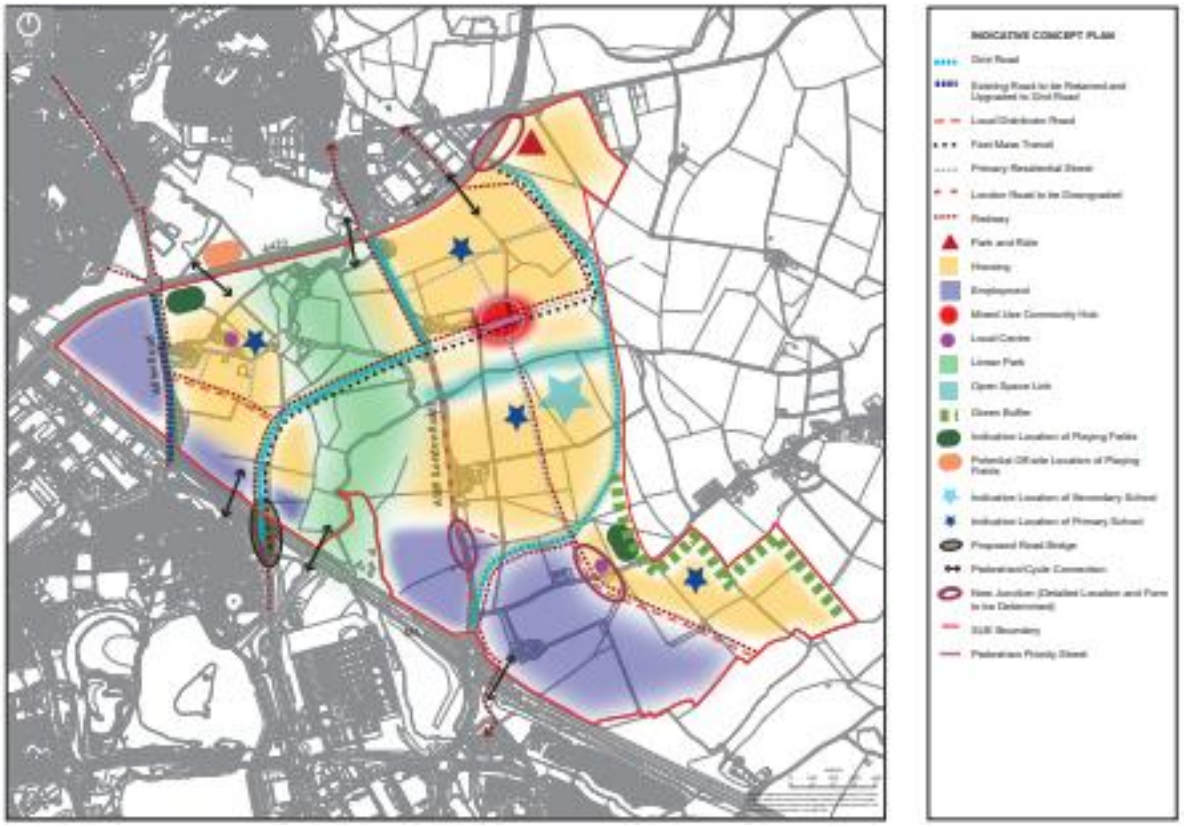
CHECKED:	S Purcell	**APPROVED:**	A Norcutt

INTRODUCTION

This technical note considers pedestrian / cycle connections between the proposed site allocation of Milton Keynes East (MKE) and Newport Pagnell / Tickford and in particular crossing points of the A422 and A509 road corridors to facilitate those movements.

The context for this is set out within the Development Framework for MKE with three crossing points identified across the A422 / A509 as shown in the below extract. These three crossing points are shown as being across the A422 east of Marsh End Roundabout, across the A422 / A509 within the vicinity of Tickford Roundabout and across the A509 within the vicinity of Howard Way. The delivery of these are discussed below, with the focus of this note on the crossing of the A422 west of Tickford Roundabout, which is the most challenging crossing to deliver.

Development Framework Indicative MKE Concept Plan



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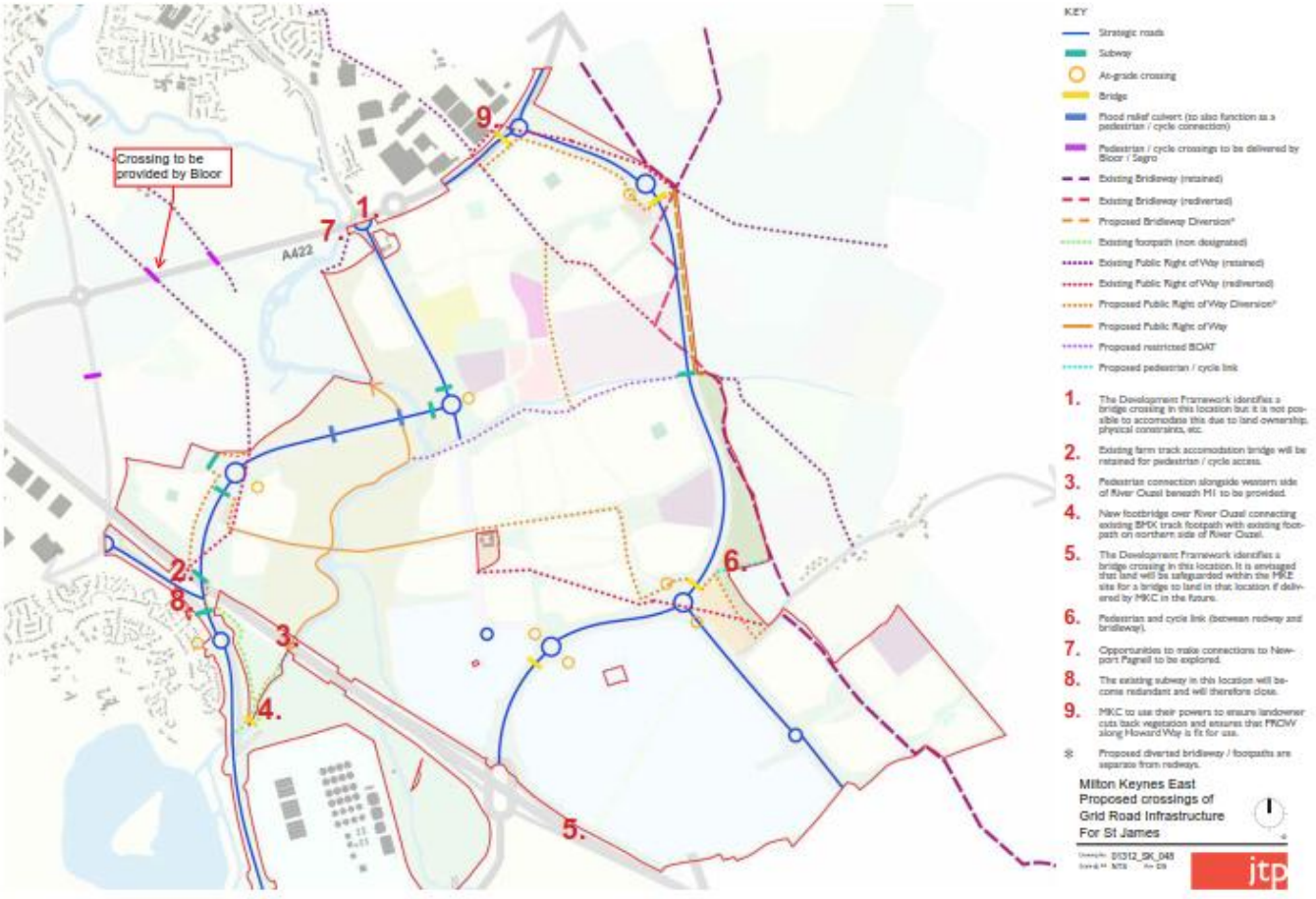
CHECKED:	S Purcell	**APPROVED:**	A Norcutt

WALKING / CYCLING CONNECTIONS FROM MKE TO A509 / A422

The below plan identifies the current strategy for retaining, diverting and providing new Public Rights of Way across the site. Points 1 and 9 are the crossing points of the A422 / A509 which Berkeley are seeking to deliver with these according with the locations identified in the Development Framework as outlined above. The crossing of the A422 east of Marsh End Roundabout (labelled below) is to be delivered by Bloor as part of their development, as their land forms part of the wider MKE allocation. Consequently, no further discussion around the delivery of that crossing is provided herein.



It is recognised that the preference is for crossings to be grade separated and therefore consideration has been given to the deliverability of these at Locations 1 and 9, as set out below.

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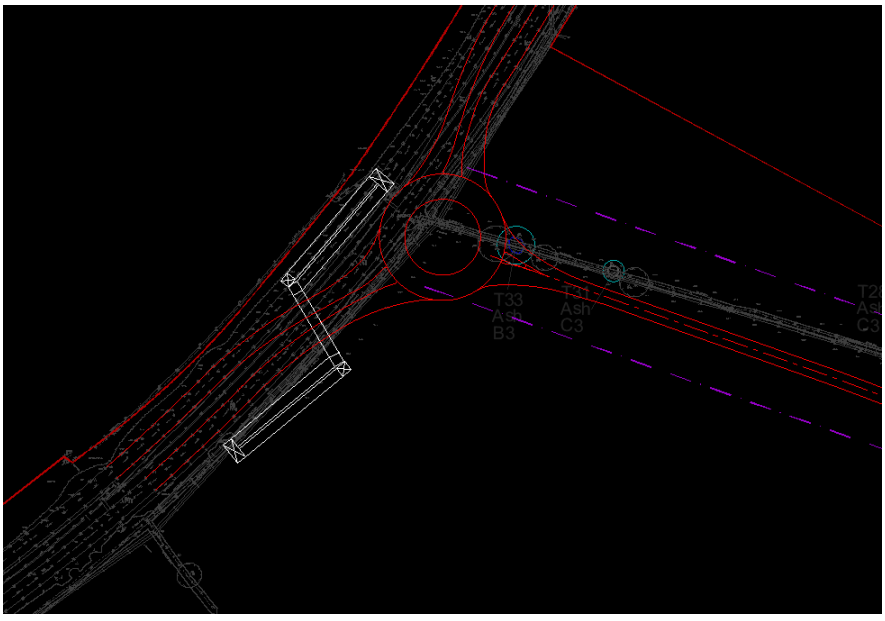
GRADE SEPARATED CROSSING OF A509 WITHIN VICINITY OF HOWARD WAY – LOCATION 9

A crossing of the A509 within the vicinity of Howard Way is considered to be deliverable and would come forwards with one of the Reserved Matters Applications for the adjacent residential parcels and relies on the Eastern Perimeter Road (which runs around the eastern edge of the MKE allocation and connects the A509 with M1 J14) having been delivered first.

The new Eastern Perimeter Road will form a roundabout junction with the A509, with that roundabout being "off-line" from the existing A509 alignment in order to meet highway design requirements. An extract of the draft design for this is provided below.

Sketch Showing Bridge Crossing of A509 in Vicinity of Howard Way



As a result of this off-line roundabout, there will be a section of the existing A509 which effectively becomes redundant and so this and the associated highway verge provides sufficient space within which to accommodate the landing structure and associated ramps of a footway / cycleway bridge on the northern side of the A509. On the southern side the landing structure and ramps can be accommodated within the development and existing / proposed highway corridor.

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This new bridge will provide connections from a redway running alongside the Eastern Perimeter Road and a diverted PROW which runs through the MKE development with the existing PROW on the northern side of the A509 which runs down Howard Way and onwards connections towards Tickford and Newport Pagnell.

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GRADE SEPARATED CROSSING OF A422 / A509 WITHIN VICINITY OF TICKFORD ROUNDABOUT

Introduction

A crossing within the vicinity of Tickford Roundabout, is the most challenging of the three crossing points to deliver. This is because there are a number of key constraints which are described and set out below.

Constraints

There are four principal constraints to delivering a crossing within the vicinity of Tickford Roundabout, namely:

- Available highway land;
- Third-party land;
- Extents of the River Ouzel floodplain; and
- Design constraints.

AVAILABLE HIGHWAY LAND

The below images are an extract from the Milton Keynes Council My Map website and shows the adopted public highway boundary based on OS mapping on the left image and aerial mapping on the right image.

Highway Boundary

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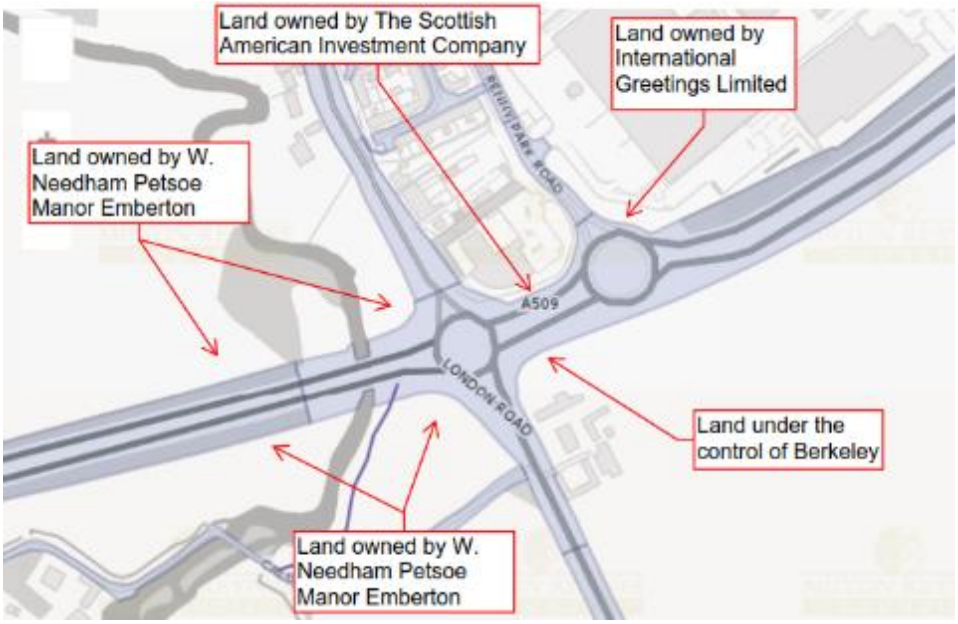
Much of the highway land to the west of London Road (both north and south) and to the north and south of the A422 (west of Tickford Roundabout) is on embankment. It can be seen that there is a narrow strip of highway land to the north of the A509 between the two roundabouts.

The land outside of the highway boundary is owned by a number of different parties as set out below.

THIRD-PARTY LAND

Land Ownership Around Tickford and Renny Lodge Roundabouts



With the exception of the land to the south and east of the A509 (and even then excluding Pyms Stables and associated properties), the land owners beyond the highway boundary are all third-parties, none of whom are party to the MKE proposals.

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FLOODPLAIN

The River Ouzel floodplain extends between the river and the A509 London Road as shown in the below image which represents the 1:20 year rainfall return period, with the extent of flooding increasing in less frequent return periods as shown in the 1:100 year + 35% climate change mapping also shown below, including up the highway embankment.

River Ouzel 1:20 Year Floodplain Extents

River Ouzel 1:100 Year + 35% Climate Change Allowance Floodplain Extents

It can therefore be seen that any grade separated crossing to the west of Tickford Roundabout would interact with that floodplain.

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HIGHWAY DESIGN CONSTRAINTS

Design standards permit bridge and subway ramps to have a maximum average gradient of 1:15 and therefore with this in mind, consideration has been given to both bridge and subway forms of grade separated crossing as summarised in the options below:

Option 1: Bridge Between Tickford and Renny Lodge Roundabouts

Lighter structures such as footbridges must have 5.70m clearance plus an allowance for the slight curvature of the road beneath; typically, 5.8m is allowed for. When one then considers the structural depth of a bridge deck, which would be at least 500mm, it can be seen that the bridge deck itself would be circa 6.5m above carriageway level.

With a maximum gradient of 1:15, ramps would therefore be circa 100m long. The below image shows approximately how long these ramps would be on the northern side of the road, disregarding the constraints outlined above or how one even then achieves a landing area for a bridge.

Bridge Between Tickford Roundabout and Renny Lodge Roundabout

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Private land would be needed for a bridge landing structure and the bridge ramp itself, and it can be seen from the above that the ramp from a bridge landing within the land north of the A509 between Tickford and Renny Lodge roundabouts would extend into London Road (N) and conflict with the pedestrian access into Imperial Cars and to the south would conflict with the access into the private properties on the eastern side of the A509.

It is therefore considered that this is not deliverable.

Option 2: Bridge West of Tickford Roundabout

The below image shows the approximate location of an indicative bridge and how long the associated ramps would be.

Bridge West of Tickford Roundabout

Putting to one side land ownership constraints or the physical space needed for a bridge landing structure, it can be seen from the above that the ramp from a bridge landing within the land north of the A422, west of Tickford roundabout would extend a considerable distance into London Road (N). The existing western footway would need to be considerably widened to accommodate the bridge ramp, the existing trees would need to be removed and alterations would be needed to the existing highway embankment with highway retaining structures likely needing to be introduced.

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Similarly, on the southern side, putting aside land ownership constraints or the physical space needed for a bridge landing structure, it can be seen from the above that the ramp from a bridge landing within the land south of the A422, west of Tickford roundabout would extend a considerable distance into London Road (S). The existing western footway would need to be considerably widened to accommodate the bridge ramp and the existing highway embankment would probably need to be removed and replaced with a highway retaining structure.

Given that the bridge structure and ramps would extend into the existing highway embankment there would be a need to introduce retaining structures which would sit within the floodplain and could therefore affect the extent of flooding around the River Ouzel. A footway around the side of the bridge ramps could not be provided.

It is therefore considered to be extremely challenging to deliver a bridge across the A422 west of Tickford Roundabout.

Option 3: Subway Between Tickford and Renny Lodge Roundabouts

A subway would require a minimum headroom of 2.7m to accommodate cyclists (where the length of the subway is over 23m – this is based on the MK Redway Design Guide). An allowance of say 1m for the structural slab and carriageway construction above would mean that the level of the walking / cycling surface of the subway itself would be around 3.5m below carriageway level.

As with bridges, a maximum gradient of 1:15 would be required on ramps which would therefore be circa 55m long. The below images show how long these ramps would be, disregarding the constraints outlined above or how one achieves a landing area for a subway, along with footway connections on to the A509 from the subway.

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Subway Ramp Across A509

Technically this demonstrates that a subway could potentially be delivered, albeit as set out above land ownership constraints in this location mean that third-party land would need to be secured on the northern side of the A509 to deliver it.

Option 4: Subway West of Tickford Roundabout

The below shows the approximate extent of a subway west of Tickford Roundabout beneath the A422. It should be noted that this does not allow for a footway to run alongside the subway ramps at ground level.

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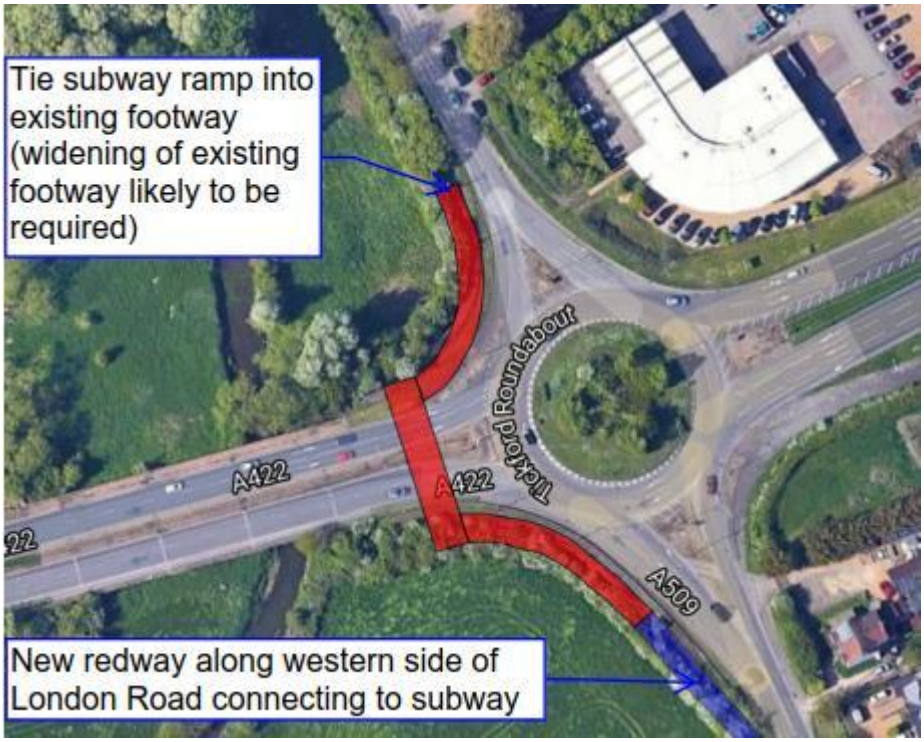
Subway Ramp Across A422 on Western Side of Tickford Roundabout



It can be seen from the above that the ramp from a subway landing within the land north of the A422, west of Tickford roundabout would extend a reasonable distance into London Road (N). The existing western footways of London Road (N and S) would need to be considerably widened to accommodate the ramp, the existing trees would need to be removed and alterations would be needed to the existing highway embankment probably with highway retaining structures.

A subway in this location would sit within the floodplain and could therefore regularly be wet and unusable. Furthermore, a structure in the floodplain would displace flood water which could lead to a detrimental impact on the extents of the floodplain and downstream flooding within Newport Pagnell.

It is therefore considered that this is highly unlikely to be deliverable.

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Option 5: Route Adjacent to River Ouzel Beneath A422 West of Tickford Roundabout

The below shows the potential route adjacent to the River Ouzel beneath the A422 west of Tickford Roundabout, connecting an existing PROW with a new ramp up to London Road (N).

Route Beneath A422 Adjacent to River Ouzel on Western Side of Tickford Roundabout

Photo of River Ouzel Beneath A422 on Western Side of Tickford Roundabout

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The route shown above has insufficient headroom beneath the A422 adjacent to the river and in order to achieve adequate headroom the road would either need to be raised or the route beneath lowered; neither of which are deemed practical. It is also noted that the route sits within the floodplain and would therefore regularly be wet and unusable. The connection from the existing PROW to the route may also require third-party land.

It can also be seen from the above that the ramp from the level adjacent to the River Ouzel west of Tickford roundabout back up to London Road (N) would lead to the existing trees being removed and alterations would be needed to the existing highway embankment probably with highway retaining structures, assuming that this could be done within highway land. Furthermore, a structure in the floodplain would displace flood water which could lead to a detrimental impact on the extents of the floodplain and downstream flooding within Newport Pagnell.

It is therefore considered that this solution is undeliverable.

Option 6: Works Needed to Accommodate a Subway Across A509

Given the constraints of land ownership on the northern side of the A509 which preclude the provision of a subway consideration has been given to what could be done in order to physically accommodate a subway within highway land or land under the control of Berkeley. It is considered that a subway could be provided if Renny Lodge Roundabout were removed and a sketch showing this is provided below.

Removal of Renny Lodge Roundabout to Accommodate Subway Across A509

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It can be seen that in order to accommodate a subway, the connection from the A509 into Renny Park Road would be severed. However, it should be possible to retain a left-turn out of Renny Park Road on to the A509 as shown. Vehicles wishing to head west out of Renny Park Road could then u-turn at the proposed new roundabout at the junction of the A509 with the Eastern Perimeter Road.

Removal of the connection between the A509 and Renny Park Road would mean that all HGVs and other vehicles accessing properties along not only Renny Lodge Road but also North Crawley Road (including those accessed from Howard Way and Jenna Way) would need to route via the A509 London Road and then North Crawley Road instead. This would lead to HGVs passing residential properties along London Road between the A509 and North Crawley Road and the associated impacts that brings.

It may be possible to shift Renny Lodge Roundabout south of its current position such that it is aligned with the new A509 alignment shown above and thus retain all movements between Renny Park Road and the A509. However, this would be subject to a detailed study to determine whether the interface between the eastbound approach arm (which would need to bend into the roundabout in order to meet deflection criteria through the roundabout itself) and the subway itself provides sufficient depth between the top of the subway and the carriageway surface.

Overall however it may be possible to deliver a subway in this location, albeit at significant cost.

Impacts of Removing of Renny Lodge Roundabout to Accommodate Subway Across A509

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SUMMARY OF ABILITY TO DELIVER A GRADE-SEPARATED CROSSING

Based on the constraints set out above it is considered that it is not feasible to introduce a bridge within the vicinity of the Tickford and Renny Lodge Roundabouts or a subway on the western side of Tickford Roundabout.

It may be possible to deliver a subway between the Tickford and Renny Lodge Roundabouts; either if private third-party land ever became available on the northern side of the A509 to enable its delivery or if the impacts along London Road are acceptable through removal of the Renny Lodge Roundabout. It may be possible to re-accommodate the Renny Lodge Roundabout in a revised position with a realignment of the A509 subject to a much more detailed study.

Given the constraints (and costs) associated with delivering a grade separated crossing, consideration has also been given to the ability to deliver an at-grade crossing of the A422 / A509 within the vicinity of Tickford Roundabout as set out below.

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AT-GRADE CROSSING OF A422 / A509 WITHIN VICINITY OF TICKFORD ROUNDABOUT

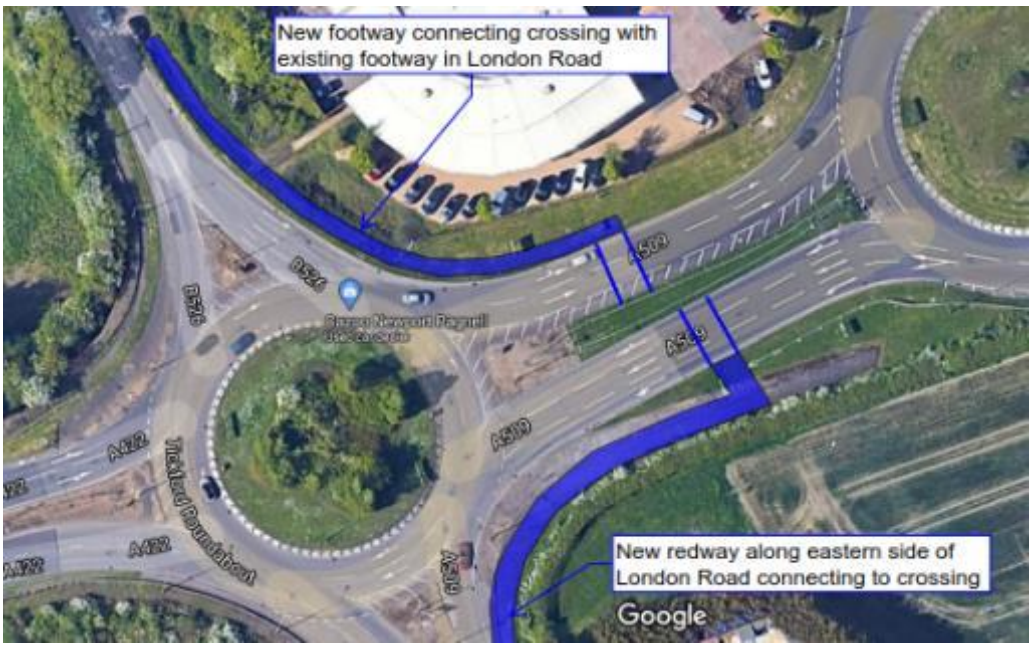
INTRODUCTION

Given the complexities of delivering a grade-separated crossing consideration has been given to whether an at-grade crossing could be delivered, and two locations have been considered for this.

OPTION 7: SIGNAL-CONTROLLED CROSSING BETWEEN TICKFORD AND RENNY LODGE ROUNDABOUTS

It is considered that a signal-controlled crossing of the A509 between the two roundabouts could be provided, with pedestrians / cyclists able to cross the two carriageways separately with a holding area provided in the central reserve between the carriageways for pedestrians and cyclists to wait when held at a red man signal. A footway could be provided between a crossing landing north of the A509 and the existing footway on the eastern side of London Road (N). On the southern side a connection could be made to a proposed redway on the A509 (S) within highway land.

Potential Signal Controlled Crossing of A509 Between Roundabouts



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OPTION 8: SIGNAL-CONTROLLED CROSSING WEST OF TICKFORD ROUNDABOUT

An alternative to the above is providing a signal-controlled crossing of the A422 west of Tickford roundabout, with pedestrians / cyclists able to cross the two carriageways separately with a holding area provided in the central reserve between the carriageways for pedestrians and cyclists to wait when held at a red man signal.

This would connect to an existing footway / cycleway on the northern side of the A422 which could be reconfigured slightly to suit, and on the southern side of the A422 connecting to a widened and extended footway on the western side of London Road (S). A sketch showing how this could be delivered is provided below.

Potential Signal Controlled Crossing of A422 West of Tickford Roundabout

Given vehicle speeds along the A422, it is considered that the speed limit of the A422 in this area would need to be reduced and measures introduced to facilitate this and overall this option is considered to be less deliverable than the solution between the two roundabouts where the physical nature of the highway layout will mean that vehicle speeds are lower.

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CONCLUSIONS

Each of the options presented in this report has been assessed using a scoring matrix:

Table 2 Scoring Matrix of Crossing Options Within Vicinity of Tickford Roundabout

Option	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Bridge		**Subway**				**At Grade Signal Crossing**	
Description / Scoring Criteria	**Between Rbt's**	**West of Tickford R'bt**	**Between Rbt's**	**West of Tickford R'bt**	**Adjacent to River Ouzel Beneath A422**	**Between Roundabouts – Renny Lodge R'bt removed**	**A509 between Rbt's**	**A422 west of Tickford Rb't**
Grade-Separated Crossing	ü	ü	ü	ü	ü	ü	X	X
No third-party land required	X	X	X	X	X	ü	ü	ü
No interaction with floodplain	ü	X	ü	X	X	ü	ü	ü
No impediment to existing accesses	X	X	ü	ü	ü	ü	ü	ü
No increase in HGVs on London Rd	ü	ü	ü	ü	ü	X	ü	ü
Total Score	**ü**	**X**	**ü ü ü**	**ü**	**ü**	**ü ü**	**ü ü ü**	**ü ü ü**
Currently Deliverable?	**N**	**N**	**N**	**N**	**N**	**N**	**Y**	**Y**

TECHNICAL NOTE TTN14 – WALKING / CYCLING CONNECTIONS BETWEEN NEWPORT PAGNELL / TICKFORD AND MKE

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As shown by the scoring above, it is considered that there are numerous technical and land constraints which would prevent the ability for a bridge crossing to be provided within the vicinity of Tickford Roundabout or for a subway to be provided west of Tickford Roundabout. Similarly, the ability to use the route adjacent to the River Ouzel is considered to be undeliverable.

Whilst it is considered that a subway could be provided between the Tickford and Renny Lodge Roundabouts it would either require third-party land north of the carriageway or would require the removal of Renny Lodge Roundabout assuming the impacts along the A509 London Road (N) were acceptable and acknowledging that the latter of these solutions would attract significant costs. It is therefore considered that neither of these options are currently deliverable.

It is considered that a signal-controlled crossing is currently deliverable either across the A509 between the Tickford and Renny Lodge roundabouts or across the A422 west of Tickford Roundabout with the former being the preferred solution. Whilst not grade separated it is considered that this would provide a satisfactory and appropriate connection for pedestrians and cyclists across the A509.

This study has therefore concluded that in the context of the third crossing within the vicinity of Tickford Roundabout that either:

1. A signal-controlled crossing is currently deliverable across the A509 between the Tickford and Renny Lodge Roundabouts to provide the Non-Motorised User connection between MKE and Tickford / Newport Pagnell; or
2. A financial contribution is provided towards the future delivery of a subway beneath the A509 once land becomes available on the northern side of the A509 to enable it to be delivered.

Appendix B

TRANSPORT SCOPING AND MKC CORRESPONDENCE

Appendix B.1

WSP TRANSPORT ASSESSMENT SCOPING REPORT

BERKELEY ST JAMES

MILTON KEYNES EAST

Transport Assessment Scoping Report

TAS
APRIL 2020

PUBLIC

BERKELEY ST JAMES

MILTON KEYNES EAST

Transport Assessment Scoping Report

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70057521

OUR REF. NO. TAS

DATE: APRIL 2020

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Draft for Client and MKC Review	Minor updates to final year		
Date	28 April 2020	26 June 2020		
Prepared by	Laure Davis			
Signature				
Checked by	Filip Imramovsky	Filip Imramovsky		
Signature				
Authorised by	Alex Smith	Alex Smith		
Signature				
Project number	70057521	70057521		
Report number	TSN	TSN		
File reference	\\uk.wspgroup.com\central data\Projects\700575xx\70057521 - MKE - PLANNING APPLICATION\03 WIP\TP Transport Planning\03 Document\Transport Assessment Scoping Report\20200626_MKE_TA Scoping Report.docx			

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TABLES

FIGURES

APPENDICES

APPENDIX A

TTN1: MODELLING APPROACH V2

APPENDIX B

AECOM (HE) REVIEW OF TTN1

1 INTRODUCTION

1.1 PREAMBLE

1.1.1. WSP has been appointed by Berkeley St James to provide transportation and highways advice in respect of the proposed development of land to the northeast of Milton Keynes ('Milton Keynes East' or 'MKE').

1.1.2. The 'Milton Keynes East Sustainable Urban Extension' site has been identified as an allocation for a strategic urban extension within Plan:MK and Milton Keynes Council's (MKC) aspirations for the allocation is set out within Policy SD12 of Plan:MK. Policy SD12 states that key strategic infrastructure improvements are required over the M1 *"to support the connectivity of this strategic urban extension to the existing Milton Keynes urban area"*.

1.1.3. The MKE site is strategically located immediately north-east of Junction 14 of the M1, one of the two main motorway junctions serving Milton Keynes. It is situated approximately 3.5 kilometres north-east of Central Milton Keynes (the central business district of Milton Keynes), with relatively good and direct walking, cycling and highway links to the city centre.

1.1.4. As shown in **Figure 1-1** below, the MKE site is wedged between the M1 motorway forming the site's southern boundary, and the A422 and A509 delineating its western boundary. Open land of predominantly agricultural character then borders the site from the west and east.

Figure 1-1 - MKE Site Location (taken from the Development Framework SPD)

1.2 BACKGROUND

1.2.1. Figure 1-1 above illustrates the MKE site as allocated by the current local plan entitled Plan:MK 2016 – 2031 (hereinafter referred to as Plan:MK) adopted by Milton Keynes Council (MKC) in March 2019 for a Strategic Urban Extension (SUE).

1.2.2. Policy SD12 of the Plan:MK that is concerned about the MKE SUE seeks to deliver a mixed-use development of circa 5,000 new homes, employment in the order of 105 hectares and supporting ancillary uses including primary and secondary schools, health care and community facilities.

1.2.3. As noted in the Plan:MK, the delivery of the MKE SUE is constrained by the artificial barrier created by the M1 and capacity constraints on bridge crossings over the M1, particularly at M1 Junction 14. Therefore, it is evident that the growth east of the M1 is reliant upon the strategic highway and social infrastructure being provided to accommodate the demand from the strategic extension at MKE, most notably delivering satisfactory transport connections across the M1 into the centre of Milton Keynes.

1.2.4. It is understood that MKC was successful in their bid for a Housing Infrastructure Funding (HIF) and secured funding for the strategic infrastructure required to enable the site to come forwards, in line with Policy SD12 of the Plan:MK. The new strategic infrastructure enabling the delivery of the MKE development would include:

- A new bridge over the M1;
- A new north-south connection to the A422 into the MKE SUE;
- A new east-west connection leading to the bridge crossing over the M1 and a new link road around the eastern perimeter of the site connecting into M1 J14;
- Dualling of the A509 southbound approach to M1 J14; and
- Closure of the Newport Road junction with the A509 and reconfiguration of Newport Road to form a new junction with the eastern perimeter road and connection to the village of Moulsoe.

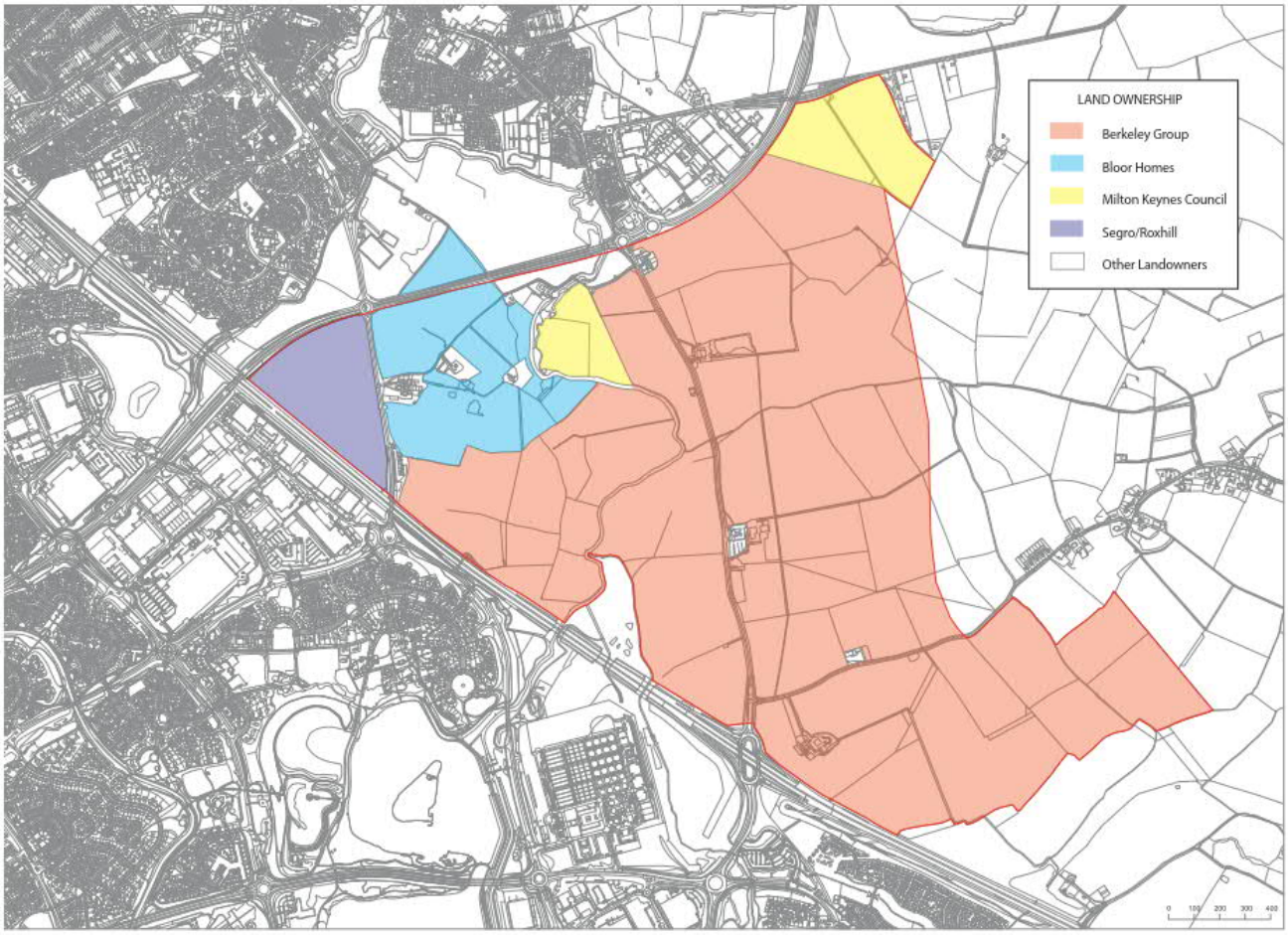
1.2.5. A Development Framework (DF) has also recently been adopted for the site setting out some key considerations and parameters for bringing forwards development on the site.

1.2.6. As set out in Plan:MK, growth east of the M1 is reliant upon the strategic highway and social infrastructure being provided to accommodate the demand from the strategic extension at MKE, most notably delivering satisfactory transport connections across the M1 into the centre of MK. This is reflected both within Plan:MK Policy SD12 and the aforementioned Development Framework.

1.2.7. The MKE site includes parcels which will be delivered by other parties (i.e. not Berkeley), including Bloor, Segro (Roxhill) and MKC. This note relates solely to the approach proposed by Berkeley albeit is recognised that it may be beneficial for this approach to be adopted by others in due course if accepted by both MKC and HE.

1.2.8. Figure 1-2 below outlines the current land ownership boundaries, taken from the Development Framework SPD.

Figure 1-2 - MKESUE - Land Ownership Boundaries



1.2.9. WSP is acting on behalf of Berkeley St James as the majority land holder. The application submitted will therefore be for the Berkeley controlled land and will be assessed independently from the other holdings. It is expected that the other site areas will be included as part of the cumulative testing within the modelling.

1.3 PURPOSE OF THE REPORT

1.3.1. This Transport Assessment Scoping Report is therefore intended to aid discussions between WSP and Milton Keynes (MKC) as the local highway authority, and with Highways England (HE) as the highway authority for the Strategic Road Network (SRN) for the Berkeley land.

1.3.2. This report has been prepared in accordance with the guidance set out in the web-based Planning Practice Guidance (PPG) under a category entitled '*Travel Plans, Transport Assessments and Statements*' published in March 2014. The report sets out the tasks, we believe, are necessary to ensure that the PPG is met and an accurate Transport Assessment (TA) and (Framework) Travel Plan (FTP) is produced.

2 DEVELOPMENT PROPOSALS

2.1 INTRODUCTION

2.1.1. As identified above, the land allocated for the MKE development consists of several sites under different ownership, with Berkeley St James controlling the majority of the allocated land.

2.1.2. It is acknowledged that the other landowners would also aim to develop their respective sites, and any assessment undertaken for the part of the MKE development under St James's control would need to take into account these sites (as a cumulative development test).

2.1.3. For the purposes of this Scoping report, this primarily focuses on the Berkeley St James proposed development only, however the development framework and wider allocation are discussed below.

2.1 DEVELOPMENT FRAMEWORK SPD

2.1.1. A Development Framework (DF) has recently been adopted as a Supplementary Planning Document (SPD) – March 2020. The Development Framework accords with Plan:MK and the National Planning Policy and sets out some key considerations and parameters for bringing forwards development on the site.

2.1.2. The Development Framework establishes:

- Vision
- Spatial disposition of land uses
- Development principles
- Infrastructure delivery

2.1.3. A key objective of the Development Framework is to ensure that the MKE site is brought forward in a strategic and comprehensive manner. Given that MKE land holdings are owned by a number of parties, the Development Framework looks holistically at the development of the site. The Development Framework will help to speed up housing delivery by adding certainty to the planning process.

2.1.4. The Development Framework provides guidance and further detail to the development principles set out in the adopted Plan:MK.

2.1.5. The planning application for the Berkeley site will ensure that the design of the scheme will have the principles and guidance as set out in the Development Framework within the heart of the design.

2.1.6. It may be that as part of the application, alternative solutions and land use arrangements could come forward as part of the planning process and where this occurs, the TA and supporting planning documentation will explain the reasons for any significant differences in approach.

2.1.7. The Berkeley development will follow the over-arching principles as set out in the Development Framework SPD which include;

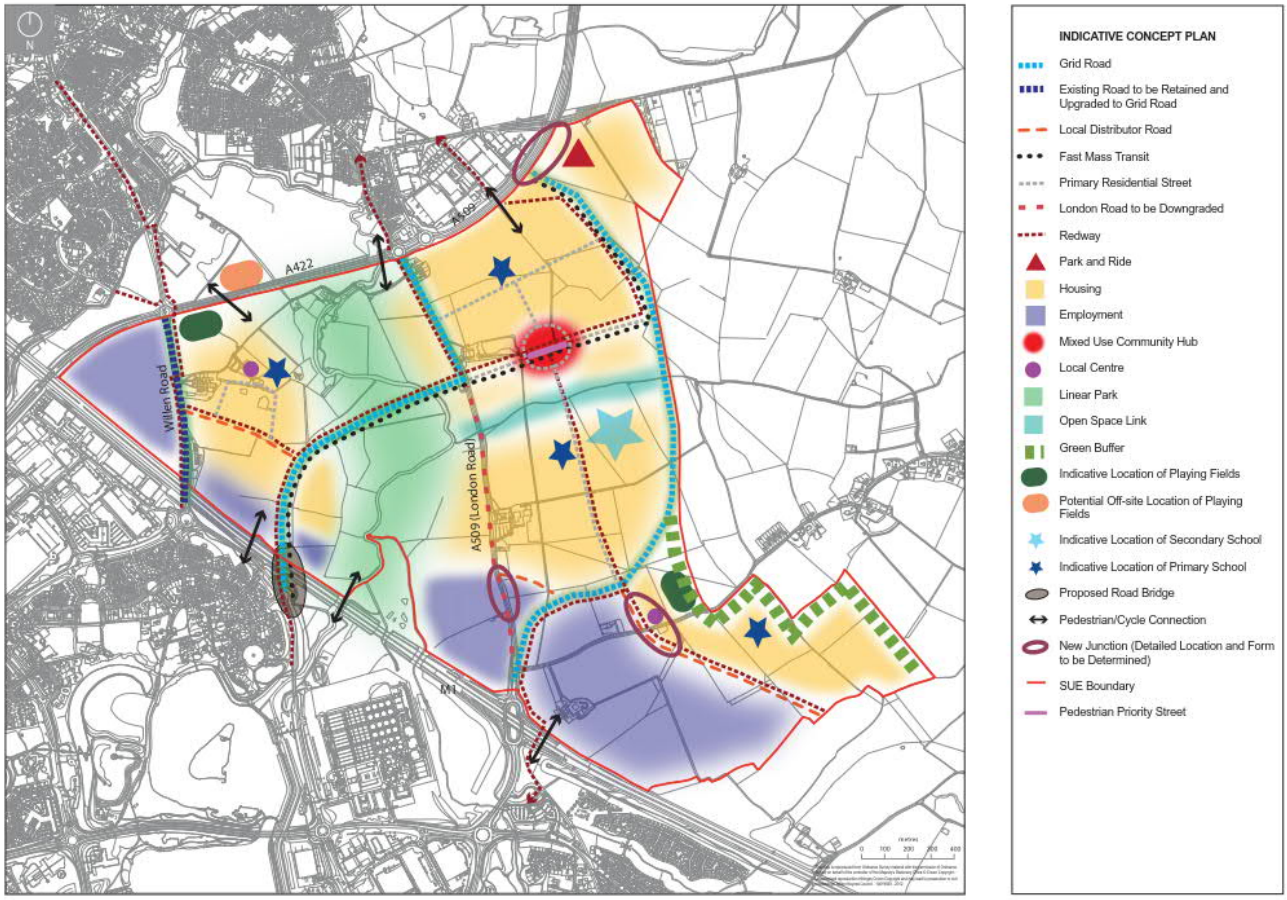
- Active modes
- Permeability
- New Strategic routes & connections
- Sustainable movement & rapid transit
- Minimised impact of transport corridors
- Quality placemaking

- Density
- Social & Community
- Economic Role
- Retail & Centre
- Green and Blue infrastructure
- Biodiversity

2.1.8. The Development framework Concept Plan (Shown in Figure 2-1 below) has been developed in order to spatially interpret the vision and development principles for the new community. The key features of the concept plan are:

- a linear park based around the River Ouzel corridor;
- a landscape buffer to Moulsoe;
- a mixed use community hub at the heart of the main residential area;
- a secondary school close to the community hub;
- four primary schools spread equidistantly around the residential areas;
- a new road bridge over the M1 providing an improved link to CMK and the urban area of MK; and reducing pressure on the A422;
- safeguarded route for a fast mass transit route;
- a park and ride site;
- employment development along the edge of the motorway;
- pedestrian/cycle connections across the M1 and A422;
- an outer road to allow through traffic to move through the site without conflicting with areas of housing and the people-centric places within the site;
- Willen Road to be retained and upgraded to a grid road;
- downgrade of A509 London Road through the site to avoid it becoming a through route.

Figure 2-1 - Development Framework Concept Plan



2.1.9. The Berkeley development application will seek to adopt the principles behind the concept plan where possible and will engage with MKC and Highways England, where appropriate over changes and / adjustments to links or infrastructure.

2.2 DEVELOPMENT QUANTUM TO BE TESTED

2.2.1. The Berkeley land covers the majority of the developable area within the allocated site. It is acknowledged that other land holders will also prepare separate applications under the framework umbrella. Those separate applications may wish to test a different number of households and as such could result in a number of dwellings higher than the development framework and allocation.

2.2.2. There is a requirement to test the application quantum as well as ensuring that the wider MKE allocation is also factored in within any modelling moving forwards.

2.2.3. Through discussions with MKC, it has been suggested that a higher number of residential units is tested to account for this variability. This approach is sensible to ensure that a suitable level of infrastructure is provided at the site and that any off-site mitigation is reviewed appropriately. It was suggested that 10% uplift on the allocation number could be suitable. This was agreed via a online meeting on 30 April 2020. Meeting notes of those discussions are contained within TTN3 – Trip Generation, which is issued as a separate document.

2.2.4. A proving layout exercise is underway, so the final number for the Berkeley land holding is not available, therefore, Berkeley propose to submit an application in the region of 4,000 - 4,500 homes (as part of a wider 5,500 homes - 10% on 5,000 homes) and 85 hectares of employment / circa 4.0m sqft (as part of a wider 105 hectares).

2.2.5. The proposals that would be subject to the forthcoming Transport Assessment would indicatively include the following:

Berkeley Application	**Allocation total (with residential uplift)**
4,000 - 4,500 homes	5,500
circa 85Ha of employment	105 Ha
a secondary school	A secondary school
3 primary schools	up to 4 primary schools (assuming one is located within the Bloor land)
a community hub / centre including healthcare, retail and leisure facilities	a community hub / centre including healthcare, retail and leisure facilities

2.2.6. The modelling methodology to be used in the strategic modelling regarding the application and wider allocation was also discussed during the 30 April 2020 meeting.

2.2.7. It was confirmed that the strategic MKMMM outputs can be extracted by zone, which in turn will allow dissemination of flows / impacts by each land holder. This will allow a greater understanding of which area of the allocation requires further assessment or potential mitigation. Although it should be noted, as set out in TN1, the strategic model will be used to inform discrete junction tests within the TA, using appropriate detailed modelling methods. This is discussed further below and in TN1.

2.2.8. The infrastructure associated with the land uses outlined above would also be delivered as part of the proposals and would be complemented by the infrastructure provided as part of the HIF as outlined in Section 1 of this report.

2.3 ACCESS STRATEGY

2.3.1. Given the size of the site and the scale of the proposals, several infrastructure schemes would be delivered to enable access to the proposed development. These schemes, either delivered as part of the proposals or the HIF, would provide all mode access points to the new development. The access strategy is interlinked with the HIF infrastructure and will be detailed both as part of the TA and through separate discussions with the relevant MKC officers.

2.3.2. In addition to the above, it is expected that several connections with the existing Public Rights of Way (PROW) and other pedestrian/cyclist facilities in the area would be created to enhance the site's connectivity further.

2.4 SITE LAYOUT

2.4.1. At this stage, the masterplan for the MKE site is under development. The site layout is to be designed in accordance with the guidance contained in Manual for Streets 1 and 2 (MfS 1 and MfS 2) as well as the Development Framework discussed above and the current MKC design standards (*New*

Residential Development Design Guide – Supplementary Planning Document, April 2012). The development will also align with the Development Framework SPD.

2.4.2. The Council adopted the New Residential Development Design Guide as a Supplementary Planning Document in April 2012. The Design Guide provides guidance on the structuring elements of a large development (e.g. the movement network, parking), as well as more detailed guidance at the scale of the street and individual dwelling. The new housing development within MKE will take account of the guidance in the Design Guide.

2.4.3. The development proposals seek to create a high value, a high-quality development delivering a strong sense of place. In line with the guidance contained in MfS, the masterplan would focus on the needs of people, capturing opportunities to produce a streetscape that encourage low vehicle speeds and achieve an environment for sustainable modes of transport.

2.4.4. Highway safety is an important factor in the design approach to the masterplan. The streets within the site would deliver pedestrian/cyclist crossing points at appropriate locations allowing the footways/cycleways to provide connections between the desired destinations within the site and beyond.

2.4.1. The development's street network would provide sections of off-road footway/cycleways. However, in line with the aim to achieve a permeable neighbourhood, several pedestrian/cycle routes would connect quiet streets as well as the existing PROWs to exploit the potential for walking and cycling.

2.4.2. The street network is to be designed with residential frontage development to provide natural surveillance; together the development would deliver a network of streets and places that where it is safe to walk, cycle and even play.

2.4.3. Consideration would also be given to the emerging MK 2050 Vision when developing the masterplan for the site, in particular future public transport corridors being considered by MKC.

2.4.4. As per the Development Framework, the site will seek to link into the existing redway, leisure route and rights of way network, and extend it into areas of development where practical and feasible to do so.

2.5 MOBILITY IMPAIRED

2.5.1. As well as ensuring excellent coverage of footway and cycle access throughout the development, the topography of the site would, as far as reasonably practicable, provide shallow gradients of up to 1 in 20 to promote inclusive access for all users including disabled and the elderly.

2.6 HIGHWAY LAYOUT

2.6.1. The strategic highway layout for the site was developed in consultation with MKC officers through both the Development Framework process and the HIF bid, albeit further dialogue is due to take place to discuss the detail of some aspects of the layout and agree the following:

- Cross-sections;
- Junction forms;
- Road hierarchy within the masterplan;
- Road typologies; and
- Footway/cycleway routes, in particular red-ways, etc.

2.7 CAR AND CYCLE PARKING PROVISION

2.7.1. Car and cycle parking throughout the site is to be provided in line with MKC's parking standards that are in place at the time of either the Hybrid Planning Application (for Phase 1 of the development) or the Reserved Matters planning applications associated with the rest of the development.

2.7.2. During the development of the site layout for the outline application, due consideration is to be given to the current standards and discussions held with MKC officers about the amount of parking provided within different areas of the masterplan depending on the specific land uses.

2.7.3. Currently, the applicable parking standards are detailed in MKC's document entitled *Parking Standards - Supplementary Planning Document* (January 2016).

2.7.4. The Supplementary Planning Document (SPD) applies a zonal approach to the parking provision:

- Zone 1: Central Milton Keynes and Cambell Park;
- Zone 2: The district centres of Westcroft and Kingston, the MK1/Stadium MK area and the older town centres of Woburn Sands, Fenny Stratford, Bletchley, Stony Stratford, Wolverton, Newport Pagnell and Olney;
- Zone 3: The remaining areas of the city not identified in Zones 1 and 2, and the rural towns of Newport Pagnell, Olney and Woburn Sands; and
- Zone 4: The rest of the MKC area, which is mostly the rural areas.

2.7.5. Whilst it is acknowledged that the MKE site sits largely within Zone 4 due to the existing land uses, it should be noted that further discussion on the application of different zone rates for the site will be required with MKC.

2.7.6. The MKE site will develop a highly connected site, with improved public transport and walking / cycling connections. Furthermore, it is expected that the site will develop a range of character areas and varying densities throughout. This combined with other social infrastructure, such as schools and community centres will enable the site to be self-sufficient and promote sustainable modes from the outset.

2.7.7. As such, it is considered appropriate to review the parking zones and its application against the development areas in due course. For ease of review the relevant parking standards are discussed below.

RESIDENTIAL

2.7.8. The residential (use class C3) parking standards applicable to each of the zones outlined above are summarised in Table 2-1 below.

Table 2-1 – Vehicular Residential Parking Standards (minimum)

Dwelling Size	Zone 1	Zone 2	Zone 3	Zone 4
1 bedroom flat/house	1	1+0.33 unallocated	1+0.33 unallocated	1+0.33 unallocated
2 bedroom flat	1	1+0.33 unallocated	1+0.75 unallocated	1+0.75 unallocated
2 bedroom house	1	1+0.33 unallocated	2+0.25 unallocated	2+0.25 unallocated
3 bedroom house	2	1+0.33 unallocated	2+0.5 unallocated	2+0.5 unallocated
4+ bedroom house	2	1+0.33 unallocated	2+0.5 unallocated	3+0.33 unallocated

Source: Parking Standards SPD (January 2016)

2.7.9. It is considered that reviewing against current SPD mapping, the proposed MKE development would be situated in Zone 3 or 4. However, as noted above, the scale, mix of uses and likely accessibility to sustainable modes of transport suggests that a lower parking standard could potentially apply to the MKE site.

2.7.10. It is proposed that a mix of parking standards that reflect the character areas of the Developmen Framework and MKE proposals are applied. Further discussions and MKC's view on this matter is welcomed.

EMPLOYMENT

2.7.11. Parking standards for employment land uses are also detailed in the SPD. The vehicle parking standards for the employment land uses proposed as part of the MKE development (i.e. B1, B2 and B8 use classes) are provided in Table 2-2 below:

Table 2-2 - Vehicular Employment Parking Standards (minimum)

Use Class	Zone 1	Zone 2	Zone 3	Zone 4
B1(a, b, c)**	1 per 50m^2	1 per 50m^2	1 per 30m^2	1 per 30m^2
B2	Not appropriate in this location	1 per 100 m^2 + office element as per B1 + 1.0 HGV per 300 m^2 or min 1	1 per 60 + office element as per B1 + 1.0 HGV per 300 m^2 or min 1	1 per 60 + office element as per B1 + 1.0 HGV per 300 m^2 or min 1
B8	Not appropriate in this location	1 per 166 m^2 + office element as per B1 + 1.0 HGV per 300 m^2 or min 1	1 per 100 m^2 + office element as per B1 + 1.0 HGV per 300 m^2 or min 1	1 per 100 m^2 + office element as per B1 + 1.0 HGV per 300 m^2 or min 1

Source: Parking Standards SPD (January 2016) ** B1 units over 300m2 are expected to provide one HGV space per 500m^2 or a minimum of 1.

2.7.12. Similar to residential land use, it is considered that the proposed MKE development would be situated in Zone 3 or 4. However, the scale, mix of uses and likely accessibility to sustainable modes of transport suggests that a lower parking standard could potentially apply to the MKE site. MKC view on this matter is welcomed.

EDUCATION

2.7.13. As outlined above, the proposals also include several educational facilities (use class D1 - Education). The summary of the minimum parking standards as outlined in the Parking Standards SPD is provided in Table 2-3 below.

Table 2-3 - Vehicular Educational Parking Standards (minimum)

Age	Zone 1	Zone 2	Zone 3	Zone 4
Age 4-7 years	1 per 3 staff + 1 drop drop-off per 9 pupils	1 per 2 FTE staff + 1 drop-off space per 9 pupils	1 per 1 FTE staff + 1 drop-off space per 6 pupils	1 per 1 FTE staff + 1 drop-off space per 6 pupils
Age 8-11 years	1 per 3 staff + 1 drop-off space per 12 pupils	1 per 2 FTE staff + 1 drop-off space per 12 pupils	1 per 1 FTE staff + 1 drop-off space per 8 pupils	1 per 1 FTE staff + 1 drop-off space per 8 pupils
Age 4-11 years	1 per 3 FTE staff + 1 drop-off space per 12 pupils	1 per 2 FTE staff + 1 drop-off space per 12 pupils	1 per 1 FTE staff + 1 drop-off space per 8 pupils	1 per 1 FTE staff + 1 drop-off space per 8 pupils
Age 11 years+	1 per 3 staff + 15 drop-off spaces for the first 500 children and 30 thereafter.	1 per 2 FTE staff + 15 drop-off spaces for the first 500 children and 30 thereafter.	1 per 1 FTE staff + 20 drop-off spaces for the first 500 children and 30 thereafter.	1 per 1 FTE staff + 20 drop-off spaces for the first 500 children and 30 thereafter.

Source: Parking Standards SPD (January 2016)

N.B. Relaxation of the parking standards for drop off spaces for schools might be considered acceptable subject to local circumstances and the car journey reducing measures in an agreed Travel Plan.

2.7.14. Similar to other proposed land uses, it is considered that the proposed MKE development would benefit from accessibility to sustainable modes of transport, which suggests that a lower parking standard could potentially apply to the MKE site. MKC view on this matter is welcomed.

OTHER USES

2.7.15. The proposals may also include a provision of a local centre with a range of facilities such as healthcare, retail and leisure. However, the details of these are not yet known. The minimum parking standards provided in the SPD would be applied to other land use classes once established.

PARKING FOR ELECTRIC VEHICLES

2.7.16. The SPD also acknowledges the need for electric vehicle parking in future developments. As a significant and sustainable development, the MKE development would likely seek to accommodate the standards set out in Table 2-4 below.

Table 2-4 - Parking Standards for electric vehicles in non-residential developments

Car Parking Provision	Minimum Provision
1-20	0 space
21-50	1 space, 1 electric charging point
51-100	2 spaces, 2 electric charging points
1 space and 1 charging point per 100 car parking spaces thereafter	

Source: Parking Standards SPD (January 2016

2.7.17. The standards above are for non-residential developments only. Confirmation on the residential EV provision expected from MKC is required. In addition to the charging point provision outlined in Table 2-4 above, 10% of car parking provision to have passive provision to allow conversion at a later date.

PARKING FOR PEOPLE WITH DISABILITIES

2.7.18. Car parking for people with disabilities would be provided in accordance with the relevant guidance provided in the document entitled *Inclusive Mobility* (Department for Transport, 2005). It is suggested that 5% of provision for employment uses and 6% of all other non-residential use classes should be suitable for blue badge holders

2.7.19. The parking would entail larger parking bays to allow easier access, as well as any additional circulation zones that may be required.

CYCLE PARKING

2.7.20. The development would seek to supply high-quality cycle parking facilities for residents, employees and visitors of the development and locate these in the proximity of cycle routes and desired lines of travel throughout the site as a means of maximising the ability for people to cycle.

2.7.21. Cycle parking standards are also detailed in the SPD. Table 2-5 below provides a summary of the residential cycle parking standards.

Table 2-5 – Cycle Parking Standards

Use Class	Casual/Visitor Parking	Employee/Resident Parking
C3 – Residential		
▪ 1 or 2 bedroom	2 per 40 units	1 per unit
▪ 3 + bedrooms		2 per unit
▪ Houses in multiple occupation		1 per 2 bedrooms
B – Employment		
▪ B1 (a, b, c) - Business	Min 2 for visitors and at 1 per 500m^2 thereafter	1 per 120m^2 or 1 per 10 FTE staff
▪ B2 – General industrial	Min 2 for visitors and at 1 per 500m^2 thereafter	1 per 400m^2 or 1 per 10 FTE staff
▪ B8 – Storage and Distribution	Min 2 for visitors and at 1 per 1000m^2 thereafter	1 per 700m^2 or 1 per 10 FTE staff
D1 – Education		
▪ Age 4-7 years	1 per year group	1 per 8 pupils + 1 per 10 FTE
▪ Age 8-11 years		1 per 6 pupils + 1 per 10 FTE
▪ Age 4-11 years		1 per 7 pupils + 1 per 10 FTE
▪ Age 11 years+		1 per 5 students + 1 per 10 FTE

2.7.22. Similar to the vehicular parking for other uses, the parking standards provided in the Parking Standards SPD would be applied to other land use classes once established.

2.8 MK FUTURES 2050 & SMART MOBILITY

2.8.1. In addition to the provision of the site layout as outlined above, due consideration would be given to emerging technologies such as mobility as a service, connected and autonomous vehicles, and others.

2.8.2. The potential measures that could be employed to future proof the proposed development would be subject to discussions with MKC. The prospective future mobility measures will be discussed in greater detail in a Transport Technical Note that will be issued once completed.

2.8.3. The site will seek to incorporate the strategies set out in the MK Future 2050 plan where possible.

2.8.4. In their MKC's 2016 report 'Making a Great City Greater', the MK Futures 2050 Commission proposed a long-term 2050 vision and Six Big Projects to create a stronger future for the city. These Six Big Projects were intended to be transformational and interdependent. They included delivering a movement network that works for everyone, so that there are efficient, cost-effective and reliable alternatives to using the private car; helping to attract investment and build the retail, leisure, employment and residential offer in Central Milton Keynes (CMK) so it becomes a vibrant, buzzing place that attracts people, activity and investment; and developing a city centre university, to create our own talent pool of graduates to help build our future economy.

2.8.5. The 2050 Strategy for Milton Keynes is designed to guide the next phase of the city's growth, building on the work of the Commission and the current delivery of the six projects.

2.8.6. The Strategy for 2050 will set out how the sustainable growth ambition for Milton Keynes will be delivered and provide a context for statutory planning over the period and sets out:

- how sustained, planned and significant long term growth will benefit existing communities, improving opportunities and quality of life for everyone who lives and spends time in MK;
- how MKC can work with partners including central government, the housebuilding industry and landowners, local communities and stakeholders to deliver successful, inclusive growth; and
- how MKC can ensure that development is managed in a planned way, that focuses on creating the place that Milton Keynes wants to be in the future.

2.8.7. The 2050 Strategy will endeavour to put people at the heart of the growth story for the city, creating a plan for how we can maintain the best of the place, fix the things that could work better, and build a city that works for everyone, not just those living in the new homes or working in new jobs, or those that have access to a private car to travel around the city.

2.8.8. The MKE site seeks deliver development needed to meet the needs of Milton Keynes now, but also to be sufficiently flexible and forward- thinking to pave the way for a future Milton Keynes that aligns with the 2050 Strategy.

2.8.9. The adoption of a Future Mobility approach follows the 2050 strategy and sets out ambitious targets to apply to the site's future year assessments.

MASS RAPID TRANSIT (MRT)

2.8.10. A key element in the delivery of the Council's Mobility Strategy is to optimise mass transit access in new development areas. The development of MKE should enable the future provision of a fast mass rapid transit (MRT) system linking the urban extension with CMK.

2.8.11. The MKE site will be designed to accommodate accessible, frequent and high quality public transport connections at key hubs within the development, including being future-proofed to accommodate and integrate with potential mass rapid transit as part of a wider system for Milton Keynes.

2.8.12. The road network and new bridge over the M1 will be designed to enable the future provision of a mass transit system. The Development Framework sets out the potential MRT route through the site.

2.8.13. The exact nature of the mass transit system is not known at this stage. Therefore, the intention is for the road infrastructure to be designed to enable a range of potential arrangements and systems to be possible. It is envisaged that there will be mass transit boarding points within the community hub, and at the park and ride site. As the MRT is a MKC initiative, it is not the sole responsibility of the site to deliver the whole of the scheme, but as noted above, the design will seek to accommodate the proposals as far as feasible.

2.8.14. A review of existing MRT and P&R sites has been undertaken within TTN6, which forms an appendix to TTN3 Trip Generation note. TTN6 provides an evidence based review of the potential mode shift from private vehicle to MRT that code occur as a result of introduction of the schemes.

2.8.15. The MRT scheme will be a major positive in the promotion of sustainable travel not just at the development, but throughout MK. The MRT details are not fixed and whilst it would clearly be of a huge benefit to the MKE site, including the potential for mode share shift away from private vehicular use, the assessments will not take into account any potential mode shift / impact from the MRT proposals. This is considered to be a robust assumption given the early nature of the MRT initiative, however, it may be possible that later phases of the site incorporate MRT use as part of any RMA.

PARK AND RIDE

2.8.16. The development includes a 2.5 - 5 ha site, safeguarded for a park and ride (P&R) in the north-eastern corner of the site. The size of site provided will be determined following further assessment during the RMA stages of the development process.

2.8.17. The P&R will pick up traffic entering Milton Keynes from the north along the A509. The P&R site is located on the route of the proposed fast mass transit system and it is envisaged that it will be served by a boarding point.

2.8.18. Similar to the MRT, it is proposed that any future year assessments do not take into account the potential positive impacts of the P&R within the modelling at this stage. The P&R will be a great opportunity to transfer vehicular trips away from the A509 (and other strategic links) and therefore could remove vehicular trips from the network after they reach the site. It is robust not to assume this transference in the modelling, but the impacts of the P&R could be assessed during later Phases of the site. This is covered within TTN6 as well.

3 TRANSPORT ASSESSMENT SCOPE

3.1 INTRODUCTION

3.1.1. A comprehensive TA will be prepared in support of the planning application, inclusive of the elements detailed in this section of the Scoping Report.

3.2 REVIEW OF RELEVANT NATIONAL AND LOCAL POLICY.

3.2.1. The TA will provide a review of both the national and local transport policy relevant to the proposals.

3.2.2. The national policy will include:

- National Planning Policy Framework (DCLG, 2019);
- National Planning Practice Guidance (DCLG, 2014); and
- Manual for Streets (DfT, 2007).

3.2.3. The TA will also refer to the relevant local policy, including:

- Plan:MK 2016 – 2031 (MKC, 2019);
- Site Allocations Plan (MKC, 2018);
- Mobility Strategy for Milton Keynes 2018 – 2036 (LTP4): Mobility for All (MKC, 2018);
- Mobility Strategy for Milton Keynes 2018 – 2036 (LTP4): Transport Infrastructure Delivery Plan (MKC, 2019); and
- MKESUE Development Framework SPD, March 2020

3.3 LAND USE AUDIT

3.3.1. A land use audit of the local area will be undertaken and will include the identification of pedestrian/cyclist desire lines. The audit will demonstrate how key local facilities such as retail, employment and education can be accessed from the site by modes of transport other than single-occupancy car and how the development access strategy facilitates ease of access to these desire lines.

3.3.2. It is acknowledged that the MKE site is located in a new development area and as such connections to existing services may be limited. The MKE allocation will also deliver social infrastructure, including primary, secondary schools alongside employment and commercial areas. As such, a review of how the proposed sites land uses interact and connect to the residential parcels will also be undertaken.

3.4 PEDESTRIANS, CYCLES AND PUBLIC TRANSPORT

3.4.1. An appraisal of existing pedestrian and cycle routes and their associated facilities as well as an examination of local rail and bus provision will be undertaken. The appraisal will inform the development of appropriate improvement strategies to existing routes and services (where needed).

3.4.2. Consideration will be given to the routes of the existing PROW within the site boundary and their incorporation in the proposals. This may include diversion, closure and/or replacement of sections of the existing PROW network resulting from the provision of the new pedestrian/cyclist facilities throughout the proposed development.

3.4.3. It is considered that a non-motorised user (NMU) audit or similar will be undertaken. The audit would assess where highway schemes have a potential impact on pedestrians, cyclists or equestrians on

the road network. The assessment will be undertaken during the concept stage and will be completed before the commencement of the preliminary design activities.

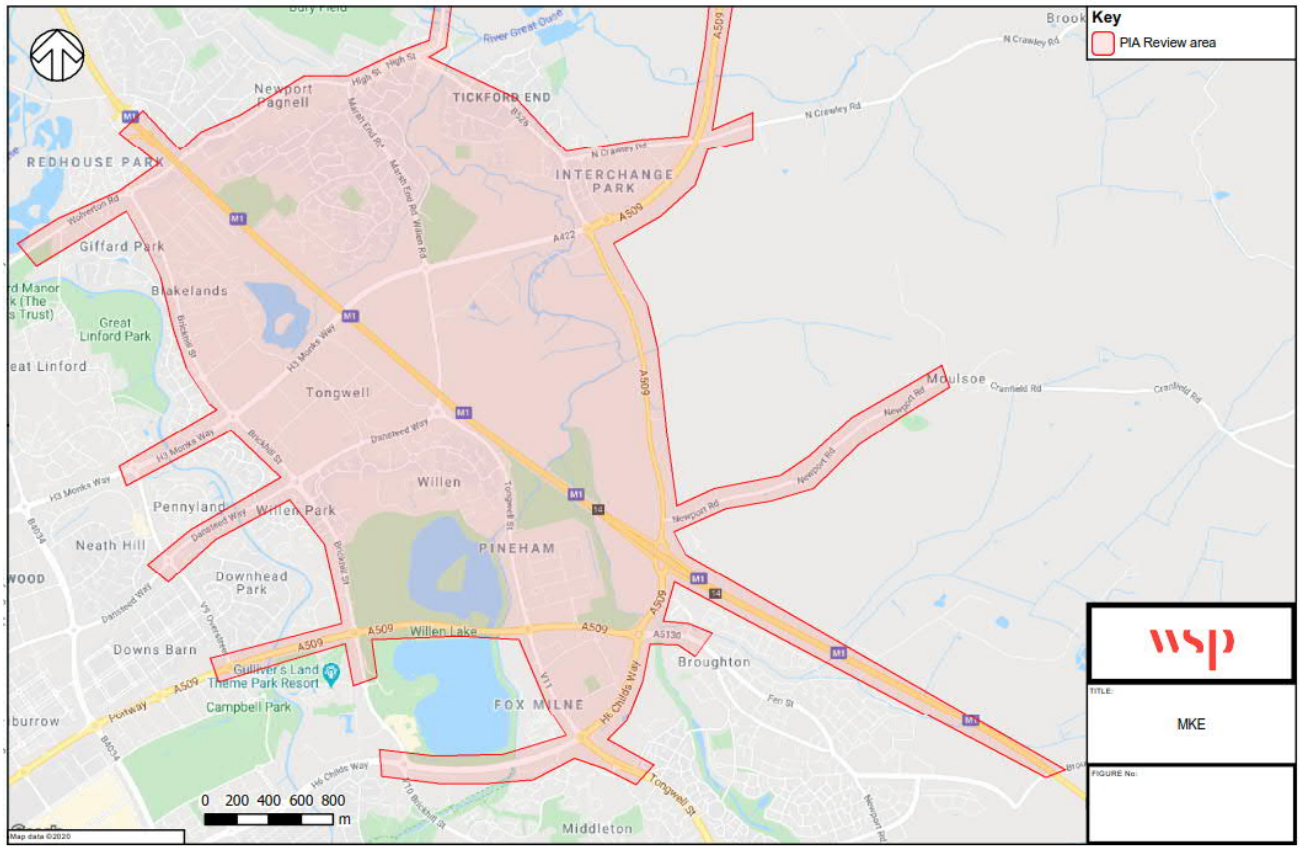
3.4.4. A comprehensive Public Transport Strategy (PTS), the scope of which is discussed in greater detail in Section 5 of this Scoping Report, will be developed and discussed with MKC and the local bus operator(s).

3.5 PERSONAL INJURY ACCIDENT RECORD

3.5.1. The Personal Injury Accident (PIA) records for the most recently available five-year period will be obtained from MKC and HE for the local highway network and Strategic Road Network (SRN respectively.

3.5.2. The proposed indicative extent of the highway network to be considered for the PIA review is shown in Figure 3-1 below.

Figure 3-1 – Proposed PIA Study Area



3.5.3. The records will be reviewed to determine any trends or patterns in accidents, which may be exacerbated by the addition of traffic from the proposed development.

3.5.4. Once modelling has been completed, it may be necessary to review other parts of the network. This will be re-evaluated once there is an understanding on the potential wider impacts of the development proposals.

3.6 DEVELOPMENT IMPACT ASSESSMENT

3.6.1. It is acknowledged that assessments of the potential impact of the proposals on the local highway network will be required using a series of modelling techniques and data sources. This section sets out the proposed approach.

TRIP GENERATION

3.6.2. Whilst it was agreed between MKC and WSP for the HIF application that the MKMMM would be used as a consistent basis for the HIF-specific modelling runs, the highway impacts of the proposed MKE development are proposed to be assessed using a sensitivity test involving bespoke trip rates and future years applied to the MKMMM. This would ensure that the proposed infrastructure is adequate to accommodate forecast demand associated with the proposals.

3.6.3. The rationale behind the future years and their associated trip rate assumptions will be set out in a separate Transport Technical Note (TTN3) that will discuss the following:

- Current status and assumptions of the MKMMM;
- Limitations/potential for a challenge;
- Potential MKMMM refinement for MKE area;
- MKE sensitivity trip rates – methodology;
    - Residential trip rates
    - Employment trip rates
- Comparison with MKMMM and MKSE data;
- Alternative trip rates (i.e. Future Mobility)

3.6.4. The Trip generation TTN3 will be circulated to MKC and HE for review under a separate cover to enable further discussions and agreement.

TRIP DISTRIBUTION AND ASSIGNMENT

3.6.5. It is expected that the distribution and assignment of the traffic generated by the proposed MKE development would be undertaken using the variable demand calculations in the MKMMM. It is understood that the default position is to use the existing base year zone distributions in the model for the forecasts unless there are zero trips in which case the distribution is based on a gravity model.

3.6.6. Given the minimal number of base year trips in the MKMMM zones representing the MKE location, which may not be necessarily representative of the proposed development, it is proposed to override the MKMMM zoning and use the gravity model used instead.

3.6.7. The gravity model uses calibrated functions developed for the base year matrices (trip-length profiles) to estimate a trip distribution based on available attractions.

3.6.8. It is assumed that the above process would be appropriate for the bespoke modelling of MKE development. However, confirmation from MKC/AECOM would be appreciated.

STRATEGIC MODELLING

3.6.9. Ongoing discussions with MKC are taking place regarding the assessment of the MKE development impact. It was agreed between MKC and HE that the existing MKC's strategic multi-modal model (MKMMM) used as part of the evidence base for Plan:MK and the HIF application is fit for the purpose of modelling the proposed MKE development.

3.6.10. However, it should be noted that the MKMMM exists for several scenarios, with those most applicable to the MKE site being the 2031 Reference Case scenario and a 2031 MKE scenario. It is recognised that for the purposes of the planning application, the MKMMM requires further validation and calibration in the area where the MKE development is proposed.

3.6.11. The TTN1: Modelling Approach (included in **Appendix A** of this Scoping Report) detailed the refinements to the MKMMM considered appropriate for the model to represent the MKE development accurately. Included in that Appendix is some further meeting notes following initial discussions with MKC.

3.6.1. The TTN1 document sets out the intentions to assess the scheme, alongside the likely modelling years and scenarios. The modelling approach was issued to MKC and HE in March 2019 (with minor updates re-issued in May 2019).

3.6.2. Highways England, through their consultants, AECOM[1], provided a Modelling Review note on 21 June 2019 which reviewed the MKMMM, the suggested approach and the intended traffic surveys to be used to improve the detail in the MKE modelled area. The review note is included in **Appendix B** of this report.

3.6.3. The HE review note outlined that the application of trip rates different from the default MKMMM rates was acceptable in principle, but that further information would be required. With regards to the modelling approach set out, the HE note continues that whilst further information on the modelling would be required as data is reviewed further, *"In overall terms, the proposals by WSP for the modelling of Milton Keynes East are consistent with the recommendation that the model is enhanced in the local area when developments are proposed."*

3.6.4. As part of the ongoing modelling discussions regarding the Modelling Approach Note, meetings were held in December 2019 with MKC and HE, where it was agreed that a review of the trip generation and mobility measures adopted at the site in the future years should be concluded.

3.6.1. It is also acknowledged that the MKMMM was developed to enable testing of Plan:MK options with the horizon year of 2031. The build-out of the proposed MKE development and its expected completion are anticipated to extend beyond Plan:MK period ending in 2031. As such, due consideration will be given to potential growth in the area after the end of Plan:MK in 2031.

3.6.2. It was previously agreed that a review of the growth between the Plan:MK period ending in 2031 and the expected full build-out year should be undertaken. This exercise would aim to ensure that the model accounts for planned growth in the Milton Keynes area, as well as sites in the wider area delivered after 2031 potentially having an impact on the locality of the proposed MKE development.

3.6.3. The suggested approach and its application are discussed in detail in a separate TTN 4: Growth and Future Year Modelling Approach which will be issued separately for further discussion.

[1] *Please note: this a different team to MKCs incumbent modelling consultants AECOM*

3.6.4. The current MKMMM has a future year of 2031 to align with the local plan period. As discussed in the TTN1: Modelling Approach v2, it was intiailly agreed that a 2031 year and 2039 year test would be adopted, with the latter representing the full build out year of development.

3.6.5. Subsequent updates to the build out schedule and further discussions with MKC has resulted in the revised full build out year of 2048. This is to ensure that completion and delivery rates are robust, defendable and realistic for the MKE site, and are based on existing delivery rates by developers in the MK area.

3.6.6. The modelling scenarios therefore being considered are:

- **2016 Base year**
  - This is supplemented with traffic flow information from 2019 surveys in the MKE area
- **A - 2031 Future year reference case - without Development**
  - To align with the Local Plan period,
  - Includes MKMMM development growth up to 2031 plus the committed developments;
- **B - 2031 Future year with Development**
  - The above scenario, with the interim built out development
- **C - 2048 Future year reference case - without Development**
  - Future year test to represent full build out of the development;
  - Built upon the 2031 reference case with additional growth and committed developments up to 2048 applied
  - This will include, where possible[2], strategic sites relevant from other boroughs
- **D - 2048 Future year with Development**
  - The above scenario, with the full built out development

3.6.7. The Trip Generation TTN3 discusses how to implement an assessment of the site based on a traditional methodology and one that embraces future mobility strategies, design and targets;

3.6.8. The Trip Generation TTN3 will set out in the approach in more detail, however covers the trip generation inputs into Scenarios B and D only. The scenarios that will be set out in that TTN are therefore:

1. **2031 with Development Scenario – traditional methodology** (i.e. the scheme forecast derived under the traditional trip generation analysis comprising scheme vehicular trip generation + 2031 committed development);
2. **2031 with Development Scenario – Future Mobility Scenario** vehicular forecasts applied to 2031 Mobility Masterplanning scenario to form interim year test;
3. **2048 with Development Scenario – traditional methodology** (similar to 2031, but with a bespoke future year + committed development; and
4. **2048 with Development Scenario – Future Mobility Scenario** – 2048 with Development Scenario forecasts applied to relevant Mobility Masterplanning scenario to represent total buildout scenario.

[2] The MKMMM is limited to what sites can be explicitly modelled outside of a core modelled area, however a separate TTN (TTN4) on the 2048 growth will be issued for discussion and agreement with MKC.

3.6.9. It is the intention that as part of the assessments within the Transport Assessment the Future Mobility with development tests (2 and 4) will be assessed against the relevant reference cases (2031 and 2048).

3.6.10. Therefore, the modelling scenarios tests in the TA will utilise the Future Mobility Scenarios within the trip generation inputs. TTN3 outlines the Future Mobility assessment methodology.

DETAILED MODELLING

3.6.11. Following the completion of the strategic modelling work for the future-year scenarios (2031 and 2048) that include the MKE development, the outputs will be analysed to identify which parts of the highway network require more detailed assessment. This will be discussed and agreed in consultation with MKC once the MKMMM modelling results become available, albeit some of the junctions/links can be identified on the back of the analysis undertaken to support the HIF application.

3.6.12. As part of the analysis, it is considered appropriate to review the Volume Over Capacity (VOC) for all turning movements at the junctions in the vicinity of the proposed MKE development. The VOC will inform a more refined list of junctions that will be subject to detailed analysis and junction modelling to assess the impacts of the proposals on their operation.

3.6.13. Following the agreement of the refined list of junctions, the following individual turning flow information extracted from the MKMMM will be required for each of the junctions for both AM and PM peaks, and all assessed scenarios:

- Actual flow
- Demand flow
- Delay

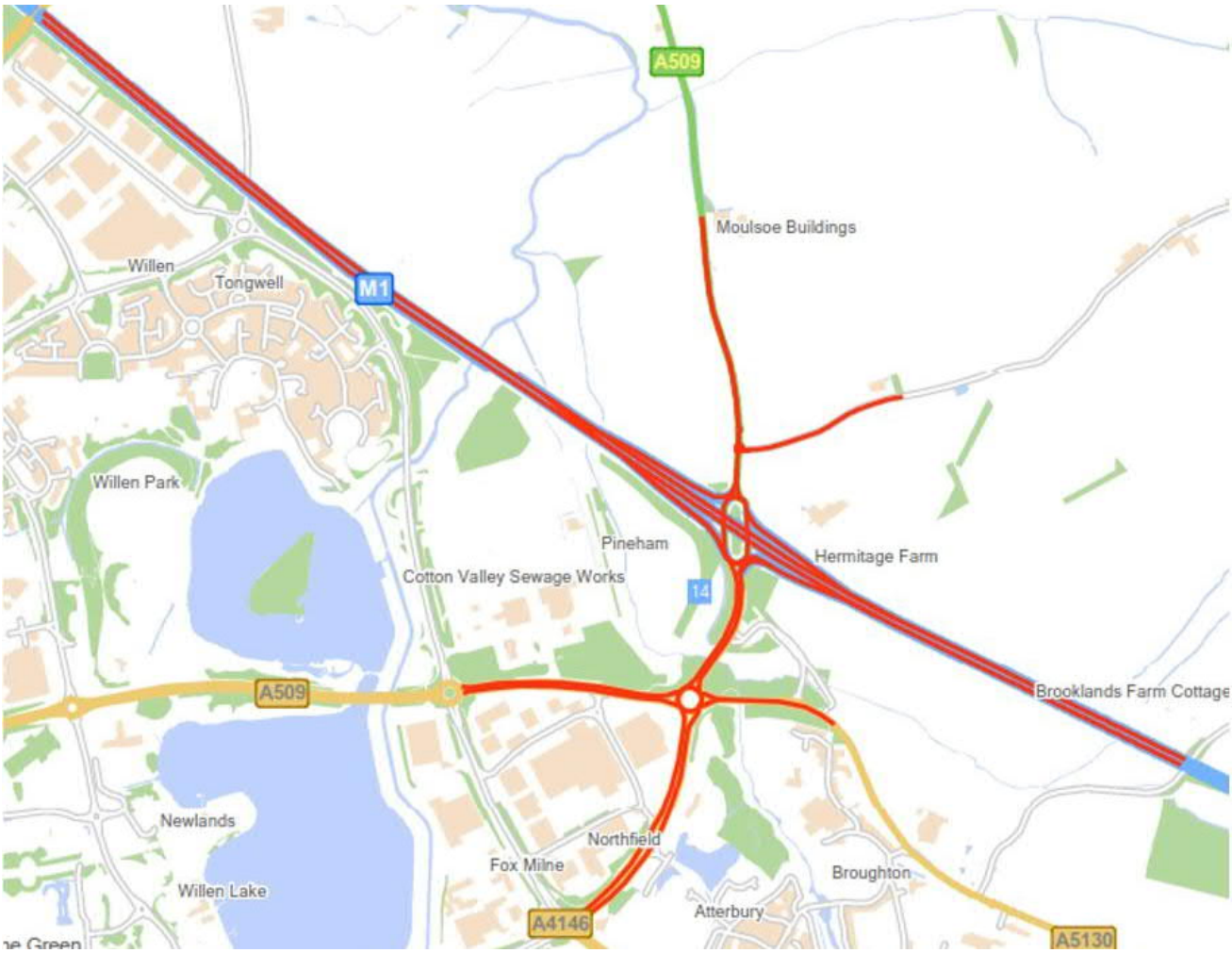
3.6.14. Additionally, it is considered appropriate to extract the actual and demand flows and the delay for each link in the vicinity of the proposed development.

M1 Junction 14

3.6.15. The junctions requiring further assessment will include M1 J14 and its interaction with Northfields Roundabout to the south and, potentially, the new southernmost roundabout junction on the proposed eastern link road through the MKE site.

3.6.16. As part of the evidence-based used for the HIF analysis, Junction 14 of the M1 has been assessed within the microsimulation platform, Paramics, albeit the current model is only validated to 2012 at this stage. It is intended to continue to use this platform but, as for the update to the MKMMM, use new traffic survey data to update the model and re-validate it. The Paramics model covers the extent highlighted red in Figure 3-2 below.

Figure 3-2 - Paramics Study Extent



3.6.17. The Paramics model uses the outputs from the MKMMM and apply the extracted flows to the calibrated and validated base year Paramics model in the assessment of the future year scenarios.

3.6.18. The base model LMVR for the Paramics has been issued to MKC and Highways England. MKC have confirmed that they are happy in principle with its use.

3.7 DEVELOPMENT ASSESSMENT STRATEGY

3.7.1. Based on the modelling approach outlined above, the proposed assessment strategy will adopt the following process:

- Use of MKMMM with alternative trip rate assumptions for the development;
  - Review of the outputs to understand further assessments required
- Agreement on the junctions/links/infrastructure which require further testing;
- Extraction of turning movements, delay and other parameters from the MKMMM for each of the identified junctions;
- Independent junction testing, where required, using the following industry-standard software:
  - Junctions 9/10 (for priority-controlled junctions); and
  - LinSig (for signalised junctions)
  - Paramics (for Junction 14 of the M1)
- Review of junction assessments and development of mitigation strategies (where required); and
- Re-testing the junctions with mitigation in place (if any).

3.7.2. It is not intended to re-run the strategic model with any proposed off-site mitigation in place as it is considered likely that the mitigation strategies required will not be of a large enough nature to be able to be captured within the SATURN model. This will be reviewed and discussed / agreed with MKC once the initial indication of junctions that may require mitigation is completed.

4 TRAVEL PLAN SCOPE

4.1 INTRODUCTION

4.1.1. As the proposed MKE development is a mixed-use development, the TA will be supported by an over-arching umbrella Travel Plan, alongside specific Travel Plans (TPs) which will also include details for individual land uses where appropriate.

4.2 INDIVIDUAL TRAVEL PLANS

4.2.1. As outlined above, it is expected that the following land uses would make up the proposed MKE development:

- C3 – Dwellings/houses;
- B1c – Business, specifically for any industrial process;
- B2 – General Industrial;
- B8 – Storage or Distribution;
- D1 - Education

4.2.2. The individual TPs will be prepared in line with the following MKC's guidance:

- Residential Travel Planning: https://www.milton-keynes.gov.uk/highways-and-transport-hub/residential-travel-planning
- Workplace Travel Plans: A step by step guide (MKC, 2015)
- Sustainable Modes of Travel Strategy 2016-17 (MKC, 2016)

4.2.3. It should also be noted that the employment uses are likely to have shift-based work in either bi or tri-daily rotations. Therefore, the quantity and severity of movement are to be taken into consideration.

4.3 SCOPE

4.3.1. The TPs will be prepared to complement and accompany the planning application and will demonstrate that the development will conform to sustainable development principles. Furthermore, the TPs are intended to serve as a strategic management tool designed to accommodate the specific transportation needs of the site by mitigating the transport demands of the residents, staff and visitors.

4.3.2. The TPs will set out the intentions of the developer and the various measures that will be implemented at the site, (and built upon through the life of the development proposals), to encourage sustainable travel amongst staff and visitors. The realistic and achievable measures will be tailored to reflect the nature of the proposed development and provide bespoke solutions encouraging sustainable modes of travel.

4.3.3. Generally, individual TPs will include:

- A review of specific travel planning policy and guidance;
- Vision and objectives, connected to overarching aspirations as well as general site-specific aspirations;
- The existing conditions in relation to existing opportunities for sustainable travel and accessibility to and from the development site;
- Travel planning measures - realistic, achievable and appropriate measures will be identified to support existing opportunities and to encourage more trips by sustainable modes to and from the site;

- Targets - in line with national and local policy requirements, a commitment will be set out for appropriate targets to be set;
- Monitoring and review – the TPs will set out the expected monitoring strategy for the site. It is expected that any monitoring will comprise some travel behaviour surveys, although this will be agreed with MKC before surveys are undertaken; and
- Management, implementation and funding - implementation and funding will be in relation to timescales and phasing of measures. An Action Plan will identify potential measures, timescales and responsibilities.

4.3.4. The overall objective of the TPs will be to encourage sustainable travel to the site and to minimise single-occupancy private car journeys. Indicative targets will be set for residents and employees to travel to/from the site by sustainable travel modes. These initially indicative targets will be set based on the existing travel patterns for journeys to work in the area surrounding the site and 2011 Census Data. It is expected that final targets for the TPs will be set following the first round of monitoring surveys.

4.3.5. The TPs will be closely aligned with the Future Mobility strategy of the site and will look to include allowances for emerging trends and uptake in alternative modes / mobility providers.

5 PUBLIC TRANSPORT STRATEGY SCOPE

5.1 INTRODUCTION

5.1.1. A comprehensive Public Transport Strategy (PTS) will be developed in liaison with the public transport team at MKC and local bus operators.

5.2 PURPOSE

5.2.1. The PTS will examine the viability of public transport provisions, including a review of existing bus services in the vicinity of the site and outline the requirements of a new and/or improved existing public transport services to provide additional public transport access for residents, employees and visitors of the proposed development.

5.2.2. Through consultation with MKC and the local service operators, agreement in principle will be sought regarding the nature and routing of any new services complementing the proposed development.

5.3 SCOPE

5.3.1. The PTS will be prepared to complement and accompany the planning application and will demonstrate the development's accessibility to both existing and new public services.

5.3.2. The PTS will set out the developer's intentions in terms of public transport provision and will include:

- A review of specific public transport policy and guidance;
- A public transport vision for the site and aspirations of the PTS;
- A review of the existing conditions in relation to existing public transport services and their accessibility from the development site;
- A detailed description of the public transport proposals, including their routes, frequencies and cost and revenue assumptions.

6 SUMMARY AND CONCLUSIONS

6.1.1. This TSR has set out the intended analysis and information to be provided to support a planning application for the Proposed Development at the land to the northeast of Milton Keynes ('Milton Keynes East' or 'MKE') shown in Figure 1-1.

6.1.2. The TSR has also outlined the scope of the supporting transport-related documents which are envisaged will accompany the planning application.

6.1.3. We trust that the above covers the required analysis and would welcome further discussions and agreement from MKC officers. Due to the location of the site and the proposed connections onto the M1 and SRN, the views of Highways England will also be sought on the assessment proposals.

Appendix A

TTN1: MODELLING APPROACH V2

PROVIDED IN FULL IN APPENDIX A.1

Appendix B

AECOM (HE) REVIEW OF TTN1

TO AVOID DUPLICATION - PROVIDED IN FULL IN APPENDIX C

Appendix B.2

MILTON KEYNES COUNCIL CORRESPONDENCE

Smith, Alex

From: Tate, Martin <Martin.Tate@milton-keynes.gov.uk>
Sent: 29 October 2020 12:44
To: Smith, Alex
Subject: MKE Ref Case infrastructure assumptions
Attachments: MKE Reference Case Schemes 2031 and 2048.xlsx

Hi Alex,
The DM scheme updates 2016-2031 that are in the Reference Case being used for MKE are as follows. They were applied in three separate elements (original Ref Case dating from c. 2017, a subsequent revised Reference Case from c. 2018, and then the changes we made specifically for the MKE model in 2019) so all these are included in our current model.
Once I'd listed them below, I remembered we had an Excel version that is a bit more user friendly!! It's attached. However the below may still be useful if you need more detail on locations, nature of improvements etc so I'll leave it in.
Kind regards,
Martin

From the original RC:

Table 8 Forecast Year Transport Schemes included in Reference Case

Scheme	Delivered by
A421 Dualling	By 2031
Monkston & Brinklow Junctions	2019
Crownhill & Loughton Junctions	2019
A5 Improvements	By 2031
Bletchley Station Highway Improvements	2017
Brooklands City Street Phase 2	2017
Nova City Street	2018
Calverton Lane/Fairways	2021
Kiln Farm Junction	2016
Bridge over Broughton Brook	2018
H10 Extension	2018
V2/H4 Extension	2021
East-West Rail	2024
M1 J13-J16 SMP	By 2031
M1 J16-J19 SMP	2021
M1 J11a / Dunstable Northern Bypass	2017

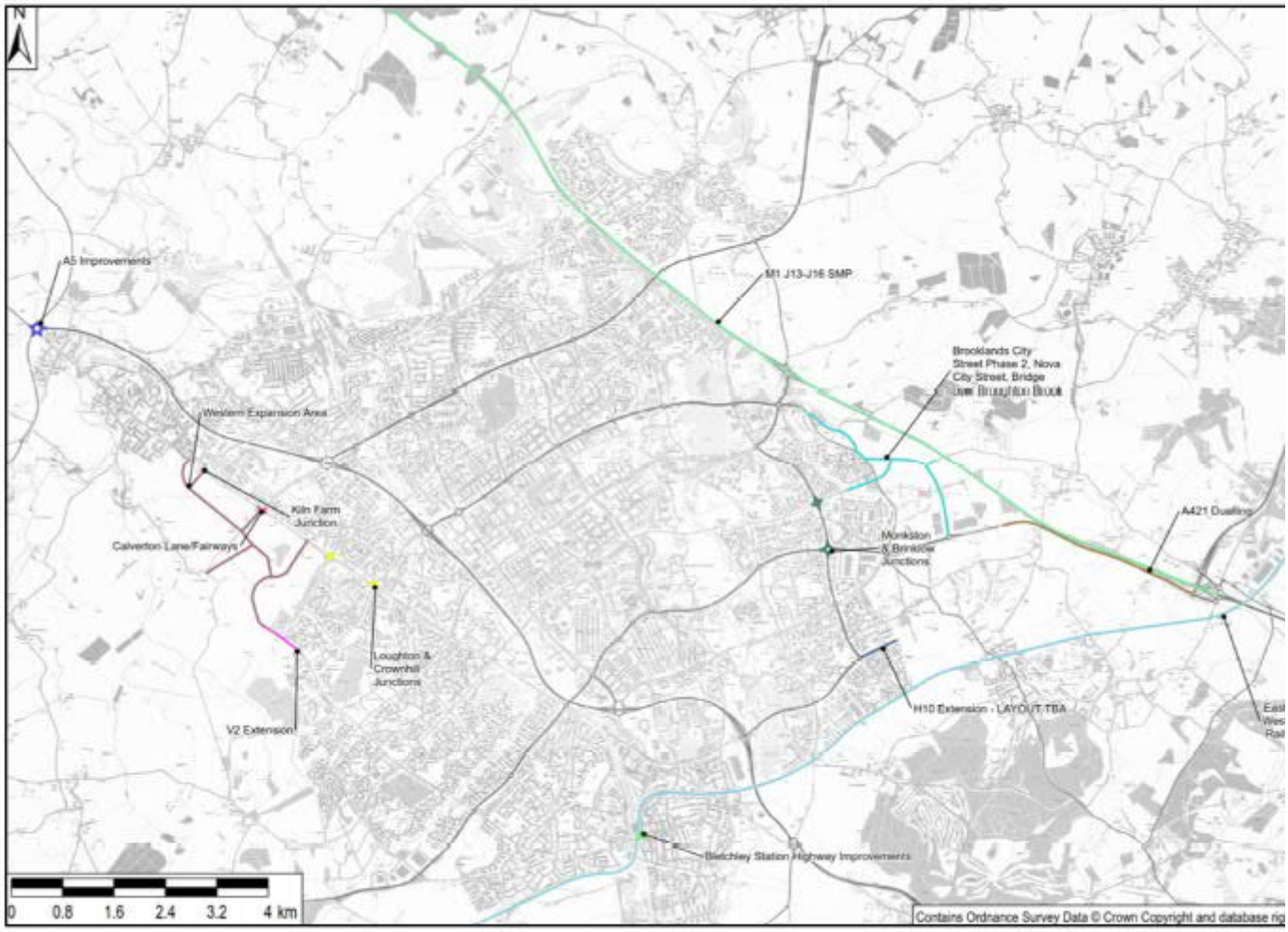


Figure 11. Uncertainty Log Schemes to 2031 included in Reference Case

From the subsequent Revised Reference Case:

- Kellys Kitchen roundabout (A5/A4146/Watling St) converted to signals (Hamburger) after discussion with HE, plus an associated new signalised T-junction access from A4146 to the south of the hamburger into the Eaton Leys development site to the west (not shown below)

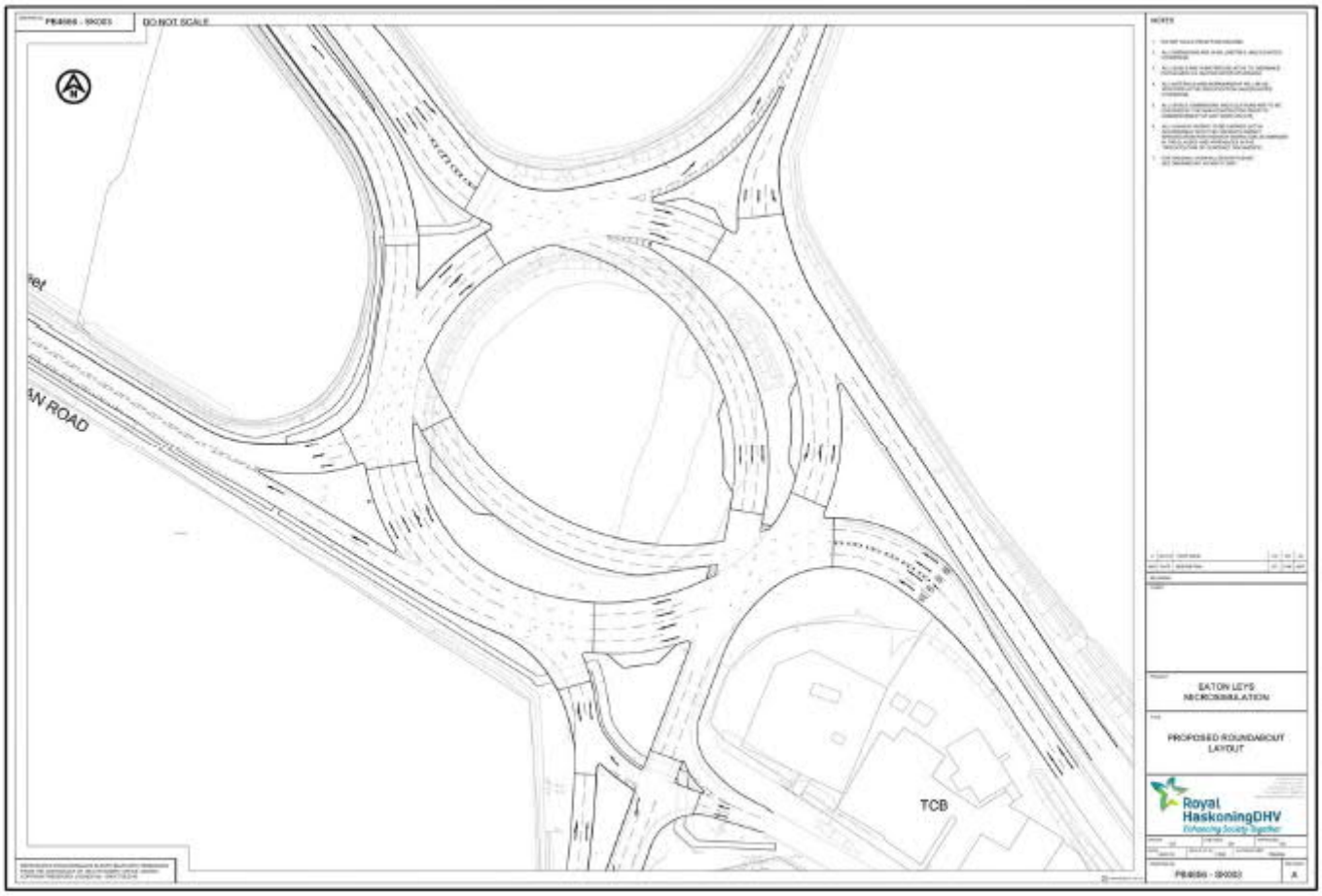


Figure 1. Kelly's Kitchen Proposed Layout (with single A5 north to south lane)

- There were some other changes, but these represented either corrections or refinements to the original RC rather than new schemes, so can be ignored for the purposes of your list

From the HIF refinements:

- M1 J14 according to HE plans
- There were some refinements to coding and the addition of some existing network detail, but again these were not new schemes

I think that's all of them, give me a shout if you need more info.

Smith, Alex

From: Nigel Weeks <nweeks@smtrans.co.uk>
Sent: 13 August 2020 17:27
To: Tate, Martin; Povey, James; Smith, Alex
Subject: RE: MKE Preliminary Ref Case results

Hi Martin

We have had a look and have nothing meaningful to add.

Kind regards

Nigel

From: Tate, Martin [mailto:Martin.Tate@milton-keynes.gov.uk]
Sent: 12 August 2020 16:20
To: Povey, James; Nigel Weeks; Smith, Alex
Subject: MKE Preliminary Ref Case results

Hi all,
I've discussed the preliminary results of the Ref Case with AECOM this morning, who sent the attached summary highlighting points they had noticed and wanted to discuss. I've added some initial thoughts from me as annotations.
In general, I think it looks plausible and therefore promising. A few key points that are also picked up in the attachment are as follows:

- The spread of increased flows and delays across MK looks reasonable given the spread of development anticipated and the distant later forecast year of 2048. There are decreases relative to the base model but these could well be congestion-related, as the diagrams show traffic that actually gets through the network as opposed to traffic that wants to.
- Delays and congestion get severe around Tickford Roundabout in the future years, and it looks as if there is re-routeing through Newport Pagnell as a result. This doesn't surprise me given the evidence of pre-lockdown conditions, and looks sensible given the assumed growth.
- On the call earlier we confirmed what had been a risk identified previously, that the unadjusted network and zone loading in Marston Vale was not up to the task of delivering the 5k homes-worth of new traffic onto the network, with big delays on the zone connector links as a consequence. This is likely to be underestimating the impact of that development, which is an artificial constraint as we assume the local network will be improved to cope.

AECOM has confirmed they can do another full run within the budget and time, so one thing to do is to make some adjustment to the network capacity at Marston Vale to get this traffic loaded onto the A421 properly. We probably need to also look more closely at what's going on at J14 to make sure it looks OK.
I'll continue to have a look through these results, prior to getting back to AECOM with any changes. The main reason for circulating them was to get second opinions as to whether there's anything else we need to pick up on. They want to re-run this week, so ideally I need to get back to them by the end of tomorrow. So any thoughts or knee-jerk reactions welcome.
Many thanks,
Martin

Martin Tate MSc, CMILT, MCIHT
Transport Planner – Multi Modal Model Consultant (Policy & Planning)

Phone: 01908 253852
Mobile: 07732 741433

Email: martin.tate@milton-keynes.gov.uk
Web: https://www.milton-keynes.gov.uk/transport-policy

Milton Keynes Council | Public Realm | Civic Offices | 1 Saxon Gate East | Milton Keynes MK9 3EJ |

Smith, Alex

From:	Tate, Martin <Martin.Tate@milton-keynes.gov.uk>
Sent:	21 May 2020 16:55
To:	Smith, Alex
Cc:	Norcutt, Allan; Gonzalez, Ana; Ashley Spearing; Ryan James; Caves, Phil; 'Nigel Weeks'; Hoque, Shamsul; 'Mould, Penny'
Subject:	RE: [EXT] Milton Keynes East - Paramics Model of M1 J14 and Northfields Roundabout - LMVR

Hi Alex,
Having reviewed the Paramics J14 LMVR, MKC is satisfied that the validation is to a good standard and acceptable as the basis for future testing in connection with the MKE planning application. As you know we had a few comments that I've already passed to you, but these were minor.
Kind regards,
Martin

Martin Tate MSc, CMILT, MCIHT
Transport Planner – Multi Modal Model Consultant (Policy & Planning)

Phone: 01908 253852
Mobile: 07732 741433
Email: martin.tate@milton-keynes.gov.uk
Web: https://www.milton-keynes.gov.uk/transport-policy

Milton Keynes Council | Public Realm | Civic Offices | 1 Saxon Gate East | Milton Keynes MK9 3EJ |

From: Smith, Alex [mailto:Alex.Smith@wsp.com]
Sent: 29 April 2020 17:47
To: Tate, Martin; Caves, Phil; nweeks@smtrans.co.uk; Hoque, Shamsul; Mould, Penny
Cc: Norcutt, Allan; Gonzalez, Ana; Ashley Spearing; Ryan James
Subject: [EXT] Milton Keynes East - Paramics Model of M1 J14 and Northfields Roundabout - LMVR

Dear all,

I hope you are all well,

Apologies for the large group email, however it is useful to include everyone at the same time. Please forward on to those who I may have missed off the circulation list.

As you may be aware we have been discussing the various strategic modelling elements with MKC to ascertain the acceptable approaches to assess the MKE site within the MKMMM model and are preparing a suite of documents for review. It is the intention to issue the notes out when they have progressed following further discussions with MKC officers initially, so just to make everyone aware there will be a number of technical notes setting out suggested approaches to transport items such as forecast committed development growth, trip generation and general scoping.

Whilst those other elements are being progressed, you may remember that as part of the suggested Modelling Approach Technical Note for MKE (updated and re-issued in May '19 last year), alongside the strategic modelling,

we set out the intention to undertake a micro-simulation model (using Paramics) of the M1 J14 and Northfields Roundabout junctions. HE, through their AECOM consultants, provided a Modelling Review note in June 2019 which reviewed the suggested approach and the intended traffic surveys to be used to improve the detail in the MKE modelled area. In that response, the extent of the Paramics model and the general approach was considered broadly acceptable.

We have taken that review note, alongside the discussions over modelling during meetings held in December 2019 with MKC and HE and have progressed the updated Paramics base model. Following recent liaison with MKC signals teams, our micro-simulation team have now prepared the attached Paramics Local Model Validation Report (LMVR) which sets outs the model performance against the 2019 ANPR surveys (as well as the other traffic surveys such as ATCs and queues).

The intention is to use the strategic MKMMM model outputs and these on to the calibrated and validated base year Paramics model to then inform the future years tests. As you'll note in the report, it is considered that the performance of the model against observed data is very good, with all DfT TAG traffic count and journey time validation criteria met in both the AM and PM peaks. We therefore considered that the Paramics model is therefore suitable for forecasting and assessing the impact of proposed MKE development.

It would be most appreciated if both Milton Keynes Council and Highways England could review the LMVR and (assuming you agree to the conclusions), confirm the acceptability of the validated Paramics base model for testing within the application.

It would be extremely useful to agree timescales for review of the attached, as well as the other notes (once they are issued) to understand when comments could be received. With regards to this LMVR, would it be possible to receive comments / acceptance by 15th May?

If you have any questions or queries, please let me know and I will provide further clarification,

Many thanks,
Alex

Kind regards,

Alex Smith MSc MCIHT
Associate

Transport

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Smith, Alex

From:	Caves, Phil <Phil.Caves@Milton-Keynes.gov.uk>
Sent:	08 September 2020 15:15
To:	Smith, Alex
Cc:	Norcutt, Allan
Subject:	FW: 2020-08-06 1112 - to WSP TTN - Scoping comments
Attachments:	MKE updated ttns & trip generation 0620 - comments.pdf

Regards,

Phil

From: Caves, Phil
Sent: 06 August 2020 11:13
To: Norcutt, Allan <Allan.Norcutt@wsp.com>
Cc: 'Nigel Weeks' <nweeks@smtrans.co.uk>
Subject: 2020-08-06 1112 - to WSP TTN - Scoping comments

Hi Allan,

Please find attached comments on TTNs. SMT said the scoping note is consistent with the ongoing discussions. However, regards parking we will expect the site to be to zone 3. Zone 2 standards may be appropriate within the local centre but not outside it.

Members will expect full adherence to parking standards so I would not recommend that you suggest any departures from it.

Please distribute this to whoever needs it.

Kind regards,

Phil

Phil Caves
Team Leader - Traffic and Development
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MKE Updated TTNS & New Trip Gen (TTN3) June 2020– Comments

Scoping Note

WSP have updated this after AECOM's review with methodology for trip generation and future year 2048 decided and explained in more detail in technical notes TTN3 and TTN4.

TTN4 – Growth And Future Year Modelling

This updated note adopts a future year of 2048 when all MKE development is completed. The Milton Keynes Multi Modal Model (MKMMM) has 2031 Reference Case. With more information on subsequent committed development, this requires refining as well as the future year modelling.

Covered by MKMMM, outside MKC, housing and jobs from 2031-2039 have been estimated. This is much greater when compared to the increase in housing numbers and jobs in TEMPRO after accumulating the Middle Layer Output Areas (MSOA) from 2040-2048. As agreed with MKC, the resultant increases from 2031-2048 would be applied to the default MKMMM trip rates for both residential and employment for the background growth.

Applying a blanket growth factor from 2031-2048 was dismissed as housing numbers & jobs in TEMPRO from 2031-2039 are much lower than the estimations so the growth would be underestimated.

For Milton Keynes Borough (MKB) Milton Keynes Strategy for 2050 (MK 2050) provides project growth forecasts from 2031. This is much higher than for MKB MSOAs than housing/job increases in TEMPRO. WSP comment that MK 2050 strategy has not been adopted and if included could mask the impacts of the MKE site. Therefore, it has not been included within committed development for MKE.

TTN3 – Trip Generation And Future Mobility

This new note explains how the trip generation is to be calculated and used instead of using the default trip rates with MKMMM. Trip generations are calculated for interim 2031 and completed 2048.

MKE trip generations have been calculated for: 1) Scenario 1 (Traditional Approach) and 2) Scenario 2 (Future Mobility) using WSP's Mobility Masterplan Tool'

For Residential, TRICS has been interrogated for total person trip generation. National Travel Survey information (NTS502) has then disaggregated by trip by purpose eg commuting, business, education. 2011 Census information (QS703EW) further splits the non-educational trips by mode eg car driver, cyclist etc. For education trips, data in NTSA 1920b was used for primary school under 1 mile and secondary school between 1-2 miles to split by mode. Finally, an internalisation factor was applied for trips by purpose. Thus for example, commuting and shopping were reduced by 15% and 33% respectively. See Table 4.5. WSP state that the internal trips will be loaded onto the MKE highway network only with MKE zoning having schools, local/district centre allocated to them to allow this to be implemented. Internalisation is only applied to the residential origin trips so the process does not discount trips twice.

I am ok with the methodology and the residential trip rates both internal & external when compared with MKMMM. The trip generations are also similar to another scheme MKSE which used a similar methodology within MKMMM.

For Employment, TRICS has been interrogated for vehicle trip rates with land uses B1a (Office, B1c/B2 (Business/General Industrial) and B8 (Storage & Distribution). Employment development areas have been converted to jobs by land use using HCA Employment Densities Guide. Thus 16,387 sqm floor area of B1a office equated to 1,261 jobs from using HCA Density guide 13 jobs per sqm. The mode shares have been taken from the respective TRICS outputs separating out B1a from the other employment land uses. Unlike residential, WSP haven't produced a table comparing employment trip rates with MKMMM and MKSE.

The 'Future Mobility' scenario (Scenario 2) takes Scenario 1 & makes changes which could include public transport, car sharing, shifts in mode share, travel plans etc. There then follows a series of tables comparing the 2 scenarios. WSP propose to use the scenario to test the development scheme within MKMMM.

Smith, Alex

From:	Stirling Maynard Transportation <smt@smtrans.co.uk>
Sent:	25 September 2020 15:42
To:	Smith, Alex; Norcutt, Allan
Cc:	Phil.Caves@Milton-Keynes.gov.uk; Tate, Martin; Povey, James (James.Povey@milton-keynes.gov.uk); Shamsul.Hoque@highwaysengland.co.uk
Subject:	MKE - MODEL QUERY SIGN OFF

Dear All,

Phil has passed me the WSP Presentation which under Transport has a number of items with responses outstanding. I think several responses have since been sent but for the record I have listed the relevant ones for us and our formal position:

Transport Scoping Note – confirmed this is acceptable
TTN3 Trip Generation and Future Mobility – confirmed this is acceptable
TTN4 Growth Note – confirmed this is acceptable
TTN5 Link Capacity – confirmed this is acceptable
Removal of Tongwell Street – still under discussion at MKC
M1 J14 Paramics – nothing further to add to MT's comment
MKNMM Base Model Calibration and Validation – MT has signed off
MKMMM C031/48 ref. case outputs – MT has signed off
Stage 3 Budget Fees – For MT

I trust this helps.

Kind regards,
Nigel Weeks
Tel:- 07770 938171

Smith, Alex

From:	Tate, Martin <Martin.Tate@milton-keynes.gov.uk>
Sent:	18 September 2020 13:10
To:	Smith, Alex
Cc:	Norcutt, Allan; Gonzalez, Ana; Ashley Spearing; 'Ryan James'; Caves, Phil; Povey, James; Turner, Andrew; 'Nigel Weeks'; 'Mould, Penny'; Hoque, Shamsul
Subject:	MKC sign-off of MKE modelling Stages 1 and 2

Hi Alex,
For MKC I'm happy to sign off the following in respect of transport modelling that will be used to inform the MKE TA:

- The MKMMM 2016 re-calibration (MKE Stage 1 modelling);
- The 2031 and 2048 Reference Cases (MKE Stage 2 modelling) including the outcome of WSP's TTN4 regarding growth assumptions.

The modelling is always subject to interpretation and approximation, particularly the later future years where there is more congestion, and we have identified a few minor issues to bear in mind (as we have discussed and documented) but where necessary we believe these can be satisfactorily allowed for in subsequent more detailed junction modelling.
Kind regards,
Martin

Martin Tate MSc, CMILT, MCIHT
Transport Planner – Multi Modal Model Consultant (Policy & Planning)

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Smith, Alex

From:	Smith, Alex
Sent:	25 March 2021 00:14
To:	Mould, Penny; Judson, Elizabeth; Ashley Spearing; Nick Trollope
Cc:	Norcutt, Allan; Bluh, Laura; Tate, Martin; James Povey; nweeks@smtrans.co.uk; Paul Van Geete
Subject:	Milton Keynes East - Stage 3 (with development) - Impacts of MKE - MKMMM note
Attachments:	MKMMM - TN30 Impacts of MKE_v3.0_Issued.pdf

Dear all,

Further to recent discussions, I am pleased to attach TN30, prepared by AECOM on behalf of MKC setting out the assessment of MKE within the MKMMM. This effectively covers the Stage 3 modelling (with development) tests and provides a summary of MKE allocation impacts at a strategic model level. You'll note that the TN provides commentary on the Core modelling results, alongside the Sensitivity test and the Key planning test.

The attached file size is relatively large, so if it fails to send properly, the below link also contains the report;

Download link

https://we.tl/t-oczNH5uvT8

1 item

MKMMM - TN30 Impacts of MKE_v3.0_Issued.pdf

17.5 MB

As you are aware, the modelling of MKE and updates of MKMMM has been a collaborative process with MKC, with numerous meetings and discussions throughout the various stages. As such, the report has also been read and reviewed by Martin Tate at MKC, who has confirmed that MKC are happy with the document.

We trust that the attached provides you with the further information required to finalise the modelling review of MKE in due course. The note will also be included within the Transport Assessment and planning application material, however we wanted to issue it separately to enable the review process to start prior to submission.

If you have any questions or queries, then please feel free to contact me,
Thanks,
Alex

Kind regards,

Alex Smith MSc MCIHT
Associate

Transport

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Appendix C

HIGHWAYS ENGLAND TECHNICAL NOTES AND CORRESPONDENCE

Smith, Alex

From:	Mould, Penny <Penny.Mould@highwaysengland.co.uk>
Sent:	21 June 2019 14:44
To:	Smith, Alex; Hoque, Shamsul; Tate, Martin; Hayes, Steve; Sidhu, Jas; Cornwell, Lee
Cc:	Norcutt, Allan; Bluh, Laura; Gonzalez, Ana
Subject:	RE: Milton Keynes East - Traffic Surveys
Attachments:	Milton Keynes East Modelling Review v7.pdf

HI Alex
Attached is AECOM's review of your modelling approach for MK East. The review confirms that your approach to traffic survey is sensible

Regards
Penny

Penny Mould, Asset Manager (Planning) Beds, Bucks and Herts

Working days Tuesday, Wednesday, Thursday and Friday

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From: Smith, Alex [mailto:Alex.Smith@wsp.com]
Sent: 19 June 2019 11:48
To: Hoque, Shamsul <Shamsul.Hoque@highwaysengland.co.uk>; Tate, Martin <Martin.Tate@milton-keynes.gov.uk>; Hayes, Steve <Steve.Hayes@milton-keynes.gov.uk>; Mould, Penny <Penny.Mould@highwaysengland.co.uk>; Sidhu, Jas <Jas.Sidhu@highwaysengland.co.uk>; Cornwell, Lee <Lee.Cornwell@kier.co.uk>
Cc: Norcutt, Allan <Allan.Norcutt@wsp.com>; Bluh, Laura <Laura.Bluh@wsp.com>; Gonzalez, Ana <Ana.Gonzalez@wsp.com>
Subject: RE: Milton Keynes East - Traffic Surveys

Hi Shamsul,

Many thanks for the below email (thanks to Jas also for reviewing again) and for confirming that there are no closures within the proposed survey dates.

We have not received anything from Kier yet – Lee – are you able to review and let us know your thoughts? I appreciate you are very busy and did respond separately last week, but it would be most welcomed if you could confirm that the intended dates are appropriate and / or provide any further information you may be aware of.

Penny – are you able to expedite the response from yourselves and AECOM on the surveys at all? I appreciate you've agreed in principle and AECOM are reviewing further, but we appear to have a good survey window and therefore are having to proceed as is for now. We may not have the ability to make any alterations if the survey company does not have enough lead in time. It would be great if we could get confirmation as soon as possible if able. Please note, as set out in the survey / modelling approach - we do not intend to undertake any surveys at J13 (as we are aware you are updating / updated your own models at that location) but we will review the potential impacts within the MKMMM model however.

Please feel free to contact me should you have any questions / queries,

Thanks,
Alex

Kind regards,

Alex Smith MSC MCIHT
Principal Transport Planner

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From: Hoque, Shamsul [mailto:Shamsul.Hoque@highwaysengland.co.uk]
Sent: 18 June 2019 13:59
To: Smith, Alex <Alex.Smith@wsp.com>; Tate, Martin <Martin.Tate@milton-keynes.gov.uk>; Hayes, Steve <Steve.Hayes@milton-keynes.gov.uk>; Mould, Penny <Penny.Mould@highwaysengland.co.uk>; Sidhu, Jas <Jas.Sidhu@highwaysengland.co.uk>; Cornwell, Lee <Lee.Cornwell@kier.co.uk>
Cc: Norcutt, Allan <Allan.Norcutt@wsp.com>; Bluh, Laura <Laura.Bluh@wsp.com>; Gonzalez, Ana <Ana.Gonzalez@wsp.com>
Subject: RE: Milton Keynes East - Traffic Surveys

Hi Alex

This information below came from our Smart Motorway Project team M1 J13-J16.

Possibly you have received information from Kier office.

Kind regards

Shamsul Hoque, PhD MCIHT FBIP FIAB
Spatial Planning Manager
Operations (East) Area 8 & Area 6
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Customer Contact Centre is available 24/7 on 0300 123 5000 or info@highwaysengland.co.uk

From: Sidhu, Jas
Subject: RE: Highways England's query on works clash- Milton Keynes East - Traffic Surveys

Shamsul

We do not have any proposed full carriageway closures on the 27th -3rd , between J13-14 , as confirmed with WSP.

Thanks

Jas

Jas Sidhu
Assistant Project Manager – SMP M1 Junctions 13-16
Highways England | Two Colmore Square | Colmore Circus | Birmingham | B4 6BN
Web: http://www.highwaysengland.co.uk
Email: Jas.Sidhu@highwaysengland.co.uk
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From: Smith, Alex [mailto:Alex.Smith@wsp.com]
Sent: 13 June 2019 09:57
To: Tate, Martin <Martin.Tate@milton-keynes.gov.uk>; Hayes, Steve <Steve.Hayes@milton-keynes.gov.uk>; Mould, Penny <Penny.Mould@highwaysengland.co.uk>; Hoque, Shamsul <Shamsul.Hoque@highwaysengland.co.uk>; Sidhu, Jas <Jas.Sidhu@highwaysengland.co.uk>; Cornwell, Lee <Lee.Cornwell@kier.co.uk>
Cc: Norcutt, Allan <Allan.Norcutt@wsp.com>; Bluh, Laura <Laura.Bluh@wsp.com>; Gonzalez, Ana <Ana.Gonzalez@wsp.com>
Subject: Milton Keynes East - Traffic Surveys

Good morning all,

Apologies for including you all in a single email, but I have been discussing the traffic surveys for Milton Keynes East with you all separately, but thought it would be easy to disseminate information regarding the surveys and the likely date.

We appreciate that Highways England and their consultants are reviewing, however I'm sure you can all understand that we need to proceed as far as we can to ensure that surveys are undertaken in a neutral month, before the school summer holidays, and ensure the influence from the SMP works are minimised.

After speaking with the survey company, they have identified the data of 27th June to undertake the bulk to the MCCs. This would require equipment to be installed on the 26th. The ATCs / week long surveys on the local links would then run for a full week (covering the MCC period) and finish 3rd July.

We and the survey company are checking for any roadworks in that period, and have not identified anything (other than long term works) – however it would be extremely appreciated if you could assist us and inform us (as soon as possible) if there are works planned that would influence the survey results. We have also reviewed the indicative traffic management dates for the SMP works, provided by Jas, that indicate no planned closures within that period – so it would seem to be a good window of opportunity. The survey company are liaising with MKC and Bedford over the surveys / permits for installation as well now.

If you could please let us know the following as soon as you are able to that would be most appreciated and would allow us to adapt accordingly;

- Any planned road works that would affect the surveys?
- Confirmation that the date is acceptable

Any questions, please feel free to give me a call to discuss,

Thanks,
Alex

Kind regards,

Alex Smith MSC MCIHT
Principal Transport Planner

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Project:	**Highways England Spatial Planning Arrangement**	Job No:	**60600479 DM016.001**
Subject:	**Summary of Review of Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application**		
Prepared by:	**Alan Boyce/Stephen Hathaway**	Date:	**11th June 2019**
Checked by:	**Liz Judson**	Date:	**20th June 2019**
Verified and Approved by:	**John Alderman**	Date:	**21st June 2019**

1. Introduction

1.1 AECOM has previously been commissioned by Highways England to undertake a review of the documentation for the Milton Keynes Multi-Modal Model (MKMMM). The model has been prepared by staff from AECOM in St Albans and Bedford on behalf of Milton Keynes Council. The independent review was undertaken by AECOM staff in Birmingham.

1.2 The highway model is a SATURN model (version 11.3.12U) which has been updated from 2009 to 2016. The simulation area has been expanded to include more detail on proposed expansion areas. There are 513 zones in the updated model.

1.3 The Public transport model is in EMME software. The modelling suite also includes a variable demand model which allocates trips between the highway assignment model and the public transport model.

1.4 Previously AECOM has reviewed the following documents relating to validation and forecasting:

- Highway Model Local Model Validation Report (June 2017);
- Public Transport Local Model Validation Report (March 2017);
- Highway Model Traffic Forecasting Report (October 2017); and
- Impacts of Plan:MK (November 2017).

1.5 The review concluded that the model had been extensively calibrated to match modelled flows with observations but that there was uncertainty as to whether the origin destination pattern was a good reflection of the pattern on the ground. These issues are likely to be compounded in the forecast years by uncertainties over assumptions.

1.6 This Technical Note has reviewed the modelling approach for the Milton Keynes East planning application. WSP intend to make local enhancements to the model to take proper account of the developments. This has been limited to a review of the following document:

- Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application, March 2019. (Prepared by WSP for Berkeley St James)

1.7 Highways England are responsible for the operation of the Strategic Road Network. This includes the M1 and A5 in this area. Consideration has been given to the extent to which it should be possible to rely on model outputs in decision making in relation to these roads.

1.8 All of the diagrams in this Technical Note have been extracted from either the WSP Technical Note or from the AECOM reports.

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2. Development of Demand

2.1 Models have been built for three periods. The morning peak represents the hour between 8:00 AM and 9:00 AM. The evening peak represents the period between 5:00 PM and 6:00 PM. An inter-peak model has been build representing the average hour between 10:00 AM and 4:00 PM.

2.2 The model uses three vehicle classes (cars, LGVs and HGVs) with three trip purposes for cars (commuting, employers business and other). These are standard vehicle types and trip purposes.

2.3 Much of the Base Year trip pattern (those trips which start and finish within Milton Keynes) is synthesised. External to external demand was derived directly from average hour South East Regional Traffic Model (SERTM) demand.

2.4 Segmentation of demand is quite standard. Off peak models have been approximated based on Interpeak networks.

3. Reference Case

3.1 The Highway Model Traffic Forecasting Report covered the development of a 2031 Reference Case. This contains planned growth in Milton Keynes up to 2031 but did not include Plan:MK options.

3.2 Most of the transport schemes are associated with new development. The Smart Motorway schemes on the M1, A5 improvements and the A421 dualling would be directly important to Highways England. The other schemes would only have an indirect impact. A change in the capacity of links does have an impact on route choice. Without these enhancements, there would be greater diversion to those routes which currently have spare capacity.

3.3 There are a great many more attractions than productions in the Milton Keynes urban area. This would be consistent with many people commuting to Milton Keynes for work or other purposes. The growth in trips between the Base Year and the 2031 Reference Case follows a similar pattern: the increase in attractions is much greater than the increase in productions.

3.4 The assignment of the Reference Case demand shows changes in optimum route choice. A disproportionate amount of the growth of traffic is on the strategic road network. In particular, there is reassignment from the local road network onto the M1 and A5, which would be an issue of concern to Highways England as shown in Figure 1.

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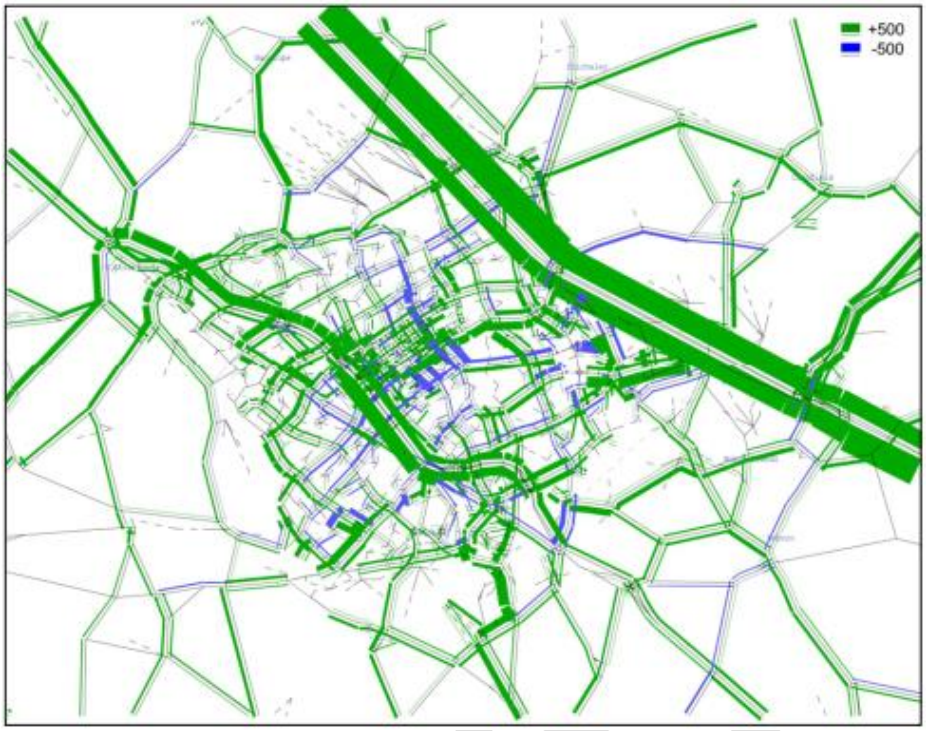

Figure 1: Flow Difference – 2031 Reference Case minus 2016 Base Year AM Peak

3.5 Given the uncertainty in the forecast pattern of demand, there must be some uncertainty in the degree of reassignment. However, there is clearly a significant risk that the forecast developments will result in large increases in traffic flow on roads which are the responsibility of Highways England.

4. Plan:MK Scenario 1

4.1 Scenario 1 consisted of the following growth assumptions over and above the housing and employment tested within the Reference Case 2031 scenario as shown in Figure 2.

Housing:

- 4,620 homes within the urban area of Milton Keynes.
- 1,000 homes at land north of the railway within the South East Milton Keynes Allocation (SEMK1) contained within the Draft Plan:MK March 2017

Employment:

- 4,254 jobs within the industrial and logistics sector associated with the South Caldecotte allocation within the Draft Plan:MK March 2017

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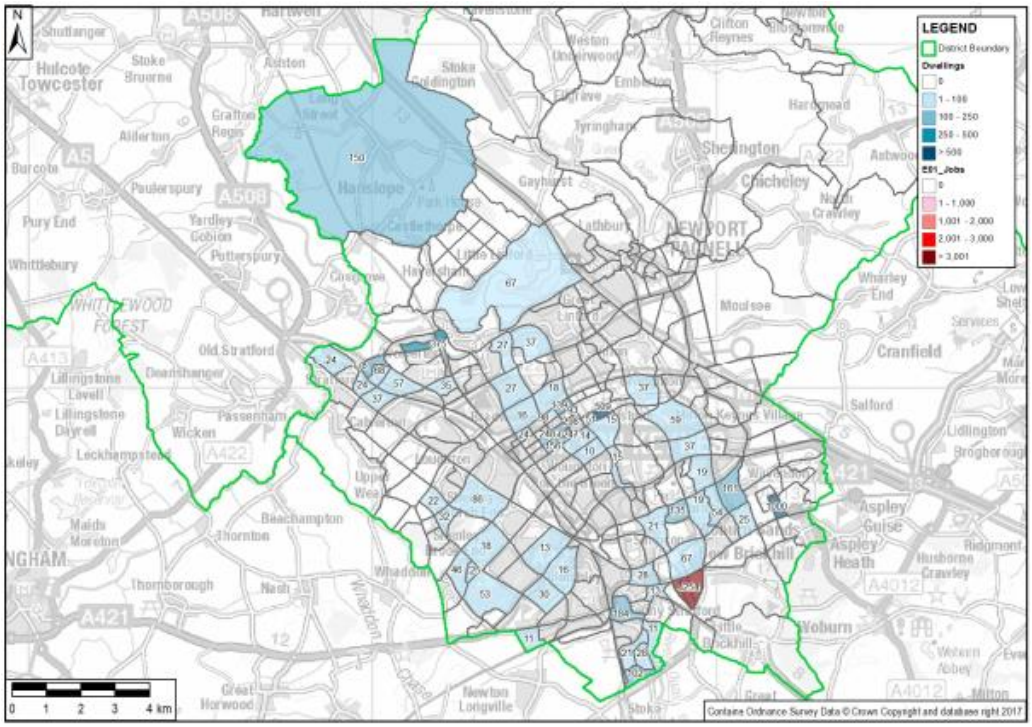

Figure 2: Scenario 1 Plan:MK Additional Dwellings and Jobs Growth to 2031

4.2 Overall Plan:MK Scenario 1 has little impact over and above the Reference Case in terms of traffic flows and delays across the Milton Keynes urban area.

5. Plan:MK Scenario 2

5.1 Over and above Scenario 1, Plan:MK Scenario 2 consisted of:

- A further 2,000 homes at land south of the railway line within the South East Milton Keynes Allocation (SEMK2);
- 2,998 homes to the East of the M1;
- 56 homes in the Milton Keynes urban area;
- 6,330 jobs included in the East of M1; and
- 918 further/higher education jobs within central Milton Keynes.

5.2 The additional housing is quite concentrated as shown in Figure 3. The additional employment is very concentrated as shown in Figure 4. As with Scenario 1, this level of development is not consistent with the Plan:MK proposed submission document.

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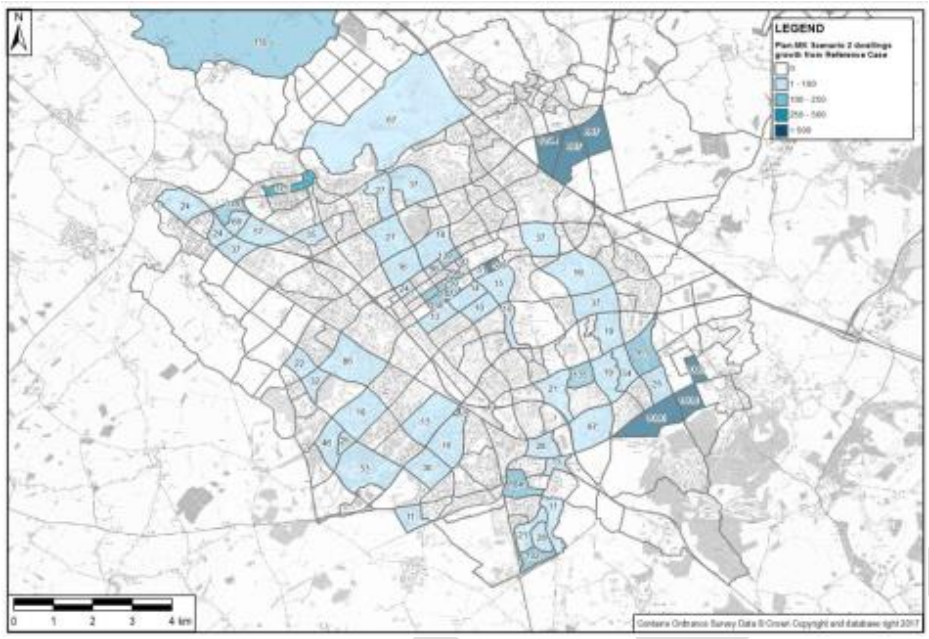

Figure 3: Plan:MK Scenario 2 Additional Dwellings Growth to 2031

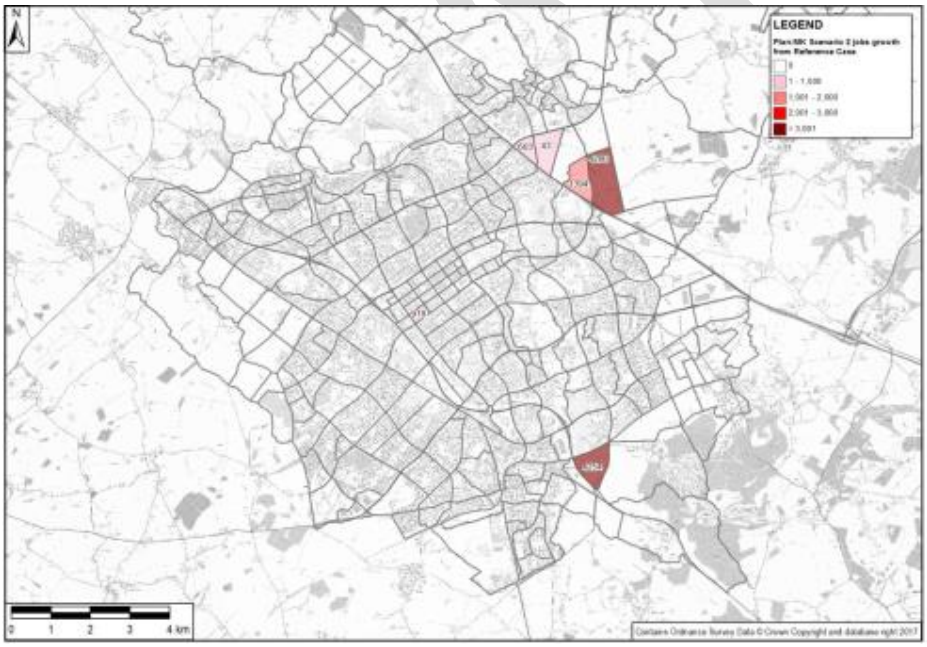

Figure 4: Plan:MK Scenario 2 Additional Jobs Growth to 2031

5.3 Both the East of M1 site and the land south of the railway in South East Milton Keynes are associated with new highway network, including a new bridge over the M1 and a new bridge over the railway line in south east Milton Keynes.

5.4 To facilitate the East of M1 growth a revised road layout is proposed as shown in Figure 5. This includes a new primary route between the dualled A509 to the south of Interchange Park through to M1 J14. A new route from Renny Lodge roundabout bridging the motorway and connecting to Tongwell Street, with the existing A509 between these new routes remaining as access to the

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development. In addition there is an east-west link between the two routes to the north of the site with an east-west route linking Willen Road through to a re-aligned Newport Road.

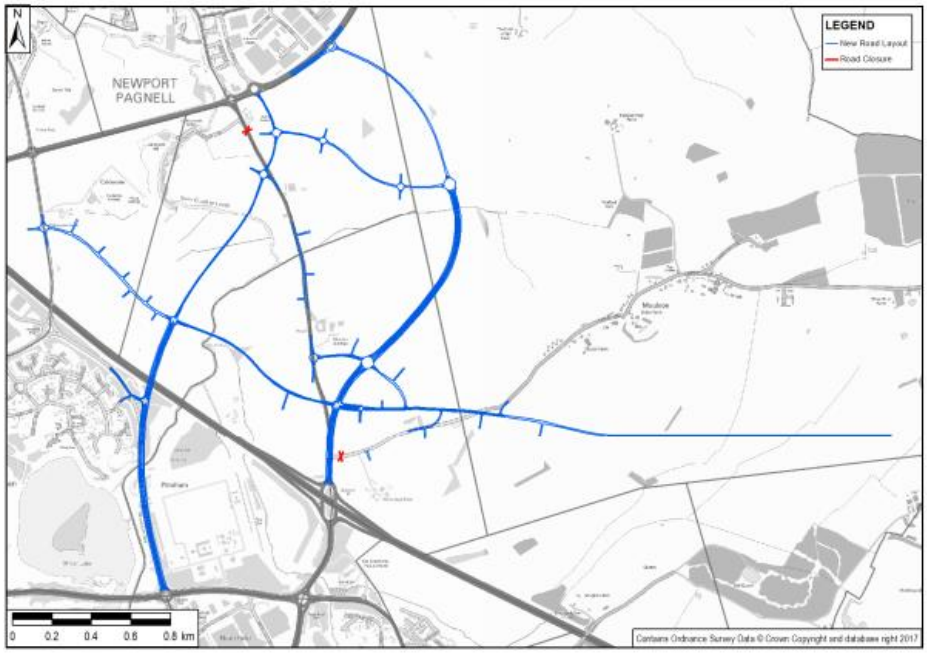

Figure 5: Indicative Additional Road Network – East of M1

5.5 The most notable impacts in terms of traffic flows are around the South East Milton Keynes Allocation (SEMK2) and the East of M1 development to the north east as shown in Figure 6.

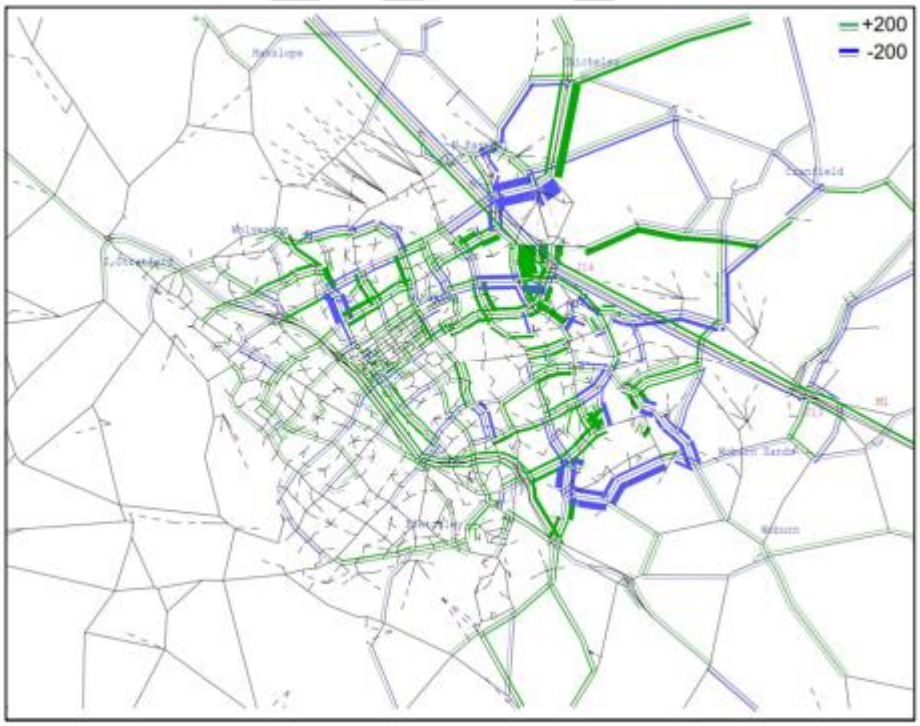

Figure 6: Change in Modelled Flow, Scenario 2 minus Reference Case AM peak.

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5.6 Scenario 2 results in increases in traffic flow in many places including the M1 and A5. Those roads showing reductions in flow (in blue) result from new parallel routes. In some cases, there is a beneficial switch of traffic crossing the M1 away from Junction 14.

5.7 For the North East Milton Keynes area, the new road caters for growth of traffic but also allows diversion. The additional growth in trips is in uncongested areas. However, the additional traffic does result in some deterioration of journey times across the network.

5.8 The road improvements associated with the developments result in improvements to some local junctions. However, the general increase in traffic results in increases in congestion at other locations as shown in Figure 7, with notable increases from HE's perspective at M1 Junction 14 and the A5/A4146 junction.

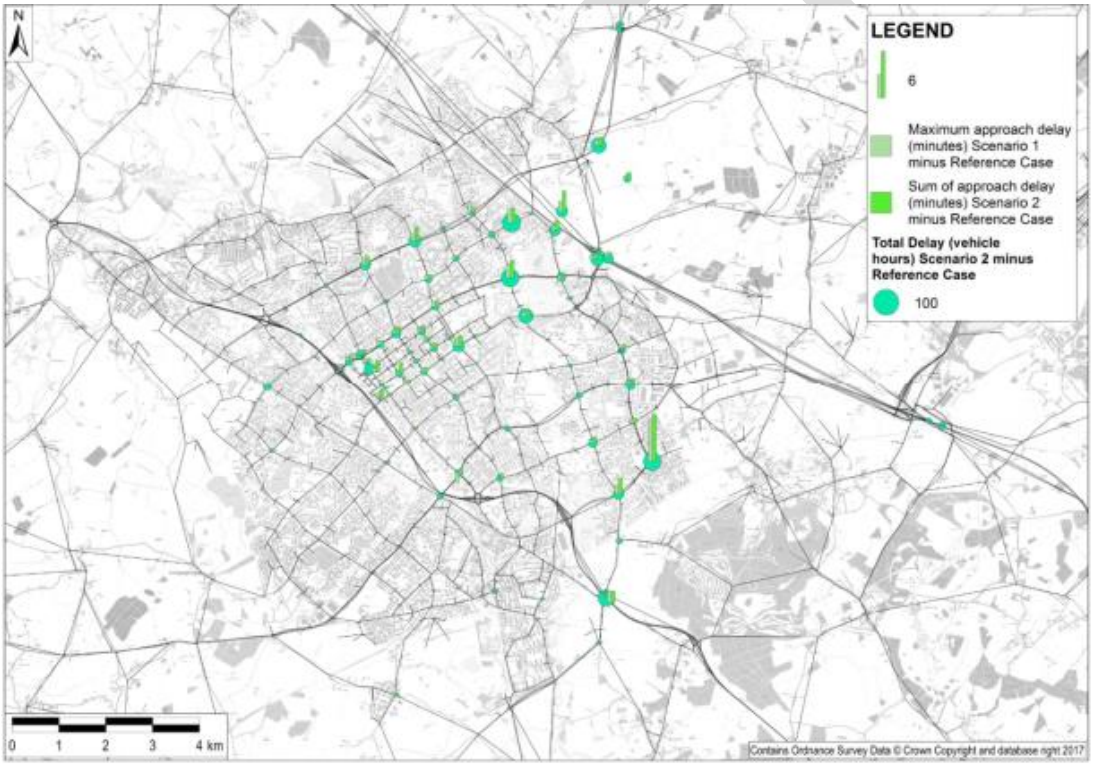

Figure 7: Change in Junction Delay at Congestion Hot Spots – Scenario 2 minus Reference Case.

5.9 Plan:MK Scenario 2 has a greater impact than Scenario 1 in line with the additional quantum of development, though this impact is still relatively small in relation to the 2031 Reference Case. Although the main impacts are in the vicinity of the South East Milton Keynes Allocation (SEMK1 and SEMK2) near Bow Brickhill and the East of M1 development site, both these developments include new road infrastructure which helps mitigate some of the impacts of the additional traffic on the network, and in the case of East of M1 this new network has also helped alleviate some pressures on parallel routes, though the impact on surrounding junctions can still be seen in Figure 6. However the higher flows forecast in Scenario 2, particularly in relation to the East of M1 development, have resulted in new or additional congestion issues modelled around these development sites and further afield.

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6. Plan:MK Scenario 2a

6.1 This assessment was run as a partial Scenario 2 that excluded the East of M1 development and the new educational establishments. This was considered to be the Preferred Plan:MK scenario.

7. Plan:MK Scenario 2b

7.1 Scenario 2b was used to assess the impact of higher growth at land East of the M1 on the proposed new road infrastructure through the site and at M1 Junction 14. To assess the impacts of Scenario 2b results have been compared against the 2031 Reference Case. This growth includes the currently 'committed' growth in Milton Keynes district up to 2031.

7.2 The dwellings growth above the Reference Case is plotted in Figure 8 with the jobs growth above the Reference Case plotted in Figure 9. Scenario 2b includes all the Scenario 1 and 2 growth, which together amounts to an additional 10674 dwellings and 11502 jobs compared to the Reference Case. In addition a further 2000 dwellings have been included in the East of M1 development, giving a total of 4998 dwellings East of the M1 (and 12674 dwellings overall). Although planned after the Plan:MK 2031 horizon year these have been included to measure the impacts on the road network in this area.

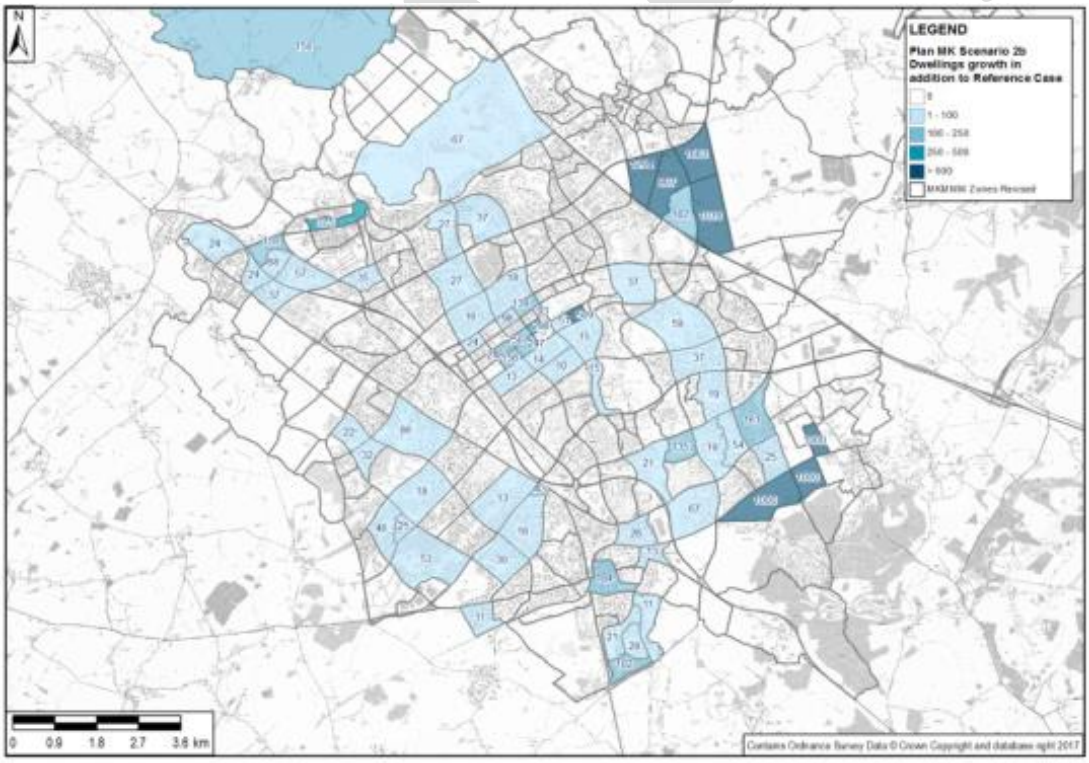

Figure 8: Plan:MK Scenario 2b, Additional Dwellings Growth to 2031

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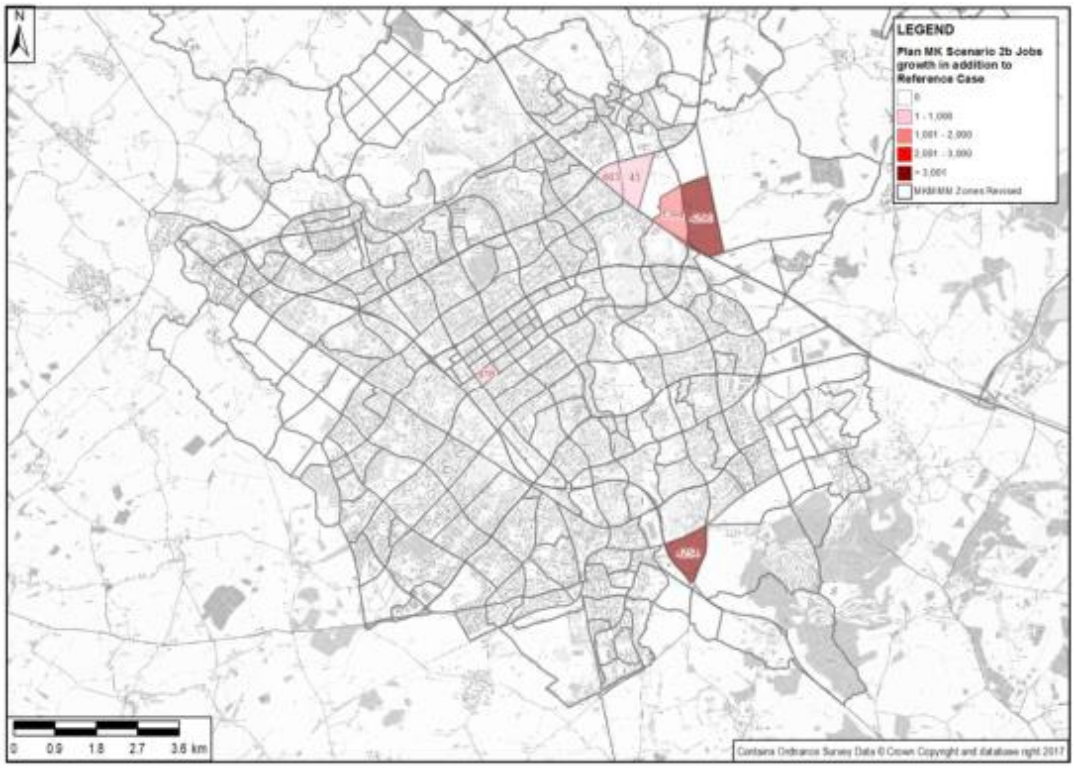

Figure 9: Plan:MK Scenario 2b, Additional jobs Growth to 2031

7.3 The additional network associated with this scenario is the same as for Scenario 2. Figure 10 shows the change in assigned flows.

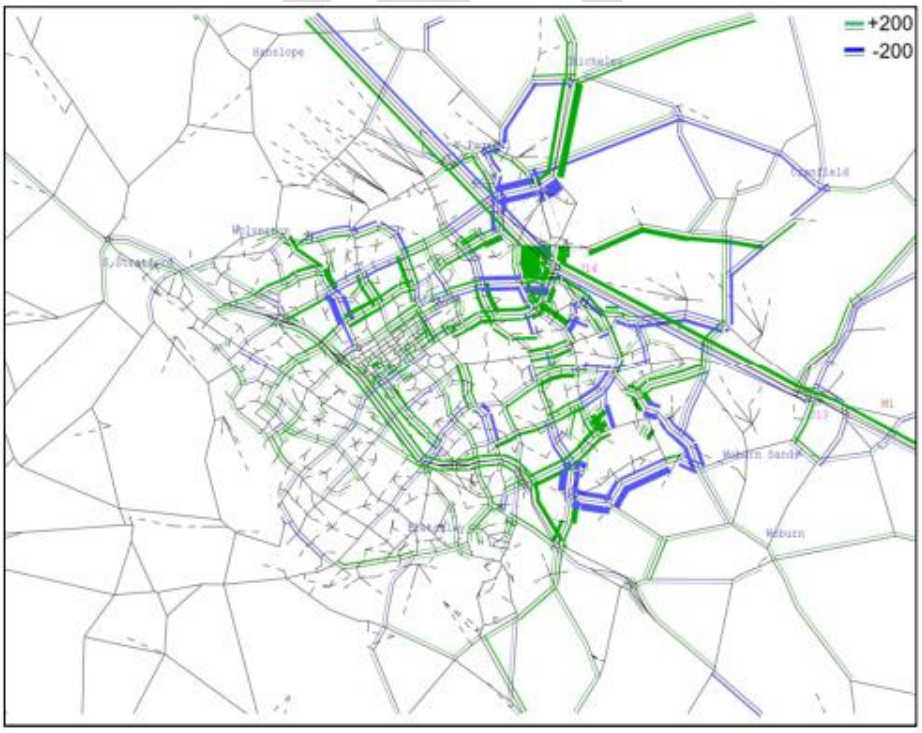

Figure 10: Change in Modelled Flows, Scenario 2b minus Reference Case AM Peak

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7.4 There is an overall increase on the M1 and A5 and on other roads. There is an increase crossing the M1 in both directions and in both peaks. This is the expected result.

7.5 The new road bridge is predicted to take a significant volume of flow (1500 -1700 PCU in the direction of peak tidal flow), which helps mitigate the impact of the East of M1 development. In the AM Peak there is still an increase in flow crossing J14 towards Milton Keynes of around 250 PCU, however the model is showing little impact in delay at J14, partly due to the addition of the dual carriageway link on southbound approach alleviating a current pinch point.

7.6 It is also possible that amending the signal timings at the junctions on the new link would encourage a further shift in through trips away from J14. It is clear that without the additional infrastructure there would be significant additional pressure on the existing roads and associated junctions across the motorway; along the A422, on Willen Road and on the A509 through J14.

7.7 The modelling has indicated that there will still be significant congestion at M1 Junction 14. Although the new M1 crossing removes some through A509 traffic from J14 the majority of traffic at J14 remains (as it is accessing the M1) and some of the additional highway capacity is taken up by the additional development related traffic.

8. Implications for Model Use

8.1 In late 2018 and 2019, MKC updated their 2031 Reference Case model to include Highways England's changes to the M1 at Junction 14. Hence, the model has been amended, and improved, since those reviewed by AECOM.

8.2 All of the reports specify the appropriate uses of the models and those tasks for which they should not be used. Primary use of the model for Milton Keynes Council is to assess the impacts of Plan:MK on the road network and test plan options. It is acknowledged that local enhancement may be required for particular transportation schemes.

8.3 There is potentially a large impact on the M1 from the development of land to the east of the M1. The additional infrastructure modelled appears to mitigate most of the issues. However, this assessment is based on an assumption concerning the origin destination pattern of the development trips. As plans become clearer, it may emerge that the likely quantity and distribution of the trips will be different. This may mean that a greater proportion of them would use the M1 motorway, which would be of concern to Highways England.

9. WSP Proposals for Modelling of Milton Keynes East

9.1 The Technical Note prepared by WSP sets out the methodology for enhancing the MKMMM in the area of the proposed Milton Keynes East (MKE) development. The MKE site sets out to deliver approximately 5000 homes (a mix of private and affordable housing types); 105 Ha of employment land as well as primary schools, secondary schools and a district centre. Berkeley St James are the major landowner with control over more than 80% of the development. The delivery of MKE depends on new strategic transport connections onto and across the M1 and links back into Milton Keynes. The plans include extending the Milton Keynes highway grid to the east over the M1 via a new M1 overbridge. This would connect onto Tongwell Street and also provide a new public transport corridor. The development and infrastructure proposals are similar to those tested in Plan:MK: Scenario 2b.

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9.2 Money is being sought through the Housing Infrastructure Fund (HIF) to build a primary school and health centre during the first phase of development in advance of sufficient developer contributions.

9.3 While the MKMMM was considered suitable to assess the scheme, it was considered that some refinement of the model was required to ensure that it was robust and defensible in the planning process. This included the use of bespoke trips rates reflecting the development proposals. This approach is very much in keeping with the MKMMM conclusions which expected that local refinement would be required for specific developments.

9.4 WSP state that the default trip rates in MKMMM require adjustment to reflect the characteristics of the MKE proposals. This includes the internalisation of trips, those trips which have both origins and destinations within the site. While this is acceptable in principle, the details have not been presented in the WSP Technical Note. It would be expected that they would be presented later.

9.5 WSP suggested that the level of detail could be improved in four areas as shown in Figure 11:

- Olney;
- Newport Pagnell;
- Junction 14 and Moulsoe; and
- A422 and A509 near Crawley.

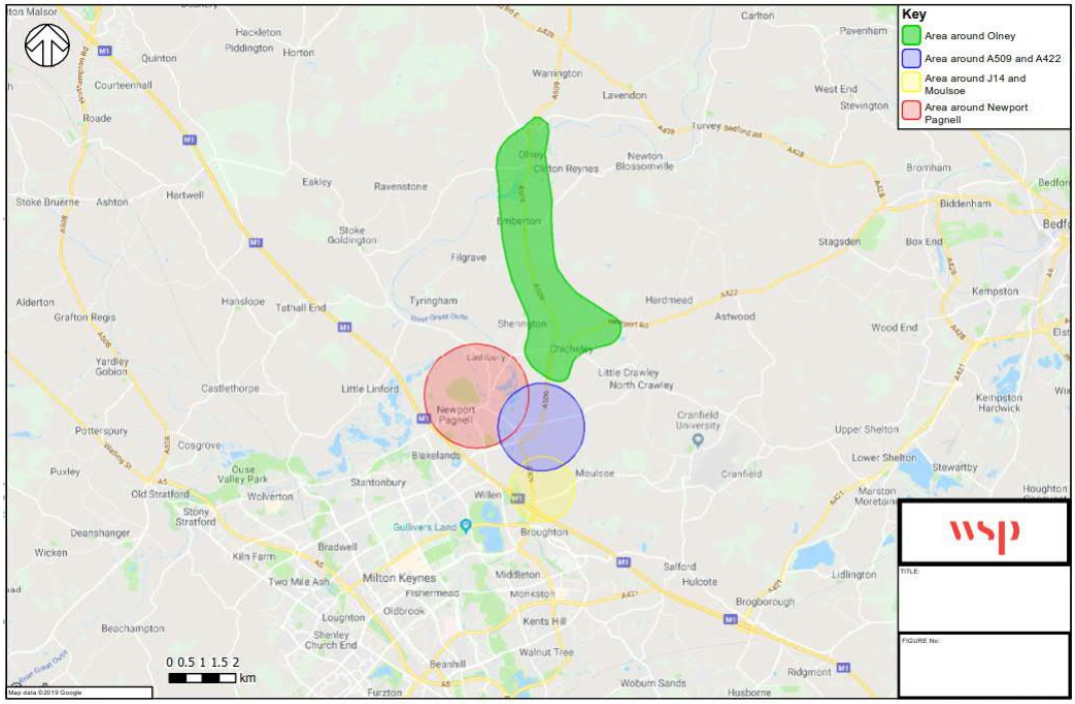

Figure 11: WSP Potential Areas for Refinement

9.6 One of the refinements proposed by WSP is to undertake traffic surveys in specific locations so that the matrix detail can be improved in the area of the development. MKMMM has been based on a series of cordons and screenlines. However, only one of these (Newport Pagnell) was east of the M1. WSP propose automatic traffic counts (ATC), Manual Classified Turning Counts (MCTC) and Queue Surveys at a number of key junctions as shown in Figures 12, 13 and 14.

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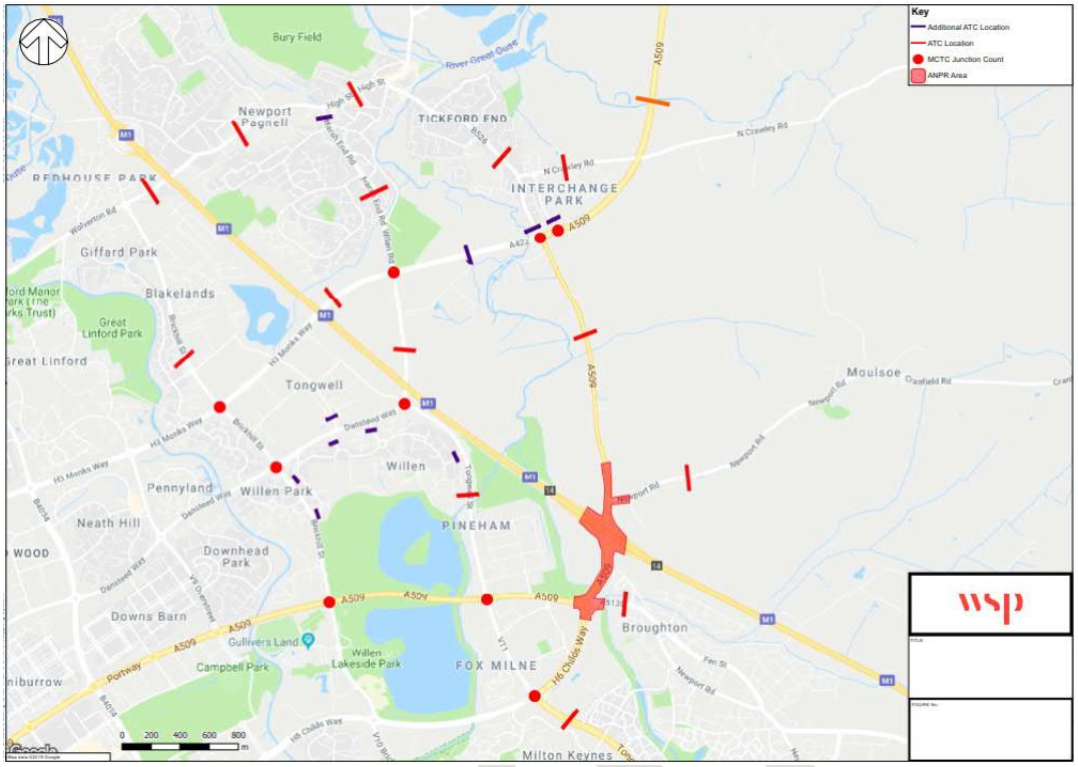

Figure 12: Suggested 2019 Traffic Survey Locations – Core Area 1

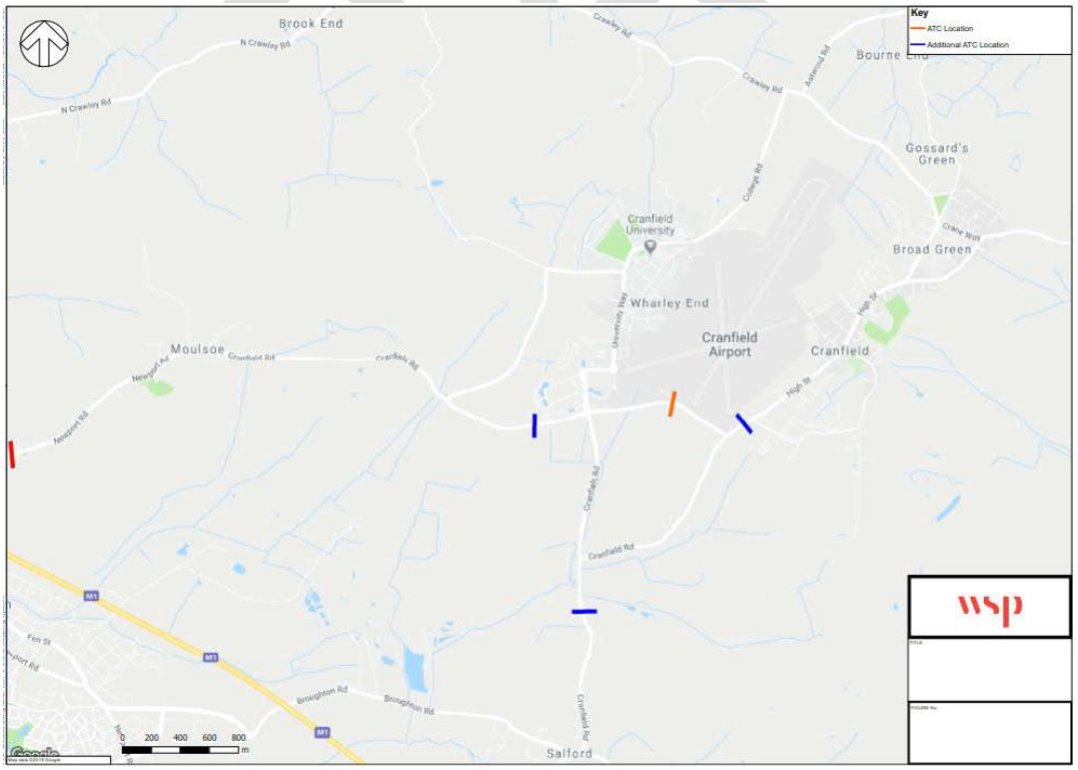

Figure 13: Suggested 2019 Traffic Survey Locations – Area 2

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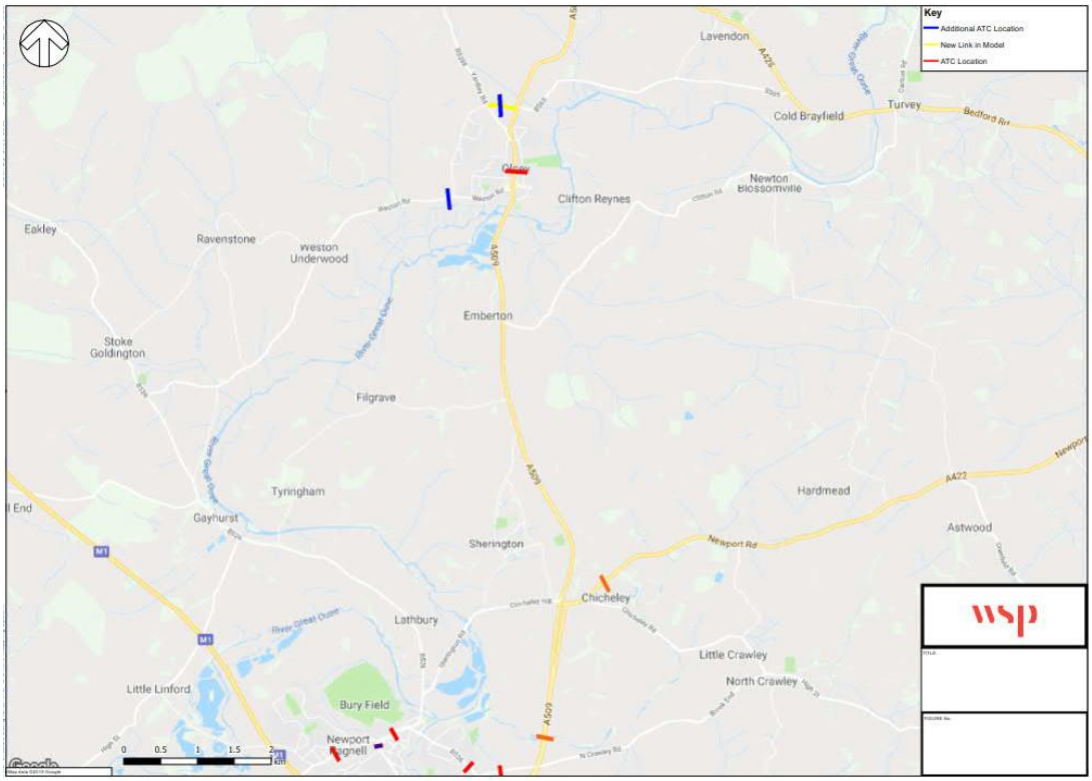

Figure 14: Suggested 2019 Traffic Survey Locations – Area 3

9.7 It should be noted that a large proportion of the proposed counts are to the east of the M1 and will complement those undertaken in the latest validation of MKMMM. The majority of these sites have not been surveyed before. The proposals include turning counts at all of the important junctions on the existing network and on all of the important links. These should provide adequate data for revalidation of the model in this area.

9.8 It is intended that the additional traffic surveys are used to update the MKMMM base year model and then the 2031 Reference Case. It is assumed that the MCTCs would be for a single day within a week-long ATC. It is expected that Automatic Number Plate Recognition (ANPR) would be used for the surveys at M1 Junction 14 and Northfields Roundabout as there is considerable interaction between these junctions. The journey time routes used in the model are considered to provide a good level of detail. Hence, no specific journey time surveys are proposed.

9.9 Of potential concern is that the surveys undertaken with the intension to update the MKMMM 2016 base year may no longer be representative of the base year in terms of quantum and distribution due to intervening traffic growth/change and the major highway improvements currently being undertaken in the area. The M1 motorway between J13 and J16 is currently being upgraded to an All Lane Running SMART motorway. Speed restrictions are in place which may encourage typical users of the motorway and affected junctions to seek alternative routes. Similarly widening works to the A421 are currently being implemented between M1 J13 and the Eagle Farm Roundabout. These network changes/constraints are not reflective of the network applicable to the 2016 base model.

9.10 If there is a difference between typical and actual traffic flows it is unclear how this will be recognised and which traffic flows can be confirmed as being appropriate for use in updating the base year model. We recommend that WSP put forward proposals as to what adjustments will be made to

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reflect traffic growth/change. As a check of count stability, we recommend that some count sites are used that were included in the 2016 validation. This should either confirm the validity of the data collected or indicate how it should be adjusted to make it appropriate for use in updating the base year model.

9.11 It recommended that further information is provided of how the above issues will addressed such that suitable reassurance is provided that the changes made to the 2016 base year are appropriate.

9.12 The proposed development would be added onto the updated Reference Case so that the impact of the development can be established. This is the accepted normal practice.

9.13 The default residential trip rates in MKMMM are believed (by WSP) to be lower than the sensitivity analysis undertaken and the production of bespoke rates will more accurately reflect the development proposals. It is proposed to use a trip rate derived from TRICS (for Mixed Housing) as the development schedule is not yet fixed. This is a sensible assumption for a situation which is, as yet, uncertain. The specific rates used should be reviewed by AECOM before they are used in the model.

9.14 The suggested methodology includes refinements accounting for varying level of internalisation. This will be a key assumption which has not been presented in the WSP Technical Note but is expected in a later Technical Note. This will also include Employment trip rates. The specific assumptions should be reviewed by AECOM before they are used in the model.

9.15 It is suggested that the distribution and assignment of the development traffic is calculated using the variable demand calculations within the MKMMM platform. This may be appropriate. However, the results would need to be reviewed by AECOM to establish that they were reasonable before they are used in the model.

9.16 For zones with non-zero trips in the Base Year, the existing distribution would be used. For zones with zero trips, or development zones with a small number of trips, the default distribution would be overwritten by the gravity model. In principle, this suggestion is acceptable. However, the specific details should be reviewed by AECOM before they are used in the model.

9.17 The MKE area is split into six zones in MKMMM as shown in Figure 15.

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Figure 15 MKMMM Zones in Area of Milton Keynes East

9.18 WSP propose to add some additional zones to divide the zones by purpose. Their proposals are:

Zone	Recommended Adjustment
1515	No adjustments, purely Employment
1521	Split the zone into two to create a residential and an employment zone
1523	Split the zone into two to create a residential and an employment zone (Approximately 2/3rds residential / 1/3rd employment to reflect the geographic split)
1525	Split the zone into two to create a residential and an employment zone
1571	No Adjustments – Residential plus Community uses
1572	Split the zone into two to create a residential and an employment zone

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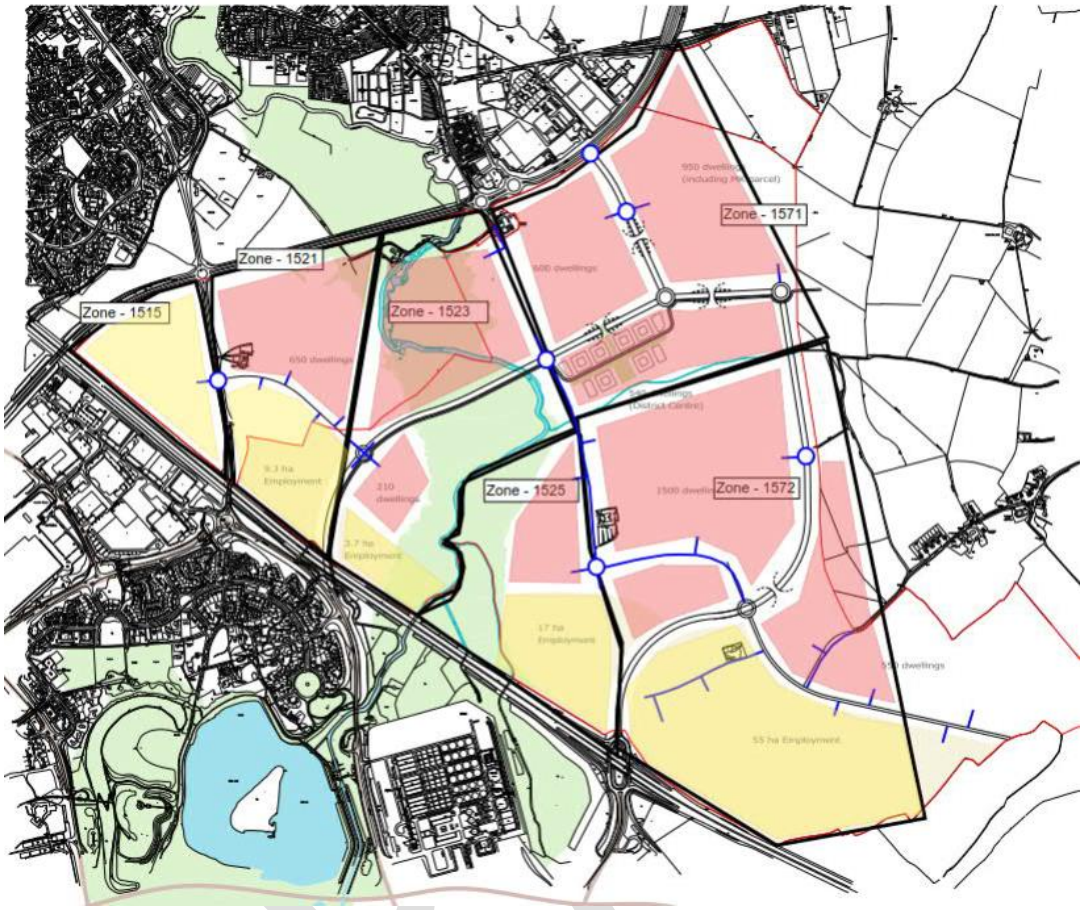

Figure 16 Alternative Zoning Structure – Residential and Commercial Parcels

9.19 This appears to be satisfactory providing the zone loading positions are appropriate.

9.20 WSP intend to reduce trip rates to account for public transport improvements. This is satisfactory in principle but will depend on the actual figures used.

10. WSP Modelling Approach

10.1 In order to test the impact of the proposals, WSP intend to model three scenarios. These would be for a future year of 2039. Scenario A would be the Reference Case. Scenario B would be the Reference Case plus the Milton Keynes East proposals. Scenario C would add mitigation if that were required.

10.2 The programme in Section 7 of the WSP Technical Note indicates that MKC and their consultants will be responsible for updating the Reference Case to take account of new traffic data and, presumably, from 2031 to 2039. This should ensure that the modelling process is consistent. The WSP Technical Note does not specify how the growth in demand between 2031 and 2039 is to be determined. While it is possible that the full build out of Milton Keynes East may contribute all of the increased demand in this area, it is likely that background growth would be expected in other types of trip including, for example, through trips on the M1. A method of taking these into account needs to be agreed between WSP, MKC and Highways England.

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10.3 Modelling of early phases would not use MKMMM, but would assess the impact through independent junction modelling. However, the trip distribution would be based on MKMMM. AECOM consider this to be a satisfactory approach.

10.4 In terms of network coding, WSP are assuming that MKMMM contains all infrastructure for the Reference Case. Limited changes are proposed for strategic infrastructure as part of the proposals. It was also considered that some links previously modelled as dual carriageway could be downgraded to single carriageway. These changes are shown in Figure 17.

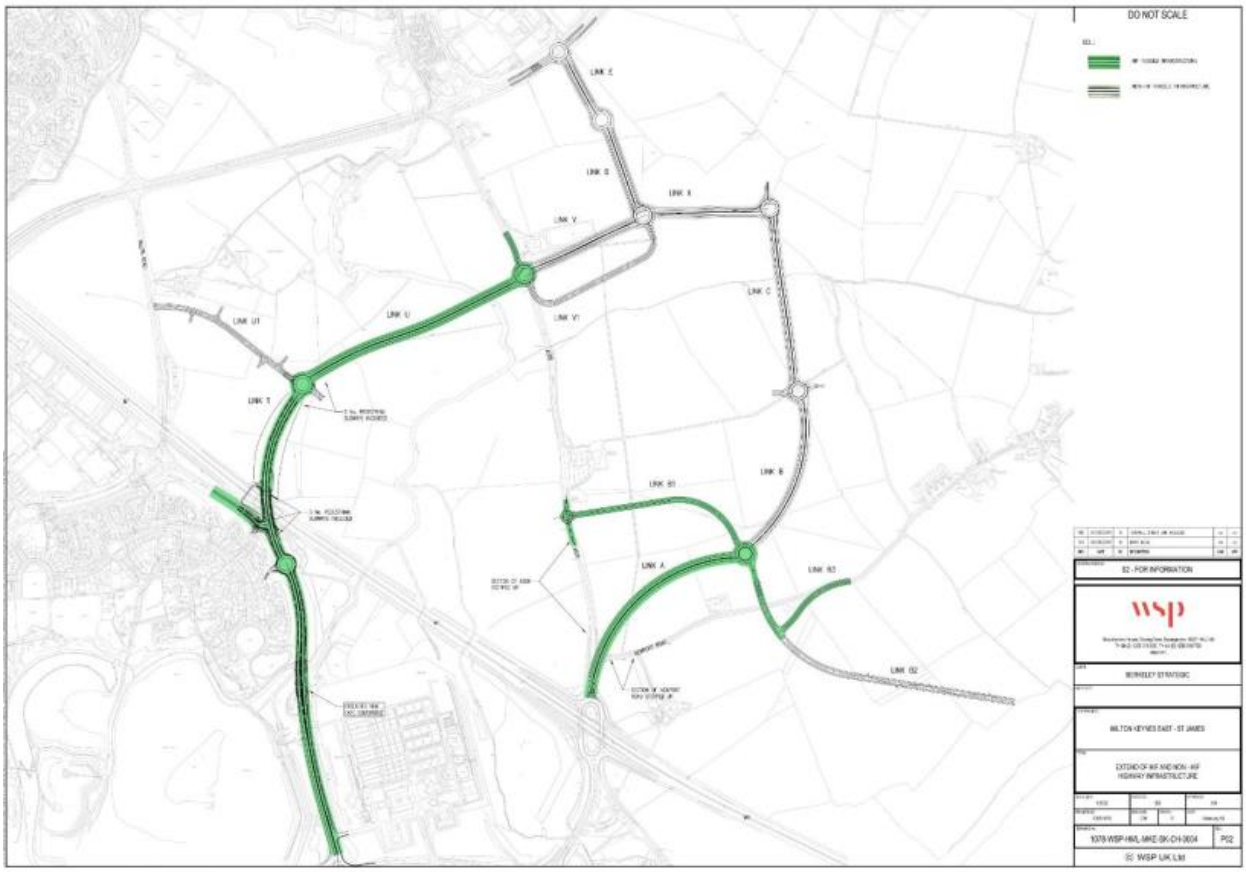

Figure 17 Milton Keynes Ease Strategic Infrastructure Plan

10.5 Other junction improvements coming forward as part of other planning applications may need to be coded in. Some of these changes may have an impact of Highways England's roads.

10.6 Agreement needs to be reached on how the new M1 overbridge will tie into Tongwell Street and whether the section of Tongwell Street to the northwest up to Tongwell Roundabout can be removed. This could be an issue for Highways England if it results in a reassignment of traffic through the motorway junctions. WSP would need to demonstrate that this would not result in an adverse impact.

11. WSP Assessment Approach

11.1 The assignment of the scenarios will determine where detailed junction modelling needs to be undertaken. This will be based on Volume over Capacity ratios, but taking account of actual flow, demand flow and delay. Comparison of Scenario B with Scenario A may reveal the need for a mitigation strategy, which will be modelled as Scenario C.

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11.2 It is expected that the junctions subject to detailed modelling will be:

- M1 J14;
- Northfields Roundabout;
- Tongwell Street Roundabout;
- Willen Road Roundabout;
- Pagoda Roundabout;
- Woolstone Roundabout;
- Blakelands Roundabout;
- Fox Milne;
- Pineham Roundabout;
- Renny Lodge Roundabout;
- Tickford Roundabout; and
- Marsh End Roundabout.

11.3 All of the junctions identified (with the exception of M1 J14) will be modelled with Junctions9 or LinSig. Any junction changes required will be coded into Scenario C.

11.4 WSP propose to undertake a review of the M1 J13 link flows. This junction is 7.5km south east of J14. Whilst WSP may not expect that development trips from Milton Keynes East will use this junction, there are a number of existing and planned residential/employment sites close to this junction which could result in trips between the proposed development and M1 J13. There may also be reassignment at M1 J13 due to changes in the capacity and delay at J14.

11.5 It is intended that M1 J14 and the Northfields Roundabout will be modelled using a Paramics microsimulation model.

12. WSP Paramics Proposals

12.1 The identified model extent seems suitable, subject to queues and delays being appropriately captured within the network.

12.2 The model has been amended for testing in the HIF process, it is not clear if these amendments will been retained in the Do Min scenario. They cannot form part of a network to be re-calibrated to new survey data. No information is provided as to how well the existing 2012 model is calibrated or validated, nor the actual version that was used to complete this.

12.3 ANPR Survey data is suggested as the main source of new data, providing turn counts, delays and journey times. ANPR will certainly provide turn counts and journey times, but delay is a nebulous value to calibrate against in microsimulation and queue surveys should also be considered given the extent of congestion described in the methodology.

12.4 If the model is to be re-validated in the current version of Paramics Discovery the network should be imported and reviewed completely, then re-calibrated against new turn data and queue data collected in the 2019 surveys, if this is appropriate. The model can then be validated against the journey time surveys completed; ANPR data should be suitable, providing the routes used are appropriate. This would then provide a suitable basis for the Do Min and future year models to be constructed.

12.5 The methodology does not state what the peak periods assessed would be, given the MKMMM are strategic models their output will be peak hour and it is assumed these will be retained, the

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methodology does not state how this will be converted to the required multiple hour demands, which are then correctly profiled in the future year models. Furthermore, the proposed 2019 surveys may indicate the actual peak hour is not directly aligned to the strategic model output and the methodology does not outline how this data will be transposed to accommodate this.

12.6 The methodology also does not state how vehicle types will be extracted from the MKMMM in the same degree of detail as needed in the Paramics model.

12.7 The use of Paramics Discovery is correct, it is the current version of the software, is supported by SYSTRA and if the model is to be updated, bringing it into Discovery is appropriate. Discovery does not allow for MOVA as the methodology states, and VA based Plan Files will need to be carefully constructed for the new Base model and reviewed at each stage of future year assessment, to reflect the operation of MOVA in the peak hour and its shoulder hours.

13. Conclusions

13.1 AECOM had been commissioned by Highways England to undertake a review of the documentation for the Milton Keynes Multi-Modal Model. The model has been prepared by staff from AECOM in St Albans and Bedford on behalf of Milton Keynes Council. The independent review was undertaken by AECOM staff in Birmingham.

13.2 AECOM reviewed the following documents relating to validation and forecasting:

- Highway Model Local Model Validation Report (June 2017);
- Public Transport Local Model Validation Report (March 2017);
- Highway Model Traffic Forecasting Report (October 2017); and
- Impacts of Plan:MK (November 2017).

13.3 WSP intend to make local enhancements to the model to take proper account of the developments. This Technical Note has reviewed the modelling approach for the Milton Keynes East planning application. This has been limited to a review of the following document:

- Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application, March 2019. (Prepared by WSP for Berkeley St James)

13.4 The following bullet point list summarises the main issues:

- The primary objective of MKMMM is to provide a robust means of assessing alternative land-use options and development phasing;
- Primary use of the model is to assess the impacts of Plan:MK on the strategic road network and test plan options;
- Local enhancement may be required for particular transportation schemes;
- The developments to the east of the M1 potentially add trips to the M1;
- A general increase in traffic flows across Milton Keynes causes further issues of congestion which are not in the immediate locality of the additional development;
- All of the modelled scenarios involve a significant deterioration in the performance of the local highway network resulting in some reassignment to the SRN;
- The proposals for the Milton Keynes East development are similar to those modelled as Scenario 2b;
- The traffic surveys proposed by WSP are consistent with the recommendations of the model for local enhancements in the areas of development;

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- Due to ongoing roadworks the traffic surveys undertaken may not be reflective of typical conditions, reassurance is required that traffic flows recorded can be confirmed as being appropriate for use in updating the base year models.
- The zone changes proposed should provide a better representation of the proposed development;
- The network changes proposed should enhance the modelling of these proposals;
- Some modelling details remain to be resolved; and
- The proposal to use junction modelling tools to assess the requirement for mitigation is satisfactory.

13.5 In overall terms, the proposals by WSP for the modelling of Milton Keynes East are consistent with the recommendation that the model is enhanced in the local area when developments are proposed.

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Penny Mould
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24 August 2020

Dear Penny,

Milton Keynes East - Stage 2 (Future years reference case) Modelling Outputs

Introduction

Further to recent correspondence and discussions, I am pleased to inform you that the results for next stage of strategic modelling for the Milton Keynes East (MKE) site have been completed. This covering letter provides further summary details of the process undertaken and any pertinent points for consideration.

As you are aware, AECOM on behalf of Milton Keynes Council (MKC) have undertaken the Stage 2 modelling for the proposed development at Milton Keynes East (MKE). As AECOM support both MKC and Highways England (although it should be noted that these are separate teams) for the purposes of this letter, and to avoid confusion, the MKC AECOM team will be referred to as 'MKC modelling team' and the Highways England AECOM team, will be referred to as 'AECOM (Birmingham)'.

The Stage 2 modelling results apply the future growth and planning assumptions for the two future year reference cases, 2031 and 2048. These years and outputs will form the basis of the comparison against the development impacts once Stage 3 modelling is completed over the coming months.

The completion of Stage 2 follows the review of the Stage 1 modelling, which updated the 2016 baseline with supplementary information and additional traffic surveys undertaken in 2019 in the areas surrounding the MKE site.

Highways England, and AECOM (Birmingham) reviewed the Stage 1 outputs and supporting technical notes and *concluded that the Base Year model had been extensively calibrated to match modelled flows with observations*.

Whilst AECOM (Birmingham) provided commentary on some of the validation aspects of the baseline updates, the review concluded that the adjustments were…*considered to be satisfactory for the defined purposes of Milton Keynes Council. Subject to the use of justifiable trip distributions for new developments, it should provide a satisfactory assessment of the impact on the A5 and M1.*

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As such, the MKC modelling team have progressed using the agreed updated 2016 baseline model to create the two new reference case models.

The MKC Modelling team have not prepared a formal technical note for the Stage 2 modelling as it was considered more appropriate to share the files and input assumptions with Highways England / AECOM (Birmingham).

Therefore, as agreed, the MKC modelling team will send the required Saturn files directly to the AECOM (Birmingham) team for their review. The AECOM (Birmingham) team will then be able to review the results on behalf of Highways England.

As I understand it, the transfer will include the following;

- UFM (demand), UFS (assignment), UFC (costs) and UFO (saved routes) files by time period for the 2031 and 2048 future years
- Inputs used in the future years.

Future Year Growth Assumptions

WSP prepared and submitted Technical Note, TTN4 – 2048 Growth Note in June 2020, which included information on the likely planned growth beyond the MK Plan period in areas outside of the Milton Keynes borough. This note set out the specific developments which should be included, where feasible in the model post 2031. Due to the limitations of the strategic model, only certain planned sites could be included specifically.

AECOM (Birmingham) have recently provided a review of TTN4 (issued 20/08/2020) and as such a formal response to that will be provided under a separate cover in due course.

A summary of the growth applied in modelling approach is set out below. The information within TTN4 alongside a review undertaken by MKC officers on the planned growth within the MK borough has allowed the creation of the two forecast reference years.

The approach to apply the various growth assumptions within the reference case modelling has been extensively discussed and agreed with the MKC modelling team. Table 1 below provides a summary of the methodology adopted.

Table 1 – Growth Assumptions used in the reference case modelling

Forecast Year	Within MK borough	Outside of MK borough
2031	Development growth only[a]	Development growth in known zones
		TEMPRO growth in other zones
2048	Unconstrained TEMPRO from 2031 to 2048[b]	Development growth in known zones plus residual TEMPRO 2040-2048 from Table 4.2 (TTN4 - CB MSOA 007 and 009)[c]
		Unconstrained TEMPRO growth to 2048[d]

Notes:

a) The MKB forecast assumptions have been provided from the MKC planning team based on a comprehensive new 2020 review, and have been used in place of TEMPRO to maximise local accuracy. Upon review, the assumptions indicate that the planned growth is similar to TEMPRO for homes and higher than TEMPRO for jobs and therefore is considered robust.

b) The housing and employment growth in TEMPRO is below the trajectory needed for MK 2050; however, as the MK 2050 strategy is not adopted at this stage, there are not yet specific locations and figures post-2031 to improve on this. It is unconstrained in the sense that the 2016-2048 MKB total is not controlled to the corresponding TEMPRO total, so will be higher, which makes some allowance for this known underestimate of the MK 2050 growth target.

c) The build out for the known developments suggests full completion at 2039. Therefore, TEMPRO growth 2040-2048 is added to avoid missing potential further growth in these areas. As the sites tend to be in larger zones, this additional development could happen elsewhere in the zone even if the sites themselves do not increase from 2039, and is considered a valid assumption.

d) TEMPRO growth has been applied except for the known external growth outside MKB, which we know is higher than TEMPRO at MSOA level.

The assumptions above and the methodology applied for the two future years is considered robust and realistic. As noted above, the growth aspirations set out the MK 2050 strategy have not been explicitly included as this could over-estimate levels of background growth in the area. As such, the reference case models and the input assumptions are considered appropriate for use in the assessment of MKE.

Stage 2 Summary of results and discussions with MKC

The modelling process has been an iterative one, with information shared between the MKC modelling team and WSP during interim runs to discuss outputs and improve areas where issues were found. This has ensured that the final model runs are suitable and reflective of likely growth patterns.

As discussed with MKC, in general, the Stage 2 results look plausible and are considered to reflect the likely impacts from planned growth in the two future years.

A few key points that were discussed during the modelling process are as follows:

- The spread of increased flows and delays across Milton Keynes looks reasonable given the spread of development anticipated and the distant later forecast year of 2048.
- It is noted that there are decreases relative to the 2016 base model in certain locations, but those checked are considered to be related to congestion and the results indicate that traffic continues to get through the network.
- Delays and congestion have been identified at Tickford Roundabout in the future years. The results indicate re-routeing through Newport Pagnell as a result. Discussing with MKC, this is considered sensible given the assumed growth.
  - Further analysis of the Tickford Roundabout and surrounding links was undertaken in the modelling process, including select link analyses. These were based on the full (UFO) runs, and the select link difference plots allowed a review of the the traffic using the eastbound A422 approach to Tickford roundabout for AM and PM, 2031 and 2048 in comparison to the 2016 flows on this link.
  - The AM plot for 2048 identified a U-turn at Tickford Roundabout by increased traffic going from the select link back towards Willen Road and then down Tongwell St towards J14. Traffic wanting to do this from the A422 west would be expected simply to turn right at Marsh End roundabout so this appears to be due to traffic coming down Marsh End Road from Newport Pagnell and then accessing Willen Road via Tickford roundabout. This is not considered to reflect likely behaviour in this location, as exiting Marsh End Road and going straight on would be expected to be subject to the same delay from cross-traffic as would turning left. The Marsh End roundabout, was 'exploded' in the coding to assist with accuracy and calibration, however a check on the capacities used has found that these are all within acceptable ranges. These results will be picked up in the detailed assessment within the TA (*see further text below*).

  - In the PM, 2031 and 2048 years indicate that the overall traffic heading across the junction, i.e. the out-commuters, are consistently higher than 2016 levels as would be expected, going on to split towards Bedford and Wellingborough further north.
  - The results in 2048 appear to show some instability in that area, however this is not considered unreasonable given the time horizon
- In earlier iterations of the modelling, the unadjusted network and zone loading in Marston Vale was not appropriate to cater for the proposed 5,000 new homes and associated new traffic onto the network, with big delays on the zone connector links as a consequence. This was likely to be underestimating the impact of that development, which is an artificial constraint as we assume the local network will be improved to cope. As such, three new or connectors were applied to spread the loading more realistically and reduce the delays that were noted in the original run. This reduced the delays seen in earlier versions, and whilst unlikely to impact the areas surrounding MKE, it was evident that these connections should be included in the final model runs.

It should be noted, regarding the turning flows identified at Marsh End Road and Tickford Roundabouts, that no adjustments will be made in the reference case models to account for this routing. It would be poor practice to adjust the reference case model away from the re-calibrated and validated base model. Instead, where routing idiosyncrasies have been observed associated with higher levels of traffic and longer delays, then this will be assessed within the detailed model tests within the Transport Assessment (TA). For example, the 'Junctions 9' models will be run using the outputs of the strategic modelling and where it is clear that vehicles routing could be different, such as the Tickford example above, a sensitivity test will be applied accordingly to include a manual adjustment.

Conclusion

The Stage 2 modelling results will be provided by the MKC modelling team to Highways England and AECOM (Birmingham) for their review. As outlined above, the results are considered robust and based on sensible growth forecasts for 2031 and 2048.

It is important to recognise, especially with the 2048 year, that the future growth assumptions are based on the best available data at this time. The future year horizon tests have applied a consistent and suitable methodology to capture planned growth in the Milton Keynes and wider boroughs without over-estimating background growth.

As suggested on our call, it may be easier to set up a virtual meeting to discuss the results between the various teams instead of going through a traditional review and response approach. It would be appreciated once the model information is received if HE / AECOM (Birmingham) could confirm their availability. We appreciate that some time will be needed to review the files to enough degree to formulate queries or questions, however we hope that Highways England will deem the Stage 2 modelling results suitable for use in the assessment of MKE.

Yours sincerely

Alex Smith
Associate
WSP

cc: Martin Tate, Milton Keynes Council
Encl.

Project:	**Highways England Spatial Planning Arrangement**	Job No:	**60600479 DM016.006**
Subject:	**Review of WSP Response concerning Approach for Milton Keynes East and Traffic Models – Stage 2**		
Prepared by:	**Alan Boyce**	Date:	**8th October 2020**
Checked by:	**Liz Judson**	Date:	**9th October 2020**
Verified and Approved by:	**John Alderman**	Date:	**9th October 2020**

1. Introduction

1.1 AECOM has previously been commissioned by Highways England to undertake a review of the documentation for the modelling for development at Milton Keynes East (MKE). This included reviews of the following documents:

- Highway Model Local Model Validation Report (June 2017);
- Public Transport Local Model Validation Report (March 2017);
- Highway Model Traffic Forecasting Report (October 2017);
- Impacts of Plan:MK (November 2017);
- Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application, March 2019. (Prepared by WSP for Berkeley St James); and
- Milton Keynes Model, MK East Model Update (April 2020).
- Transport Technical Note – TTN4 Growth and Future Year Modelling Approach for Milton Keynes East, June 2020 (Prepared by WSP for Berkeley St James)

1.2 All of the reviews had been limited to the documentation as it had not been possible for AECOM (Birmingham) to access the models themselves.

1.3 Highways England are responsible for the operation of the Strategic Road Network. This includes the M1 and A5 in this area. Consideration has been given to the extent to which it should be possible to rely on model outputs in decision making in relation to these roads.

1.4 This Technical Note covers three issues:

- It reviews WSP response and clarifications to AECOM's TN06 - 'Response to HE/AECOM's comments to TTN4 Growth and Future Year Modelling Approach for MKE (Hereafter known as 'Response to TTN4 comments')', dated September 2020;
- It reviews the WSP 'Technical Note MKMMM Stage 2 Outputs (Hereafter known as 'TN Stage 2 outputs')', dated September 2020; and
- It reviews the performance of the traffic models themselves (model files received via email on 26/08/2020).

1.5 It should be noted that this review is related to Stage 2 of the MKE modelling, which is the modelling of future years without the inclusion of MKE development.

1.6 One of the diagrams in this Technical Note has been extracted from the WSP Technical Note. The remaining diagrams have been created from the model assignments.

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2. WSP Response to AECOM Requests and Recommendations ('Response to TTN4 comments)

2.1 In Technical Note number 6, AECOM had reviewed WSP's growth and future year modelling approach. The major points raised in this review are summarised below.

2.2 AECOM recommended that growth within Milton Keynes Borough for the periods 2031 – 2039 and 2039 – 2048 should use the growth forecasts for Milton Keynes East and constrain the total level of growth in the Borough to TEMPRO/NTEM.

2.3 AECOM's interpretation of TTN4 for growth external to Milton Keynes Borough for the period 2031 - 2039 was that a number of identified developments which may impact the assessment of MKE were marked for inclusion in the modelling. The total growth from these identified developments was greater than TEMPRO for the particular MSOA within which they are located. AECOM's understanding was that no growth was applied to other MSOA outside of Milton Keynes Borough. On this basis, AECOM recommended that the overall growth outside of Milton Keynes Borough but within the model area should be constrained to TEMPRO.

2.4 For the period 2039 -2048 WSP proposed assuming TEMPRO/NTEM growth for the area outside Milton Keynes Borough. AECOM considered this to be appropriate.

2.5 There were a number of cases where it was unclear what was being proposed. It was stated that the trip distribution would be determined within MKMMM, however AECOM expressed a concern that the use of trip distributions from existing zones would not be reliable as most of the model demand is synthetic and that a different method should be used.

2.6 WSP produced a Technical Note in response to these comments which provided clarifications or explanations. This is WSP 'Response to TTN4 comments'. The key points are highlighted here.

2.7 In paragraph 1.1.8 of their Technical Note, WSP state that growth has been applied to zones not just to MSOA. We interpret this as meaning that the location of the growth from developments is more precisely modelled. This is the expected process.

2.8 Paragraph 2.2.3 of WSP 'Response to TTN4 comments' elaborates on the process of the application of growth in the area external to Milton Keynes Borough between 2031 and 2039. It is agreed that the growth in the two MSOA where the developments are located will be greater than TEMPRO. It had not been clear what has been assumed for other areas external to Milton Keynes Borough. There appear to be four alternatives:

A. AECOM had interpreted the situation as being that growth was assumed to be zero in all of the zones outside of the two MSOA containing the developments. The indication from this paragraph was that this assumption was incorrect.

B. AECOM's initial interpretation of the latest information was that TEMPRO has been applied to all zones external to Milton Keynes Borough and not within the two MSOA containing the developments. This will result in a situation where the total growth in zones external to Milton Keynes Borough is greater than TEMPRO. In terms of total level of trips generated, this should provide a robust assessment.

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C. An alternative interpretation of the latest information is that TEMPRO has been applied to all zones external to Milton Keynes Borough and not within the two zones containing the developments. Both Tables 2.1 and 3.1 of TTN4 indicate that this is the case. In this case, growth should be slightly higher than alternative B above. WSP have subsequently confirmed that this is the case.

D. The central position would be provided by constraining the overall level of growth in the zones external to Milton Keynes Borough to TEMPRO. This would mean that the growth in external zones without specific developments would be lower than TEMPRO. This is not unreasonable as a significant proportion of TEMPRO growth is modelling the impact of developments. Theoretically, growth could be negative, but this is not thought to be the case in this instance. An overall constraint to TEMPRO would be required for an economic assessment.

2.9 AECOM agree that it is appropriate to include the specific locations of developments, such as those at Cranfield and Marston Moretaine, where this is known rather than only the total number of trips as there is the potential that this will affect the impact on particular junctions.

2.10 Paragraph 2.3.2 of WSP 'Response to TTN4 comments' states that the growth within Milton Keynes Borough is greater than TEMPRO, particularly for jobs. This should result in an increase in in-commuting. In a similar manner to above, WSP consider that this will provide a robust assessment of the impact on the SRN. AECOM agree that this should be the case.

2.11 Paragraph 3.1.2 acknowledges that there is agreement that trip distributions should not be based on existing distributions for specific zones. Instead the gravity model within the MKMMM was to be used. AECOM accept that this is appropriate.

3. Review of WSP Technical Note MKMMM Stage 2 Outputs (TN Stage 2 outputs)

3.1 TN Stage 2 outputs emphasises that the modelling is for operational purposes, to ensure adequate network capacity, and not for economic assessment. Hence, development trips have been added with no constraint to NTEM.

3.2 It was stated that there had previously been an issue as to how trip distributions were to be applied to the new developments. This procedure has been explained and AECOM consider that it is satisfactory.

3.3 WSP issued the model files to AECOM and highlight some areas which they considered were worthy of review:

- Tickford Roundabout, between the A509 and the A422 to the south of Newport Pagnell and on the edge of the Milton Keynes East site;
- M1/A421 connections around Marston Vale, to the east of the Milton Keynes East development site, where zone loading has been changed to provide a better representation of development trips and ensure that they load onto the network;
- M1 Junction 14, which is the closest motorway junction to the Milton Keynes East development, immediately adjacent to the edge of the development;
- Mainline M1 between junctions 13 and 15;
- Pineham Roundabout on the A509 to the west of the M1 junction 14, where queuing may interact with the SRN;

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- Fox Milne Roundabout on the A4146 to the west of M1 junction 14, where queuing may interact with the SRN;
- Tongwell Roundabout immediately to the west of the Milton Keynes East development and to the west of the M1 but with no direct connection.

3.4 These areas are shown in Figure 1, which has been extracted from the WSP Technical Note.

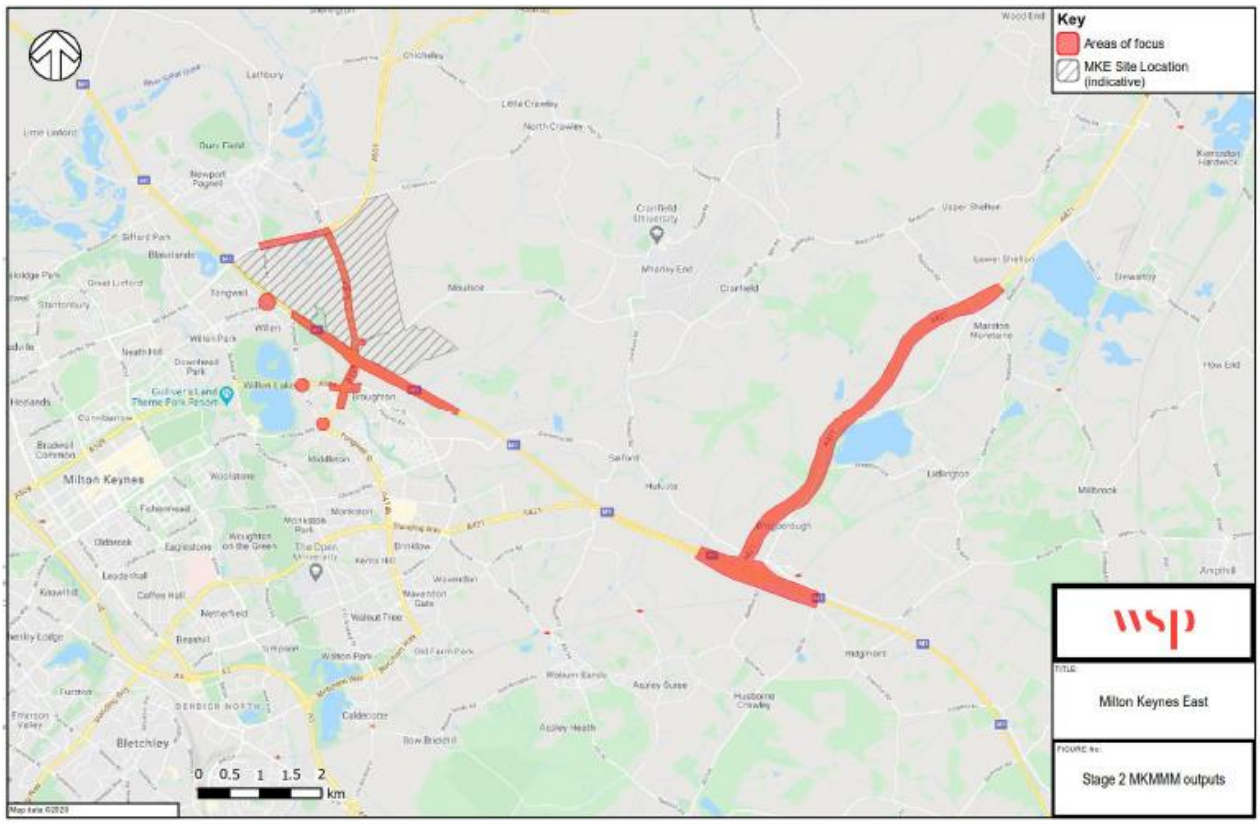

Figure 1: WSP Suggested Area of Study Focus

3.5 AECOM agreed that these were appropriate areas of focus for the study. In addition, a review was made of previous AECOM Technical Notes to determine those situations where we considered that access to the model would have been beneficial. These issues were also investigated within the model files.

4. AECOM Assessment of Modelling Files

4.1 AECOM were provided with the MKMMM Stage 2 forecast model files via email on 26th August 2020). The model (SATURN UFS and associated) files provided were for the following scenarios:

- 2031 Stage 2 (AM, IP and PM); and
- 2048 Stage 2 (AM, IP and PM).

4.2 AECOM developed a series of tests to understand changes in flows and delays between AM and PM and between modelled years. Tests were made about stability of route choice, both in terms of select links and trees between zone pairs. Checks were also made on differences between demand and

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actual flow to establish whether lack of network capacity was resulting in traffic suppression. The key results are detailed in the following sections.

5. Location of Centroid Connectors for New Developments

5.1 The first test looked at changes in the locations of centroid connectors between the base year and forecast years. The major development at Marston Moretaine was used as an example.

5.2 The base year arrangement is shown in Figure 2 with the forecast year arrangements in Figure 3.

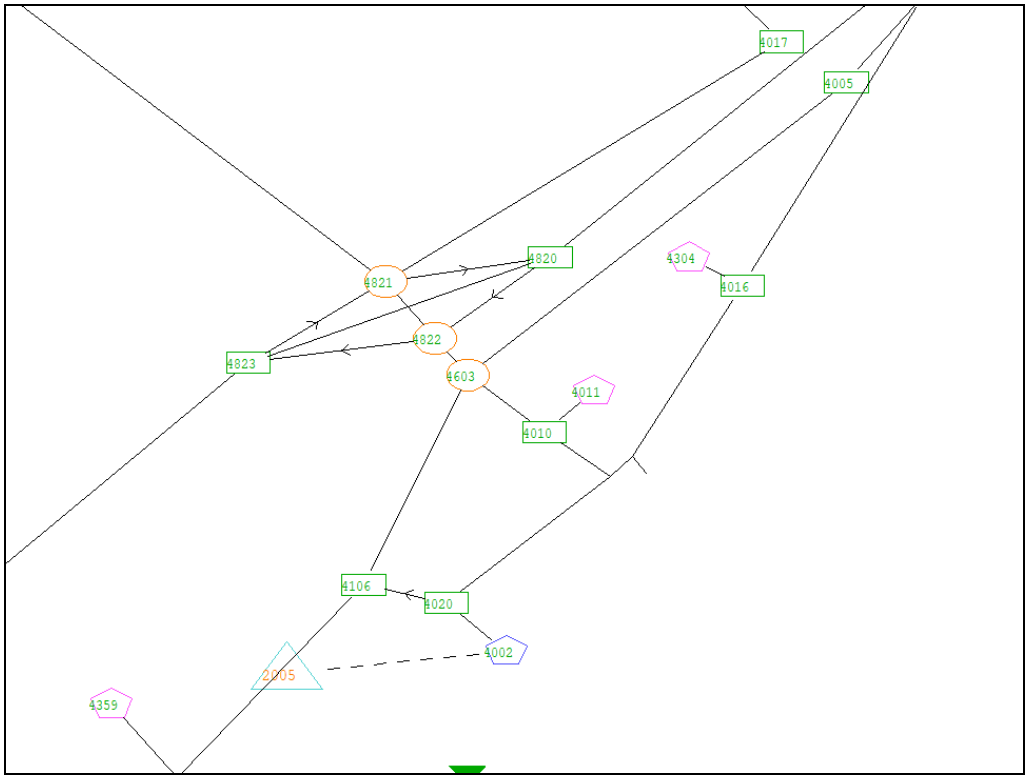

Figure 2 Centroid Connectors at Marston Development - Base Year

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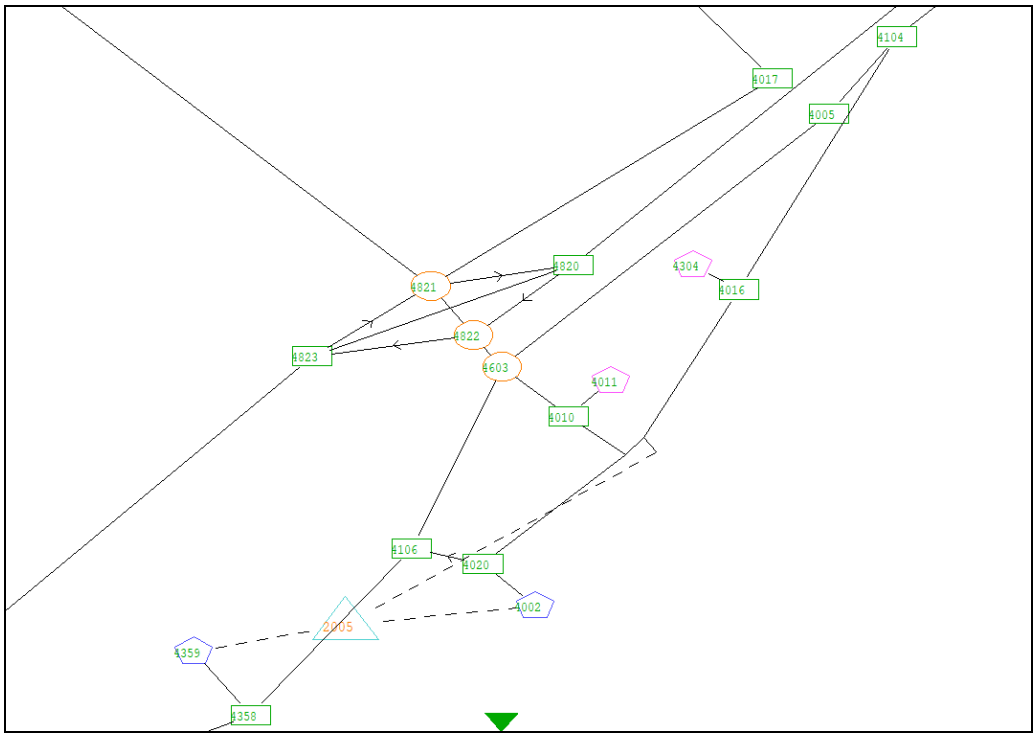

Figure 3 Centroid Connectors at Marston Development - 2031/2048

5.3 There is one centroid connector in the base year. This is expanded to three in the forecast years allowing for a greater distribution of the development traffic. Access to the A421 is made slightly easier. This is considered to be acceptable.

6. Matrix Growth in Developments

6.1 A test was undertaken to establish if the matrix growth in areas of development was consistent with the stated assumptions. Marston Moretaine was also used for this test as there is forecast to be development up to 2039, hence showing a significant difference between 2031 and 2048.

6.2 Figure 4 shows the number of AM peak origins and destinations.

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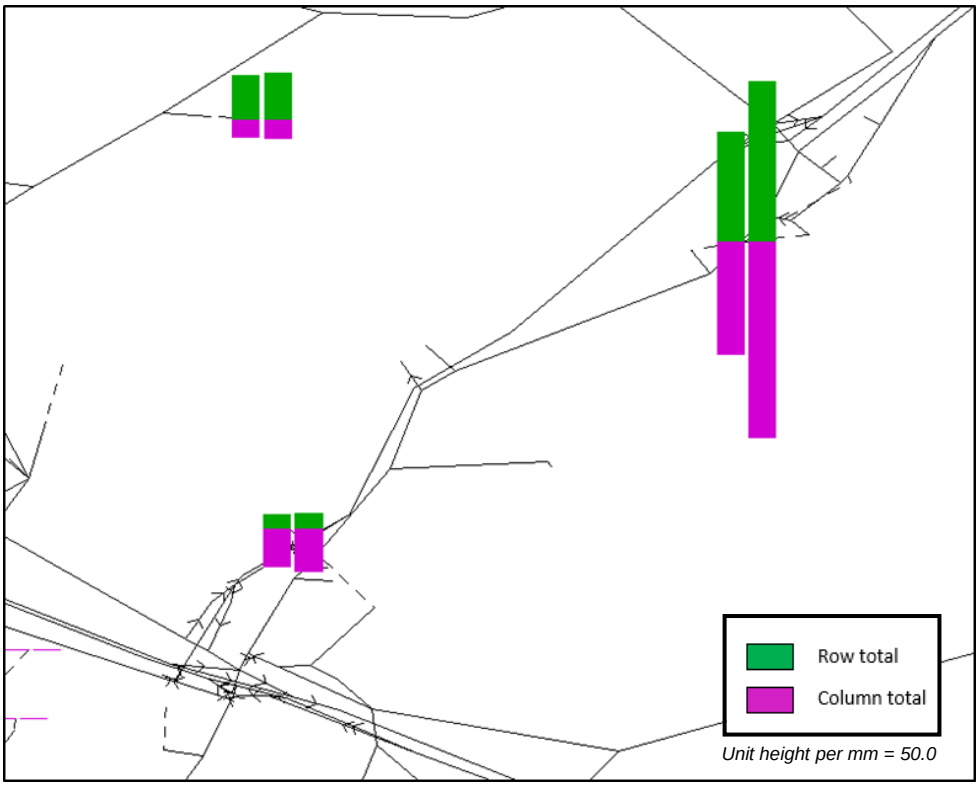

Figure 4 Matrix Totals in 2031 and 2048 AM Peak (Marston Moretaine)

6.3 The growth in the number of trips at Marston Moretaine is clearly greater than in the other zones, which is the expected result.

6.4 Figure 5 shows the matrix growth to the south west of the M1 in Milton Keynes.

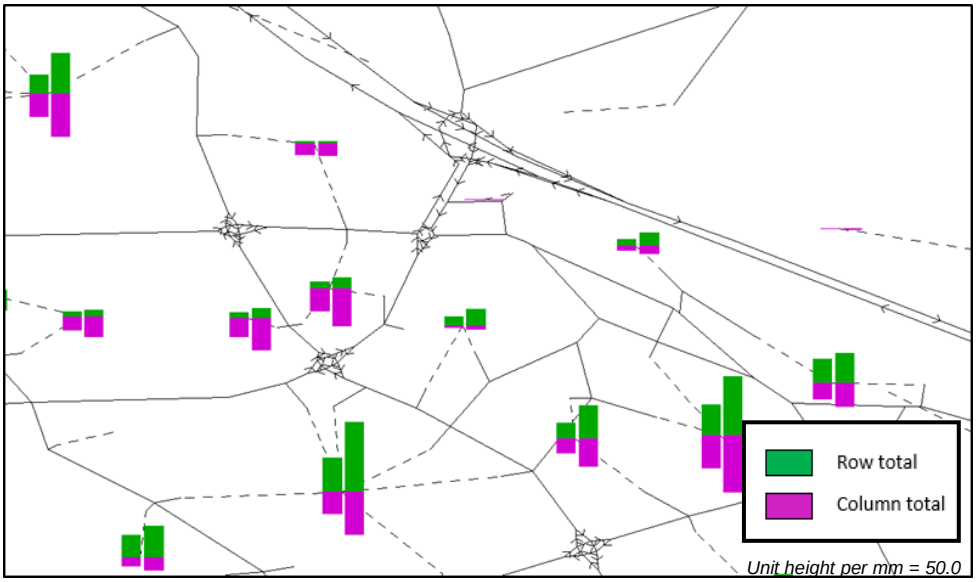

Figure 5 Matrix Totals in 2031 and 2048 AM Peak (South West of M1 Junction 14)

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6.5 As these are figures for the AM peak, it would be expected that zones which were mainly residential would have more (green) origins and fewer (purple) destinations. As a test, it was confirmed that the zone directly to the west of M1 Junction 14 is an employment zone where the predominant movement would be expected to be destinations in the AM peak. This is considered to be reasonable.

7. Trip Distributions from New Developments

7.1 AECOM had previously raised questions concerning the trip distributions from new developments. This test used 'select zones' to track the distributions around the network. This is shown in Figure 6 for the Marston Moretaine development in 2031, while Figure 7 shows these trips as they reach the M1 at Junction 13. Figures 8 and 9 show the same details for 2048.

Figure 6 Trips originating from Marston Moretaine in 2031 (AM peak)

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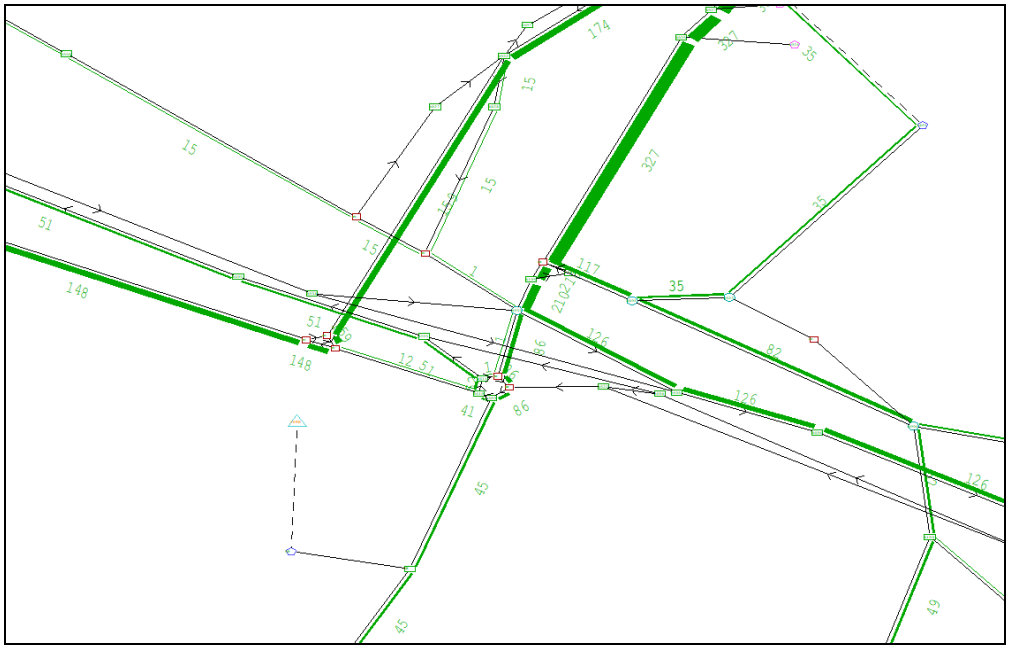

Figure 7 Trips originating from Marston Moretaine at M1 Junction 13 in 2031 (AM peak)

7.2 Of the trips generated in 2031, approximately 500 head towards Milton Keynes and the M1 on either the A421 or Bedford Road. Approximately 450 head towards Bedford with 100 trips heading towards Cranfield. Though there are obvious uncertainties about what will happen, this appears to be a reasonable distribution.

7.3 Of the trips reaching the M1, 126 join the motorway heading to the south, 51 join the motorway heading to the north, and 148 using the A421 towards Milton Keynes. Other roads account for the remaining trips. Again, this appears to be a reasonable distribution.

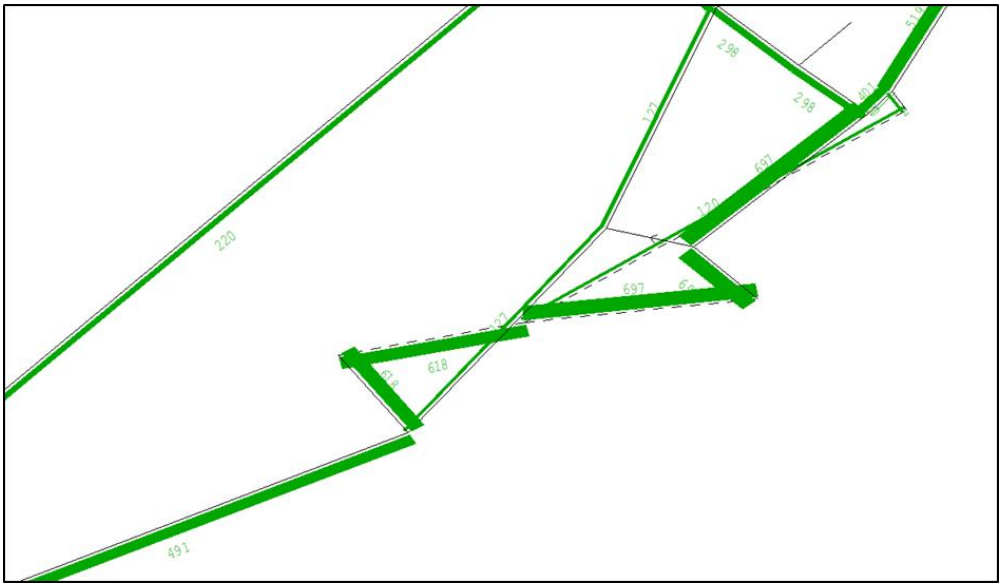

Figure 8 Trips originating from Marston Moretaine in 2048 (AM peak)

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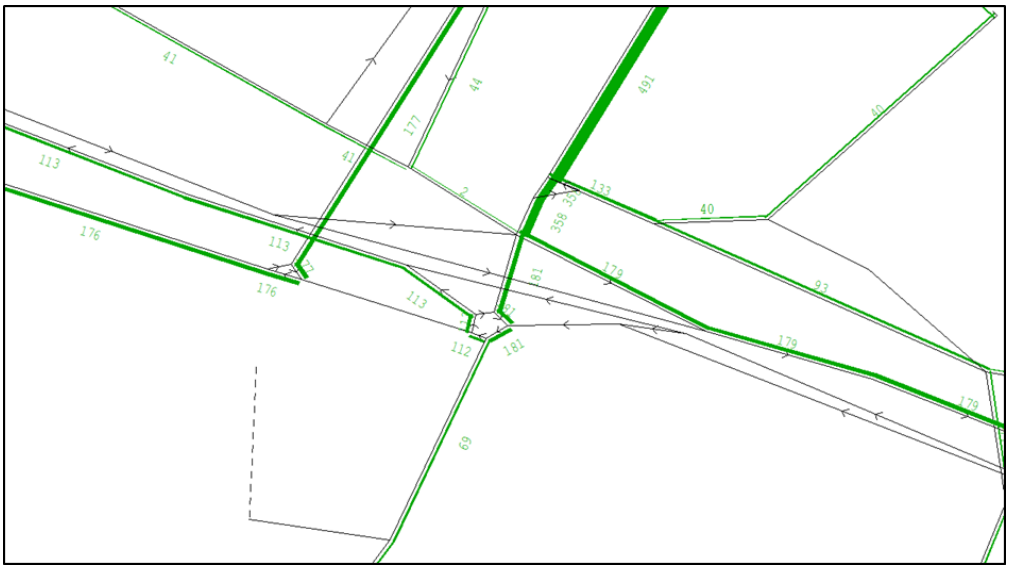

Figure 9 Trips originating from Marston Moretaine at M1 Junction 13 in 2048 (AM peak)

7.4 Figure 8 shows more traffic from the Marston Moretaine development in 2048, as would be expected. However, the distribution between Bedford, Milton Keynes and Cranfield is similar.

7.5 Figure 9 indicates that a greater proportion of these trips now join the motorway, particularly in the northbound direction. The distributions appear to be reasonable.

8. Proportion of Through Trips on the M1

8.1 Select link analyses were undertaken to establish the proportion of trips using the full length of the motorway as opposed to those terminating within the model area. This has been shown in Table 1 for all vehicles combined and for HGVs separately for each of the modelled years.

Table 1 Proportion of Through Trips on M1 Motorway

2016 AM (All)				**2016 AM (HGVs)**			
	Start	**End**	**Through Trips (%)**		**Start**	**End**	**Through Trips (%)**
M1 Northbound	5212	1858	36%	**M1 Northbound**	1300	805	62%
M1 Southbound	5242	2114	40%	**M1 Southbound**	1634	727	44%
2031 AM (All) without MKE				**2031 AM (HGVs)**			
	Start	**End**	**Through Trips (%)**		**Start**	**End**	**Through Trips (%)**
M1 Northbound	6548	2303	35%	**M1 Northbound**	1376	855	62%
M1 Southbound	6372	2669	42%	**M1 Southbound**	1739	787	45%
2048 AM (All) without MKE				**2048 AM (HGVs)**			
	Start	**End**	**Through Trips (%)**		**Start**	**End**	**Through Trips (%)**
M1 Northbound	7575	2443	32%	**M1 Northbound**	1283	736	57%
M1 Southbound	7229	2768	38%	**M1 Southbound**	1612	699	43%

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8.2 In the 2016 base year AM, 62% of northbound HGVs use the full length of the motorway within the model area. Hence 38% of them terminate in the model area. In the southbound direction, 44% of HGVs trips fare through trips.

8.3 The proportion of through trips for all vehicles is lower than for HGVs. This is the expected result as the average trip length for HGVs is longer and a greater proportion of these will be on the motorway.

8.4 The proportion of through trips declines over time. This result is consistent with the scale of developments within the model area: the increase in local trip ends is greater than the increase in long-distance trip ends.

8.5 It should be noted that similar patterns were found in the PM peak.

9. Consistency of Coding

9.1 Some checks were made of the consistency of coding along routes. This was a test of whether changes had been made to link characteristics to enhance the calibration results. A number of apparent inconsistencies were investigated. In all cases, it was found that there was a justifiable reason for the change in characteristics, for example, the road passing through a village.

10. Destination of Trips using M1 Junction 14

10.1 A test was made of changes to the destination of trips entering M1 Junction 14 from the A509 to the north of the junction, with the results shown in Table 2.

Table 2 Destination of Trips Entering M1 Junction 14

Base Year (2016) AM		
Entering M1 J14 from North	**Exiting on local roads**	**Ratio**
1043	725	70%
2031 AM (without MKE)		
Entering M1 J14 from North	**Exiting on local roads**	**Ratio**
1102	629	57%
2048 AM (without MKE)		
Entering M1 J14 from North	**Exiting on local roads**	**Ratio**
1398	727	52%

10.2 In the 2016 base year AM peak, 70% of the trips entering M1 Junction 14 from the A509 to the north of the junction leave on the A509 to the south of the junction. Most of the remaining trips join the southbound M1 as shown in Figure 10.

10.3 The proportion remaining on the local road network declines over the year until by 2048, nearly half of the traffic is joining the motorway as shown in Figure 11. This is the expected result. As the level of congestion increases at the motorway junction, there is a greater incentive for trips which do not want to join the motorway to find alternative points to cross the motorway.

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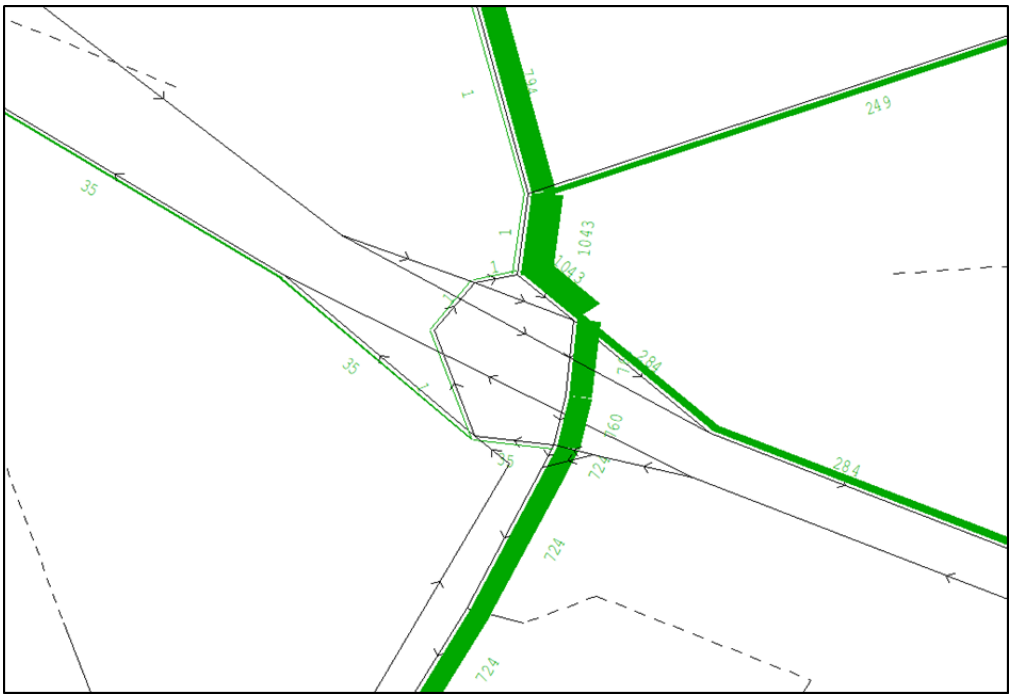

Figure 10 Trips entering M1 Junction 14 from the North AM Peak Base Year

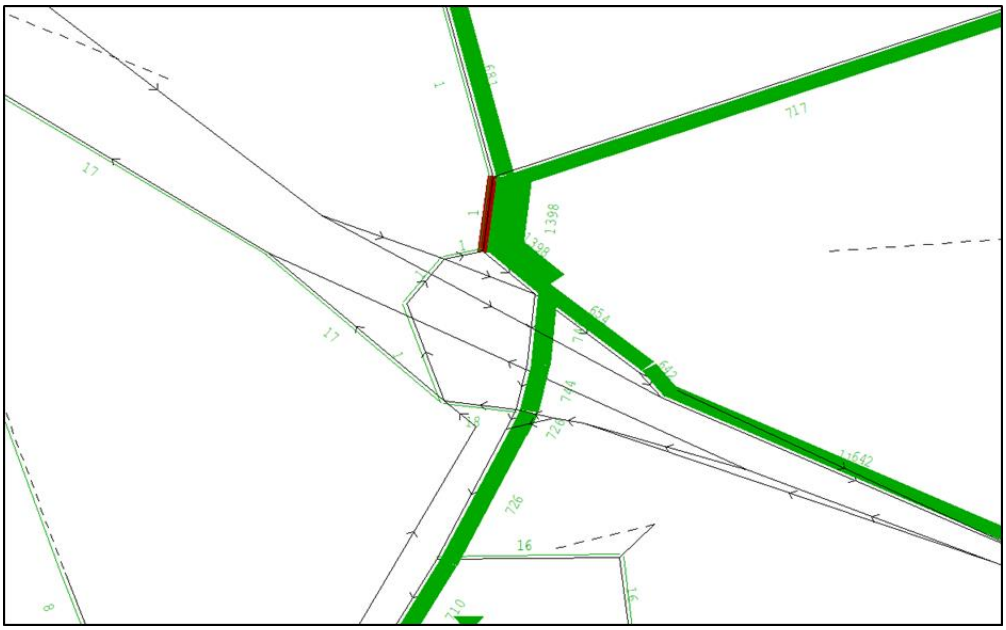

Figure 11 Trips entering M1 Junction 14 from the North AM Peak 2048 (without MKE)

11. Conclusions

11.1 AECOM has previously been commissioned by Highways England to undertake a review of the documentation for the modelling for Milton Keynes East. This included reviews of the following documents:

- Highway Model Local Model Validation Report (June 2017);
- Public Transport Local Model Validation Report (March 2017);

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- Highway Model Traffic Forecasting Report (October 2017); and
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- Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application, March 2019. (Prepared by WSP for Berkeley St James)
- Milton Keynes Model, MK East Model Update (April 2020).
- Transport Technical Note - TTN4 Growth and Future Year Modelling Approach for Milton Keynes East, June 2020 (Prepared by WSP for Berkeley St James)

11.2 All of the reviews had been limited to the documentation as it had not been possible for AECOM (Birmingham) to access the models themselves.

11.3 This Technical Note covers three issues:

- It reviews WSP response and clarifications to AECOM's TN06 - 'Response to HE/AECOM's comments to TTN4 Growth and Future Year Modelling Approach for MKE (Hereafter known as 'Response to TTN4 comments')', dated September 2020;
- It reviews the WSP 'Technical Note MKMMM Stage 2 Outputs (Hereafter known as 'TN Stage 2 outputs')', dated September 2020; and
- It reviews the performance of the traffic models themselves (model files received via email on 26/08/2020)

11.4 The review has had the benefit of access to the models in addition to the Technical Notes.

11.5 It should be noted that this review is related to Stage 2 of the MKE modelling, which is the modelling of future years without the inclusion of MKE development.

11.6 Highways England are responsible for the operation of the Strategic Road Network. This includes the M1 and A5 in this area. Consideration has been given to the extent to which it should be possible to rely on model outputs in decision making in relation to these roads.

11.7 The following bullet point list summarises the main issues:

- WSP have provide satisfactory responses to all of the requests for information and recommendations on their approach to growth and future year modelling;
- The assessment made of the modelling files showed that the changes in the number and location of centroid connectors did not make a material difference to the assessed impact on the SRN;
- The matrix growth was assessed as being consistent with the development assumptions;
- The trip distributions from new developments were considered to be satisfactory;
- The changes in the proportions of through trips on the M1 by vehicle type and by assessment year were consistent with expectations;
- No instances were found of inappropriate network coding;
- The behaviour of trips crossing the M1 at Junction 14 was found to be consistent with expectations.

11.8 For the purposes of Highways England, this review has concentrated on the parts of the SRN which may be affected by new developments, particularly at Milton Keynes East. All of the outstanding issues on the growth assumptions have been satisfactorily addressed. The review of the models themselves demonstrated that the model responses were consistent with expectation. It is concluded

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that the model is considered to be satisfactory for the assessment of the operational impact of developments at Milton Keynes East on the SRN.

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Project:	**Highways England Spatial Planning Arrangement**	Job No:	**60600479 DM016.005**
Subject:	**Review of Growth and Future Year Modelling Approach for Milton Keynes East**		
Prepared by:	**Alan Boyce**	Date:	**6th August 2020**
Checked by:	**Liz Judson**	Date:	**14th August 2020**
Verified and Approved by:	**Andrew Cuthbert**	Date:	**19th August 2020**

1. Introduction

1.1 AECOM has been commissioned by Highways England to undertake a review of the documentation for the Growth and Future Year Modelling Approach for Milton Keynes East. The independent review has been undertaken by AECOM staff in Birmingham.

1.2 The Milton Keynes Multi Modal Model (MKMMM) has a long history. AECOM have previously reviewed the following documents relating to validation and forecasting:

- Highway Model Local Model Validation Report (June 2017);
- Public Transport Local Model Validation Report (March 2017);
- Highway Model Traffic Forecasting Report (October 2017); and
- Impacts of Plan:MK (November 2017).

1.3 Subsequently, AECOM reviewed the model enhancements proposed by WSP:

- Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application, March 2019. (Prepared by WSP for Berkeley St James)

1.4 In this Technical Note, WSP had outlined the suggested modelling approach which included three main elements:

- Update the local calibration/validation around Milton Keynes East;
- Update the forecast Reference Case; and
- Development Scenario Testing.

1.5 The WSP proposals were taken into account by AECOM Bedford in their update of the model and documented in a Technical Note which has also been reviewed:

- Milton Keynes Model, MK East Model Update (April 2020).

1.6 Following these earlier reviews, this Technical Note covers the review of

- Transport Technical Note – TTN4 Growth and Future Year Modelling Approach for Milton Keynes East, June 2020 (Prepared by WSP for Berkeley St James)

1.7 The review has been limited to the documentation. There were occasions during this review where additional information from the models would have been informative.

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1.8 Highways England are responsible for the operation of the Strategic Road Network. This includes the M1 and A5 in this area. Consideration has been given to the extent to which it should be possible to rely on model outputs in decision making in relation to these roads.

1.9 All of the diagrams in this Technical Note have been extracted from the WSP Technical Note.

2. Summary of Base Year Update

2.1 The Base Year Update was described in detail in a previous Technical Note.

2.2 The highway assignment model was built in SATURN version 11.3.12W. The base year represents an average Monday to Thursday in June 2016 with three modelled time periods:

- AM peak – 0800-0900;
- PM Peak – 1700-1800; and
- Inter-peak – average of 1000-1600.

2.3 The model uses three vehicle classes (cars, LGVs and HGVs) with three trip purposes for cars (commuting, employers' business and other).

2.4 The assignment uses Wardrop Equilibrium based on the Frank-Wolfe algorithm. Generalised costs have been updated to the TAG May 2019 data book.

2.5 Some local enhancements were made of the networks around Milton Keynes East. The zoning in Milton Keynes East was disaggregated to better reflect the loading of development trips.

2.6 The validation of the model had been enhanced on the basis of a programme of surveys undertaken in 2019 around Milton Keynes East.

2.7 A check was made on the routes used between origins and destinations. After some model adjustments, these were found to be satisfactory.

2.8 Matrix estimation by maximum entropy (ME2) has been used to refine the matrices. Following the ME2 process, the vast majority of the links used for calibration had a close match between counts and modelled flows. However, this result had only been achieved by significant changes from the prior matrices (changes greater than those advised in TAG).

2.9 Calibration of journey times was undertaken in locations where there was a mismatch between the model and observations. This involves changes to link speeds and speed flow curves. At the end of the process, most of the journey time routes met TAG guidance. The journey time performance through Milton Keynes East had been improved with delays now occurring in the expected places.

3. Assessment for Model Use

3.1 The previous Technical Note made an assessment of the uses for which the model may be used and those tasks for which it should not be used. It was acknowledged that local enhancement may be required for particular developments and transportation schemes. Hence, the enhancements around MKE were considered appropriate for the required purpose.

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3.2 While it was recognised that the models reproduced observable patterns of travel (link loading) to a reasonable extent, this did not guarantee that the origin-destination pattern was an accurate reflection of reality. There is potentially a large impact on the M1 and its junctions from the development of land to the east of the M1, which would be of concern to Highways England. The distribution of development trips will be important. Given the uncertainties of the current OD pattern, the distribution of development trips should be based on a different source.

3.3 In an equilibrium assignment, all alternative routes will have the same costs. Hence, in congested networks, all routes will become congested at a similar rate. Providing that the proportion of development traffic crossing the M1 (going to Milton Keynes) and the proportion joining the M1 are reliable, the actual destinations may not be critical.

4. WSP Forecasting Considerations

4.1 The current MKMMM was developed for testing Plan:MK options with the horizon year of 2031 (i.e. Reference Case scenario). In general, both Milton Keynes Council (MKC) and Highways England accept the assumptions applied for the Milton Keynes Borough (MKB) in the MKMMM up to 2031.

4.2 However, full build-out of the proposed Milton Keynes East Sustainable Urban Extension (MKE) development is expected to be in 2048, significantly beyond the Plan:MK period. Hence, there is a requirement to consider potential growth in the area after the end of Plan:MK; i.e. beyond 2031.

4.3 Though WSP are working for Berkeley, it is acknowledged that the MKE site includes parcels which will be delivered by other parties including Bloor, Segro (Roxhill) and MKC. Any modelling undertaken for the part of the MKE development under Berkeley's control would need to take into account the other parcels of the wider MKE allocation (as a cumulative development test).

4.4 It is clear that growth east of the M1 depends on strategic highway improvements delivering satisfactory transport connections across the M1 into the centre of MK.

4.5 WSP have undertaken a review of the growth between the Plan:MK period ending in 2031 and the expected full build-out in 2048. This exercise aims to ensure that the model accounts for planned growth in the Milton Keynes Borough area, as well as sites in the wider area delivered after 2031 potentially having an impact on the locality of the proposed MKE development.

4.6 WSP Transport Technical Note (TTN4) reviews the 2031-2048 growth and suggests an approach to be employed in future year modelling within the MKMMM. MKC and Highways England agreed that an interim year test of 2031 would also be completed, with a partially built-out MKE scheme; however, TTN4 focuses on the expected growth assumptions to be applied in the 2048 model.

4.7 WSP have concentrated on growth external to Milton Keynes Borough. They have considered the state of developments in 2031 (to coincide with the Plan:MK horizon); 2048 (when MKE is expected to be complete); and 2039 (when the remaining identified developments are expected to be complete). Growth in each of these periods is treated differently, depending on the available information.

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5. Significant Planned or Committed Development considered by WSP

5.1 With the agreement of MKC and Highways England, WSP considered potential large-scale developments in the wider area around Milton Keynes. Some of those considered, including a large development at Bedford Commercial Park, were found to be outside the model area. These were excluded from detailed modelling on the basis that it was not practicable to override the NTEM assumptions for external areas. It may also be concluded that the impact of specific developments at this distance will not be significant.

5.2 Sites within the model area which were specifically included with 2048 assumptions were:

- Cranfield (multiple sites);
- Marston Moretaine (Marston Vale New Villages); and
- M1 Junction 13 (Marston Gate Expansion).

5.3 These locations are illustrated in Figure 1, which has been extracted from the WSP Technical Note. This figure also shows the locations of sites which were excluded as they were outside the model area.

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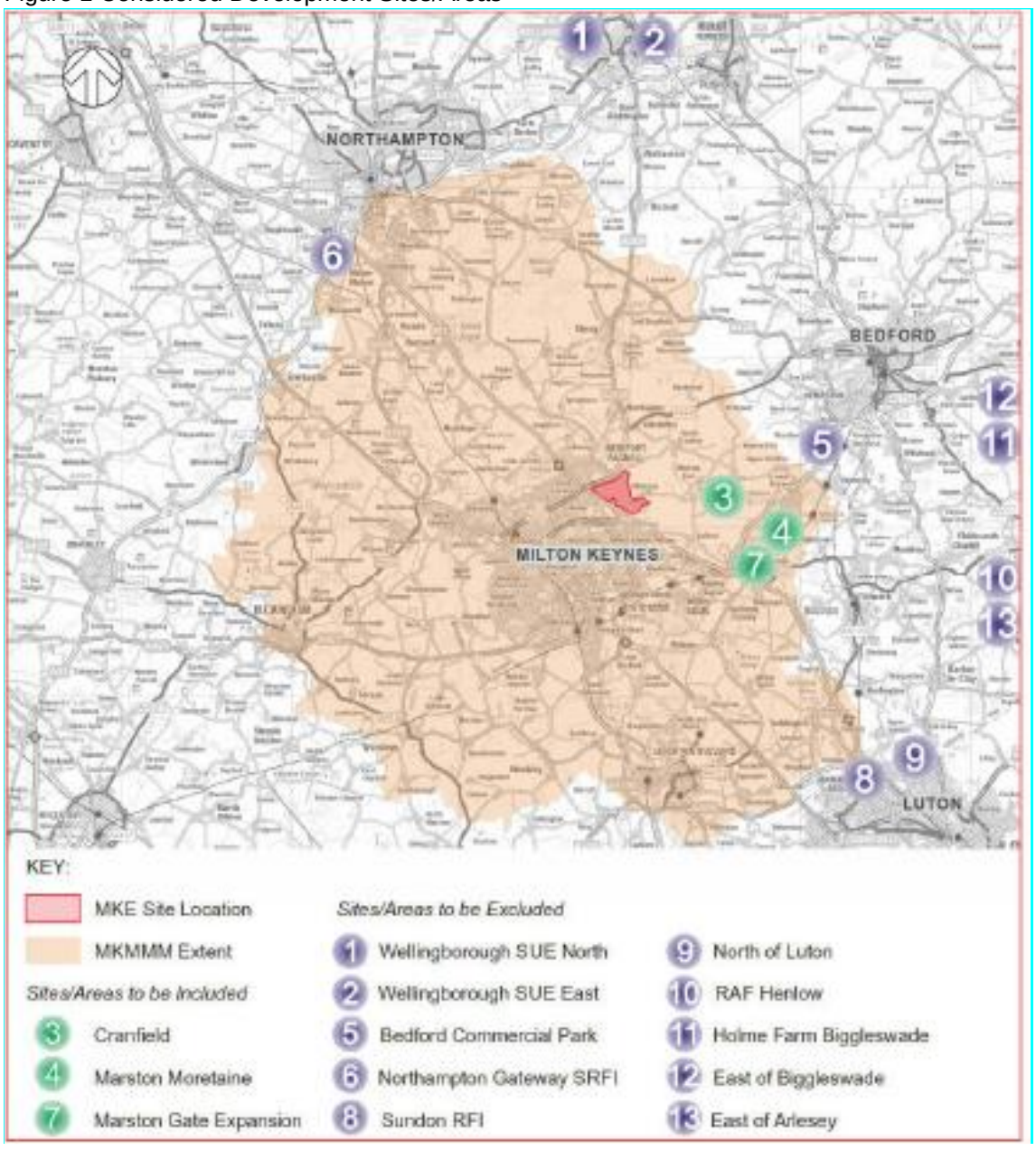
Figure 1 Considered Development Sites/Areas



5.4 The location of the identified sites/areas relative to the proposed MKE development is illustrated in Figure 2, which has been extracted from the WSP Technical Note.

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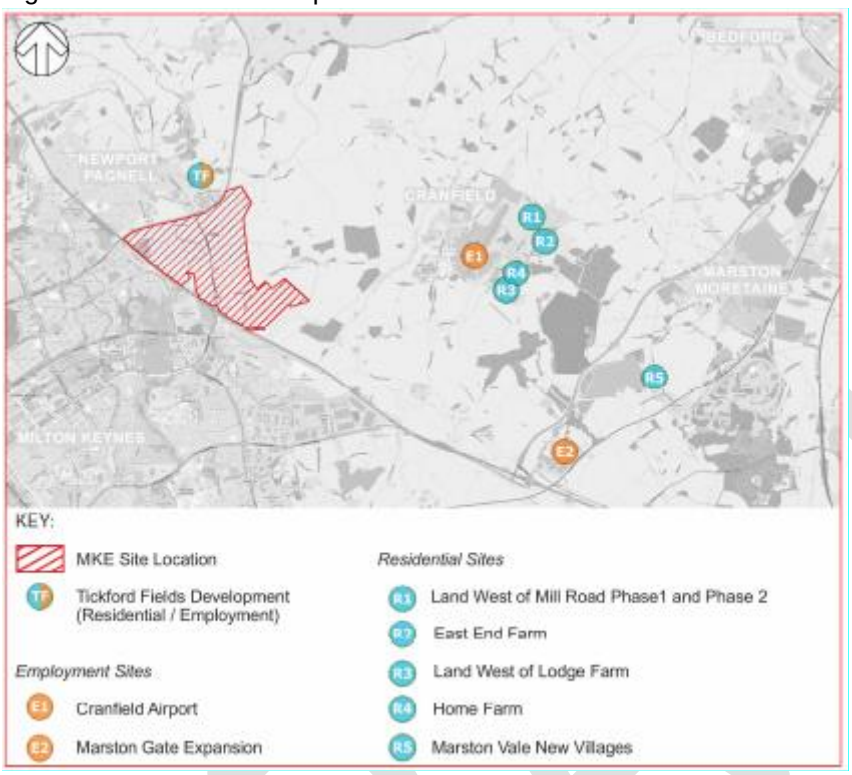
Figure 2: Identified Development



5.5 In the TTN4, WSP provide descriptions of the assumptions which are summarised here.

Cranfield

5.6 Upgrades to Cranfield Airport consist of the provision of new aircraft hangars and associated businesses which were granted outline planning permission in 2018. The completed development is expected in 2024 and will generate approximately 600 new jobs. This development was not included in the 2031 Reference Case scenario of the MKMMM due to limited details being available at the time of the model development, the proposals were assumed to be covered by the TEMPRO/NTEM assumptions.

5.7 As the Air Park development has planning permission, it is considered that the TEMPRO/NTEM employed by the MKMMM could be overridden with more refined specific information and the development included in the updated 2031 Reference Case scenario as well as the future year modelling.

5.8 In addition to the Air Park, several residential developments are expected to be delivered in Cranfield, including:

- Land West of Mill Road Phase1 and Phase 2;
- East End Farm;
- Land West of Lodge Farm;
- Home Farm

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5.9 The majority of the developments are considered by MKC to be 'near-certain' As such, they should all be considered in the updated 2031 Reference Case/future year scenario of the MKMMM.

Marston Moretaine

5.10 The development called Marston Vale New Villages is expected to deliver a series of up to four villages with a range of facilities and employment opportunities. The proposals consist of:

- Up to 5,000 new homes;
- Up to 30 hectares of employment land (class B1 and B2) plus employment uses (B1a) within
- the community hubs;
- Up to 9,500m^2 of retail uses (A1-A5 use class) including a food store (A1) of up to 2,500m^2;
- Up to 5,000m^2 for hotel use (class C1);
- Up to 1,750m^2 of community uses (class D1);
- Up to 4,000m^2 of assembly and leisure uses including indoor sports facilities (class D2);
- Four lower schools (class D1), two middle schools and one upper school including playing fields/sports pitches plus an allowance for land for an extension to the existing lower school in Lidlington; and
- Formal open space (up to 17ha) including playing fields and sports pitches (including associated sports pavilions and lighting) and children's play areas.

5.11 The development is estimated to generate approximately 4,180 Full Time Equivalent (FTE) jobs. The proposals are currently expected to be determined by the end of 2020, with full build-out estimated in 2039. Given that the development is considered to be 'near certain', it should be included in the updated 2031 Reference Case scenario and the modelling of the future year in the MKMMM.

Marston Gate Expansion

5.12 Marston Gate Expansion site is situated to the east of Milton Keynes, immediately adjacent to Junction 13 of the M1 motorway. The development would form an extension to the existing Prologis Park Marston Gate Distribution Centre. The development proposals comprise of up to 166,000m2 (gross external area) of storage and distribution facilities (Use Class B8) with ancillary office accommodation. Prologis UK submitted a planning application in mid-2019 with the decision expected by the end of quarter one of 2020. It is expected that the development would be constructed and occupied within approximately a five-year period from the consent being granted (i.e. circa 2025).

5.13 Despite its allocation in the Central Bedfordshire Local Plan, the developments outside Milton Keynes Borough were covered by the TEMPRO/NTEM assumptions rather than being modelled specifically. Hence, this development has not been specifically included in the Plan:MK 2031 forecasts. WSP recommended that MKC should include this development specifically in refining the MKMMM 2031 Reference Case and for creating future year scenarios beyond 2031.

5.14 WSP identified several developments that are significant enough to be considered in the MKMMM modelling beyond the 2031 Reference Case scenario up to the future year of 2048. Plans for these sites have not yet been developed in detail and the development schedules are not known. WSP considered it appropriate to apply a linear growth to the expected development quantum based on the predicted annual build-out rates provided by MKC. This would seem to be a sensible approach.

5.15 Delivery of the identified developments is not expected to extend beyond 2037, except Marston Vale New Villages, which is expected in 2039. Given the size of the Marston Vale New Villages

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development (relative to the other development in the area), it is considered appropriate to normalise the year of 2039 for all identified development. WSP proposed that any housing/employment growth beyond 2039 up to 2048 should be included in the MKMMM using TEMPRO/NTEM due to uncertainty and limited information about the development in the area post 2039.

6. 2031 – 2039 Growth

6.1 WSP based their forecasts for growth between 2031 and 2039 on the information in Table 1.

Table 1: 2039 Housing/Employment Projections

Residential	Number of Dwellings (2031)	Number of Dwellings (2039)	Growth between 2031 and 2039
Land west of Mill Road	228	230	2
East End Farm	29	48	19
Land west of Lodge Farm	15	15	0
Home Farm	136	136	0
Marston Vale New Villages	2765	5000	2235
Total Dwellings			**2256**
Employment	Number of Jobs (2031)	Number of Jobs (2039)	Growth between 2031 and 2039
Cranfield Airport	600	600	0
Marston Gate Expansion	1733	2000	267
Marston Vale New Villages	2312	4180	1868
Total Jobs			**2135**

6.2 Most of the developments would be substantially complete before 2031. Hence, most of the additional growth comes from Marston Vale New Villages. Due to uncertainties about the delivery, the jobs at Marston Vale New Villages have been assumed to develop at the same rate as the housing. This would appear to be a sensible approach.

6.3 WSP proposed that growth between 2039 and 2048 outside of MKB should be based on TEMPRO. Given the lack of detailed plans, this would appear to be a sensible approach. Details are shown in Table 2.

Table 2: 2031 - 2048 Growth (Planned Development + TEMPRO/NTEM)

	Dwellings / Jobs (2031 – 2039 Growth)	Dwellings / Jobs (2040 – 2048 Growth)	Growth between 2031 and 2048
Residential	2256	6206	8462
Employment	2135	2469	4604

6.4 The table headings in WSP TTN4 (Table 4-3) actually state 2045 instead of 2048. However, it is believed that this is just a misprint. As outlined above, the total growth of dwellings and jobs between 2031 and 2039 is based on the specific developments. The total growth of dwellings and jobs between 2040 and 2048 is based on TEMPRO for the whole area. This includes the whole of the model area excluding Milton Keynes Borough.

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6.5 Table 1 and Table 2 demonstrate that the growth rate of jobs between 2040 and 2048 is similar to the equivalent figure for 2031 to 2039. However, the growth in dwellings is substantially higher.

6.6 In order to demonstrate that the growth occurring from the specific developments was greater than TEMPRO, WSP undertook a comparison of the specific growth with the TEMPRO projections for the two MSOAs where the developments were located. This demonstrated that the specific growth in these MSOAs was greater than TEMPRO for these specific MSOAs.

6.7 However, it is considered that this creates a false picture of total growth. Though specific growth is higher in these two MSOAs, there is no specific growth in other MSOAs. Hence, the overall level of growth for these MSOAs is substantially less than NTEM for the whole of the model area excluding Milton Keynes Borough.

6.8 There will be many developments which will come forward between 2031 and 2039 which are currently unknown. Some will be in the planning process but are not yet committed. Others will not even be concepts. It would be appropriate to constrain the growth over the whole model area to NTEM but taking account of the committed developments.

6.9 Hence, AECOM disagree with the calculations summarised in Tables 1 and 2. The growth in dwellings, in particular, between 2031 and 2039 should be much higher. Though the growth in the local area may be correct, there should be growth in other parts of the model area so that the total is consistent with NTEM.

7. Housing and Employment within Milton Keynes Borough

7.1 WSP understand that MKC's planning team will undertake a review of the 2031 to 2039 growth associated with schemes internal to the borough. After this period, they would be expected to use TEMPRO/NTEM growth due to the high level of uncertainty. Due to the understanding that MKC would be considering growth within the borough, WSP have concentrated on external growth in TTN4.

7.2 MKE is within Milton Keynes Borough and will provide a significant proportion of expected growth within the borough. However, WSP acknowledge that several other potentially significant schemes may come forward after 2031. These potential developments are expected to be included in the new local plan up to 2040. However, this plan has not yet been developed.

7.3 The Milton Keynes Strategy for 2050 (MK 2050) document has ambitious forecasts for growth of housing. To achieve the targets in this document, the rate of building of new houses would need to be increased from 2700 per annum to 2900 per annum. In addition to the new homes there would also be 130,000 new jobs, which is an increase of over 70% of the current level. This would represent approximately 73,950 jobs created between 2031 and 2048.

7.4 The level of growth derived from MK 2050 has been compared with TEMPRO projections. This is summarised in Table 3.

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Table 3: MK 2050 / TEMPRO Growth Comparison

	No. of Households / Jobs (MK 2050)	No. of Households / Jobs (TEMPRO)	Difference (MK 2050 minus TEMPRO)
Residential	55,100	33,945	21,155
Employment	82,650	10,908	71,742

7.5 This comparison demonstrates that the residential growth projected by TEMPRO is much lower than the aspirations of MK 2050 strategy. The difference is even more evident with the TEMPRO forecast number of jobs that is lower by 71,742 compared to the MK 2050 strategy.

7.6 WSP considered that it would not be appropriate to include the aspirational MK 2050 growth assumptions within the committed development modelling for MKE as MK 2050 strategy is not adopted yet, and this level of assumed growth may mask the impact of MKE.

8. AECOM Recommendations

8.1 It is clear that the forecasting assumptions are quite fluid, in terms of development growth in the medium and long term. The horizon year of PLAN:MK is 2031. There are projections of other developments up to 2039. Full build out of Milton Keynes East is not expected until 2048. Hence, there are four situations to be considered: within Milton Keynes Borough and external to Milton Keynes Borough, and between 2031 and 2039 and between 2039 and 2048.

Within Milton Keynes Borough 2031 – 2039 and 2039 - 2048

8.2 While there is a draft strategy for significant growth in Milton Keynes Borough after the end of the current plan period, the strategy has not yet been adopted. The strategy projections for housing and, particularly, jobs are significantly higher that TEMPRO/NTEM, to which growth should normally be constrained.

8.3 The most appropriate assumption would be to use the growth forecasts for Milton Keynes East and constrain the total level of growth in the Borough to TEMPRO/NTEM.

External to Milton Keynes Borough 2031 -2039

8.4 There are a number of commitments external to Milton Keynes Borough which would load trips in particular locations. WSP have identified those which may impact the assessment of MKE and marked them for inclusion in the modelling. However, while the forecast number of trips from these developments is greater than TEMPRO for the particular MSOA within which they are located, the forecast is lower than TEMPRO growth for the whole model area outside of Milton Keynes Borough. It would seem logical to constrain the overall level of growth to TEMPRO. This would mean assuming that there was some growth in other MSOAs.

External to Milton Keynes Borough 2039 -2048

8.5 There are no committed developments external to Milton Keynes Borough after 2039. WSP proposed assuming TEMPRO/NTEM growth for this period and this section of the model. This would appear to be appropriate.

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9. Conclusions

9.1 AECOM has been commissioned by Highways England to undertake a review of the documentation for the Growth and Future Year Modelling Approach for Milton Keynes East. The independent review has been undertaken by AECOM staff in Birmingham.

9.2 The MKMMM has a long history. AECOM have previously reviewed the following documents relating to validation and forecasting:

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9.7 Highways England are responsible for the operation of the Strategic Road Network. This includes the M1 and A5 in this area. Consideration has been given to the extent to which it should be possible to rely on model outputs in decision making in relation to these roads.

9.8 All of the diagrams in this Technical Note have been extracted from the WSP Technical Note.

9.9 It is stated that MKMMM will determine the trip distributions, but it is unclear exactly what this means. Some method of trip distribution should be found for assessing new developments. In many models, distributions for new developments are based on existing patterns. This relies on the existing patterns being accurate, and that cannot be guaranteed for this model.

9.10 The following bullet point list summarises the main issues:

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- WSP have only undertaken a high-level review of developments within the borough, WSP expect that planning officers of Milton Keynes Borough will provide detailed assumptions for sites within the borough;
- In the absence of an adopted plan, it is recommended that forecasts within Milton Keynes Borough take account of the Milton Keynes East development but are constrained to TEMPRO/NTEM at the Milton Keynes Borough level;
- There are three significant developments external to Milton Keynes Borough which include trip forecasts up to 2039. These developments should be included specifically, with the overall level of growth constrained to TEMPRO/NTEM for the total area external to Milton Keynes Borough;
- TEMPRO/NTEM should be used for the area external to Milton Keynes Borough after 2039;
- It is stated that MKMMM will determine the trip distributions, but it is unclear exactly what this means. Given that most of the model is synthetic means that the trip distributions from new developments should not rely on the trip distributions from existing zones.

9.11 It is expected that the assumptions to be included will be refined as more information becomes available.

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Project:	**Highways England Spatial Planning Arrangement**	Job No:	**60600479 DM016.002**
Subject:	**Summary of Review of Milton Keynes Model MK East Model Update**		
Prepared by:	**Alan Boyce**	Date:	**2nd June 2020**
Checked by:	**Liz Judson**	Date:	**3rd June 2020**
Verified and Approved by:	**John Alderman**	Date:	**5th June 2020**

1. Introduction

1.1 AECOM has been commissioned by Highways England to undertake a review of the documentation for the Milton Keynes Multi Modal Model (MKMMM) Update to support development proposals at Milton Keynes East. The model has been prepared by staff from AECOM in Bedford on behalf of Milton Keynes Council. The independent review has been undertaken by AECOM staff in Birmingham.

1.2 In a number of Technical Notes, AECOM reviewed the following documents relating to validation and forecasting:

- Highway Model Local Model Validation Report (June 2017);
- Public Transport Local Model Validation Report (March 2017);
- Highway Model Traffic Forecasting Report (October 2017); and
- Impacts of Plan:MK (November 2017).

1.3 Subsequently, within a further Technical Note AECOM reviewed the model enhancements proposed by WSP on behalf of the developers:

- Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application, March 2019. (Prepared by WSP for Berkeley St James).

1.4 In December 2019 AECOM Bedford were commissioned by Milton Keynes Council (MKC) to test the impacts of a proposed development of land to the northeast of Milton Keynes; Milton Keynes East (MKE). This proposed development consists of approximately 5000 dwellings and 6330 jobs.

1.5 In March 2019 MKC had submitted a Housing Infrastructure Fund (HIF) bid to central government for an additional crossing of the M1 between Junction 14 and the A422. This additional crossing was required to overcome capacity constraints on the road network. Without this additional infrastructure the site would not have been feasible. The cost and timing for the required infrastructure had meant that it could not be financed using the normal developer contributions.

1.6 The bid was approved in March 2020 and the current programme envisages submission of a planning application by September 2020.

1.7 While the Milton Keynes Multi-Modal Model (MKMMM) was considered appropriate for use to support the HIF bid, further refinement in the locality of the MKE site would ensure it is sufficiently robust to support the planning application.

1.8 The developer's consultants, WSP, had outlined the suggested modelling approach in the note referenced in section 1.3 of this TN (which has been reviewed by AECOM). There were three main elements to the modelling approach:

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- Update the local calibration/validation around Milton Keynes East;
- Update the forecast Reference Case; and
- Development Scenario Testing.

1.9 The WSP proposals were taken into account by AECOM Bedford in their update of the model. The Technical Note which is the subject of this review details the first main element; the update of the base year local recalibration and validation focussed around MKE:

- Milton Keynes Model, MK East Model Update (April 2020).

1.10 The review has been limited to the documentation. There were occasions during this review where additional information from the models would have been informative.

1.11 Highways England are responsible for the operation of the Strategic Road Network. This includes the M1 and A5 in this area, in particular M1 Junction 14 is located closest to the proposed site. Consideration has been given to the extent to which it should be possible to rely on model outputs in decision making in relation to these roads.

1.12 All of the diagrams in this Technical Note have been extracted from the AECOM Bedford Technical Note.

2. Development of Demand

2.1 The highway assignment model was built in SATURN version 11.3.12W and the SATURN network originated from the existing 2009 model and was updated.

2.2 The base year represents an average Monday to Thursday in June 2016. The modelled time periods remain unchanged as most historic MKC data has been collected for 60-minute periods commencing at the start of each hour. These periods being:

- AM peak – 0800-0900;
- PM Peak – 1700-1800; and
- Inter-peak – average of 1000-1600.

2.3 The model uses three vehicle classes (cars, LGVs and HGVs) with three trip purposes for cars (commuting, employers' business and other). These are standard vehicle types and trip purposes and are unchanged from the previous version.

2.4 Much of the Base Year trip pattern (those trips which start and finish within Milton Keynes) is synthesised. External to external demand was derived directly from average hour SERTM demand.

2.5 The assignment uses Wardrop Equilibrium implemented in SATURN version 11.3.12W based on the Frank-Wolfe algorithm. This is the standard SATURN procedure. Generalised costs have been updated to the TAG May 2019 data book. This was the latest available at the time.

2.6 The Public transport model remains in EMME software. Bus routes from the EMME public transport model are coded into the SATURN highway model. The modelling suite also includes a variable demand model which allocates trips between the highway assignment model and the public transport model.

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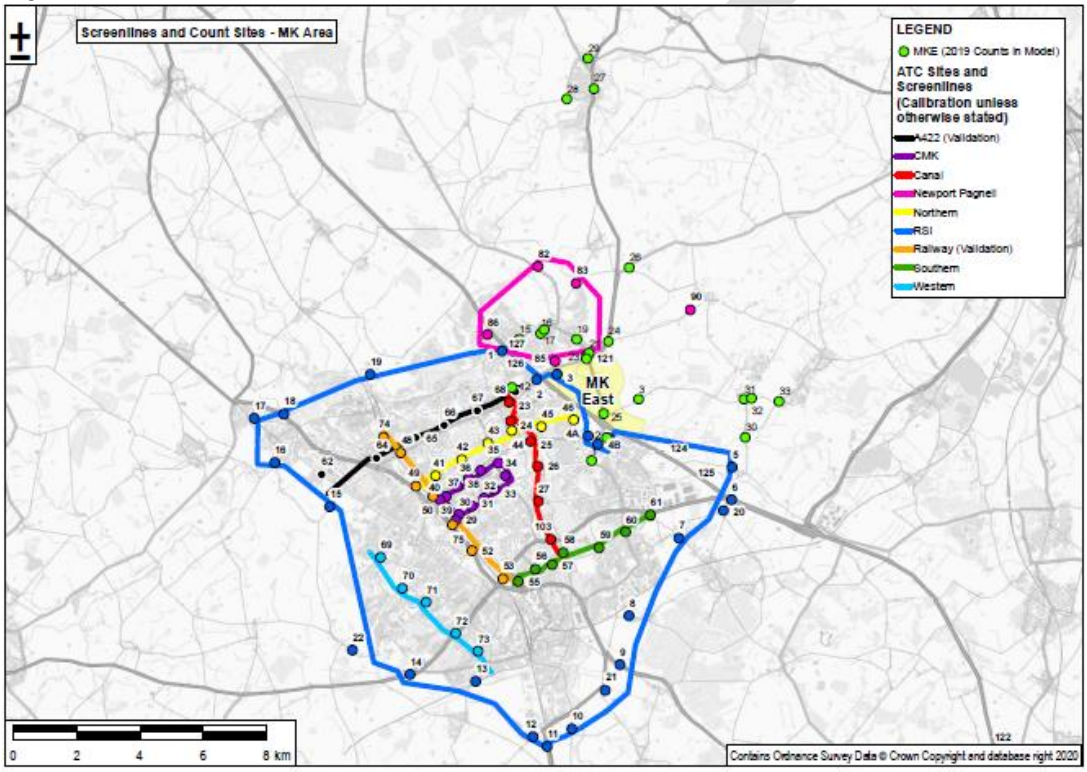
3. Model Update

3.1 A programme of surveys was organized in 2019 around Milton Keynes East. The Technical Note does not specify who organized the surveys. The counts had not been arranged in cordons or screenlines like those from 2016. Count locations are shown in Figure 1 below. However, many of the counts were excluded from the model update either because they were on the same links as existing counts or on spigot links in the model. Those counts which were used were factored to the 2016 Base Year. This represented a change of less than 5%.

Figure 1: Counts, Cordons and Screenlines



3.2 Only two of the screenlines were used for validation, the remainder were used for calibration. All of the new counts were used to enhance the local calibration in Milton Keynes East.

4. Network Development and Verification

4.1 Some local enhancements were made of the networks around Milton Keynes East. For example, Drift Way was coded in and some roundabouts were exploded to allow for better modelling of delays. Table 7 in the Technical Note showed the changes made in link definitions. As an example, North Crawley Road and London Road had heavy vehicle restrictions placed on them. These were checked against Google Maps and Streetview and found to be correct.

4.2 The network was stress tested to identify pinch points. This was undertaken by increasing the number of trips in the peak hour matrices by 25%. This showed significant increases in delays as would be expected but did not identify anything unrealistic.

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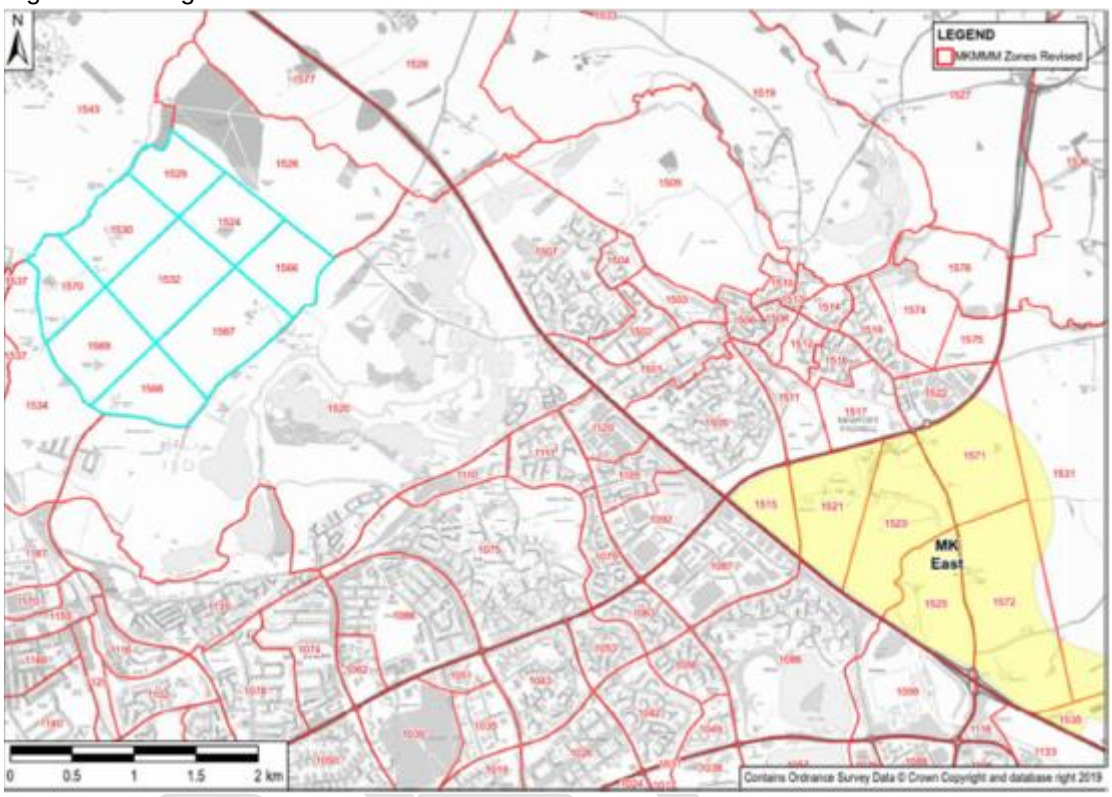
4.3 The zoning in Milton Keynes East was disaggregated to better reflect the loading of development trips. The disaggregation, which is shown in Figure 2 below appears to be the same as that proposed in the WSP Technical Note.

Figure 2: Changes in Zones between Previous Model and Current Model



5. Route Choice

5.1 Two types of check were made:

- Origin to destination;
- Trips on select links.

5.2 In cases where these appeared to be incorrect, a review was made of link speeds and speed flow curves on the routes. Adjustments were made where necessary. The final results were included in Appendices A and B respectively.

5.3 All of the routes shown between pairs or origins and destinations in Appendix A were plausible. There was some degree of multi routeing. However, in most cases, there was one dominant route. In reality, the grid system within Milton Keynes allows for a lot of route choice. However, this should not be a significant issue for Highways England.

5.4 The select links in Appendix B show that the trips drawn to use particular links come from the expected places. There is no indication of unexpected routeing.

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6. Trip Matrix Calibration and Validation

6.1 Matrix estimation by maximum entropy (ME2) has been used to refine the matrices. Following the ME2 process, the vast majority of the links used for calibration have a close match between counts and modelled flows. In order to undertake the calibration exercise, AECOM Bedford have gone back to the 'prior' matrices for the existing base year of 2016. This is in accordance with the recommendations in TAG. However, as the original model had a base year of 2009, it is still possible that further matrix estimation has been undertaken on a model which has previously been matrix estimated.

6.2 TAG includes a series of comparisons to demonstrate that the calibration process has not unduly distorted the matrices. One of these is the trip length distribution. Matrix estimation has a tendency to adjust short-distance trips as each trip affects fewer counts. This tends to reduce the average trip length. This was the case for each vehicle class and each assignment period, though most of the changes were not large. The diagrams in Appendix C showed an increase in the shortest trips for cars and HGVs. The proportional changes in trip length distribution for HGVs were greater than for the other vehicle types. However, they related to small numbers of trips.

6.3 For the trip length distributions, it was stated that the external to external trips were excluded. Tables 11 – 13 which showed the changes in trip totals demonstrate that the vast majority of trips are external to external. It is assumed that many of these are through trips on the M1 which are unlikely to be directly affected by the development proposals. The greatest changes relate to entirely internal trips and HGVs.

6.4 The changes in trip ends are, in nearly all cases, greater than the TAG recommendations. The intercepts are all near zero. Five out of the six gradients are outside of the guidance limits. The R^2 values are all lower (worse) than the criterion. This means that the changes made to the matrices are greater than those recommended in the guidance.

6.5 The comparison of cell values pre and post matrix estimation shows that the gradients are generally outside guidance limits for LGVs and HGVs and the R^2 values are low, particularly for HGVs. This indicates that there have been significant changes in the number of trips on an individual origin destination level. In part this can be explained by the fact that the internal matrix was based on a synthetic model rather than observations.

7. Assignment Calibration and Validation

7.1 Calibration of journey times was undertaken in locations where there was a mismatch between the model and observations. This involves changes to link speeds and speed flow curves. At the end of the process, most of the journey time routes met TAG guidance. The journey time performance through Milton Keynes East had been improved with delays now occurring in the expected places.

7.2 The comparison of modelled flows against counts has been improved in the Milton Keynes East area where those counts have been included in the calibration. Calibration meets TAG standards. The Newport Pagnell outbound cordon is the worst performing screenline having 12% more modelled trips than the counts in the AM peak. However, the match of modelled flows against those counts reserved for validation is less good. In overall terms the model has been improved compared to its previous version, particularly around Milton Keynes East.

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8. Implications for Model Use

8.1 All of the reports have specified the appropriate uses of the models and those tasks for which they should not be used. It is acknowledged that local enhancement may be required for particular developments and transportation schemes. Hence, the enhancements around MKE are appropriate for the required purpose.

8.2 While the models reproduce observable patterns of travel (link loading) to a reasonable extent, this does not guarantee that the origin-destination pattern is accurately reflected. This could be a concern for a major transportation scheme as it is the OD pattern that determines traffic transfer not the link loading. This could make it unreliable for significant improvements (capacity enhancements or diversions) on major roads including the M1 or A5.

8.3 There is potentially a large impact on the M1 and its junctions from the development of land to the east of the M1, which would be of concern to Highways England. The distribution of development trips will be important. Given the uncertainties of the current OD pattern, the distribution of development trips should be based on a different source.

8.4 In an equilibrium assignment, all alternative routes will have the same costs. Hence, in congested networks, all routes will become congested at a similar rate. Providing that the proportion of development traffic crossing the M1 (going to Milton Keynes) and the proportion joining the M1 are reliable, the actual destinations may not be critical.

9. Conclusions

9.1 AECOM has been commissioned by Highways England to undertake a review of the documentation for the Milton Keynes Multi-Modal Model. The model has been prepared by staff from AECOM in Bedford on behalf of Milton Keynes Council. The independent review has been undertaken by AECOM staff in Birmingham.

9.2 A number of previous Technical Notes include AECOM's review of four documents:

- Highway Model Local Model Validation Report (June 2017); and
- Public Transport Local Model Validation Report (March 2017).
- Highway Model Traffic Forecasting Report (October 2017); and
- Impacts of Plan:MK (November 2017).

9.3 Subsequently, within a further Technical Note, AECOM reviewed the model enhancements proposed by WSP on behalf of the developers:

- Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application, March 2019. (Prepared by WSP for Berkeley St James)

9.4 The WSP proposals were taken into account by AECOM Bedford in their update of the model. The Technical Note which is the subject of this review details the update of the base year local recalibration and validation focussed around MKE:

- Milton Keynes Model, MK East Model Update (April 2020).

9.5 One of the refinements proposed by WSP was to undertake traffic surveys in specific locations so that the matrix detail could be improved in the area of the development. MKMMM has been based on a series of cordons and screenlines. However, only one of these (Newport Pagnell) was east of the

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M1. WSP proposed automatic traffic counts (ATC), Manual Classified Turning Counts (MCTC) and Queue Surveys at a number of key junctions. Additional surveys were undertaken in the MKE area.

9.6 The review concluded that the Base Year model had been extensively calibrated to match modelled flows with observations. However, the poorer validation suggests that the modelled origin destination pattern in the Base Year may be significantly different to reality. These issues are likely to be compounded in the forecast years by uncertainties over assumptions.

9.7 This is an indication of a poor starting matrix. This scale of matrix adjustment reduces the confidence that the matrix is an accurate reflection of the pattern of demand. However, it is generally better to allow more significant matrix changes rather than to restrict the matrix changes and have a less good flow comparison, particularly when much of the original matrix was synthetic rather than based on surveys.

9.8 The journey time validation is generally good with nearly all routes meeting the standard in all periods. There is evidence in the graphs of compensating errors. This could have implications for route choice as the grid system in Milton Keynes gives many route choices. However, this is unlikely to be an issue for Highways England.

9.9 Some method of trip distribution should be found for assessing new developments. In many models, distributions for new developments are based on existing patterns. This relies on the existing patterns being accurate, and that cannot be guaranteed for this model.

9.10 Given the uncertainty in the forecast pattern of demand, there must be some uncertainty in the degree of reassignment. However, there is clearly a significant risk that the forecast developments will result in large increases in traffic flow on roads which are the responsibility of Highways England.

9.11 The following bullet point list summarises the main issues:

- Local enhancements have been made to the model around MKE;
- The model is well calibrated. However, the validation statistics are some way short of meeting TAG criteria;
- The modelled origin destination pattern in the Base Year may be significantly different to reality creating uncertainty in potential reassignments;
- The developments to the east of the M1 potentially add trips to the M1;
- Hence, the trip distributions from new developments should not rely on the trip distributions from existing zones.

9.12 Consideration has also been given to the extent to which it should be possible to rely on model outputs in decision making.

9.13 In overall terms, the model is considered to be satisfactory for the defined purposes of Milton Keynes Council. Subject to the use of justifiable trip distributions for new developments, it should provide a satisfactory assessment of the impact on the A5 and M1.

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Project:	**Highways England Spatial Planning Arrangement**	Job No:	**60600479 DM016.008**
Subject:	**Milton Keynes East Transport Assessment Trip Generation Response Review**		
Prepared by:	**Bhryce Coz**	Date:	**16/12/2020**
Checked by:	**Jenny Oakes**	Date:	**18/12/2020**
Verified by:	**Simon Willison**	Date:	**22/12/2020**
Approved by:	**John Alderman**	Date:	**23/12/2020**

Executive Summary

Following a review of WSP's Transport Technical Note 3.1 (TTN3.1) which responds to comments provided in AECOM Technical Note 07 (TN07) regarding the Transport Assessment Scoping Report for Milton Keynes East Sustainable Urban Extension development, AECOM provide the following comments.

AECOM agrees to the following responses provided in WSP's TTN3.1:

1. The TA should demonstrate the differences in terms of trip generation between the two methodologies identified previously.
2. The TA and other supporting documentation should outline all the specific sustainable infrastructure to be delivered along with its corresponding phasing schedule.
3. There should be no further adjustment taken into account from either the travel plans or the MRT & PR for robustness purposes.
4. The TRICS trip rate output files are to be appended to the TA.
5. The proposed methodology of using multi-modal trip rates as well as Census data in determining vehicular trips as well as non-vehicular trips is accepted.
6. The proposed approach in which internalisation is not applied to trips associated with employment uses is accepted.
7. The proposed evidence-based approach of selecting appropriate surrounding MSOAs to provide a comparison with the proposed development is accepted.
8. The proposed internalisation factor of 73% for Education and Escort Education once the site is fully built out and occupied is accepted.
9. For holiday/day trip/other, no internalisation factor was applied. AECOM agrees with this proposed assumption.

Recommendations regarded as critical to the acceptability of the upcoming Transport Assessment associated with WSP's TTN3.1:

10. AECOM generally agree with the proposed approach for using the identified multi-modal trip rates, nonetheless it is recommended that the proposed Gross Floor Area (GFA) per development type (B1,

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B2, B8, etc.) or unit numbers as appropriate, is identified and that this equals the land uses and quantum detailed within the planning application to be submitted (Para. 2.13)

11. It is recommended that, for a consistent and robust approach, the average of all the selected MSOA's used to define the mode share percentage is used instead, or that additional evidence is provided to confirm that a percentage towards the upper end of the range, e.g. 15%, is appropriate. (Para. 2.24)

12. An evidence-based justification that 'a third' adopted for Shopping internalisation factor is a reasonable assumption is provided. (Para. 2.28)

13. An evidence-based justification that 25% of trips adopted for 'other work, other escort and personal business' internalisation factor is a reasonable assumption is provided (Para. 2.30)

14. An evidence-based justification that 20% internalisation factor adopted for visiting friends/entertainment/sports is a reasonable assumption is provided. (Para. 2.32)

Recommendations regarded as important but not critical to the acceptability of the upcoming Transport Assessment associated with WSP's TTN3.1:

15. Consideration should be given to which mode will be used to access rail and underground modes from the site. Census records the main mode used across the longest part of a journey (in distance terms), however an alternative mode will most likely be used to access a station. For the MKE site, given the distance from Milton Keynes Central Station, this is more likely to be car and bus modes. (Para. 2.21)

16. The level of internalisation could potentially vary during the build-out of the site depending on the phasing of the residential and education uses with a lower internalisation during earlier phases, therefore it is recommended that this is considered further in the TA. (Para. 2.27)

17. The TA should clearly set out the trip generation for education uses for the proposed assessment years, this should include sufficient detail to fully explain the forecast trips in 2048 and 2031. (Para. 2.36)

18. AECOM recommend that further detail is provided about which modes are anticipated to accommodate the forecast modal shift. Similarly, it is expected that levels of walking and cycling will increase as the site develops and AECOM would expect this to be captured within the future trip generation. (Para. 2.37)

19. The TA should ensure that there is suitable evidence to demonstrate that all of the sustainable modes of travel can be sufficiently supported by the proposed infrastructure associated with the development. Such evidence can be in the form of WCHAR and Public Transport assessment which can be appended to the TA. (Para. 2.40)

20. The internalisation factors set out in the forthcoming TA should reflect the model update. (Para. 2.43)

Outstanding recommendations from AECOM's TN07 which are not addressed in WSP's TTN3.1

21. The site access strategy is not explicitly set out in the TASR but is understood to include several all mode access points which will either be delivered by the site or HIF funding. The access strategy for all modes should be clearly defined in the forthcoming TA.

22. Due to the close proximity of the site to the SRN, consideration should be given to:

    a. the number of new vehicular trips using M1 J14 including associated slip roads;

b. the extent to which downgrading of the A509 will decrease trips using the site as a through route;

c. details of the location and operation of the new junction with the A509 proposed to the north of M1 J14 to provide reassurance its operation will not adversely impact upon the operation of M1 J14;

d. the dualling of the A509 southbound approach to M1 J14 and the impact of the proposed revisions on the operation and safety of the junction;

e. the impact the construction of a new bridge across the M1 may have on the operation of the SRN mainline; and

f. the level of HGV flow into the site from M1 J14 during the construction period.

23. In addition, consideration should also be given to the scope of the impact of the proposed development on the SRN, including the potential for the proposed development to adversely impact upon the safety and operation of M1 J13, M1 J15 and the A5.

24. Highways England should be engaged in discussions regarding the vehicular accesses and off-site highway works to better understand potential impacts on the SRN.

25. Further detail should be provided on the proposed build out of the site to demonstrate how the programme for sustainable infrastructure fits in relation to the delivery of land uses and should also provide reassurance that the levels of modal shift forecast will be delivered.

26. Confirmation should be provided that the infrastructure and mitigation requirements will be measured against Scenario D.

27. The future mobility methodology does not separate the level of shift to different future mobility modes. Further detail should be provided about which modes are anticipated to accommodate the forecast modal shift. Similarly, it is expected that levels of walking and cycling will increase as the site develops and we would expect this to be captured within the future trip generation.

28. The proposed scope of the Travel Plans (TP) is acceptable. They will be expected to include SMART (Specific, Measurable, Achievable, Realistic, Time-bound) targets set which reflect the levels of modal shift anticipated by the 'Future Mobility' methodology

29. The approach to the Public Transport Strategy (PTS) is considered acceptable, but we would expect to see information provided on proposed bus corridors and delivery timelines to ensure consistency with the trip generation methodology and TP.

30. That further information is provided on the delivery timescales of the P&R site, together with details of how traffic would access and egress the P&R site.

31. In the policy section, reference should be made to the emerging Milton Keynes: Strategy for 2050 to inform the 'Future Mobility' approach of the site.

AECOM recommend that Highways England withhold judgement on the proposals until the full TA and accompanying TP, PTS and any other supporting documents have been provided and the recommendations listed above have been addressed.

1. Introduction

1.1. AECOM, on behalf of Highways England, have previously undertaken a review of a Transport Assessment Scoping Report (TASR) dated April 2020, produced by WSP, in support of the proposed Milton Keynes East (MKE) Sustainable Urban Extension (SUE) development. The findings of this review were set out in AECOM TN07. WSP have subsequently provided a response to AECOM's comments in TTN3.1 – 'Trip Generation: Response to comments', dated November 2020. This Technical Note provides a review of WSP TTN3.1 and provides further comments and recommendations in response to it.

1.2. For ease of reference, AECOM's main comments and recommendations are presented in bold and underlined text throughout this document and listed in the executive summary. Comments which agrees to WSP's responses are coloured **green**. Recommendations regarded as critical to the acceptability of this assessment are coloured **red.** Recommendations that are of concern but are not detrimental to future assessment are highlighted in **amber.**

2. AECOM / HE Comments in response to WSP's Technical Note 3.1

2.1. AECOM's response to TTN3.1 is set out below. For clarity and consistency, the headings used below match with those used in TTN3.1.

Use of Traditional Trip Generation within the tests set out in the TA

2.2. TTN3.1 states in paragraph 2.2.2 that the TA will demonstrate the differences in terms of trip generation between the two methodologies. Nonetheless, it is indicated that WSP do not consider that it is appropriate to run a full set of capacity and modelling tests using the two methodologies as this will lead to uncertainty from the use of differing results and could lead to over-engineering based on vehicular focused demand, whereas the promotion of sustainable trips should be paramount.

2.3. **AECOM agree that the TA should demonstrate the differences in terms of trip generation between the two methodologies identified previously.** The proposed approach is deemed reasonable; however, it may not be considered as a robust approach based on the information submitted to date (unless proven otherwise) as it appears that the MKE development will be relatively reliant on the delivery of the supporting sustainable infrastructure in order to reflect the proposed trip generation.

2.4. It is indicated that the MKE development should be leading the way in sustainable travel by adopting mobility services alongside permeable and accessible masterplan design. It is acknowledged that assurance on the deliverability of the supporting sustainable infrastructure is required, noting that the TA and supporting documentation (including Public Transport Strategy and Travel Plans) will outline how these measures will enable the site to move away from prioritising private vehicular based travel.

2.5. **AECOM agree that the TA and other supporting documentation should outline all the specific sustainable infrastructure to be delivered along with its corresponding phasing schedule.** Ideally this information should be provided in advance of any strategic modelling being undertaken to allow key stakeholders, including Highways England, to review and agree the full list of supporting sustainable infrastructure and its corresponding phasing schedule.

2.6. It is noted that WSP have engaged with a number of mobility providers and operators and have received letters of support from these companies. These will be attached to the TA as an appendix.

2.7. WSP also indicate that the Travel Plan strategy, alongside the promotion of future mobility at the site, is therefore appropriate for the Future Mobility to be used in the assessments, without any further adjustments (either for Travel Plans or Mass Rapid Transit & Park and Ride).

2.8. **AECOM agree that there should be no further adjustment taken into account from either the travel plans or the MRT & PR for robustness purposes**.

TRICS trip rate output files

2.9. TTN3.1 paragraph 2.3.2 states that, for ease of review, TRICS trip rates will be included in the TA as well in the TRICS pdf format.

2.10. **AECOM welcome that the TRICS trip rate output files are to be appended to the TA**.

Justification for the use of vehicle trip rates for the B1 and B2 use classes.

2.11. Multi-modal trip rates for B1 and B2 uses have been extracted from TRICS and vehicular trip rates have been extracted from them for use in the calculations. As the focus of the modelling, in capacity terms, is on vehicular demand, the strategic modelling inputs are also looking at likely vehicular use.

2.12. Paragraph 2.4.2 of TTN3.1 indicates that as the development seeks to develop a significant proportion of B8 land uses.

2.13. **AECOM generally agree with proposed approach for using the identified multi-modal trip rates, nonetheless it is recommended that the proposed Gross Floor Area (GFA) per development type (B1, B2, B8, etc) or unit numbers as appropriate, is identified and that this equals the land uses and quantum detailed within the planning application to be submitted.** This will allow for the trip generation calculation to be more accurate and to be reflective of the planning permission requested.

2.14. It is also mentioned in TTN3.1 that the use of multi-modal trip rates allows both a review of vehicular trips as well as the potential non-vehicular modes. However, as discussed in paragraphs 2.18-2.20 below, Census Journey to Work data has also been used to review potential mode shares for employees.

2.15. **AECOM agree with the proposed methodology of using multi-modal trip rates as well as Census data in determining vehicular trips as well as non-vehicular trips**.

External trip rate for employment uses

2.16. Paragraph 2.5.1 of TTN3.1 states that the employment trips as set out in TTN3 are added into the model as external trips. In addition, it is stated that internalisation factors are applied within the analysis to cater for the mix of uses on site. However, the application of internalisation has been applied to the residential origin trips only. This is to ensure that the process does not discount trips twice.

2.17. **AECOM agree with the proposed approach in which internalisation is not applied to trips associated with employment uses**.

Evidence that the mode share percentages from the surrounding MSOAs are appropriate to the SUE development.

2.18. A larger number of local MSOA's have been examined within TTN3.1 to ensure that the MSOA's selected to derive mode share are reflective of the proposed development.

2.19. The MSOA's used include Milton Keynes 003, Milton Keynes 004, Milton Keynes 005, Milton Keynes 007 and Milton Keynes 017. Milton Keynes 006 and Milton Keynes 009 MSOA's have been excluded on the basis that these two MSOA's have a lower car mode share. Milton Keynes 002 MSOA, where the development is located, has also been excluded as it does not reflect the nature of the proposed development.

2.20. **AECOM agree with the proposed evidence approach in selecting the appropriate surrounding MSOAs to provide a comparison with the proposed development**.

2.21. **Consideration should be given to which mode will be used to access rail and underground modes from the site. Census records the main mode used across the longest part of a journey (in distance terms), however an alternative mode will most likely be used to access a rail station. For the MKE site, given the distance from Milton Keynes Central Station, this is more likely to be car and bus modes.**

Explanation of how the final 'internalisation' factors per trip purpose have been derived

2.22. TTN3.1 identifies reasons for the proposed internalisation factors for each of the trip purposes including Commuting and Business; Education and Escort Education; Shopping; Other work, other escort and personal business; Visiting friends/entertainment/sports; Holiday/day trip/other.

2.23. For Commuting and Business, WSP consider Milton Keynes 004 MSOA to be a close match to the proposed development which produces an internalisation factor of 13.7% however a factor of 15% derived using journey to work data has been defined.

2.24. As shown in Table 2-3 of TTN3.1, the % internal trips varies significantly across the selected MSOAs from 4.6% to 17.7%. Although it falls within the range and may be more reflective of the ambitions for the proposed development, the selection of 15% is not fully substantiated. **It is recommended that, for a consistent and robust approach, the average of all the selected MSOA's used to define the mode share percentage is used instead, or that additional evidence is provided to confirm that a percentage towards the upper end of the range, e.g. 15%, is appropriate.**

2.25. For Education and Escort Education, an internalisation factor of 100% is proposed for primary school, 50% for secondary school and 0% for higher education, resulting in a 73% internalisation factor for education and escort education.

2.26. **AECOM are generally in agreement with the proposed internalisation factor of 73% for Education and Escort Education once the site is fully built out and occupied**. **However, the level of internalisation could potentially vary during the build-out of the site depending on the phasing of the residential and education uses with a lower internalisation during earlier phases, therefore it is recommended that this is considered further in the TA.**

2.27. For shopping, it is indicated that the internalisation factor will be approximately 33% (a third) of residential trips.

2.28. It is acknowledged that the community centre and local shops are likely to predominantly serve local residents. Nonetheless, **an evidence-based justification as to how it is derived that a third is a reasonable assumption for Shopping internalisation factor should be presented.**

2.29. For other work, other escort and personal business, it is indicated that the internalisation factor will be 25% of residential trips.

2.30. Similarly, it is acknowledged that 'other work, other escort and personal business' including the health centre is likely to predominantly serve local residents. Nonetheless, **an evidence-based justification as to how it is derived that 25% of trips is a reasonable assumption for 'other work, other escort and personal business' internalisation factor should be presented.**

2.31. For visiting friends/entertainment/sports, it is indicated that the internalisation factor will be 20% of residential trips.

2.32. It is also acknowledged that visiting friends/entertainment/sports is likely to generate internalised trips. Nonetheless, **an evidence-based justification as to how it is derived that 20% is a reasonable assumption for visiting friends/entertainment/sports internalisation factor should be presented.**

2.33. **For holiday/day trip/other, no internalisation factor was applied. AECOM agree with this proposed assumption**.

Details of the trip generation for education uses and how this will change during the build out of the site.

2.34. TTN3.1 states that the Development Framework sets out that the social infrastructure would be delivered by the residential milestones and indicated that by the completion of Phase 2, 2 x Primary Schools, 1 x Secondary School and the Health Hub would also be developed. It is also acknowledged that as school services get built out, the corresponding mode shares towards cars are likely to be higher in the earliest phases. However, this is countered by the lower number of residents making these trips on the network.

2.35. Furthermore, TTN3.1 points out that the trip generation forecasts for education and escort education journey purposes are four times higher in 2048 than in 2031 assessment years. Even accounting for differing mode shares than what are currently adopted, and even if 100% of trips in 2031 were car based, which is not accurate, then this would still not be higher than the forecast trips in 2048.

2.36. AECOM agree with the proposed justification and recommend that **the TA should clearly set out the trip generation for education uses for the proposed assessment years, this should include sufficient detail to fully explain the forecast trips in 2048 and 2031.**

2.37. **AECOM recommend that further detail is provided about which modes are anticipated to accommodate the forecast modal shift. Similarly, it is expected that levels of walking and cycling will increase as the site develops and AECOM would expect this to be captured within the future trip generation.**

2.38. TTN3.1 specifies that in terms of external trips, the level of mode shift will be varied and dependent on the uptake of various sustainable and public transport options. Considering the location of the MKE site, it is likely that increases in Cycling and Public Transport will be seen at higher levels than walking, simply due to the distances from the MKE site to other existing locations. In addition, the TA will be supported by a Travel Plan which will further look at the potential change between trip mode shares.

2.39. Furthermore, it is indicated that for the purposes of the modelling, the focus has been on the worst case vehicular based impacts.

2.40. **The TA should ensure that there is suitable evidence to demonstrate that all of the sustainable modes of travel can be sufficiently supported by the proposed infrastructure associated with the development. Such evidence can be in the form of WCHAR and Public Transport assessment which can be appended to the TA.**

Modelling Update

2.41. It is identified that as part of the Stage 3 modelling (with development tests) an allowance has been made to account for the 50 jobs generated by the community hub and 250 jobs for the secondary school (with 50% of trips being made externally).

2.42. This assumption is considered to be reasonable in terms of additional vehicular demand on the network. It is possible that a number of the jobs both in the community hub and schools could be served by those living within the proposed development site. For the purposes of the modelling though, the Community Hub trips have been added, and half of the Secondary School trips have been added. These are on top of the residential and other employment trips previously set out in TTN3.

2.43. AECOM are in agreement with the above approach. **The internalisation factors set out in the forthcoming TA should reflect the model update.**

Outstanding Recommendations from previous TN07

2.44. Other recommendations from the previous AECOM TN07 that have not been specifically addressed within the TTN3.1 are outlined below. Reference should be made to TN07 for the context of each comment and how critical they are deemed to be made to future assessment.

2.45. The site access strategy is not explicitly set out in the TASR but is understood to include several all mode access points which will either be delivered by the site or HIF funding. The access strategy for all modes should be clearly defined in the forthcoming TA.

2.46. Due to the close proximity of the site to the SRN, consideration should be given to:

- the number of new vehicular trips using M1 J14 including associated slip roads;
- the extent to which downgrading of the A509 will decrease trips using the site as a through route;
- details of the location and operation of the new junction with the A509 proposed to the north of M1 J14 to provide reassurance its operation will not adversely impact upon the operation of M1 J14;
- the dualling of the A509 southbound approach to M1 J14 and the impact of the proposed revisions on the operation and safety of the junction;
- the impact the construction of a new bridge across the M1 may have on the operation of the SRN mainline; and
- the level of HGV flow into the site from M1 J14 during the construction period.

2.47. In addition, consideration should also be given to the scope of the impact of the proposed development on the SRN, including the potential for the proposed development to adversely impact upon the safety and operation of M1 J13, M1 J15 and the A5.

2.48. Highways England should be engaged in discussions regarding the vehicular accesses and off-site highway works to better understand potential impacts on the SRN.

2.49. Further detail should be provided on the proposed build out of the site to demonstrate how the programme for sustainable infrastructure fits in relation to the delivery of land uses and should also provide reassurance that the levels of modal shift forecast will be delivered.

2.50. Confirmation should be provided that the infrastructure and mitigation requirements will be measured against Scenario D.

2.51. The future mobility methodology does not separate the level of shift to different future mobility modes. Further detail should be provided about which modes are anticipated to accommodate the forecast modal shift. Similarly, it is expected that levels of walking and cycling will increase as the site develops and we would expect this to be captured within the future trip generation.

2.52. The proposed scope of the Travel Plans (TP) is acceptable. They will be expected to include SMART (Specific, Measurable, Achievable, Realistic, Time-bound) targets set which reflect the levels of modal shift anticipated by the 'Future Mobility' methodology.

2.53. The approach to the Public Transport Strategy (PTS) is considered acceptable, but we would expect to see information provided on proposed bus corridors and delivery timelines to ensure consistency with the trip generation methodology and TP.

2.54. That further information is provided on the delivery timescales of the P&R site, together with details of how traffic would access and egress the P&R site.

2.55. In the policy section, reference should be made to the emerging Milton Keynes: Strategy for 2050 to inform the 'Future Mobility' approach of the site.

3. Conclusions

3.1. AECOM, on behalf of Highways England, have undertaken a review of TTN3.1 which responds to comments provided in AECOM TN07 regarding the Transport Assessment Scoping Report (TASR) for Milton Keynes East (MKE) Sustainable Urban Extension (SUE) development. This Technical Note provides comments and recommendations in response to TTN3.1.

3.2. For ease of reference, AECOM's main comments and recommendations are presented in bold and underlined text throughout this document and listed in the executive summary. Comments which agrees to WSP's responses are coloured **green**. Recommendations regarded as critical to the acceptability of this assessment are coloured **red**. Recommendations that are of concern but are not detrimental to future assessment are highlighted in **amber**. These changes should be addressed in the forthcoming TA, TP, PTS and any other relevant supporting documents.

3.3. AECOM recommend that Highways England withhold judgement on the proposals until the full TA and accompanying TP and PTS have been provided and the recommendations raised in this note and outstanding comments made in TN07 have been addressed.

Appendix D

WCHAR

BERKELEY ST JAMES

MILTON KEYNES EAST

Walking, cycling and horse-riding assessment and review

70057521-WCHAR
MARCH 2021

PUBLIC

BERKELEY ST JAMES

MILTON KEYNES EAST

Walking, cycling and horse-riding assessment and review

DRAFT (V1) PUBLIC

PROJECT NO. 70057521

OUR REF. NO. 70057521-WCHAR

DATE: MARCH 2021

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1 BACKGROUND AND SCHEME DESCRIPTION

1.1 BACKGROUND

1.1.1. WSP has been appointed by Berkeley St James to provide transportation and highways advice in respect of the proposed development of land to the northeast of Milton Keynes (hereinafter referred to as 'Milton Keynes East' or 'MKE' and detailed in Section 1.2 of this report).

1.1.2. Whilst MKE is classified as a 'large scheme' as there will be major changes that will affect the local motorised highway network, the level of permanent impact associated with walking, cycling and horse-riding modes can only be regarded to the proposed new bridge over the M1 motorway which is detailed in the following section.

1.1.3. The above approach based on focusing only on the proposed new bridge over the M1 motorway has been agreed by Highways England within conversations with WSP which took place in November 2020 and are included in **Appendix A**. In summary, the following methodology was confirmed as acceptable by HE:

WCHAR Summary Chapter within the TA

This would be supported by a standalone document / technical note that would follow GG 142 guidance and template, but would cross refer to the areas in the TA where relevant information is already provided.

This note would be appended to the TA and would be a 'lite' version to the assessment process, given the extent of the review already being completed as part of the TA and ES. It would provide any additional information where needed,

- *For example, the TA will review the existing situation, relevant policies, PIA data, trip generation, site visits, liaison with stakeholders and development proposals etc;*
- *The note will then summarise the relevant information from the TA to the proposals and discuss these.*

Due to current Covid-19 conditions, we do not consider NMU surveys would be representable at this time and do not propose to undertake any given the lack of access in the current area.

Extent of the assessment

Within the note, an explanation of J14 proposals would be set out, and justification why a review has not been undertaken outlined;

The review would then focus on the new M1 Bridge and tie in to Tongwell Street (plus immediate surrounding areas) and the resulting changes to pedestrian and cycle access.

The TA would review a wider area including off-site impacts and so this will be referred to as necessary.

1.1.4. In accordance with the above, this Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) follows GG142 guidance but producing a 'lite' version to the assessment process to cover mainly the proposed new M1 bridge that ties into Tongwell Street plus immediate surrounding areas.

1.1.5. After the options stage of the proposed highway scheme, this Lite WCHAR will thereafter be followed by subsequent WCHAR Reviews at preliminary and detailed design stages.

1.1.6. It should be noted that WSP and the applicant, Berkeley St James, has been in contact both Milton Keynes Council and Highways England numerous times over the proposed development. This has included various meetings on subject matters including the new M1 bridge and supporting analysis / modelling of the development. The various correspondence and responses are set out further in the main body of the TA.

1.2 THE PROPOSED MILTON KEYNES EAST SCHEME

1.2.1. The MKE site has been identified as an allocation for a Strategic Urban Extension (SUE) within the current local plan entitled Plan:MK 2016 – 2031. Milton Keynes Council's (MKC) aspirations for the allocation are set out in Policy SD12 of Plan:MK which states that key strategic infrastructure improvements are required over the M1 "*to support the connectivity of this strategic urban extension to the existing Milton Keynes urban area*".

1.2.2. **Diagram 1** below shows the MKE Allocation Boundary and its context with the highway network.

Diagram 1 – MKE SUE Allocation Boundary

Source: MKE Development Framework Supplementary Planning Document (MKC, March 2020)

1.2.3. In the context of the above, The current description of development is as follows:

Hybrid planning application encompassing:

(i) outline element (with all matters reserved) for a large-scale mixed-use urban extension (creating a new community) comprising: residential development; employment including business, general industry and storage/distribution uses; a secondary school and primary schools; a community hub

containing a range of commercial and community uses; a new linear park along the River Ouzel corridor; open space and linked amenities; new redways, access roads and associated highways improvements; associated infrastructure works; demolition of existing structures; and

(ii) detailed element for strategic highway and multi-modal transport infrastructure, including: new road and redway extensions; a new bridge over the M1 motorway; a new bridge over the River Ouzel; works to the Tongwell Street corridor between Tongwell roundabout and Pineham roundabout including new bridge over the River Ouzel; alignment alterations to A509 and Newport Road; and associated utilities, earthworks and drainage works. Policy SD12 of the Plan:MK that is concerned about the MKE SUE seeks to deliver a mixed-use development of circa 5,000 new homes, employment in the order of 105 hectares and supporting ancillary uses including primary and secondary schools, health care and community facilities.

1.2.4. The Development Framework Concept Plan of MKE has been developed in order to spatially interpret the vision and development principles for the new community. The key features of the concept plan are:

- a linear park based around the River Ouzel corridor;
- a landscape buffer to Moulsoe;
- a mixed-use community hub at the heart of the main residential area;
- a secondary school close to the community hub;
- four primary schools spread equidistantly around the residential areas;
- a new road bridge over the M1 providing an improved link to CMK and the urban area of MK; safeguarded route for a fast mass transit route;
- land for a potential park and ride site;
- employment development along the edge of the motorway;
- pedestrian/cycle connections across the M1 and A422 as well as the new infrastructure itself;
- an outer road to allow through traffic to move through the site without conflicting with areas of housing and the people-centric places within the site;
- Willen Road to be retained and upgraded to a grid road; and
- downgrading of part of the A509 London Road through the site to avoid it becoming a through route

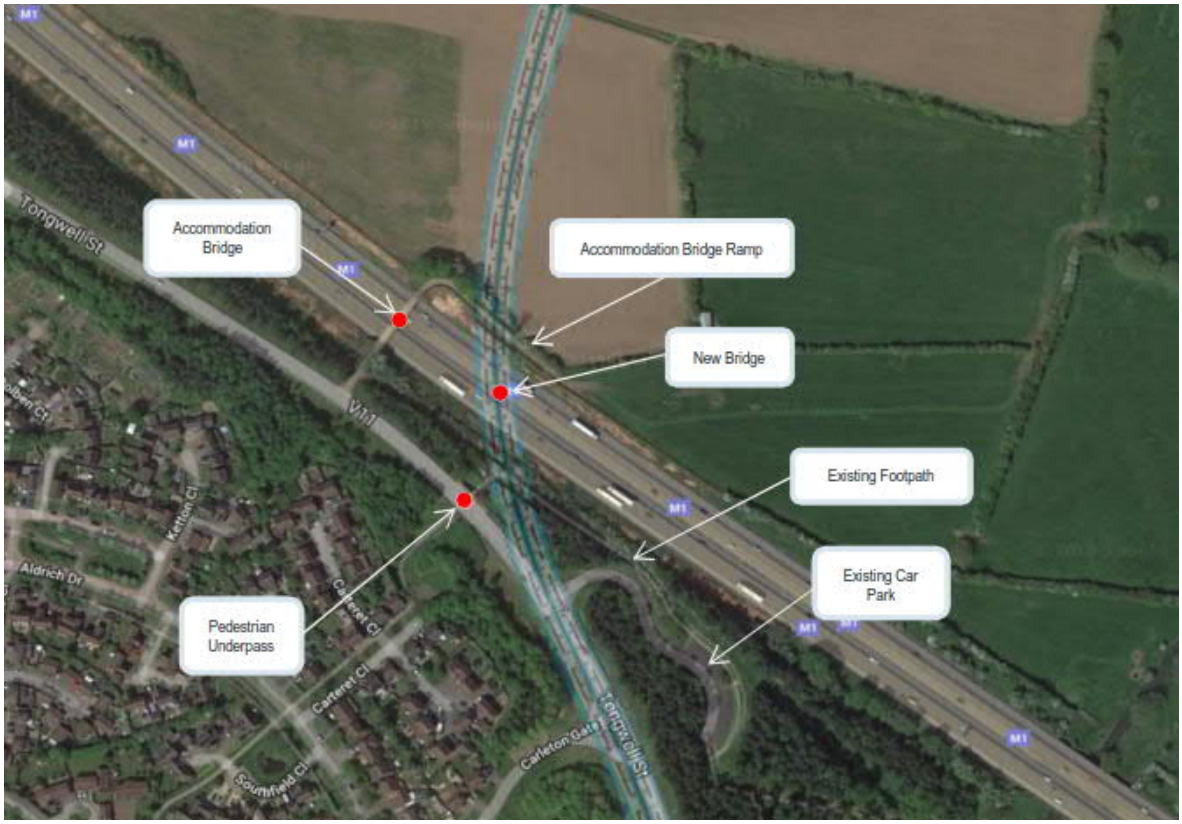
1.2.5. MKC was successful in their bid for a Housing Infrastructure Funding (HIF) and secured funding for the strategic infrastructure required to enable the Site to come forwards, in line with Policy SD12 of the Plan:MK. The new strategic infrastructure enabling the delivery of the MKE development would include:

- A new bridge over the M1;
- A new north-south connection to the A422 into the MKE SUE;
- A new east-west connection leading to the bridge crossing over the M1 and part of a new link road around the eastern perimeter of the site connecting into M1 J14;
- Dualling of the A509 southbound approach to M1 J14; and
- Closure of the Newport Road junction with the A509 and reconfiguration of Newport Road to form a new junction with the eastern perimeter road and connection to the village of Moulsoe.

1.2.6. Different options for the new bridge over the M1 (subject of this Lite WCHAR as per Section 1.1) have been previously considered by WSP, in particular within the Structure Options Report (August 2020) which has been agreed by HE.

1.2.7. Consideration of interference between the new proposed bridge and existing infrastructure was a key element of the Structure Options Report which concluded the best alignment option was as illustrated in **Diagram 2** below.

Diagram 2 – Proposed New Bridge over M1



Source: Figure 3.1 of WSP's Structure Options Report (August 2020)

1.2.8. It is proposed that the accommodation bridge will be retained and may be converted for use by cyclists as well as pedestrians.

1.2.9. The ramp on the north-east side of the M1 will need to be routed beneath the proposed road through either a new subway through the northern approach embankment or the M1 overbridge structure may need to oversail this area of land; however, this will not affect any desire lines for pedestrians, cyclists or horse-riders.

1.3 WCHAR STUDY AREA

1.3.1. In the above context and as detailed in Section 1.1, this Lite WCHAR focuses on the proposals for the new road bridge over the M1 which will provide an improved link to CMK and the urban area of Milton Keynes East. This is as such since these proposals are the only ones which will affect existing walking, cycling and horse-riding facilities around the site area. This is what has been marked as 'Accommodation Bridge' and its associated ramp in **Diagram 2**.

1.3.2. Whilst it is noted that the improvements proposed for the M4 J14 will also provide infrastructure for active travel modes, these are looked at in the Transport Assessment accompanying the Milton Keynes East scheme; the reason being that currently there are no walking, cycling and horse-riding

facilities around the junction and as such no impact is to be brought by the scheme to any non-motorised users' existing infrastructure.

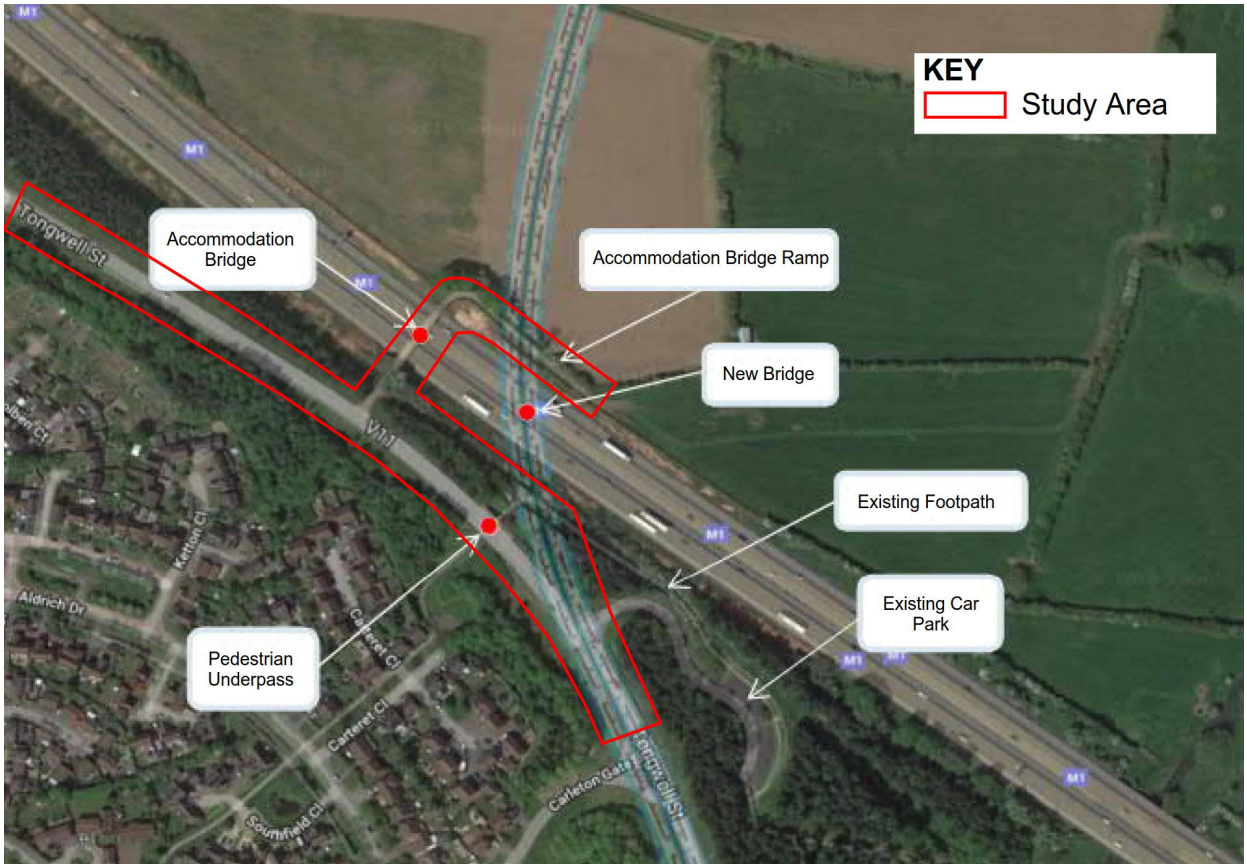
1.3.3. Elena Cristobal, MEng, MCIHT and Engineer at WSP, is the Lead assessor for the WCHAR process. Elena has five years of experience in the UK's Development and Transport Planning industry which has been developed in close proximity to local councils, members of the public and private developers.

1.3.4. Elena has extensive specific involvement in assessing the impact of developments and required transport infrastructure or walking and cycling users, with a particular focus on especially vulnerable users to provide them with safe, adequate facilities to allow everyone to use their freedom of travel mode choice.

1.3.5. Following from the above experience, the background conversations with Highways England as explained within Section 1.1, and the justification of the forecasted impacting features as per previous paragraphs, the study area has been set in terms of changes to the existing walking, cycling and horse-riding network around the new proposed bridge over the M1 by the Lead Assessor in association with the design team.

1.3.6. This Lite WCHAR will consequently focus on the area with Highways England's pedestrian, cycle and equestrian infrastructure impacted by the proposed M1 new bridge. The defined study area is illustrated in Diagram 3.

Diagram 3 – Lite WCHAR Study Area



2 WALKING, CYCLING AND HORSE-RIDING ASSESSMENT

2.1 INTRODUCTION

2.1.1. The tables included in the following sections summarise the findings of the Lite WCHAR as set out in GG142, using in particular the Assessment Report Template shown in GG142 *Appendix B*.

2.1.2. The findings under each topic area are summarised in an individual table and any potential opportunities for improvement are thereafter noted in Chapter 3 of this Lite WCHAR.

2.1.3. As outlined in Chapter 1 of this Lite WCHAR, the area of assessment and review described in the below tables refer only to the Study Area shown in Diagram 3 i.e. the only area where existing pedestrians, cyclists and horse-riders may be detrimentally impacted by the Milton Keynes East scheme and the associated proposal for the new bridge over the M1.

2.2 WCHAR ASSESSMENT SUMMARY TABLES

REVIEW OF POLICIES AND STRATEGIES

Table 1 - Assessment of walking, cycling & horse-riding policies and strategies

National Policies	
A	DfT Local Transport Note 1/12: Shared Use Routes for Pedestrians and Cyclists (2012)
B	Sustrans Design Manual: Handbook for cycle-friendly design (2014)
C	Department for Transport Walking and Cycling Strategy (2017)
Local Policies	
D	Plan:MK 2016-2031 (2019)
E	Mobility Strategy for Milton Keynes 2018-2036 (LTP4): Mobility for All (2018)
F	Mobility Strategy for Milton Keynes 2018-2036 (LTP4): Transport Infrastructure Delivery Plan (2019)
G	Milton Keynes East Strategic Urban Extension Development Framework Supplementary Planning Document (2020)
H	MK Sustainability Strategy 2019-2050 (2018)

COLLISION DATA

Table 2 – Collision data

Collision data
Personal Injury Accident (PIA) data has been obtained from MKC for the latest available five-year period for the immediate highway network surrounding the Milton Keynes East scheme. The data was obtained for the period between June 2015 and May 2020.

Collision data

For this Lite WCHAR, only the data associated with the study area as illustrated in **Figure 3** has been analysed, with the remainder of the data being assessed in Chapter 3 of the Transport Assessment.

Diagram 2.1: PIA study area and PIA locations

Data shows that a total of one collision have occurred during the past five years in the study area, this one resulting in fatal injury. The collision occurred on 11 January 2016, during daylight and damp conditions.

The collision was the result of one casualty involving three vehicles, where a minibus driving southbound direction drove into the oncoming lane, colliding with two cars.

The casualty appears likely to be related to illness or disability, mental or physical, of the minibus driver.

The fact that there has been only one collision in the study area within the 5-year period, and also in a location with a posted speed limit of 60mph and no current active travel infrastructure, evidences there are no highway safety issues which the new bridge may have an impact on. It should also be noted that the location where the collision took place will not be affected by the new bridge as can be seen in **Diagram 2.1**.

PUBLIC TRANSPORT

Table 3 – Multi-modal transport services and interchange information

Multi-modal transport services and interchange information

There are several stops within the vicinity of the Milton Keynes East site which are considered in depth within the TA. However, for the purpose of this Lite WCHAR, the only bus stops that are being considered are on Willen Road and Tongwell Roundabout West which are within close proximity to the WCHAR Study Area as illustrated in Diagram 3.

Bus services operating from these bus stops are:

- **C10:** Bedford – Cranfield University – Milton Keynes
- **1:** Newport Pagnell – Milton Keynes – Bletchley

The C10 service is run by Uno Bus. Bus services 1 is run by Arriva Beds and Bucks.

A summary of the bus services serving the bus stops within the Lite WCHAR Study Area can be seen in Table .

Table 3.1 – Bus services in the vicinity of the Site

Service/Route	Frequency			Earliest Departure	Latest Departure
	Weekday	Saturday	Sunday		
C10 Bedford – Cranfield University – Milton Keynes	1 per hour	-	-	06:33	18:50
1 Newport Pagnell – Milton Keynes - Bletchley	2 per hour	1 per hour	1 per hour	05:38	23:04

Source: Milton-Keynes.gov.uk (Up to date as of September 2020, timetables temporarily disrupted by the COVID 19 outbreak at the time of writing)

RAIL NETWORK

The Milton Keynes region has a number of railway stations. There are two railway stations in proximity of the Milton Keynes East scheme, which form the basis of the assessment included within the TA. These railway stations include Central Milton Keynes and Woburn Sands.

The TA provides further information on these railway stations including frequency of services and accessibility. To avoid unnecessary repetition, details are not included within the Lite WCHAR Study Area and are instead shown in Section 4 of the TA.

TRIP GENERATORS

Table 4 – Trip Generators

Trip Generators
The existing accommodating bridge serves a public footpath and connects to a public segregated cycleway to satisfy leisure demands from local residents. Since this infrastructure is there to satisfy existing demand, it is not considered the bridge to be a trip generator per se. Consequently, it is concluded that there are no public trip generators at present to be included within this Lite WCHAR. Regarding existing desire lines, these are considered to be reflected by the existing public footpath over the accommodating bridge and the connecting cycleway (parallel to the M1 alignment) which are shown within Diagram 3 above. It should be noted that these will not be amended as part of the proposals (as detailed in Section 1.2) which will in turn retain the accommodating bridge and also improve walking and cycling infrastructure and connections. Future trip generators which will be positively impacted by the new proposals have been assessed within Chapter 6 of the Transport Assessment submitted in support of the Milton Keynes East scheme.

SITE VISIT

Table 5 – Site Visit

Site Visit
Due to the current COVID-19 emergency health situation there has been limited opportunity to undertake a site visit only with the purpose of assessing this Lite WCHAR. However, several site visits have taken place during the different phases of the project (including various site visits in 2018 as part of the HIF application). These site visits included visual inspection of the Lite WCHAR Study Area as identified in Diagram 3. Photos below are evidenced of this.

Site Visit

Photo 5.1 – Accommodation bridge – southeast elevation

Photo 5.2 – Accommodation bridge northern ramp – looking southeast

The site visits have also confirmed that in WSPs opinion there are no additional areas which should be part of this Lite WCHAR.

LIAISON WITH KEY STAKEHOLDERS

Table 6 – Liaison with Key Stakeholders

Liaison with Key Stakeholders
The approach to prepare this Lite WCHAR has been agreed with HE within conversations with WSP which took place in November 2020 and are included in **Appendix A**. In summary, the following methodology was confirmed as acceptable by Highways England as it has been further explained in Section 1.1. As noted in Section 1, ongoing discussions with Highways England and Milton Keynes regarding the MKE site are still being held, ensuring that the key stakeholders are aware of progress in terms of design and assessment. In conclusion from these discussions, this Lite WCHAR follows GG142 guidance to cover the proposed new M1 bridge that ties into Tongwell Street plus immediate surrounding areas (i.e. study area illustrated in Diagram 3).

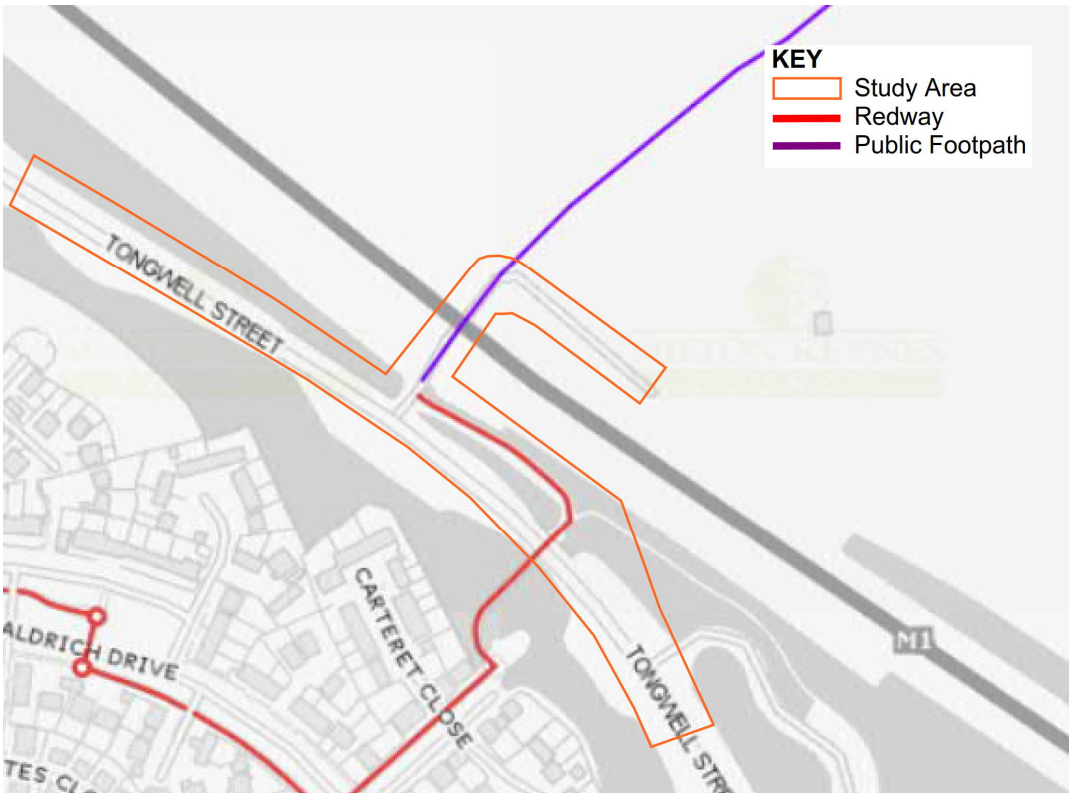
EXISTING PEDESTRIAN, CYCLIST AND EQUESTRIAN FACILITIES

Table 7 – Existing Pedestrian, Cyclist and Equestrian Facilities

Existing pedestrian, cyclist and equestrian facilities
Walking and cycling infrastructure in the way of footways, public footpaths and redways (shared foot/cycle paths) around this WCHAR study area are provided in the context of Willen's residential area to the southwest of the existing accommodating bridge. There is no dedicated horse-riding infrastructure in close proximity to the existing bridge subject of this Lite WCHAR. In addition to the footways shown in Diagram 4, redways and public footways as owned by MKC are illustrated below from MKC Mapping System. These will be connected to and improved by the proposed new bridge over the M1 as detailed within WSP Structure Options Report (August 2020) which has been agreed by Highways England.

Existing pedestrian, cyclist and equestrian facilities

Diagram 4 – Existing pedestrian, cyclist and equestrian facilities



Source: MyMK Mapping System (December 2020)

LIAISON WITH LOCAL USER GROUPS AND WIDER PUBLIC

Table 8 – Liaison with Local User Groups and Wider Public

Liaison with Local User Groups and Wider Public

The new bridge aligns with the preferred options which were identified through consultation with stakeholders during the Development Framework process for the site.

As part of the MKE discussions, numerous meetings have been held with local Councillors and members as well as local cycle user groups and forums.

In terms of wider public consultation, understandably, the COVID-19 pandemic presented many challenges and complexities to the Milton Keynes East public consultation process. The proposed consultation strategy was significantly altered during the course of the application's preparation to ensure that as many people were consulted on the proposals as possible. To comply with the relevant rules around public meetings, social distancing and essential travel, the community engagement was predominantly undertaken via virtual channels; including:

- A Consultation Brochure distributed to +23,000 addresses;
- A dedicated Consultation Website;

Liaison with Local User Groups and Wider Public

- An introductory film showing Berkeley Group's vision and ambitions for the new neighbourhood;
- Virtual webinar events with MKC Cabinet Members, Ward and Parish Councillors, relevant Stakeholder Groups and Educational Institutions; and
- Presenting the Milton Keynes East proposals at Virtual Forums.

In light of the COVID-19 restrictions the Berkeley Group utilised virtual consultation methods and other means to ensure the local community and relevant stakeholders have been extensively consulted on the proposed new neighbourhood at Milton Keynes East.

It should also be noted that the Milton Keynes East consultation will remain open for comment until September 2021.

3 USER OPPORTUNITIES

Table 9 – Identified User Opportunities

General
The proposed new bridge over the M1 was considered to be the best option to provide a solution for the Milton Keynes East scheme as it draws more traffic away from M1 J14 and reduces delays and journey times across the M1 corridor beyond that achieved by the other options that were assessed.
Strategic Opportunities
The new bridge over the M1 is considered to provide the most legible and intuitive route for motorists wishing to access areas of Central MK, South and SE MK instead of using J14, and aligns with MKC's aspirations for providing rapid transit between the north and MKC. The new bridge provides additional resilience in the network insofar as there would be four bridge crossings of the M1 (J14, Willen Road, the A422 and the new bridge). Not only does this therefore provides resilience during times of road maintenance, accidents, etc., but it also provides the ability for further housing growth to occur in the future.
Pedestrian Specific Opportunities
At present, it is envisaged that there will be 3-metre-wide foot/cycleways (redway) within a 5.0m verge to each side of the bridge. This wide, segregated pedestrian infrastructure provided within a verge which will make separation from traffic more noticeable is considered adequate to encourage walking and to accommodate future demand to connect the Milton Keynes East development with existing urban areas to the south of the site. Existing pedestrians using the accommodating bridge and surrounding walking infrastructure will also be able to benefit from an improved network.
Cyclist Specific Opportunities
At present, it is envisaged that there will be 3-metre-wide foot/cycleways (redway) within a 5.0m verge to each side of the bridge. This wide, segregated cycling infrastructure provided within a verge which will make separation from traffic more noticeable is considered adequate to encourage cycling and to accommodate future demand to connect the Milton Keynes East development with existing urban areas to the south of the site. Existing cyclists using the cycling infrastructure within and around this Lite WCHAR study area will be able to benefit from new cycling connections where there are not any at present.
Equestrian Specific Opportunities
None determined at present.

4 WALKING, CYCLING AND HORSE-RIDING ASSESSMENT TEAM STATEMENT

4.1.1. As Lead Assessor, I confirm that this walking, cycling and horse-riding assessment report has been compiled in accordance with DMRB GG 142. The walking, cycling and horse-riding assessment was undertaken by the following assessment and review team:

Table 10 – Lite WCHAR Lead Assessor

Name	Elena Cristobal
Position	Engineer
Organisation	WSP UK
Signed	
Date	March 2021

Table 11 – Lite WCHAR Assessor

Name	Elena Cristobal
Position	Engineer
Organisation	WSP UK

4.1.2. As the design team leader, I confirm that the assessment has been undertaken at the appropriate stage of the highway scheme development.

Table 12 – Design Team Leader

Name	Alex Smith
Position	Associate
Organisation	WSP UK
Signed	
Date	March 2021

Appendix A

HE SCOPE AND METHODOLOGY AGREEMENT

Smith, Alex

From: Smith, Alex
Sent: 23 October 2020 17:00
To: Mould, Penny
Subject: MKE - WCHAR combined in TA - Proposed Methodology

Importance: High

Hi Penny,

I hope you are well,

I appreciate there are a number of items being discussed regarding MKE, and apologies to add another to the mix. We are conscious that due to the proposed infrastructure as part of the HIF elements, that assessment of walking, cycling and equestrian routes using GG142 guidance may be required.

As we are assessing the site, surrounding area and infrastructure both in the TA and ES, including wider area impacts, I am keen to avoid duplication of work when a lot of the same analysis is being conducted that is applicable to this as well. Additionally, I know there have been multiple discussions with you and your colleagues over the preliminary bridge designs already and so engagement and discussions over design have progressed.
Also as part of the TA and development proposals, improvements for walking, cyclists and equestrian users are being identified, if required, and would form part of the over-arching mitigation strategy. This would be both on plot as well as off-site mitigation.

We want to ensure that we engaged with you over the appropriate level of assessment of the highway schemes in terms of walking, cycling and equestrians users considering the above.

Proposals to be reviewed;
As you are aware, there are two areas where direct influence onto the SRN could be considered. These areas are set out below with some justification as to whether further assessment is considered appropriate;

- Alterations to northern approach to J14
    - The current development proposals set out alterations to the northern arm of the junction, as well as the A509;
    - There are no pedestrian, cyclist or equestrian access currently provided at the junction;
    - We are not proposing any routes where peds / cycles or equestrians are permitted, and as outlined in GG142, we believe that this would be exempt from any further study; and
    - As noted above, the whole site's accessibility and impacts on walking / cycling routes is being assessed as part of the TA and so a review of this area would still be undertaken generally.
- New M1 bridge
    - Proposals include a new bridge over the M1 tying into Tongwell Street from the new MKE site;
    - The existing area has limited or no demand and access for users, with only the farm accommodation bridge providing a route across to the fields currently;
    - The existing farm track accommodation bridge will be retained for pedestrian and cyclist use as part of the proposals; and
    - We believe that this doesn't necessarily constitute a direct effect to the M1, we acknowledge that it influences how pedestrians and cyclists will access the site.

In line with GG142, we therefore propose to adopt the following methodology and reporting, as set out below, which I hope is agreeable to yourself / Highways England;

Proposed Assessment Methodology

- WCHAR Summary Chapter within the TA

    - This would be supported by a standalone document / technical note that would follow GG 142 guidance and template, but would cross refer to the areas in the TA where relevant information is already provided..
    - This note would be appended to the TA and would be a 'lite' version to the assessment process, given the extent of the review already being completed as part of the TA and ES. It would provide any additional information where needed,
        - For example, the TA will review the existing situation, relevant policies, PIA data, trip generation, site visits, liaison with stakeholders and development proposals etc;
        - The note will then summarise the relevant information from the TA to the proposals and discuss these.
    - Due to current Covid-19 conditions, we do not consider NMU surveys would be representable at this time and do not propose to undertake any given the lack of access in the current area.
- Extent of the assessment
    - Within the note, an explanation of J14 proposals would be set out, and justification why a review has not been undertaken outlined;
    - The review would then focus on the new M1 Bridge and tie in to Tongwell Street (plus immediate surrounding areas) and the resulting changes to pedestrian and cycle access.
    - The TA would review a wider area including off-site impacts and so this will be referred to as necessary.

I hope the above is clear and we would welcome your confirmation that it is appropriate given the parallel assessments being undertaken at the same time.

As always, I would be happy to discuss with you once you've had chance to review. In the meantime, we will proceed on the above basis given programme need to proceed with the various reviews before submission.

Thanks – have a nice weekend,
Alex

Kind regards,

Alex Smith MSc MCIHT
Associate

Transport

[redacted]

WSP, Mountbatten House
Basing View, Basingstoke,
RG21 4HJ

wsp.com

Mountbatten House
Basing View
Basingstoke, Hampshire
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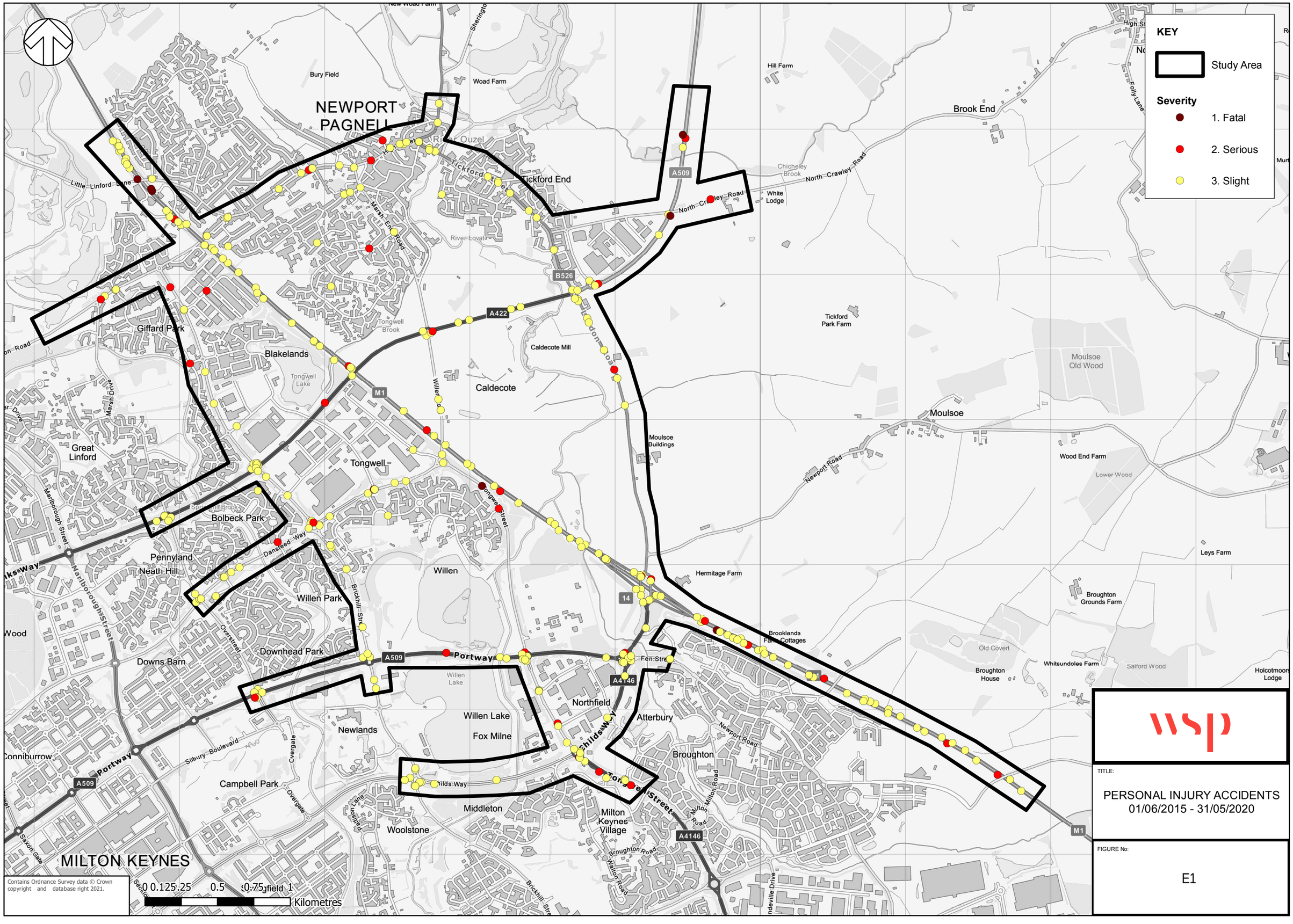
Appendix E

PIA DATA


KEY
Study Area
Severity
1. Fatal
2. Serious
3. Slight
NEWPORT PAGNELL
Bury Field
Woad Farm
Hill Farm
Brook End
Tickford End
Chicheley Brook
White Lodge
North Crawley Road
A509
B526
A422
M1
Little Linford Lane
Marsh End Road
River Ouzel
River Lovat
Giffard Park
Blakelands
Tongwell Brook
Tongwell Lake
Caldecote Mill
Caldecote
Tickford Park Farm
Moulsoe Old Wood
Moulsoe
Moulsoe Buildings
Wood End Farm
Lower Wood
Great Linford
Tongwell
Bolbeck Park
Pennyland
Neath Hill
Willen
Willen Park
Hermitage Farm
Leys Farm
Broughton Grounds Farm
Brooklands Farm Cottages
Old Covert
Broughton House
Whiteundoles Farm
Salford Wood
Downs Barn
Downhead Park
Willen Lake
Fox Milne
Willen Lake
Northfield
Atterbury
Broughton
Newlands
Campbell Park
Middleton
Woolstone
Milton Keynes Village
A4146
14
Portway
Childs Way
Tongwell Street
Newport Road
Broughton Road
Milton Road
Marlborough Street
Silbury Boulevard
Overgate
Dansteed Way
Brickhill Street
MILTON KEYNES
Contains Ordnance Survey data © Crown copyright and database right 2021.
0 0.125 0.25 0.5 0.75 1
Kilometres
wsp
TITLE:
PERSONAL INJURY ACCIDENTS
01/06/2015 - 31/05/2020
FIGURE No:
E1

Date	Name	Vendor	Amount	Check #	Payment Method	Check Cleared	Invoice #	Tax	Category	Notes
2019-03-19	Electric Company	Pacific Power	142.67	4471	Online Payment	Yes	PP-2019-03	0.00	Utilities	
2019-03-20	Office Supplies	Staples	89.34	4472	Credit Card	Yes	STP-88201	7.12	Supplies	Printer paper and toner
2019-03-21	Internet Service	Comcast Business	199.99	4473	Auto-Pay	Yes	CB-03-2019	0.00	Utilities	
2019-03-22	Water Bill	City of Riverton	64.20	4474	Mail	Yes	RIV-0322	0.00	Utilities	
2019-03-23	Cleaning Service	Sparkle Clean LLC	350.00	4475	Check	Yes	SC-1187	28.00	Janitorial	Monthly cleaning
2019-03-24	Gas Bill	Northwest Natural	118.45	4476	Online Payment	Yes	NW-GAS-0319	0.00	Utilities	
2019-03-25	Trash Removal	Waste Management	76.50	4477	Auto-Pay	Yes	WM-44210	0.00	Utilities	
2019-03-26	Printer Repair	Office Tech Solutions	225.00	4478	Check	Yes	OTS-5512	18.00	Repairs	Fuser unit replaced
2019-03-27	Coffee Supplies	Costco Wholesale	156.78	4479	Credit Card	Yes	CW-03-2019	12.54	Supplies	Coffee and filters
2019-03-28	Payroll Processing	ADP	4,250.00	4480	Auto-Pay	Yes	ADP-PR-0328	0.00	Payroll	Bi-weekly payroll
2019-03-29	Landscaping	Green Thumb Lawn Care	180.00	4481	Check	Yes	GTL-0329	14.40	Landscaping	Spring mowing
2019-03-30	Security System	ADT Commercial	65.99	4482	Auto-Pay	Yes	ADT-88412	0.00	Utilities	
2019-04-01	Rent	Harbor Property Group	2,800.00	4483	Check	Yes	RENT-APR19	0.00	Rent	April rent
2019-04-02	Accounting Fees	Hayes & Associates CPA	450.00	4484	Check	Yes	HA-2019-Q1	36.00	Professional Services	Q1 bookkeeping
2019-04-03	Office Supplies	Staples	134.22	4485	Credit Card	Yes	STP-88455	10.74	Supplies	Folders and labels
2019-04-04	Internet Service	Comcast Business	199.99	4486	Auto-Pay	Yes	CB-04-2019	0.00	Utilities	
2019-04-05	Water Bill	City of Riverton	61.75	4487	Mail	Yes	RIV-0405	0.00	Utilities	
2019-04-06	Cleaning Service	Sparkle Clean LLC	350.00	4488	Check	Yes	SC-1201	28.00	Janitorial	Monthly cleaning
2019-04-07	Gas Bill	Northwest Natural	102.30	4489	Online Payment	Yes	NW-GAS-0405	0.00	Utilities	
2019-04-08	Trash Removal	Waste Management	76.50	4490	Auto-Pay	Yes	WM-44298	0.00	Utilities	
2019-04-09	Equipment Repair	Office Tech Solutions	310.00	4491	Check	Yes	OTS-5540	24.80	Repairs	Scanner calibration
2019-04-10	Coffee Supplies	Costco Wholesale	142.10	4492	Credit Card	Yes	CW-04-2019	11.37	Supplies	Coffee and filters
2019-04-11	Payroll Processing	ADP	4,250.00	4493	Auto-Pay	Yes	ADP-PR-0411	0.00	Payroll	Bi-weekly payroll
2019-04-12	Landscaping	Green Thumb Lawn Care	180.00	4494	Check	Yes	GTL-0412	14.40	Landscaping	Mowing and edging
2019-04-13	Security System	ADT Commercial	65.99	4495	Auto-Pay	Yes	ADT-88530	0.00	Utilities	
2019-04-14	Rent	Harbor Property Group	2,800.00	4496	Check	Yes	RENT-MAY19	0.00	Rent	May rent
2019-04-15	Accounting Fees	Hayes & Associates CPA	450.00	4497	Check	Yes	HA-2019-Q1-2	36.00	Professional Services	Q1 bookkeeping
2019-04-16	Office Supplies	Staples	98.67	4498	Credit Card	Yes	STP-88612	7.89	Supplies	Pens and notebooks
2019-04-17	Internet Service	Comcast Business	199.99	4499	Auto-Pay	Yes	CB-04-2019-2	0.00	Utilities	
2019-04-18	Water Bill	City of Riverton	58.40	4500	Mail	Yes	RIV-0418	0.00	Utilities	
2019-04-19	Cleaning Service	Sparkle Clean LLC	350.00	4501	Check	Yes	SC-1215	28.00	Janitorial	Monthly cleaning
2019-04-20	Gas Bill	Northwest Natural	95.12	4502	Online Payment	Yes	NW-GAS-0419	0.00	Utilities	
2019-04-21	Trash Removal	Waste Management	76.50	4503	Auto-Pay	Yes	WM-44355	0.00	Utilities	
2019-04-22	Equipment Repair	Office Tech Solutions	275.00	4504	Check	Yes	OTS-5571	22.00	Repairs	Printer maintenance
2019-04-23	Coffee Supplies	Costco Wholesale	138.45	4505	Credit Card	Yes	CW-04-2019-2	11.08	Supplies	Coffee and filters
2019-04-24	Payroll Processing	ADP	4,250.00	4506	Auto-Pay	Yes	ADP-PR-0425	0.00	Payroll	Bi-weekly payroll
2019-04-25	Landscaping	Green Thumb Lawn Care	180.00	4507	Check	Yes	GTL-0425	14.40	Landscaping	Mowing and edging
2019-04-26	Security System	ADT Commercial	65.99	4508	Auto-Pay	Yes	ADT-88701	0.00	Utilities	
2019-04-27	Rent	Harbor Property Group	2,800.00	4509	Check	Yes	RENT-JUN19	0.00	Rent	June rent
2019-04-28	Accounting Fees	Hayes & Associates CPA	450.00	4510	Check	Yes	HA-2019-Q1-3	36.00	Professional Services	Q1 bookkeeping
2019-04-29	Office Supplies	Staples	112.30	4511	Credit Card	Yes	STP-88790	8.98	Supplies	Binders and tape
2019-04-30	Internet Service	Comcast Business	199.99	4512	Auto-Pay	Yes	CB-04-2019-3	0.00	Utilities	
2019-05-01	Water Bill	City of Riverton	55.90	4513	Mail	Yes	RIV-0501	0.00	Utilities	
2019-05-02	Cleaning Service	Sparkle Clean LLC	350.00	4514	Check	Yes	SC-1229	28.00	Janitorial	Monthly cleaning
2019-05-03	Gas Bill	Northwest Natural	88.60	4515	Online Payment	Yes	NW-GAS-0503	0.00	Utilities	
2019-05-04	Trash Removal	Waste Management	76.50	4516	Auto-Pay	Yes	WM-44412	0.00	Utilities	
2019-05-05	Equipment Repair	Office Tech Solutions	195.00	4517	Check	Yes	OTS-5602	15.60	Repairs	Toner cartridge
2019-05-06	Coffee Supplies	Costco Wholesale	151.23	4518	Credit Card	Yes	CW-05-2019	12.10	Supplies	Coffee and filters
2019-05-07	Payroll Processing	ADP	4,250.00	4519	Auto-Pay	Yes	ADP-PR-0509	0.00	Payroll	Bi-weekly payroll
2019-05-08	Landscaping	Green Thumb Lawn Care	180.00	4520	Check	Yes	GTL-0509	14.40	Landscaping	Mowing and edging
2019-05-09	Security System	ADT Commercial	65.99	4521	Auto-Pay	Yes	ADT-88844	0.00	Utilities	
2019-05-10	Rent	Harbor Property Group	2,800.00	4522	Check	Yes	RENT-JUL19	0.00	Rent	July rent
2019-05-11	Accounting Fees	Hayes & Associates CPA	450.00	4523	Check	Yes	HA-2019-Q2	36.00	Professional Services	Q2 bookkeeping
2019-05-12	Office Supplies	Staples	76.45	4524	Credit Card	Yes	STP-88901	6.12	Supplies	Pens and notebooks
2019-05-13	Internet Service	Comcast Business	199.99	4525	Auto-Pay	Yes	CB-05-2019	0.00	Utilities	
2019-05-14	Water Bill	City of Riverton	52.60	4526	Mail	Yes	RIV-0514	0.00	Utilities	
2019-05-15	Cleaning Service	Sparkle Clean LLC	350.00	4527	Check	Yes	SC-1243	28.00	Janitorial	Monthly cleaning
2019-05-16	Gas Bill	Northwest Natural	74.88	4528	Online Payment	Yes	NW-GAS-0517	0.00	Utilities	
2019-05-17	Trash Removal	Waste Management	76.50	4529	Auto-Pay	Yes	WM-44467	0.00	Utilities	
2019-05-18	Equipment Repair	Office Tech Solutions	260.00	4530	Check	Yes	OTS-5633	20.80	Repairs	Fuser unit replaced
2019-05-19	Coffee Supplies	Costco Wholesale	147.90	4531	Credit Card	Yes	CW-05-2019-2	11.83	Supplies	Coffee and filters
2019-05-20	Payroll Processing	ADP	4,250.00	4532	Auto-Pay	Yes	ADP-PR-0523	0.00	Payroll	Bi-weekly payroll
2019-05-21	Landscaping	Green Thumb Lawn Care	180.00	4533	Check	Yes	GTL-0523	14.40	Landscaping	Mowing and edging
2019-05-22	Security System	ADT Commercial	65.99	4534	Auto-Pay	Yes	ADT-89012	0.00	Utilities	
2019-05-23	Rent	Harbor Property Group	2,800.00	4535	Check	Yes	RENT-AUG19	0.00	Rent	August rent
2019-05-24	Accounting Fees	Hayes & Associates CPA	450.00	4536	Check	Yes	HA-2019-Q2-2	36.00	Professional Services	Q2 bookkeeping
2019-05-25	Office Supplies	Staples	64.10	4537	Credit Card	Yes	STP-89055	5.13	Supplies	Pens and notebooks
2019-05-26	Internet Service	Comcast Business	199.99	4538	Auto-Pay	Yes	CB-05-2019-3	0.00	Utilities	
2019-05-27	Water Bill	City of Riverton	49.25	4539	Mail	Yes	RIV-0527	0.00	Utilities	
2019-05-28	Cleaning Service	Sparkle Clean LLC	350.00	4540	Check	Yes	SC-1257	28.00	Janitorial	Monthly cleaning
2019-05-29	Gas Bill	Northwest Natural	68.40	4541	Online Payment	Yes	NW-GAS-0529	0.00	Utilities	
2019-05-30	Trash Removal	Waste Management	76.50	4542	Auto-Pay	Yes	WM-44523	0.00	Utilities	
2019-05-31	Equipment Repair	Office Tech Solutions	240.00	4543	Check	Yes	OTS-5690	19.20	Repairs	Fuser unit replaced
2019-06-01	Coffee Supplies	Costco Wholesale	155.67	4544	Credit Card	Yes	CW-06-2019	12.45	Supplies	Coffee and filters
2019-06-02	Payroll Processing	ADP	4,250.00	4545	Auto-Pay	Yes	ADP-PR-0606	0.00	Payroll	Bi-weekly payroll
2019-06-03	Landscaping	Green Thumb Lawn Care	180.00	4546	Check	Yes	GTL-0606	14.40	Landscaping	Mowing and edging
2019-06-04	Security System	ADT Commercial	65.99	4547	Auto-Pay	Yes	ADT-89188	0.00	Utilities	
2019-06-05	Rent	Harbor Property Group	2,800.00	4548	Check	Yes	RENT-SEP19	0.00	Rent	September rent
2019-06-06	Accounting Fees	Hayes & Associates CPA	450.00	4549	Check	Yes	HA-2019-Q2-3	36.00	Professional Services	Q2 bookkeeping
2019-06-07	Office Supplies	Staples	102.55	4550	Credit Card	Yes	STP-89240	8.20	Supplies	Binders and tape
2019-06-08	Internet Service	Comcast Business	199.99	4551	Auto-Pay	Yes	CB-06-2019	0.00	Utilities	
2019-06-09	Water Bill	City of Riverton	46.80	4552	Mail	Yes	RIV-0609	0.00	Utilities	
2019-06-10	Cleaning Service	Sparkle Clean LLC	350.00	4553	Check	Yes	SC-1271	28.00	Janitorial	Monthly cleaning
2019-06-11	Gas Bill	Northwest Natural	61.22	4554	Online Payment	Yes	NW-GAS-0611	0.00	Utilities	
2019-06-12	Trash Removal	Waste Management	76.50	4555	Auto-Pay	Yes	WM-44578	0.00	Utilities	
2019-06-13	Equipment Repair	Office Tech Solutions	215.00	4556	Check	Yes	OTS-5744	17.20	Repairs	Scanner calibration
2019-06-14	Coffee Supplies	Costco Wholesale	143.88	4557	Credit Card	Yes	CW-06-2019-2	11.51	Supplies	Coffee and filters
2019-06-15	Payroll Processing	ADP	4,250.00	4558	Auto-Pay	Yes	ADP-PR-0613	0.00	Payroll	Bi-weekly payroll
2019-06-16	Landscaping	Green Thumb Lawn Care	180.00	4559	Check	Yes	GTL-0613	14.40	Landscaping	Mowing and edging
2019-06-17	Security System	ADT Commercial	65.99	4560	Auto-Pay	Yes	ADT-89301	0.00	Utilities	
2019-06-18	Rent	Harbor Property Group	2,800.00	4561	Check	Yes	RENT-OCT19	0.00	Rent	October rent
2019-06-19	Accounting Fees	Hayes & Associates CPA	450.00	4562	Check	Yes	HA-2019-Q2-4	36.00	Professional Services	Q2 bookkeeping
2019-06-20	Office Supplies	Staples	78.90	4563	Credit Card	Yes	STP-89355	6.31	Supplies	Pens and notebooks
2019-06-21	Internet Service	Comcast Business	199.99	4564	Auto-Pay	Yes	CB-06-2019-3	0.00	Utilities	
2019-06-22	Water Bill	City of Riverton	43.70	4565	Mail	Yes	RIV-0622	0.00	Utilities	
2019-06-23	Cleaning Service	Sparkle Clean LLC	350.00	4566	Check	Yes	SC-1285	28.00	Janitorial	Monthly cleaning
2019-06-24	Gas Bill	Northwest Natural	55.04	4567	Online Payment	Yes	NW-GAS-0623	0.00	Utilities	
2019-06-25	Trash Removal	Waste Management	76.50	4568	Auto-Pay	Yes	WM-44634	0.00	Utilities	
2019-06-26	Equipment Repair	Office Tech Solutions	230.00	4569	Check	Yes	OTS-5801	18.40	Repairs	Fuser unit replaced
2019-06-27	Coffee Supplies	Costco Wholesale	139.56	4570	Credit Card	Yes	CW-06-2019-3	11.16	Supplies	Coffee and filters
2019-06-28	Payroll Processing	ADP	4,250.00	4571	Auto-Pay	Yes	ADP-PR-0627	0.00	Payroll	Bi-weekly payroll
2019-06-29	Landscaping	Green Thumb Lawn Care	180.00	4572	Check	Yes	GTL-0627	14.40	Landscaping	Mowing and edging
2019-06-30	Security System	ADT Commercial	65.99	4573	Auto-Pay	Yes	ADT-89412	0.00	Utilities	
2019-07-01	Rent	Harbor Property Group	2,800.00	4574	Check	Yes	RENT-NOV19	0.00	Rent	November rent
2019-07-02	Accounting Fees	Hayes & Associates CPA	450.00	4575	Check	Yes	HA-2019-Q3	36.00	Professional Services	Q3 bookkeeping
2019-07-03	Office Supplies	Staples	91.20	4576	Credit Card	Yes	STP-89470	7.30	Supplies	Binders and tape
2019-07-04	Internet Service	Comcast Business	199.99	4577	Auto-Pay	Yes	CB-07-2019	0.00	Utilities	
2019-07-05	Water Bill	City of Riverton	40.55	4578	Mail	Yes	RIV-0705	0.00	Utilities	
2019-07-06	Cleaning Service	Sparkle Clean LLC	350.00	4579	Check	Yes	SC-1299	28.00	Janitorial	Monthly cleaning
2019-07-07	Gas Bill	Northwest Natural	49.76	4580	Online Payment	Yes	NW-GAS-0707	0.00	Utilities	
2019-07-08	Trash Removal	Waste Management	76.50	4581	Auto-Pay	Yes	WM-44689	0.00	Utilities	
2019-07-09	Equipment Repair	Office Tech Solutions	205.00	4582	Check	Yes	OTS-5855	16.40	Repairs	Scanner calibration
2019-07-10	Coffee Supplies	Costco Wholesale	147.33	4583	Credit Card	Yes	CW-07-2019	11.78	Supplies	Coffee and filters
2019-07-11	Payroll Processing	ADP	4,250.00	4584	Auto-Pay	Yes	ADP-PR-0711	0.00	Payroll	Bi-weekly payroll
2019-07-12	Landscaping	Green Thumb Lawn Care	180.00	4585	Check	Yes	GTL-0711	14.40	Landscaping	Mowing and edging
2019-07-13	Security System	ADT Commercial	65.99	4586	Auto-Pay	Yes	ADT-89523	0.00	Utilities	
2019-07-14	Rent	Harbor Property Group	2,800.00	4587	Check	Yes	RENT-DEC19	0.00	Rent	December rent
2019-07-15	Accounting Fees	Hayes & Associates CPA	450.00	4588	Check	Yes	HA-2019-Q3-2	36.00	Professional Services	Q3 bookkeeping
2019-07-16	Office Supplies	Staples	84.60	4589	Credit Card	Yes	STP-89580	6.77	Supplies	Pens and notebooks
2019-07-17	Internet Service	Comcast Business	199.99	4590	Auto-Pay	Yes	CB-07-2019-2	0.00	Utilities	
2019-07-18	Water Bill	City of Riverton	37.40	4591	Mail	Yes	RIV-0718	0.00	Utilities	
2019-07-19	Cleaning Service	Sparkle Clean LLC	350.00	4592	Check	Yes	SC-1313	28.00	Janitorial	Monthly cleaning
2019-07-20	Gas Bill	Northwest Natural	44.31	4593	Online Payment	Yes	NW-GAS-0721	0.00	Utilities	
2019-07-21	Trash Removal	Waste Management	76.50	4594	Auto-Pay	Yes	WM-44745	0.00	Utilities	
2019-07-22	Equipment Repair	Office Tech Solutions	250.00	4595	Check	Yes	OTS-5912	20.00	Repairs	Fuser unit replaced
2019-07-23	Coffee Supplies	Costco Wholesale	151.02	4596	Credit Card	Yes	CW-07-2019-2	12.08	Supplies	Coffee and filters
2019-07-24	Payroll Processing	ADP	4,250.00	4597	Auto-Pay	Yes	ADP-PR-0725	0.00	Payroll	Bi-weekly payroll
2019-07-25	Landscaping	Green Thumb Lawn Care	180.00	4598	Check	Yes	GTL-0725	14.40	Landscaping	Mowing and edging
2019-07-26	Security System	ADT Commercial	65.99	4599	Auto-Pay	Yes	ADT-89634	0.00	Utilities	
2019-07-27	Rent	Harbor Property Group	2,800.00	4600	Check	Yes	RENT-JAN20	0.00	Rent	January rent
2019-07-28	Accounting Fees	Hayes & Associates CPA	450.00	4601	Check	Yes	HA-2019-Q3-3	36.00	Professional Services	Q3 bookkeeping
2019-07-29	Office Supplies	Staples	96.75	4602	Credit Card	Yes	STP-89690	7.74	Supplies	Binders and tape
2019-07-30	Internet Service	Comcast Business	199.99	4603	Auto-Pay	Yes	CB-07-2019-3	0.00	Utilities	
2019-07-31	Water Bill	City of Riverton	34.85	4604	Mail	Yes	RIV-0731	0.00	Utilities	
2019-08-01	Cleaning Service	Sparkle Clean LLC	350.00	4605	Check	Yes	SC-1327	28.00	Janitorial	Monthly cleaning
2019-08-02	Gas Bill	Northwest Natural	39.18	4606	Online Payment	Yes	NW-GAS-0802	0.00	Utilities	
2019-08-03	Trash Removal	Waste Management	76.50	4607	Auto-Pay	Yes	WM-44801	0.00	Utilities	
2019-08-04	Equipment Repair	Office Tech Solutions	185.00	4608	Check	Yes	OTS-5968	14.80	Repairs	Scanner calibration
2019-08-05	Coffee Supplies	Costco Wholesale	143.61	4609	Credit Card	Yes	CW-08-2019	11.49	Supplies	Coffee and filters
2019-08-06	Payroll Processing	ADP	4,250.00	4610	Auto-Pay	Yes	ADP-PR-0808	0.00	Payroll	Bi-weekly payroll
2019-08-07	Landscaping	Green Thumb Lawn Care	180.00	4611	Check	Yes	GTL-0808	14.40	Landscaping	Mowing and edging
2019-08-08	Security System	ADT Commercial	65.99	4612	Auto-Pay	Yes	ADT-89745	0.00	Utilities	
2019-08-09	Rent	Harbor Property Group	2,800.00	4613	Check	Yes	RENT-FEB20	0.00	Rent	February rent
2019-08-10	Accounting Fees	Hayes & Associates CPA	450.00	4614	Check	Yes	HA-2019-Q3-4	36.00	Professional Services	Q3 bookkeeping
2019-08-11	Office Supplies	Staples	88.40	4615	Credit Card	Yes	STP-89810	7.07	Supplies	Pens and notebooks
2019-08-12	Internet Service	Comcast Business	199.99	4616	Auto-Pay	Yes	CB-08-2019	0.00	Utilities	
2019-08-13	Water Bill	City of Riverton	31.95	4617	Mail	Yes	RIV-0813	0.00	Utilities	
2019-08-14	Cleaning Service	Sparkle Clean LLC	350.00	4618	Check	Yes	SC-1341	28.00	Janitorial	Monthly cleaning
2019-08-15	Gas Bill	Northwest Natural	34.62	4619	Online Payment	Yes	NW-GAS-0815	0.00	Utilities	
2019-08-16	Trash Removal	Waste Management	76.50	4620	Auto-Pay	Yes	WM-44856	0.00	Utilities	
2019-08-17	Equipment Repair	Office Tech Solutions	270.00	4621	Check	Yes	OTS-6021	21.60	Repairs	Fuser unit replaced
2019-08-18	Coffee Supplies	Costco Wholesale	147.06	4622	Credit Card	Yes	CW-08-2019-2	11.76	Supplies	Coffee and filters
2019-08-19	Payroll Processing	ADP	4,250.00	4623	Auto-Pay	Yes	ADP-PR-0822	0.00	Payroll	Bi-weekly payroll
2019-08-20	Landscaping	Green Thumb Lawn Care	180.00	4624	Check	Yes	GTL-0822	14.40	Landscaping	Mowing and edging
2019-08-21	Security System	ADT Commercial	65.99	4625	Auto-Pay	Yes	ADT-89867	0.00	Utilities	
2019-08-22	Rent	Harbor Property Group	2,800.00	4626	Check	Yes	RENT-MAR20	0.00	Rent	March rent
2019-08-23	Accounting Fees	Hayes & Associates CPA	450.00	4627	Check	Yes	HA-2019-Q4	36.00	Professional Services	Q4 bookkeeping
2019-08-24	Office Supplies	Staples	79.30	4628	Credit Card	Yes	STP-89920	6.34	Supplies	Pens and notebooks
2019-08-25	Internet Service	Comcast Business	199.99	4629	Auto-Pay	Yes	CB-08-2019-3	0.00	Utilities	
2019-08-26	Water Bill	City of Riverton	28.70	4630	Mail	Yes	RIV-0826	0.00	Utilities	
2019-08-27	Cleaning Service	Sparkle Clean LLC	350.00	4631	Check	Yes	SC-1355	28.00	Janitorial	Monthly cleaning
2019-08-28	Gas Bill	Northwest Natural	31.05	4632	Online Payment	Yes	NW-GAS-0828	0.00	Utilities	
2019-08-29	Trash Removal	Waste Management	76.50	4633	Auto-Pay	Yes	WM-44912	0.00	Utilities	
2019-08-30	Equipment Repair	Office Tech Solutions	295.00	4634	Check	Yes	OTS-6078	23.60	Repairs	Fuser unit replaced
2019-08-31	Coffee Supplies	Costco Wholesale	155.34	4635	Credit Card	Yes	CW-08-2019-3	12.43	Supplies	Coffee and filters
2019-09-01	Payroll Processing	ADP	4,250.00	4636	Auto-Pay	Yes	ADP-PR-0905	0.00	Payroll	Bi-weekly payroll
2019-09-02	Landscaping	Green Thumb Lawn Care	180.00	4637	Check	Yes	GTL-0905	14.40	Landscaping	Mowing and edging
2019-09-03	Security System	ADT Commercial	65.99	4638	Auto-Pay	Yes	ADT-89978	0.00	Utilities	
2019-09-04	Rent	Harbor Property Group	2,800.00	4639	Check	Yes	RENT-APR20	0.00	Rent	April rent
2019-09-05	Accounting Fees	Hayes & Associates CPA	450.00	4640	Check	Yes	HA-2019-Q4-2	36.00	Professional Services	Q4 bookkeeping
2019-09-06	Office Supplies	Staples	82.15	4641	Credit Card	Yes	STP-90030	6.57	Supplies	Pens and notebooks
2019-09-07	Internet Service	Comcast Business	199.99	4642	Auto-Pay	Yes	CB-09-2019	0.00	Utilities	
2019-09-08	Water Bill	City of Riverton	25.55	4643	Mail	Yes	RIV-0908	0.00	Utilities	
2019-09-09	Cleaning Service	Sparkle Clean LLC	350.00	4644	Check	Yes	SC-1369	28.00	Janitorial	Monthly cleaning
2019-09-10	Gas Bill	Northwest Natural	28.47	4645	Online Payment	Yes	NW-GAS-0910	0.00	Utilities	
2019-09-11	Trash Removal	Waste Management	76.50	4646	Auto-Pay	Yes	WM-44967	0.00	Utilities	
2019-09-12	Equipment Repair	Office Tech Solutions	225.00	4647	Check	Yes	OTS-6134	18.00	Repairs	Scanner calibration
2019-09-13	Coffee Supplies	Costco Wholesale	139.89	4648	Credit Card	Yes	CW-09-2019	11.19	Supplies	Coffee and filters
2019-09-14	Payroll Processing	ADP	4,250.00	4649	Auto-Pay	Yes	ADP-PR-0919	0.00	Payroll	Bi-weekly payroll
2019-09-15	Landscaping	Green Thumb Lawn Care	180.00	4650	Check	Yes	GTL-0919	14.40	Landscaping	Mowing and edging
2019-09-16	Security System	ADT Commercial	65.99	4651	Auto-Pay	Yes	ADT-90123	0.00	Utilities	
2019-09-17	Rent	Harbor Property Group	2,800.00	4652	Check	Yes	RENT-MAY20	0.00	Rent	May rent
2019-09-18	Accounting Fees	Hayes & Associates CPA	450.00	4653	Check	Yes	HA-2019-Q4-3	36.00	Professional Services	Q4 bookkeeping
2019-09-19	Office Supplies	Staples	86.90	4654	Credit Card	Yes	STP-90170	6.95	Supplies	Pens and notebooks
2019-09-20	Internet Service	Comcast Business	199.99	4655	Auto-Pay	Yes	CB-09-2019-2	0.00	Utilities	
2019-09-21	Water Bill	City of Riverton	22.40	4656	Mail	Yes	RIV-0921	0.00	Utilities	
2019-09-22	Cleaning Service	Sparkle Clean LLC	350.00	4657	Check	Yes	SC-1383	28.00	Janitorial	Monthly cleaning
2019-09-23	Gas Bill	Northwest Natural	25.89	4658	Online Payment	Yes	NW-GAS-0923	0.00	Utilities	
2019-09-24	Trash Removal	Waste Management	76.50	4659	Auto-Pay	Yes	WM-45023	0.00	Utilities	
2019-09-25	Equipment Repair	Office Tech Solutions	310.00	4660	Check	Yes	OTS-6189	24.80	Repairs	Fuser unit replaced
2019-09-26	Coffee Supplies	Costco Wholesale	151.56	4661	Credit Card	Yes	CW-09-2019-2	12.13	Supplies	Coffee and filters
2019-09-27	Payroll Processing	ADP	4,250.00	4662	Auto-Pay	Yes	ADP-PR-0926	0.00	Payroll	Bi-weekly payroll
2019-09-28	Landscaping	Green Thumb Lawn Care	180.00	4663	Check	Yes	GTL-0926	14.40	Landscaping	Mowing and edging
2019-09-29	Security System	ADT Commercial	65.99	4664	Auto-Pay	Yes	ADT-90289	0.00	Utilities	
2019-09-30	Rent	Harbor Property Group	2,800.00	4665	Check	Yes	RENT-JUN20	0.00	Rent	June rent
2019-10-01	Accounting Fees	Hayes & Associates CPA	450.00	4666	Check	Yes	HA-2019-Q4-4	36.00	Professional Services	Q4 bookkeeping
2019-10-02	Office Supplies	Staples	93.25	4667	Credit Card	Yes	STP-90350	7.46	Supplies	Pens and notebooks
2019-10-03	Internet Service	Comcast Business	199.99	4668	Auto-Pay	Yes	CB-10-2019	0.00	Utilities	
2019-10-04	Water Bill	City of Riverton	19.25	4669	Mail	Yes	RIV-1004	0.00	Utilities	
2019-10-05	Cleaning Service	Sparkle Clean LLC	350.00	4670	Check	Yes	SC-1397	28.00	Janitorial	Monthly cleaning
2019-10-06	Gas Bill	Northwest Natural	22.76	4671	Online Payment	Yes	NW-GAS-1006	0.00	Utilities	
2019-10-07	Trash Removal	Waste Management	76.50	4672	Auto-Pay	Yes	WM-45112	0.00	Utilities	
2019-10-08	Equipment Repair	Office Tech Solutions	265.00	4673	Check	Yes	OTS-6245	21.20	Repairs	Fuser unit replaced
2019-10-09	Coffee Supplies	Costco Wholesale	147.45	4674	Credit Card	Yes	CW-10-2019	11.80	Supplies	Coffee and filters
2019-10-10	Payroll Processing	ADP	4,250.00	4675	Auto-Pay	Yes	ADP-PR-1010	0.00	Payroll	Bi-weekly payroll
2019-10-11	Landscaping	Green Thumb Lawn Care	180.00	4676	Check	Yes	GTL-1010	14.40	Landscaping	Mowing and edging
2019-10-12	Security System	ADT Commercial	65.99	4677	Auto-Pay	Yes	ADT-90456	0.00	Utilities	
2019-10-13	Rent	Harbor Property Group	2,800.00	4678	Check	Yes	RENT-JUL20	0.00	Rent	July rent
2019-10-14	Accounting Fees	Hayes & Associates CPA	450.00	4679	Check	Yes	HA-2019-Q4-5	36.00	Professional Services	Q4 bookkeeping
2019-10-15	Office Supplies	Staples	76.80	4680	Credit Card	Yes	STP-90510	6.14	Supplies	Pens and notebooks
2019-10-16	Internet Service	Comcast Business	199.99	4681	Auto-Pay	Yes	CB-10-2019-2	0.00	Utilities	
2019-10-17	Water Bill	City of Riverton	16.10	4682	Mail	Yes	RIV-1017	0.00	Utilities	
2019-10-18	Cleaning Service	Sparkle Clean LLC	350.00	4683	Check	Yes	SC-1411	28.00	Janitorial	Monthly cleaning
2019-10-19	Gas Bill	Northwest Natural	19.63	4684	Online Payment	Yes	NW-GAS-1019	0.00	Utilities	
2019-10-20	Trash Removal	Waste Management	76.50	4685	Auto-Pay	Yes	WM-45201	0.00	Utilities	
2019-10-21	Equipment Repair	Office Tech Solutions	240.00	4686	Check	Yes	OTS-6301	19.20	Repairs	Fuser unit replaced
2019-10-22	Coffee Supplies	Costco Wholesale	143.22	4687	Credit Card	Yes	CW-10-2019-2	11.46	Supplies	Coffee and filters
2019-10-23	Payroll Processing	ADP	4,250.00	4688	Auto-Pay	Yes	ADP-PR-1024	0.00	Payroll	Bi-weekly payroll
2019-10-24	Landscaping	Green Thumb Lawn Care	180.00	4689	Check	Yes	GTL-1024	14.40	Landscaping	Mowing and edging
2019-10-25	Security System	ADT Commercial	65.99	4

2019-10-22	488770	241120	3. Slight	1. Dry	1. Daylight	1	0	0	0	0	0	0. No turn	07:30:00	2	3. Dual carriageway	70	5. Slip Road	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-11-01	487722	243857	3. Slight	2. Wet/Damp	4. Darkness: street lights present and lit	1	0	0	0	0	0	0. No turn	21:15:00	2	6. Single carriageway	30	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	2. Raining without high winds
2019-11-05	486032	242757	3. Slight	2. Wet/Damp	4. Darkness: street lights present and lit	1	0	0	0	0	0	2. Right turn	17:07:00	2	6. Single carriageway	60	3. T & Stag Jct	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	2. Raining without high winds
2019-11-06	488719	239728	3. Slight	2. Wet/Damp	1. Daylight	1	0	0	0	0	1	0. No turn	14:15:00	3	3. Dual carriageway	70	1. Roundabout	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-11-07	491637	239551	2. Serious	1. Dry	6. Darkness: no street lighting	4	0	0	0	3	0	0. No turn	23:38:00	3	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-11-08	487321	243782	2. Serious	2. Wet/Damp	1. Daylight	1	1	0	0	1	0	0. No turn	10:00:00	1	6. Single carriageway	20	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	2. Raining without high winds
2019-11-17	490713	240057	3. Slight	2. Wet/Damp	1. Daylight	2	0	0	0	0	0	0. No turn	12:30:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-11-22	487565	243910	3. Slight	2. Wet/Damp	1. Daylight	1	0	0	0	0	0	0. No turn	16:00:00	2	6. Single carriageway	30	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-11-25	488381	240345	3. Slight	2. Wet/Damp	4. Darkness: street lights present and lit	1	0	1	0	0	0	0. No turn	20:17:00	2	3. Dual carriageway	70	1. Roundabout	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	2. Raining without high winds
2019-11-28	486175	243200	3. Slight	1. Dry	1. Daylight	1	0	0	0	0	0	0. No turn	12:30:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-12-06	487151	240969	3. Slight	2. Wet/Damp	1. Daylight	3	0	0	0	2	0	2. Right turn	10:15:00	3	6. Single carriageway	60	3. T & Stag Jct	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-12-18	489147	240831	3. Slight	2. Wet/Damp	6. Darkness: no street lighting	2	0	0	0	0	0	0. No turn	20:12:00	2	7. Slip road	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-12-26	489062	240325	3. Slight	1. Dry	4. Darkness: street lights present and lit	1	0	0	0	0	0	0. No turn	20:50:00	2	3. Dual carriageway	70	1. Roundabout	2. Automatic traffic signal	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-12-27	489195	240739	3. Slight	2. Wet/Damp	7. Darkness: street lighting unknown	1	0	0	0	0	0	0. No turn	19:50:00	2	3. Dual carriageway	70	1. Roundabout	2. Automatic traffic signal	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2020-01-21	486299	243110	3. Slight	2. Wet/Damp	4. Darkness: street lights present and lit	1	0	0	0	1	0	0. No turn	05:20:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	7. Fog or mist
2020-01-24	488587	241276	3. Slight	1. Dry	6. Darkness: no street lighting	2	0	0	0	0	0	0. No turn	20:10:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2020-01-25	488610	239887	3. Slight	1. Dry	1. Daylight	2	0	0	0	0	0	2. Right turn	10:15:00	4	6. Single carriageway	60	3. T & Stag Jct	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2020-02-02	487004	242115	2. Serious	1. Dry	1. Daylight	2	0	0	0	0	0	0. No turn	13:44:00	1	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2020-02-06	488669	239772	3. Slight	1. Dry	1. Daylight	2	0	0	0	2	0	0. No turn	11:44:00	2	3. Dual carriageway	60	7. Junction - more than 4 arms (not a roundabout	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2020-02-07	488761	239700	3. Slight	4. Frost/Ice	1. Daylight	1	0	0	0	0	0	0. No turn	07:33:00	2	1. Roundabout	60	1. Roundabout	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2020-02-20	488478	240128	3. Slight	2. Wet/Damp	1. Daylight	2	0	0	0	0	0	2. Right turn	08:30:00	2	6. Single carriageway	60	3. T & Stag Jct	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	2. Raining without high winds
2020-02-26	487402	243924	2. Serious	1. Dry	1. Daylight	1	1	0	0	0	0	2. Right turn	15:19:00	1	6. Single carriageway	30	9. Other junction	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	4. Fine with high winds
2020-04-17	489181	240788	3. Slight	2. Wet/Damp	4. Darkness: street lights present and lit	1	0	0	0	0	0	0. No turn	22:15:00	2	1. Roundabout	70	1. Roundabout	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	2. Raining without high winds
2020-04-27	487067	242408	3. Slight	1. Dry	1. Daylight	1	1	0	0	0	0	0. No turn	12:50:00	1	6. Single carriageway	30	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2020-05-09	488277	243559	3. Slight	1. Dry	1. Daylight	1	0	1	0	0	0	0. No turn	13:30:00	2	6. Single carriageway	30	9. Other junction	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-06-18	485542	243919	3. Slight	1. Dry	1. Daylight	1	0	0	0	1	0	0. No turn	11:29:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2018-08-10	485586	243848	3. Slight	1. Dry	7. Darkness: street lighting unknown	3	0	0	0	0	1	0. No turn	23:45:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-08-09	485627	243775	3. Slight	1. Dry	1. Daylight	2	0	0	0	0	0	0. No turn	10:30:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2019-09-14	485639	243757	3. Slight	1. Dry	1. Daylight	2	0	0	0	2	0	0. No turn	10:47:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2018-07-22	485658	243730	3. Slight	1. Dry	1. Daylight	4	0	0	0	0	0	0. No turn	13:22:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2016-01-07	485712	243655	1. Fatal	2. Wet/Damp	6. Darkness: no street lighting	1	1	0	0	0	0	0. No turn	22:29:00	3	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	7. Footbridge or subway	1. Fine without high winds
2017-01-08	485571	243908	3. Slight	2. Wet/Damp	4. Darkness: street lights present and lit	1	0	0	0	0	0	0. No turn	16:40:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2015-11-01	485576	243892	3. Slight	1. Dry	4. Darkness: street lights present and lit	5	0	0	0	0	1	0. No turn	19:07:00	3	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2018-12-06	485584	243885	3. Slight	1. Dry	4. Darkness: street lights present and lit	1	0	0	0	0	0	0. No turn	17:55:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2018-11-26	485599	243858	3. Slight	1. Dry	4. Darkness: street lights present and lit	1	0	0	0	1	0	0. No turn	18:00:00	3	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2018-06-17	485633	243797	3. Slight	1. Dry	1. Daylight	1	0	0	0	0	0	0. No turn	16:17:00	2	3. Dual carriageway	70	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2017-12-24	486840	243696	3. Slight	1. Dry	4. Darkness: street lights present and lit	3	0	0	0	0	2	2. Right turn	16:30:00	2	6. Single carriageway	30	2. Mini roundabout	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2016-02-15	486891	243718	2. Serious	1. Dry	1. Daylight	1	1	0	0	0	0	0. No turn	10:00:00	1	6. Single carriageway	30	0. Not within 20M	. Not applicable	0. None in 50m / not controlled	4. Pelican or puffin crossing	1. Fine without high winds
2019-08-11	486916	243731	3. Slight	1. Dry	1. Daylight	1	0	1	0	1	0	2. Right turn	09:20:00	2	6. Single carriageway	30	3. T & Stag Jct	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	1. Fine without high winds
2018-07-29	486915	243729	3. Slight	2. Wet/Damp	4. Darkness: street lights present and lit	1	0	0	1	0	0	2. Right turn	23:08:00	2	6. Single carriageway	30	3. T & Stag Jct	4. Give way or Uncontrolled	0. None in 50m / not controlled	0. No crossing facility within 50 metres	5. Raining with high winds

488770	M1 MOTORWAY N/BND ENTRY SLIP RD FROM JNC 14 RBT, PINEHAM, MK	C2 PARKED BROKEN DOWN AT END OF ENTRY SLIP RD WITH HAZARDS ON, C1 ENTERNG M/WAY FROM SLIP RD & COLLS WITH REAR C2.
487722	ST JOHN STREET, O/S N0.30, NEWPORT PAGNELL, MK	C2 PARKED FACING S/W, C1 REVERESD INTO C2. DRVR C1 REFUSED TO GIVE DETAILS.
486032	V10 BRICKHILL STREET JNC TANNERS DRIVE, BLAKELANDS, MK	C2 TRAV S/E ON V10 APPR JNC, GV1 TRAV OPP DIR TURNS RIGHT TWDS TANNERS DR & INTO PATH C2 CAUSING COLL.
488719	H6 JNC V11 FOX MILNE ROUNDABOUT, NORTHFIELD, MK	C2 TRAV N/E ON H6 ENTERS RBT FOLL BY C1, C3 TRAV S/E ON V11 FAILS TO GIVE WAY & ENTERS RBT INTO PATH C2, C2 BRAKES HARD, C1 COLLS WITH REAR C2. C3 DOES NOT STOP.
491637	M1 MOTORWAY, NORTHBND C/WAY, MARKER POST 776, BROOKLANDS, MK	GV1 (FORGN REG, L/H DR) TRAV N IN LN 1, C2 TRAV N IN LN 2 & PASSING GV1, GV1 MOVES INTO LN 2 & CLIPS N/SIDE C2, C2 SPINS INTO LN 3. C3 APPR & FAILS TO SEE C2 COLL HEAVILY INTO REAR C2.
487321	HIGH STREET, O/S NUMBER 114, NEWPORT PAGNELL, MK	GV1 STOPPED THEN REVERSED TO PARK, PED STEPPED INTO RD BEHIND GV1 & WAS NUDGED BY GV1 CAUSING PED TO FALL.
490713	M1 MOTORWAY, NORTHBND C/WAY, MARKER POST 786, BROUGHTON, MK	GV1 TRAV N IN LN 1, C2 TRAV N IN LN 2 & PASSING GV1, GV1 MOVED TWDS LN 2 & CLIPPED N/SIDE C2, C2 HIT CENT BARRIER & REBOUNDED.
487565	HIGH STREET, O/S NO.70, NEWPORT PAGNELL, MK	TX2 PARKED COLLECTING PASSENGR, GV1 VAN COLLS WITH TX2. GV1 THEN DRIVES OFF.
488381	H5 JNC V11 PINEHAM ROUNDABOUT, FOX MILNE, MK	PC2 TRAV WEST ON H5 NEG RBT, C1 TRAV NORTH ON V11 DOES NOT SEE PC2 & ENTERS RBT COLL WITH PC2 AT LOW SPEED. PC2 NO LIGHTS.
486175	M1 MOTORWAY, NORTHBND C/WAY, MARKER POST 842, NEWPORT PAGNELL, MK	C2 TRAV NORTH IN LN 2, GV1 TRAV NORTH IN LN 1 MOVES INTO LN 2 & COLLS WITH N/SIDE C2.
487151	V10 BRICKHILL ST JNC PETERBOROUGH GATE, WILLEN PARK, MK	C2 TRAV N/W ON V10 APPR JNC, C1 STAT ON PETERBGH GT TURNS RIGHT ONTO V10 & INTO PATH C2, C2 COLLS WITH O/SIDE C1, C1 THEN HITS C3 STAT ON V10 IN RIGHT TURN LN.
489147	M1 MOTORWAY, NORTHBND ON-SLIP RD FROM JNC 14 RBT, PINEHAM, MK	GV1 & C2 TRAV ON SLIP RD N/BND, FRONT C2 COLLS WITH O/SIDE GV1. C2 OVRTURNS.
489062	H5 JNC H6 NORTHFIELD ROUNDABOUT, NORTHFIELD, MK	C2 NEG RBT TO EXIT W/BND ONTO H5, C1 NEG RBT COLLS WITH O/SIDE C2. DRVR C1 ALCOHOL IMPRMNT, C1 DID NOT EXCHANGE DETAILS & LEFT THE SCENE.
489195	A509 JNC WITH M1 JNC 14 ROUNDABOUT, PINEHAM, MK	C2 TRAV NORTH ON A509 STAT AT ENTRY TO RBT, C1 FOLL COLLS WITH REAR C2.
486299	M1 MOTORWAY, SOUTHBND C/WAY, MARKER POST 840, NEWPORT PAGNELL, MK	C2 TRAV SOUTH IN LN1, GV1 TRAV SOUTH IN LN 2 MOVES INTO LN 1 & COLLS WITH C2, C2 SPINS, HITS CENT BARRIER & OVRTURNS. GV1 FAILS TO STOP.
488587	M1 MOTORWAY, SOUTHBND C/WAY, JUST BEFORE JNC 14 EXIT SLIP RD, PINEHAM, MK	C2 TRAV SOUTH, GV1 (L/HAND DR) TRAV SOUTH CLIPS N/S REAR C2 CAUSING C2 TO SPIN & COLL WITH N/S BARRIER.
488610	V11 TONGWELL ST JNC NORTHFIELD DRIVE, NORTHFIELD, MK	C2 TRAV S/E ON V11 APPR JNC, C1 TRAV OPP DIR TURNS RIGHT TWDS NORTHFLD DR & COLLS WITH FRONT C2. VEHS THEN ALSO COLL WITH C3 & C4.
487004	A422 APPR TO NEWPORT PAGNEL, MK	C1 TRAV N/E ON A422, DRVR LOST CONTRL & C1 CROSSED CENT RES ROLLED.
488669	V11 TONGWELL ST. FOX MILNE	C2 COLL WITH C1 BOTH TRVL SE TO NW
488761	FOX MILNE RABT TONGWELL ST CHILDS WAY	C1 ENT RABT COLL WITH C2 LVING RABT
488478	V11 TONGWELL ST, NORTHFIELD, NORTHFIELD DR	C1 TRAV SE APPR JNT TURN RGH. C2 TRVL NW GOING AHEAD APPR JNCT. C1 COLL WITH C2
487402	QUEENS AV, NEW PAG	V1 TRN RGH COLL WITH PED
489181	ENT JNCT 14 ROUNDABOUT TWDS NEWPORT PAGNELL	C2 IN O/S COLL WITH C1 IN CTR LANE RABT SENT INTO SLIP LANE TRVL S TO N
487067	TONGWELL LANE TWDS TONGWELL LAKE	PED TRVL NE - SW WAS STRUCK BY MOTORISED SCOOTER
488277	SEVERN WAY/TICKFORD ST NEWPORT PAGNELL	PC1 TRVL SE-NW C1 ENT TICKFORD ST FROM SEVERN WAY COLL WITH PC1
485542	M1 MOTORWAY, NORTHBND C/WAY, JUST NORTH OF EXIT FROM NEWPORT PAGNELL SERVISE, MILTON KEYNES	C2 TRAV NORTH IN LN 2, GV1 TRAV IN LN 1 MOVED INTO LN 2 & COLL WITH N/SIDE REAR C2. GV1 FORGN REG, L/H DRIVE. C2 SPUN & CAME TO REST AGAINST N/SIDE BARRIER.
485586	M1 MOTORWAY, NORTHBND C/WAY JUST NORTH OF NEWPORT PAGNELL SERVICES, MILTON KEYNES	C2 TRAV NORTH & STAT IN TRAFFIC, C1 TRAV SAME DIR COLLS INTO REAR C2. DRVR C1 ABUSIVE & REFUSES TO GIVE DETAILS.
485627	M1 MOTORWAY, SOUTHBND C/WAY, MARKER POST 849, NEWPORT PAGNELL, MK	C2 TRAV SOUTH IN LN 1, GV1 TRAV SOUTH IN LN 2 MOVED INTO LN 1 FORCING C2 INTO N/SIDE CONED OFF AREA & INTO CONES.
485639	M1 MOTORWAY, NORTHBND C/WAY, MARKER POST 849, NEWPORT PAGNELL, MK	C2 TRAV NORTH EXITS SERVICE AREA INTO LN 1, GV1 TRAV NORTH IN LN 2 SWERVES INTO LN 1 COLL WITH C2 PUSHING C2 INTO BARRIER. GV1 DOES NOT STOP.
485658	M1 MOTORWAY, NORTHBND C/WAY, MARKER POST 849, NEWPORT PAGNELL, MK	C2 TRAV NORTH IN LN 3 & SLOWING FOR TRAFFIC AHEAD, C1 FOLL FAILS TO SLOW IN TIME & COLLS WITH REAR C2.
485712	M1 MOTORWAY, NORTHBND C/WAY BY LITTLE LINFORD LANE OVERBRIDGE, NEWPORT PAGNELL, MK	PED JUMPED FROM OVERBRIDGE ONTO NORTHBND C/WAY & WAS STRUCK BY SEVERAL VEHICLES.
485571	M1 MOTORWAY, SOUTHBND C/WAY, MARKER POST 851, NEWPORT PAGNELL, MK	GV1 (FORGN REG, L/H DRIVE) TRAV SOUTH IN LN 1 MOVED INTO LN 2 & COLL WITH N/SIDE C2 TRAV IN LN 2.
485576	M1 MOTORWAY, SOUTHBND C/WAY, MARKER POST 851, NEWPORT PAGNELL, MK	C3, C2 & C1 TRAV S IN LN 3, TRAFF AHEAD SLOWING, C3 BRAKES, C2 BRAKES, C1 FAILS TO REACT IN TIME & COLL INTO REAR C2, C2 PUSHED INTO REAR C3.
485584	M1 MOTORWAY, SOUTHBND C/WAY, JUST NORTH OF NEWPORT PAGNELL SERVICES, MILTON KEYNES	C2 TRAV SOUTH IN LN 1, GV1 TRAV SOUTH IN LN 2 MOVES INTO LN 1 & COLLS WITH O/SIDE C2. GV1 DID NOT STOP & CONTINUES ON. UNKNOWN IF GV1 L/H DRIVE.
485599	M1 MOTORWAY, SOUTHBND C/WAY, PRIOR TO NEWPORT PAGNELL SERVICES, MILTON KEYNES	C3 & C2 TRAV SOUTH & STAT IN TRAFF QUEUE, C1 TRAV SAME DIR COLLS WITH REAR C2, C2 PUSHED INTO REAR C3.
485633	M1 MOTORWAY, SOUTHBND C/WAY, EXACT LOC NOT KNOWN, NEWPORT PAGNELL, MK	C2 TRAV SOUTH & STAT IN HEAVY TRAFF, C1 TRAV BEHIND COLLS WITH REAR C2. DRVR C1 REFUSES TO EXCHANGE DETAILS.
486840	WOLVERTON ROAD JNC WESTBURY LANE, NEWPORT PAGNELL, MK	C2 TRAV S/W ON WOLV RD & TURNING RIGHT INTO WESTBURY LN, C1 TRAV OPP DIR ON WOLV RD ACROSS MINI RBT, C1 COLL WITH N/SIDE C2.
486891	WOLVERTON ROAD, PEDESTRIAN CROSSING NEAR PARK AVENUE, NEWPORT PAGNELL, MK	C2 TRAV W ON WOLV RD APPR PED CROSSING ON GREEN SIGNAL, CHILD PED ON N/SIDE F/WAY WALKED INTO RD & INTO N/SIDE C1.
486916	WOLVERTON ROAD JNC PARK AVENUE, NEWPORT PAGNELL, MK	PC2 TRAV N/E ON WOLV RD APPR JNC, C1 STAT ON PARK AVE TURNS RIGHT ONTO WOLV RD & COLLS WITH PC2.
486915	WOLVERTON ROAD JNC PARK AVENUE, NEWPORT PAGNELL, MK	MC2 TRAV WEST ON WOLV RD APPR JNC, C1 TURNS RIGHT FROM PARK AVE ONTO WOLV RD & INTO PATH MC2, MC2 TRIES TO TAKE AVOID ACTION BUT COLLS WITH O/SIDE C1.

488770	3. Tuesday	405. Failed to look properly	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
487722	6. Friday	602. Careless/Reckless/In a hurry	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
486032	3. Tuesday	405. Failed to look properly	A. Very likely	403. Poor turn or manoeuvre	B. Possible	406. Failed to judge other persons path or speed	B. Possible	. Not coded	. Not Coded	
488719	4. Wednesday	308. Following too close	A. Very likely	408. Sudden braking	A. Very likely	602. Careless/Reckless/In a hurry	B. Possible	. Not coded	. Not Coded	
491637	5. Thursday	403. Poor turn or manoeuvre	A. Very likely	405. Failed to look properly	A. Very likely	406. Failed to judge other persons path or speed	A. Very likely	. Not coded	. Not Coded	
487321	6. Friday	803. Failed to judge vehicles path or speed	A. Very likely	804. Wrong use of pedestrian crossing facility	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	
490713	1. Sunday	403. Poor turn or manoeuvre	B. Possible	403. Poor turn or manoeuvre	B. Possible	406. Failed to judge other persons path or speed	B. Possible	406. Failed to judge other persons path or speed	B. Possible	
487565	6. Friday	403. Poor turn or manoeuvre	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
488381	2. Monday	506. Not displaying lights at night or in poor visibility	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
486175	5. Thursday	403. Poor turn or manoeuvre	B. Possible	405. Failed to look properly	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	
487151	6. Friday	405. Failed to look properly	A. Very likely	606. Inexperience of driving on the left	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	
489147	4. Wednesday	602. Careless/Reckless/In a hurry	B. Possible	406. Failed to judge other persons path or speed	B. Possible	308. Following too close	B. Possible	. Not coded	. Not Coded	
489062	5. Thursday	501. Impaired by alcohol	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
489195	6. Friday	405. Failed to look properly	A. Very likely	406. Failed to judge other persons path or speed	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	
486299	3. Tuesday	403. Poor turn or manoeuvre	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
488587	6. Friday	710. Vehicle blind spot	A. Very likely	405. Failed to look properly	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	
488610	7. Saturday	403. Poor turn or manoeuvre	A. Very likely	405. Failed to look properly	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	
487004	1. Sunday	403. Poor turn or manoeuvre	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
488669	5. Thursday	603. Nervous/Uncertain/Panic	A. Very likely	405. Failed to look properly	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	
488761	6. Friday	405. Failed to look properly	A. Very likely	602. Careless/Reckless/In a hurry	B. Possible	103. Slippery road (due to weather)	B. Possible	. Not coded	. Not Coded	
488478	5. Thursday	602. Careless/Reckless/In a hurry	A. Very likely	403. Poor turn or manoeuvre	A. Very likely	405. Failed to look properly	A. Very likely	406. Failed to judge other persons path or speed	A. Very likely	
487402	4. Wednesday	405. Failed to look properly	A. Very likely	504. Uncorrected, defective eyesight	A. Very likely	602. Careless/Reckless/In a hurry	B. Possible	803. Failed to judge vehicles path or speed	A. Very likely	
489181	6. Friday	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
487067	2. Monday	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
488277	7. Saturday	405. Failed to look properly	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
485542	3. Tuesday	405. Failed to look properly	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
485586	6. Friday	405. Failed to look properly	B. Possible	406. Failed to judge other persons path or speed	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	
485627	6. Friday	405. Failed to look properly	A. Very likely	403. Poor turn or manoeuvre	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	
485639	7. Saturday	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
485658	1. Sunday	406. Failed to judge other persons path or speed	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
485712	5. Thursday	999. Other	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	PEDESTRIAN JUMPED FROM OVERBRIDGE.
485571	1. Sunday	406. Failed to judge other persons path or speed	A. Very likely	405. Failed to look properly	B. Possible	404. Failed to signal/Misleading signal	B. Possible	. Not coded	. Not Coded	
485576	1. Sunday	308. Following too close	A. Very likely	406. Failed to judge other persons path or speed	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	
485584	5. Thursday	602. Careless/Reckless/In a hurry	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
485599	2. Monday	403. Poor turn or manoeuvre	A. Very likely	405. Failed to look properly	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	
485633	1. Sunday	405. Failed to look properly	B. Possible	. Not coded	. Not Coded	. Not coded	. Not Coded	. Not coded	. Not Coded	
486840	1. Sunday	302. Disobeyed Give Way or Stop sign or markings	B. Possible	405. Failed to look properly	A. Very likely	. Not coded	. Not Coded	. Not coded	. Not Coded	
486891	2. Monday	802. Failed to look properly	A. Very likely	808. Careless/Reckless/In a hurry	B. Possible	804. Wrong use of pedestrian crossing facility	A. Very likely	. Not coded	. Not Coded	
486916	1. Sunday	602. Careless/Reckless/In a hurry	A. Very likely	405. Failed to look properly	A. Very likely	403. Poor turn or manoeuvre	A. Very likely	. Not coded	. Not Coded	
486915	1. Sunday	405. Failed to look properly	A. Very likely	602. Careless/Reckless/In a hurry	B. Possible	602. Careless/Reckless/In a hurry	B. Possible	707. Rain, sleet, snow, or fog	B. Possible	

Severity	TOTAL		PIA inv. Peds		PIA inv. Cycles		PIA inv. m/c	
	Total No. PIA	Total % PIA	No.	% over total PIA	No.	% over total PIA	No.	% over total PIA
Slight	274	86.4%	11	3.5%	21	6.6%	14	4.4%
Serious	36	11.4%	5	1.6%	5	1.6%	8	2.5%
Fatal	7	2.2%	1	0.3%	0	0.0%	0	0.0%
Total	317	100.0%	17	5.4%	26	8.2%	22	6.9%

Appendix F

PIA ANALYSIS

1 PIA ANALYSIS

1.1 OVERVIEW

1.1.1. Personal Injury Accident (PIA) data was obtained from MKC for a study area covering the site and its vicinity for the five-year period between 01/06/2015 and 31/05/2020, and as agreed within the Transport Assessment Scoping Report (WSP, June 2020).

1.1.2. The data, as supplied by MKC, is included in **Appendix E** with the locations of the PIA data which occurred in the full extent of the study area being shown in Figure 5.

1.1.3. A summary of the PIA data recorded within the study area during the five-year study period is provided in Table F1Error! Reference source not found. below.

Table F1 – PIA Data Summary

SEVERITY	TOTAL PIA		PIAS INVOLVING PEDESTRIANS		PIAS INVOLVING CYCLISTS		PIAS INVOLVING MOTORCYCLES	
	NO.	%	NO.	%	NO.	%	NO.	%
Slight	274	86.4%	11	3.5%	21	6.6%	14	4.4%
Serious	36	11.4%	5	1.6%	5	1.6%	8	2.5%
Fatal	7	2.2%	1	0.3%	0	0.0%	0	0.0%
Total	317	100.0%	17	5.4%	26	8.2%	22	6.9%

1.1.4. As shown in Table E1, 317 accidents took place during the five-year period in the study area, of which 274 resulted in slight injury, 36 in serious injury and seven were fatal casualties.

1.1.5. In addition to the above, the analysis of the data indicates that 17 of the recorded PIAs (5.4%) involved a pedestrian, 26 involved a cyclist (8.2%), and 22 involved a motorcyclist (6.9%).

1.1.6. For ease, the received PIA data has been analysed by areas **where clusters (i.e. two or more incidents in the same location) or recurrent incident patterns around a specific area have been observed** so that potential safety issues in particular locations could be analysed in more detail, in particular:

Junctions

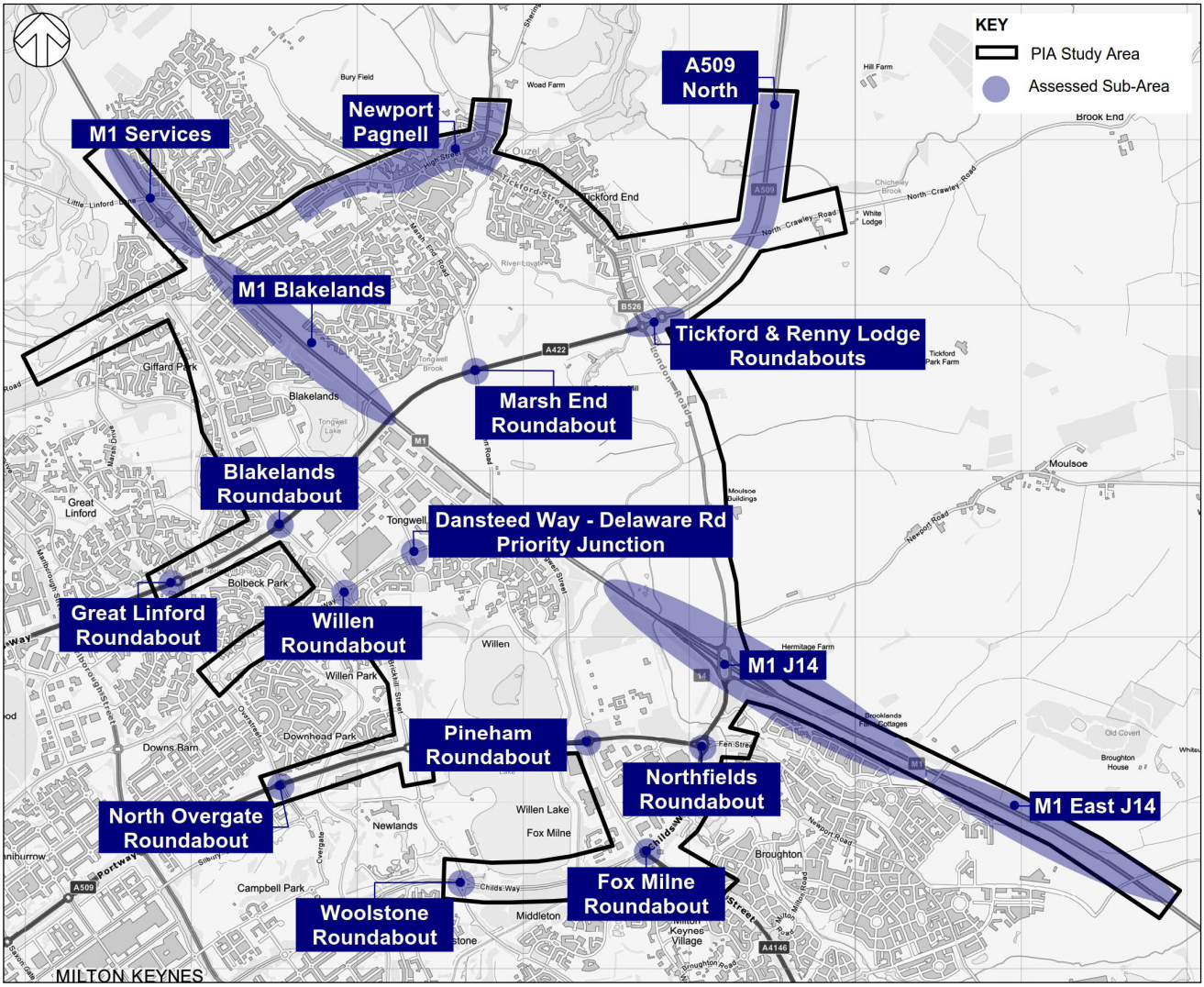
- Great Linford roundabout;
- Blakelands roundabout;
- Marsh End roundabout;
- Tickford & Renny Lodge roundabouts;
- Willen roundabout;
- Dansteed Way – Delaware Road priority junction;
- M1 Junction 14;
- North Overgate roundabout;
- Pineham roundabout;
- Northfields roundabout;
- Woolstone roundabout; and
- Fox Milne roundabout.

Links

- Newport Pagnell;
- A509 North;
- M1 Services;
- M1 Blakelands; and
- M1 East J14.

1.1.7. The junctions and links which have been listed above are illustrated in **Diagram F1** below.

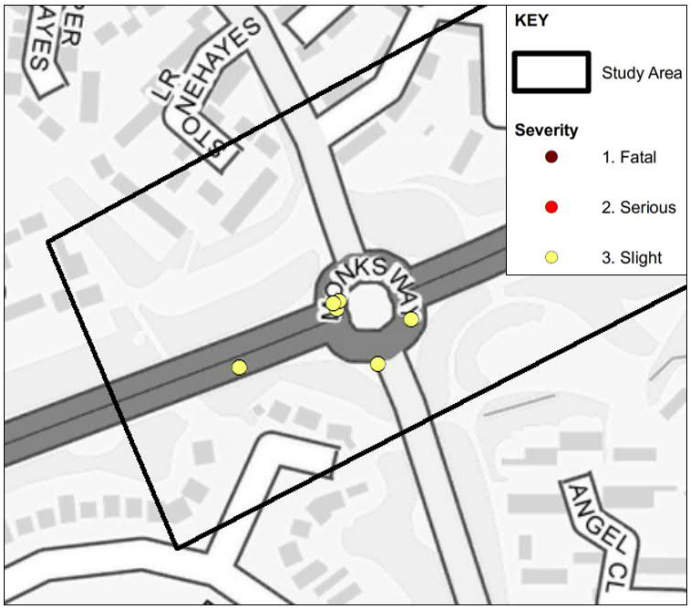
Diagram F1 - PIA Study Sub-Areas



1.1.8. The analysis of the areas illustrated in **Diagram F1** is provided herein.

1.2 JUNCTIONS

GREAT LINFORD ROUNDABOUT



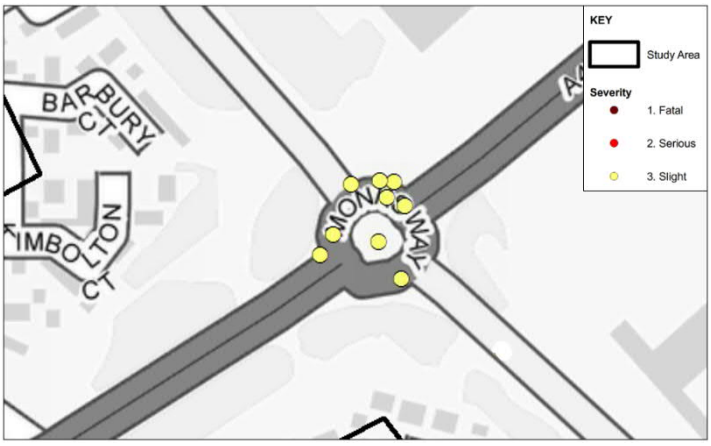
1.2.1. There were six incidents during the five-year study period at this roundabout, all of which resulted in slight severity.

1.2.2. There was a cluster of three incidents by the western arm of the roundabout, within the circulatory lanes. These incidents all occurred within a six-month period (2017) and involved the same scenario whereby a vehicle travelling on H3 Monks Way failed to react to the roundabout ahead. Two out of the three drivers were impaired by alcohol and one driver was travelling at excess speed. In addition, no incidents have occurred in the same place on the roundabout since 2017.

1.2.3. Consequently, this would suggest there are no longstanding highway safety issues at this roundabout.

BLAKELANDS ROUNDABOUT

1.2.4. There were nine incidents during the five-year PIA period at this roundabout, all of which were of slight severity. One of them involved a pedal cycle.

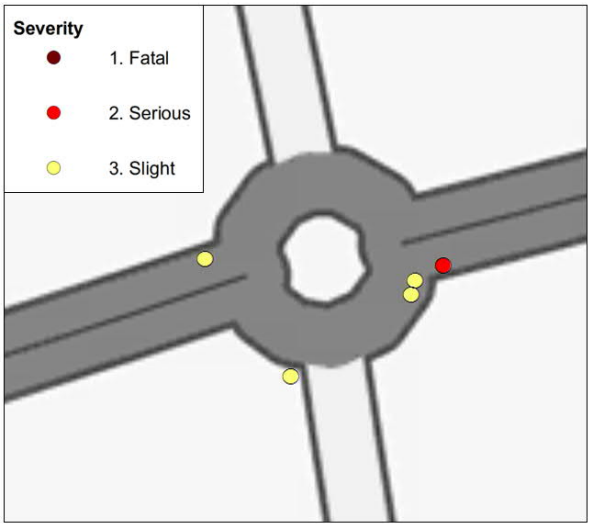


1.2.5. Four incidents have been recorded along the northern section of the roundabout within the circulatory lanes which may represent a cluster. Three of these four involved one only vehicle and took place in wet/damp conditions with drivers travelling too fast for the wet, slippery conditions. This suggest there may be a speeding problem where drivers feel they can circulate faster than adequate considering the conditions.

1.2.6. Signage may be required to warn drivers of slippery conditions; however, considering the level of traffic accommodated in this roundabout and the low number of incidents recorded during a five-year period, this is potentially not necessary and as such it is recommended further investigation is undertaken by the relevant authority.

MARSH END ROUNDABOUT

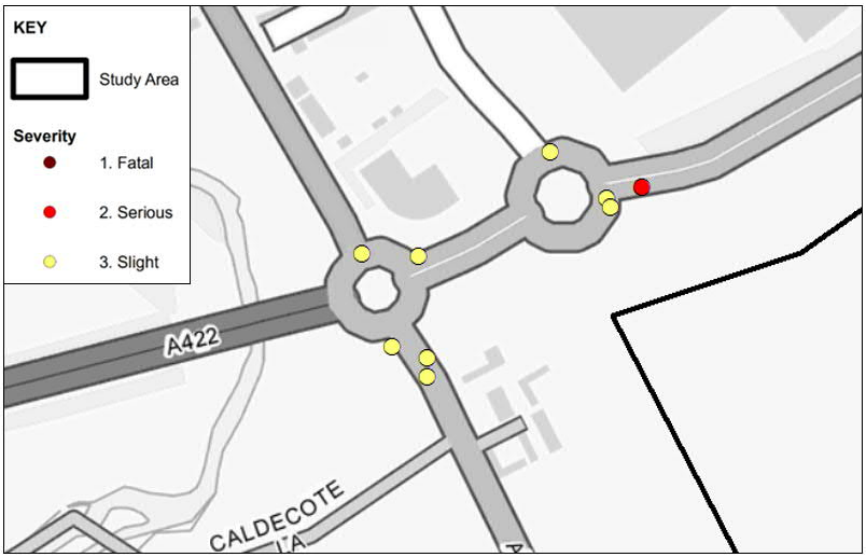
1.2.7. There were five incidents at this roundabout, four of which resulted in slight injury and one of serious severity, with no fatal incidents.



1.2.8. The three incidents which occurred on the eastern section of the roundabout were recorded by the STATS to be due to driver error (i.e. following too close and failing to look properly). The incident in this location which resulted in serious severity involved two motorcycles that encountered slippery conditions and were not driving accordingly to those. The two slight incidents in the same location involved vehicles not seeing cyclists in time, however they took place in 2015 and 2016 with no similar incidents having been recorded since. This suggest there are no highway safety issues in this section of the roundabout.

TICKFORD & RENNY LODGE ROUNDABOUTS

1.2.9. There were 13 incidents during the five-year study period at these two linked roundabouts, 12 of which resulted in slight severity injury and one in serious severity, with no fatal incidents.

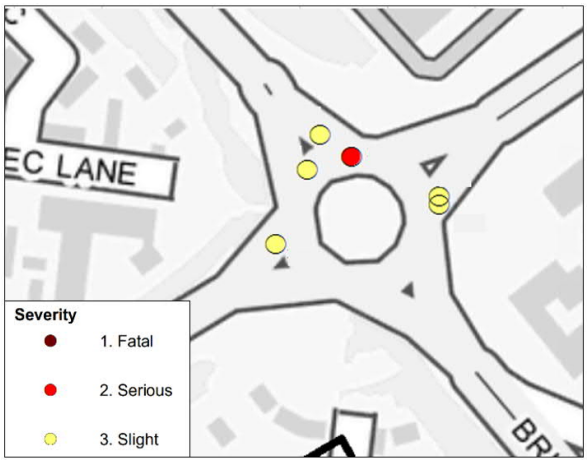


1.2.10. Where incidents occurred in the same area (i.e. eastern section of Renny Lodge Roundabout), these have been demonstrated to be caused by driver errors: of the three incidents around this location, one involved a driver being impaired by alcohol and the other two were generated by poor turns.

1.2.11. Therefore, the incidents around these two roundabouts were largely as a result of driver careless/error, with no other clusters having been identified and no apparent highway safety issues.

WILLEN ROUNDABOUT

1.2.12. There were five slight incidents and one serious incident during the five-year study period in the Willen Roundabout, with no fatal incidents. The incident resulting in serious injury involved a pedal cycle where a car entered the roundabout in dark conditions and collided with the cyclist already in the circulatory lane.



1.2.13. No clusters have been identified at this roundabout. The slight severity incidents were all different in their nature and mainly due to driver error. It is therefore concluded there are no highway safety issues at this location which could be exacerbated by the MKE development.

DANSTEED WAY – DELAWARE DRIVE JUNCTION

1.2.14. Collisions occurred in this section of road within the PIA study area are illustrated in **Diagram F2** below and detailed thereafter.

Diagram F2 – Dansteed Way-Delaware Drive Jct PIA

1.2.15. There was a cluster of seven incidents at this junction, six of which were classified as being of slight severity and one of serious severity, with no fatal incidents. The majority of incidents occurred during dry conditions and during daylight.

1.2.16. Six slight incidents involved two motor vehicles, the seventh included a car and a pedal cycle, and the serious injury was the result of three casualties involving three vehicles.

1.2.17. The cluster at this junction presents a pattern of vehicles turning right from Dansteed Way onto Delaware Drive into the path of another vehicle, causing the collision. These incidents occurred every year during the five-year PIA period. The right turning vehicles are accessing

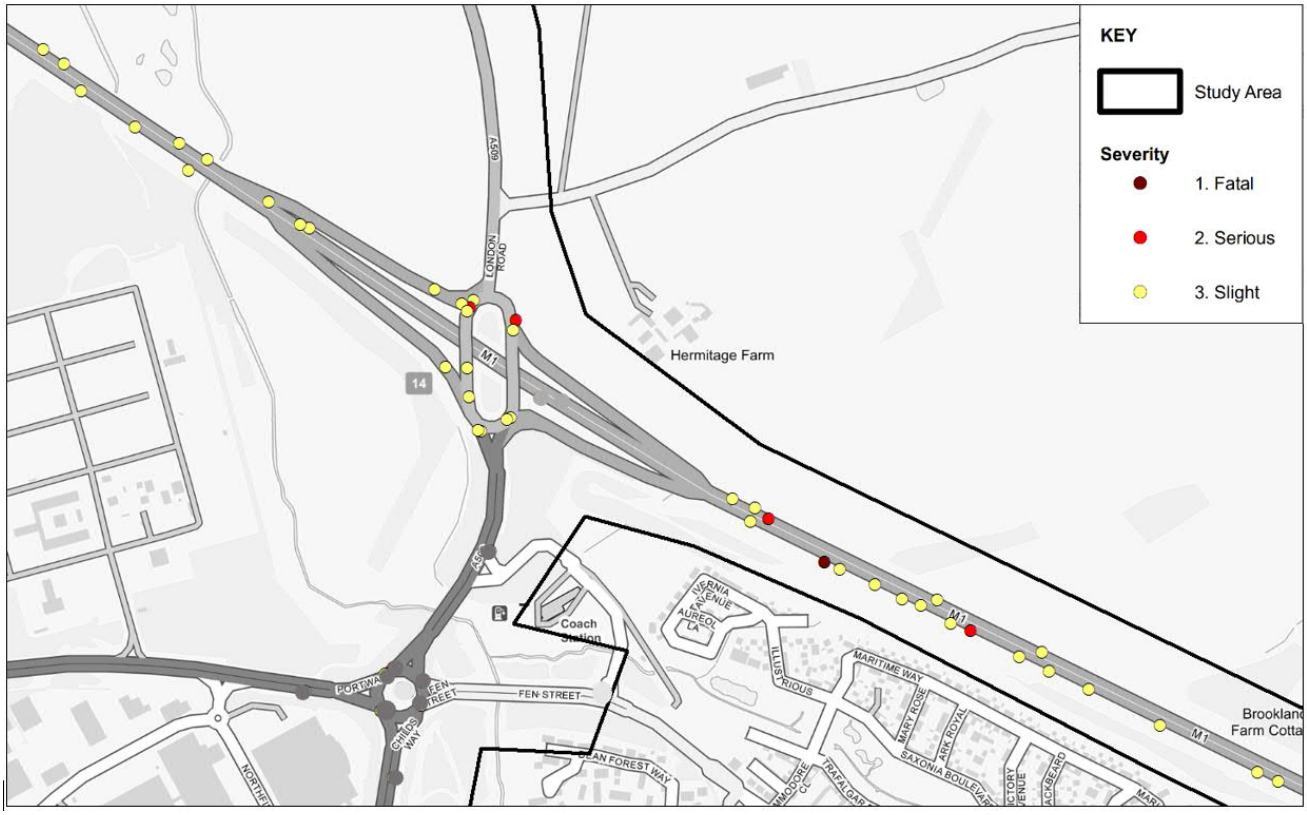
the industrial estate located off Delaware Drive. The proposed development does not increase any turning movements at this junction and is therefore not considered to materially influence the safety of vehicles.

1.2.18. Upon review, it is suggested that the industrial estate consider the implementation of improved signage, alongside training for staff and operatives access the site.

M1 JUNCTION 14

1.2.19. This junction has been analysed including the slip roads and the nearby carriageways of the M1 so that any clusters associated with traffic related to approaching or leaving the junction could be identified. Collisions occurred have been illustrated in the below diagram.

Diagram F3 - M1 J4 PIA



1.2.20. 41 incidents have been recorded around the M1 J14 during the five-year period which are comprised of 36 slight incidents, four serious and one fatal. These have also been analysed by location herein to enable identification of clusters.

Western (Northbound) on-slip arm and linked M1 carriageway

1.2.21. Six slight incidents occurred in this area within the five-year period, with no serious or fatal collisions taking place, and no involvement of vulnerable road users such as motorcycles.

1.2.22. The majority of these incidents were attributed to drivers failing to look and vehicle blind spots when changing lanes. All incidents occurred in dry weather conditions. Half of the incidents occurred in daylight and half at night. As such no identifiable clusters have been identified.

Western (Southbound) off-slip arm and linked M1 carriageway

1.2.23. No clusters have been identified. All three incidents that have occurred along this section of the M1 during the five-year period resulted in slight injury and involved two vehicles colliding together at different points along the southwestern approach to J14.

1.2.24. The three incidents were attributed to drivers failing to look and vehicle blind spots when changing lanes. These incidents all occurred in daylight with dry conditions. No vulnerable road users were involved.

Roundabout (circulatory lanes)

1.2.25. 13 incidents occurred within the roundabout during the five-year period, of which 11 resulted in slight injury and two in serious.

1.2.26. A cluster has been identified adjacent to the north-western arm of the roundabout, where four incidents have taken place (three of slight severity of which one involved a motorcycle, and one serious). All these incidents took place during daylight conditions, and the four of them were somehow related to the traffic lights where vehicles were waiting during the red phase and were hit by another vehicle, except for one where traffic lights were not operating.

1.2.27. Whilst the four incidents took place in the same location and are related to the traffic lights, all casualties have been associated with drivers' errors such as travelling too fast or inexperience with the type of vehicle that was being driven.

1.2.28. No other clusters or incident patterns have been identified within the circulatory lanes of the junction.

Eastern (Southbound) on-slip arm and linked M1 carriageway

1.2.29. 14 accidents took place in the M1 southbound carriageway within a distance of approximately 850m from the access to the on-slip road, with none of them taking place in the latter. Of these, 12 resulted in slight injury, one in serious and one in fatal, with the serious involving a motorcycle and the fatal involving five vehicles and five casualties in static traffic conditions.

1.2.30. The majority of these incidents occurred in daylight with dry conditions and were attributed to drivers failing to look properly when approaching a traffic queue from the on-slip road, failing to stop in time and colliding with the rear of the vehicle ahead. In particular, eight of the 14 incidents took place during these slow or static traffic conditions, which suggests a high propensity for slow shunt type incidents. Drivers may not have sufficient warning or regularly not respect recommended stopping distances to the vehicle ahead.

1.2.31. Whilst these collisions are predominantly caused by drivers' error, implementing signs to warn drivers of potential queues ahead of the junction may be beneficial following a review of the PIA analysis at this location. As the Smart motorway road works have begun construction, including all lane running and works to the slips at J14, it is considered that those work will improve this issue and are consequently expected to reduce queues and associated static traffic conditions.

Eastern (Northbound) off-slip arm and linked M1 carriageway

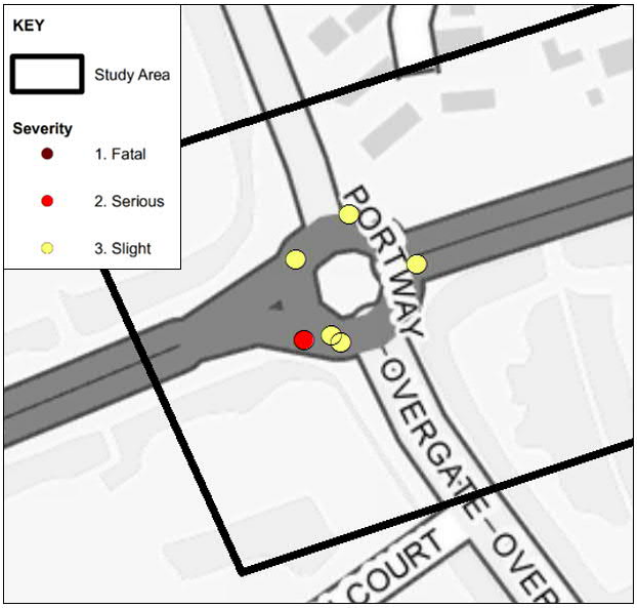
1.2.32. Five collisions occurred in this area within the five-year period, with four incidents resulting in slight injury and one being a serious severity. None of these incidents involved vulnerable road users and no clusters have been identified.

1.2.33. The majority of these incidents were attributed to driver error and recklessness when changing lanes and occurred in dry conditions, with only one of them occurring in static traffic.

1.2.34. The incidents of slight severity were caused by a variety of driver errors as opposed to any identified highway safety issues. The incident which resulted in serious injury was partly due to the driver using their phone whilst driving.

NORTH OVERGATE ROUNDABOUT

1.2.35. There were six incidents during the five-year PIA period at this roundabout, five of which resulted in slight injury and one of serious severity, with no fatal incidents.



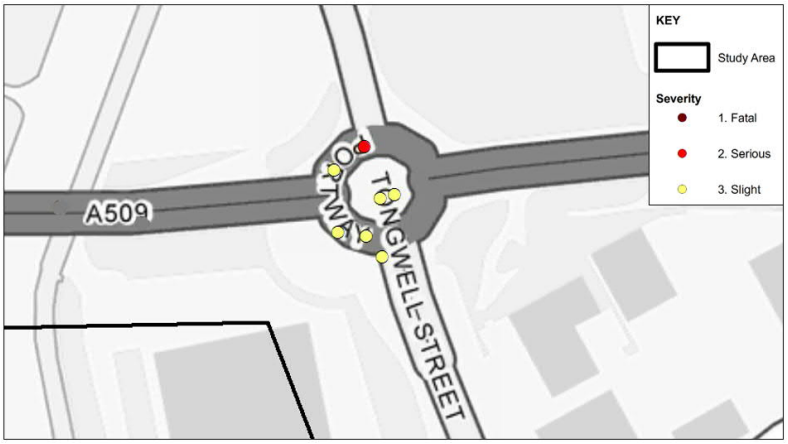
1.2.36. A cluster has been identified in the southwestern section of the roundabout, comprised of two slight and one serious incidents. Whilst the serious collision involved one only vehicle which lost control due to speeding, the two slight incidents involved a motorcycle and a pedal cycle respectively.

1.2.37. The incident involving the motorcycle was caused by a car driver who was on the phone whilst driving, and the collision which involved the pedal cycle was due to the cyclist accessing the roundabout and not giving way to the car which was already circulating within.

1.2.38. Therefore, this analysis demonstrates that the incidents were due to driver error and carelessness as opposed to longstanding highway safety issues.

PINEHAM ROUNDABOUT

There were seven incidents during the five-year study period at this roundabout, six of which resulted in slight severity and one in serious, with no fatal incidents. No clusters have been identified at this roundabout.



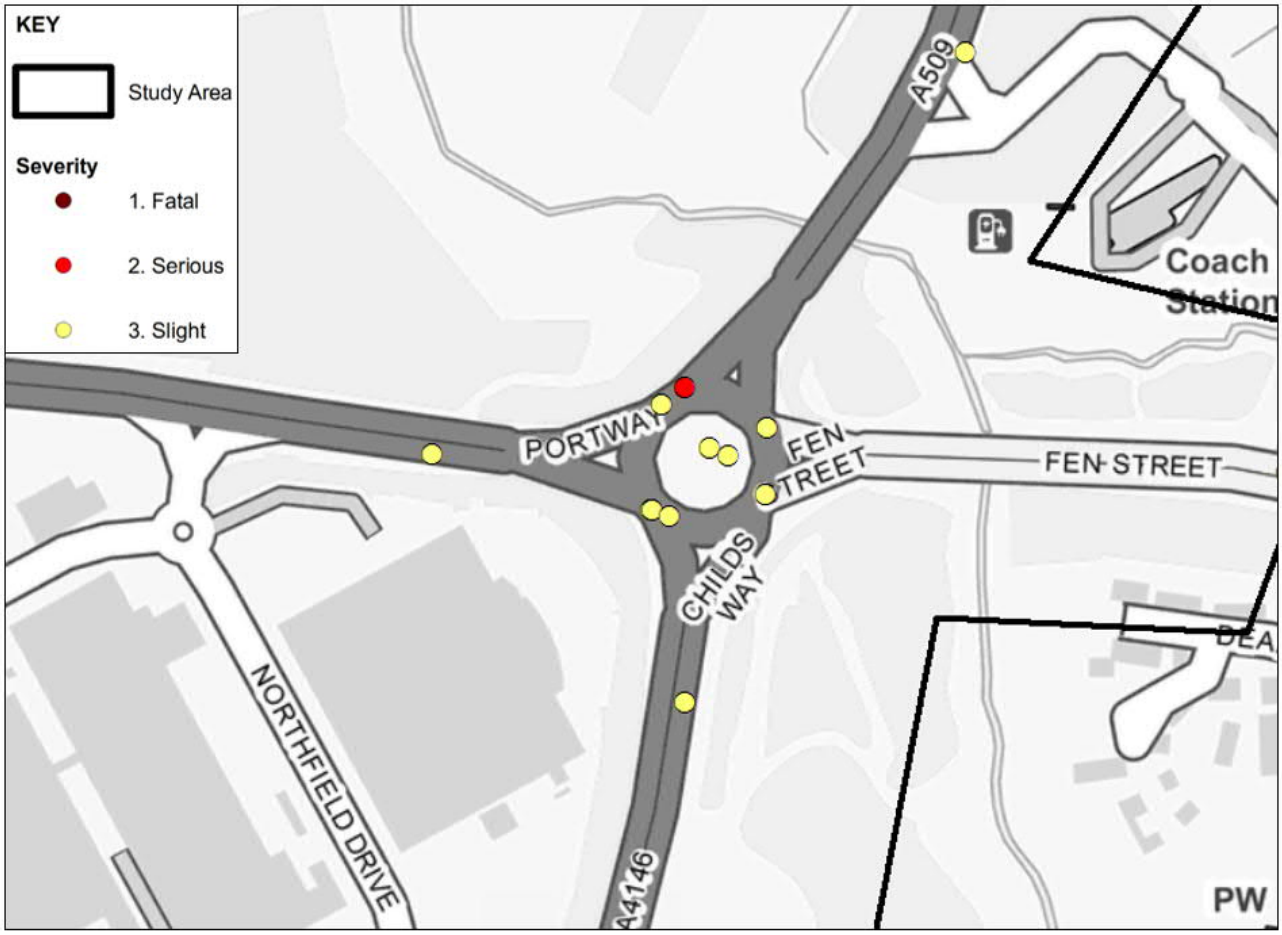
1.2.39. One of the slight collisions involved a pedal cycle, one motorcycle was involved in another slight collision, and the serious incident involved a motorcycle as well.

1.2.40. All incidents were different in nature and occurred due to driver error (such as travelling too fast for conditions or overshooting the junction)

NORTHFIELDS ROUNDABOUT

1.2.41. Collisions occurred in this roundabout within the PIA study area are illustrated in **Diagram F4** below and detailed thereafter.

Diagram F4 – Northfields Roundabout PIA



1.2.42. There were 10 incidents during the five-year PIA period at this roundabout, nine of which were classified as slight severity and one of serious severity, with no fatal incidents. The majority of incidents occurred during dry conditions and during daylight.

1.2.43. There were three clusters at this roundabout, where cluster is understood as two collisions in the same location and as seen in **Diagram E4**:

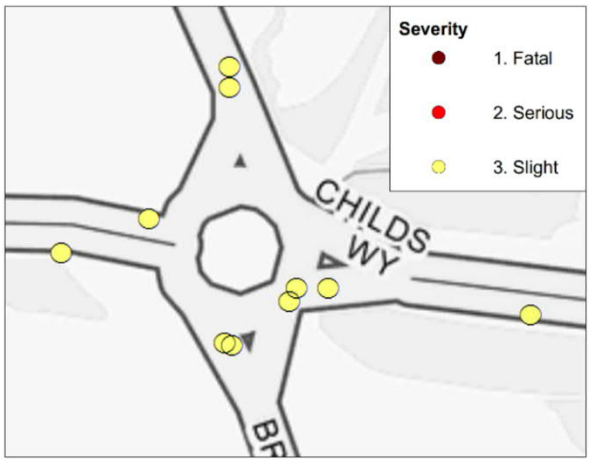
- Two incidents took place at the north-western section of the roundabout, one slight and one serious, in 2015 and 2016 respectively. Related casualties were associated with drivers not respecting traffic lights.
- The second cluster involved vehicles exiting the roundabout onto the A509 west, both in dry, dark conditions, in 2018 and 2019. These two slight incidents were different in their nature, with a driver being impaired by alcohol and likely defective traffic signals respectively.
- The third cluster is identified by two slight incidents where vehicles collided as result of the vehicle ahead cutting off and sudden braking being required.

1.2.44. In accordance with the above, it is concluded that all accidents were different in their nature, all attributed to driver error, and not representing a consistent pattern. Consequently, it is

concluded these incidents were as a result of driver error/carelessness as opposed to longstanding highway safety issues.

WOOLSTONE ROUNDABOUT

1.2.45. Nine incidents occurred at Childs Way/ Brickhill Street Roundabout over the five-year study period, all of which resulted in slight severity.



1.2.46. The majority of incidents occurred during dry conditions and during daylight. Two of the incidents involved cyclists and occurred due to drivers failing to look properly. The incidents were different in their nature (for example an animal crossing the road, or the driver being impaired by alcohol), therefore mainly due to driver error with no recurring patterns or clusters that can be attributed to specific highway safety issues.

FOX MILNE ROUNDABOUT

1.2.47. Eight incidents occurred at this roundabout and respective approach arms during the five-year study period, seven of which were of slight severity and one of serious severity, with no fatal incidents. One slight and the serious collision involved a motorcycle, the serious not involving any other vehicle.

1.2.48. Five of the eight incidents occurred during wet/damp or frozen/iced conditions and all in lit conditions (either because of daylight or because streetlights were present).

1.2.49. Where a cluster has been identified (eastern section of the roundabout), all incidents included an element of drivers overshooting the junction (either due to failing to look properly or not appropriately judging other person's path or speed). No visibility issues however have been encountered in the roundabout, and an amount of four incidents in a five-year period is not deemed to evidence any particular highway safety issues.

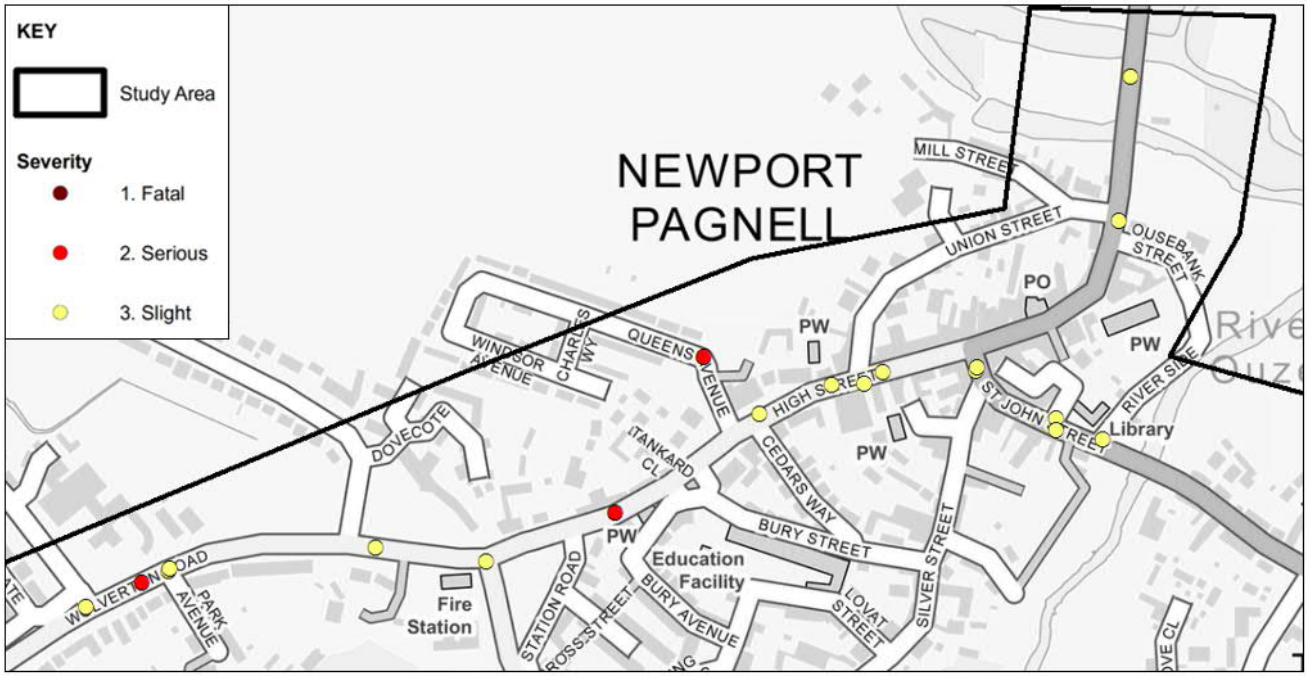
1.2.50. In accordance with the above, the incidents around this roundabout would suggest no highway safety issues are present.

1.3 ROAD LINKS AND AREAS

NEWPORT PAGNELL

1.3.1. Collisions occurred in this section of road within the PIA study area are illustrated in **Diagram F5** below and detailed thereafter.

Diagram F5 – Newport Pagnell PIA



1.3.2. 19 incidents occurred in Newport Pagnell area illustrated in **Diagram F5** over the five-year study period, 16 of which were of slight severity and three of serious severity. There were no incidents resulting in fatal injury. The majority of incidents occurred during dry conditions and under daylight conditions.

1.3.3. Due to the residential nature of Newport Pagnell, four of the 16 slight incidents involved pedestrians, and additional three of the 16 involved cyclists. The three serious incidents involved a pedal cycle. The locations and dates of the incidents involving vulnerable users, in consideration of the recorded casualties and incidents description, suggest no safety issues also considering the amount of traffic along this area and the low number of incidents recorded.

1.3.4. Consequently, it is concluded that there are no recurring patterns around the area which would suggest longstanding highway safety issues to be considered in this TA.

A509 NORTH

1.3.5. Four collisions occurred in this section of road within the PIA study area as illustrated in **Diagram F6** below and detailed thereafter.

Diagram F6 - A509 North PIA

550m north of North Crawley Road bridge

1.3.6. A cluster of three incidents has been identified in the section of the A509 located approximately 550m to the north of North Crawley Road bridge, all involving LGVs or HGVs and taking place between 2015 and 2016. All incidents occurred in dry conditions.

1.3.7. One incident resulted in fatal injury which involved a car colliding into the rear of an HGV (parked in the northbound layby) and becoming trapped under the trailer of said HGV.

1.3.8. The other two incidents (of serious and slight severity) took place in the northbound and southbound carriageways respectively and were rear-end incidents caused by driver error such as failure to look properly or distraction in vehicle.

1.3.9. In accordance with the above and considering no other incidents have taken place in this section of the A509 during the three-year period from April 2016 to May 2020, it is concluded there are no evident safety issues within this section of highway.

50m south of North Crawley Road bridge

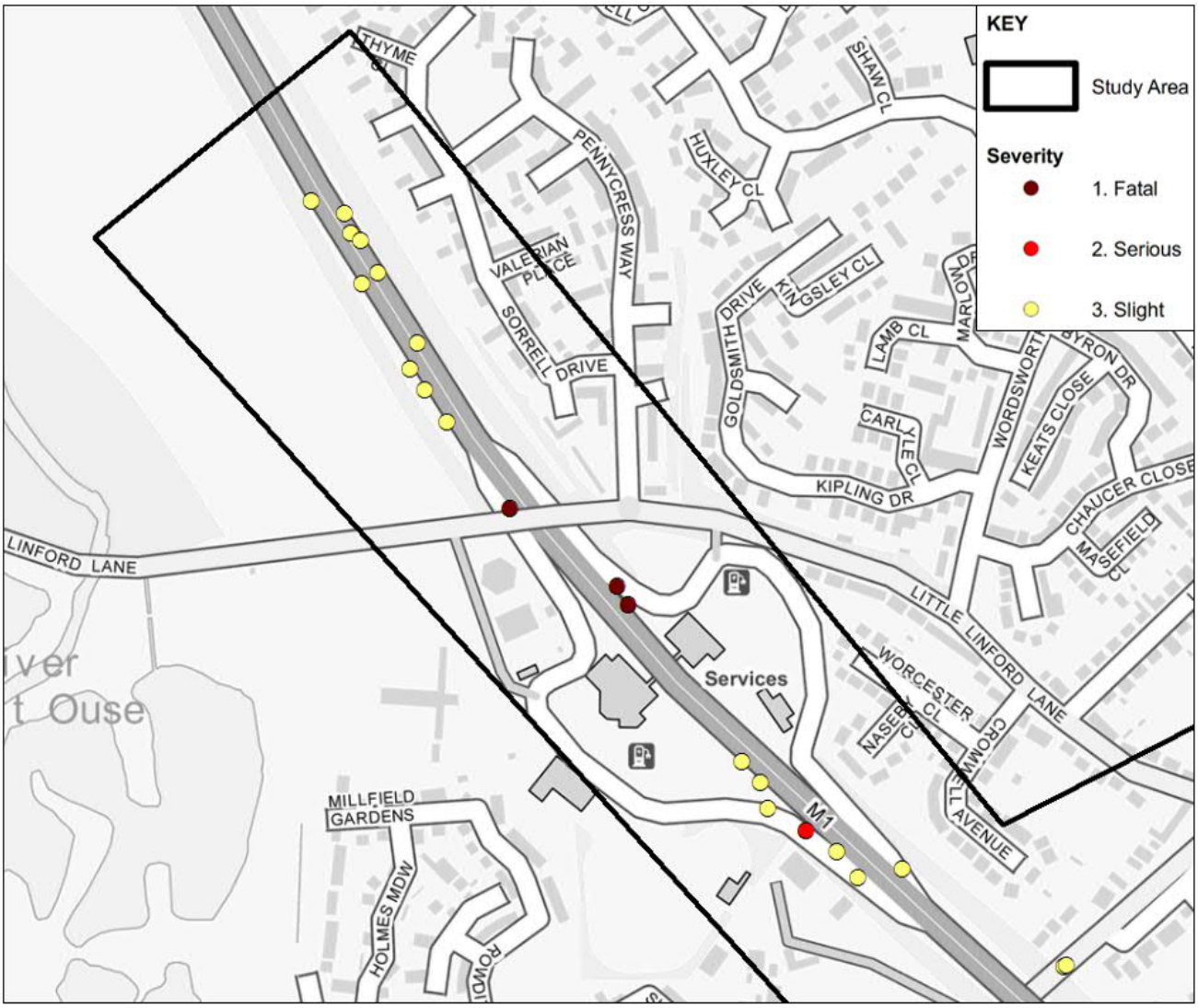
1.3.10. Two incidents occurred south of the bridge within the five-year PIA period, in October 2015 and January 2018, the former resulting in slight injury and the latter being fatal. The incident which resulted in fatal injury was due to the driver exceeding the speed limit in dark conditions

1.3.11. These took place on the southbound and northbound carriageways respectively. It is considered that these incidents do not represent a trend, as in addition to the above no safety issues have been identified in the casualties associated with these two collisions.

M1 SERVICES

1.3.12. Collisions occurred in this section of road within the PIA study area are illustrated in **Diagram F7** below and detailed thereafter.

Diagram F7 – M1 Services PIA



1.3.13. There were 20 incidents during the five-year study period at the M1 services, 16 of which were classified as slight, one being serious and three being fatal incidents. The majority of incidents occurred during dry conditions and during darkness. Three clusters have been identified in this area as can be seen in **Diagram F7**:

- A cluster of four slight incidents southbound towards the services, approximately 150m north of the Little Linford bridge. All of these incidents occurred in the darkness and it two of the incidents were caused by HGV's drivers' error when changing lanes, and two due to car drivers' failing to see traffic ahead.
- A second cluster of three slight incidents and one serious incident on the southern access road into the services has been identified. Only one of these incidents was related to slipped surface, with the other three related to alcohol, driver's physical episode and poor turning.
- There was also a cluster of two fatal incidents on the southbound carriageway, approximately 100m south of the Little Linford bridge on the M1 carriageway. This cluster

also appears to be attributed to a range of driver errors when changing lanes and failing to see traffic ahead. Therefore, this would suggest no apparent highway safety issues.

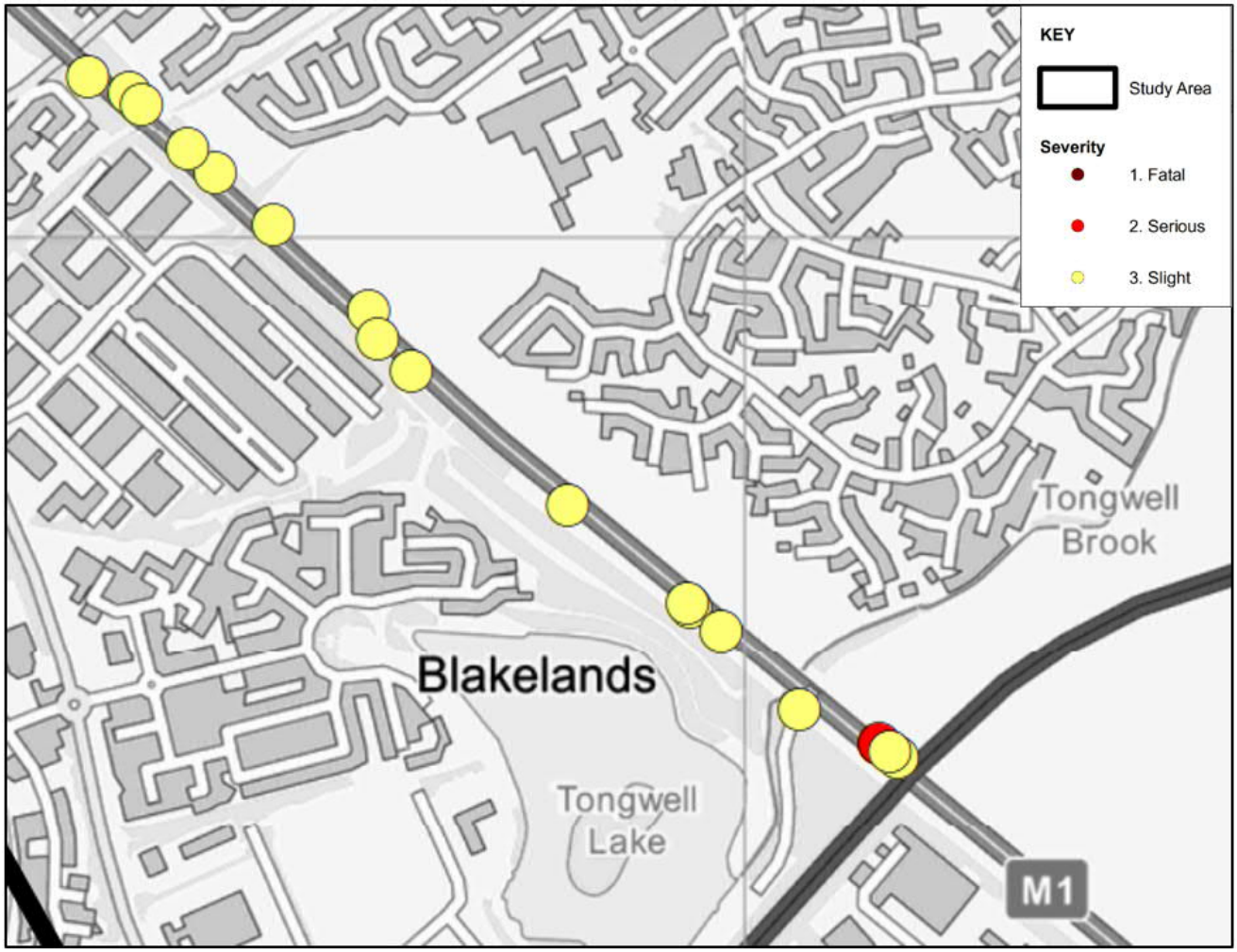
- The third fatal incident was due to a suicide.

1.3.14. In accordance with the above no highway safety issues seem evident along this section of the M1.

"M1 BLAKELANDS" – M1 MAINLINE NORTH OF H3 MONKS WAY CROSSING

1.3.15. Collisions which occurred in this section of road within the PIA study area are illustrated in **Diagram F8** below and detailed thereafter.

Diagram F8 – M1 NORTH OF H3 MONKS WAY CROSSING PIA



Southbound carriageway

1.3.16. Eight slight incidents and one serious incident occurred in this area within the five-year period, with no involvement of vulnerable users.

1.3.17. The majority of these incidents occurred in dry conditions, during night time but with streetlights present, and were attributed to driver error when changing lanes or failing to judge other drivers' speed.

1.3.18. A cluster has been identified on this carriageway, less than 50m to the west of the H3 Monks Way bridge where one serious incident and two slight incidents occurred. These three collisions were due to driver error in failing to look properly and judging a driver's speed when

traffic became stationary and congested due to queues ahead, and two of them took place in wet conditions which would exacerbate braking distances for a traffic queue ahead.

1.3.19. The three incidents occurred between May and October of 2017, and no more collisions have taken place since. It is therefore considered that any highway safety issues in place during that period of 2017 have been solved and there are no remaining highway safety issues in the area.

Northbound carriageway

1.3.20. Seven incidents occurred on this carriageway, all occurring in dry conditions and of slight severity, with no clusters being evident at a particular location along this link though five of them happened in 2019 (two during roadworks). None of these incidents involved vulnerable users.

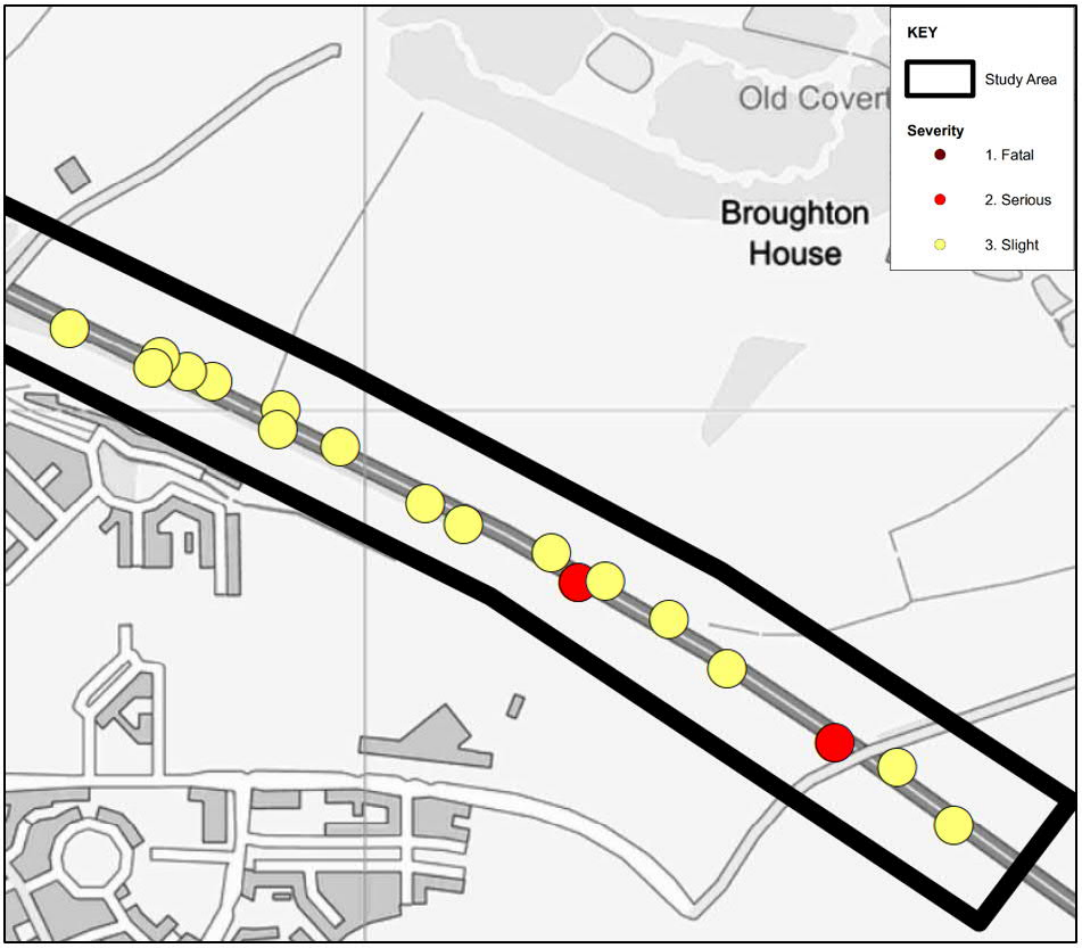
1.3.21. The three incidents that took place in 2019 (in normal conditions, with no roadworks present) were attributed to driver error in judging a driver's speed and failing to look properly when changing lanes.

1.3.22. It is therefore considered there are no highway safety issues to be considered within this assessment along this road link.

M1 EAST OF JUNCTION 14

1.3.23. Collisions occurred in this section of road within the PIA study area are illustrated in **Diagram F9** below and detailed thereafter.

Diagram F9 – M1 East of J14 PIA



1.3.24. Within this section of the M1 during the five-year study period, 18 incidents occurred of which 16 resulted in slight injury (two of these involving motorcycles) and two in serious. No fatal incidents occurred.

1.3.25. Analysis of the incidents along the M1 north-eastern and southwestern separate carriageways suggests that each of the incidents were different in their nature, mainly due to driver's poor judgement and aggressive or reckless driving, with no collision patterns having been identified.

1.3.26. There are also no clusters which suggest these collisions are result of driver errors as opposed to prevailing highway safety issues which could be exacerbated by traffic generated by the proposed development.

Appendix G

INDICATIVE MASTERPLAN

THE MASTERPLAN

MILTON KEYNES EAST

MASTERPLAN KEY:

1. Community hub including Health Hub and a range of mixed uses to serve the community
2. Secondary school and playing fields
3. Primary school and playing fields
4. Employment Hub providing approximately 5,000 new job opportunities
5. A 63ha linear park along the River Ouzel
6. Broughton Brook
7. Moulsoe Stream Park
8. Community sports pitches and pavilion
9. Community building/visitor centre
10. Moulsoe New Wood
11. A new bridge over the M1
12. Retained woodlands
13. Allotments
14. Burial ground
15. Community orchard
16. Neighbourhood play area
17. Potential Park and Ride

St James
Designed for life

jtp architects masterplanners placemakers

Appendix H

INDICATIVE STOPPING UP DRAWINGS

A509 RBT 2
A509
ROUNDABOUT 2

EL RBT 1
EASTERN LINK
ROUNDABOUT 1

A509 LONDON ROAD

EXISTING A509 LONDON ROAD TO BE STOPPED UP.

LINK 301

LINK 101

NEWPORT ROAD

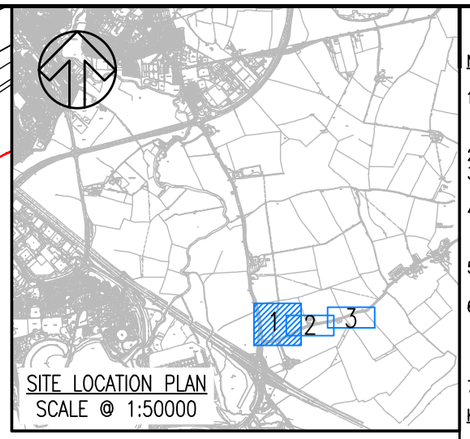
NEWPORT ROAD TO BE STOPPED UP.

FOR CONTINUATION REFER TO DRAWING MKE-WSP-ZZ-ZZ-C-SK-0059

64.37m

65.8m

70.7m



SITE LOCATION PLAN
SCALE @ 1:50000

0 50 metres

VIEWPORT 1
SCALE @ 1:1250

DO NOT SCALE

NOTES:

1. DRAWINGS ARE PREPARED TO SUPPORT DETAILED PLANNING APPLICATION FOR THE STRATEGIC HIGHWAY INFRASTRUCTURE ASSOCIATED WITH MILTON KEYNES EAST (MKE) DEVELOPMENT.
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTATION, DRAWINGS AND STANDARD DETAILS.
4. THE MILTON KEYNES HIGHWAY BOUNDARY IS TAKEN FROM INTERACTIVE HIGHWAY BOUNDARY MAPPING FOUND ON THE MILTON KEYNES COUNCIL'S WEBSITE.
5. THE HIGHWAYS ENGLAND HIGHWAY BOUNDARY PROVIDED BY HIGHWAYS ENGLAND
6. TOPOGRAPHICAL INFORMATION PROVIDED BY MK SURVEYS FILE – "28562" ON THE 11/06/2020 AND 3D ENGINEERING SURVEYS FILE – "DES21007_MKE_REV1" ON THE 22/02/2021. WSP CAN NOT ACCEPT RESPONSIBILITY FOR ANY INACCURACIES.
7. ALL REDWAYS DESIGNED IN ACCORDANCE WITH LTN 2/08.

KEY:

- MKC HIGHWAY BOUNDARY
- HIGHWAYS ENGLAND HIGHWAY BOUNDARY
- PROPOSED HIGHWAY TRANSPORT CORRIDOR
- PROPOSED AREAS OF PUBLIC HIGHWAY TO BE STOPPED UP UNDER S247 OF THE TCPA

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	19/03/2021	MEC	FIRST ISSUE	AJN	AJN

DRAWING STATUS: S2 - FOR INFORMATION

WSP House, 70 Chancery Lane, London, WC2A 1AF, UK
T+ 44 (0) 207 314 5000, F+ 44 (0) 207 314 5111
wsp.com

CLIENT: BERKELEY ST JAMES

ARCHITECT: JTP / STEPHEN GEORGE AND PARTNERS

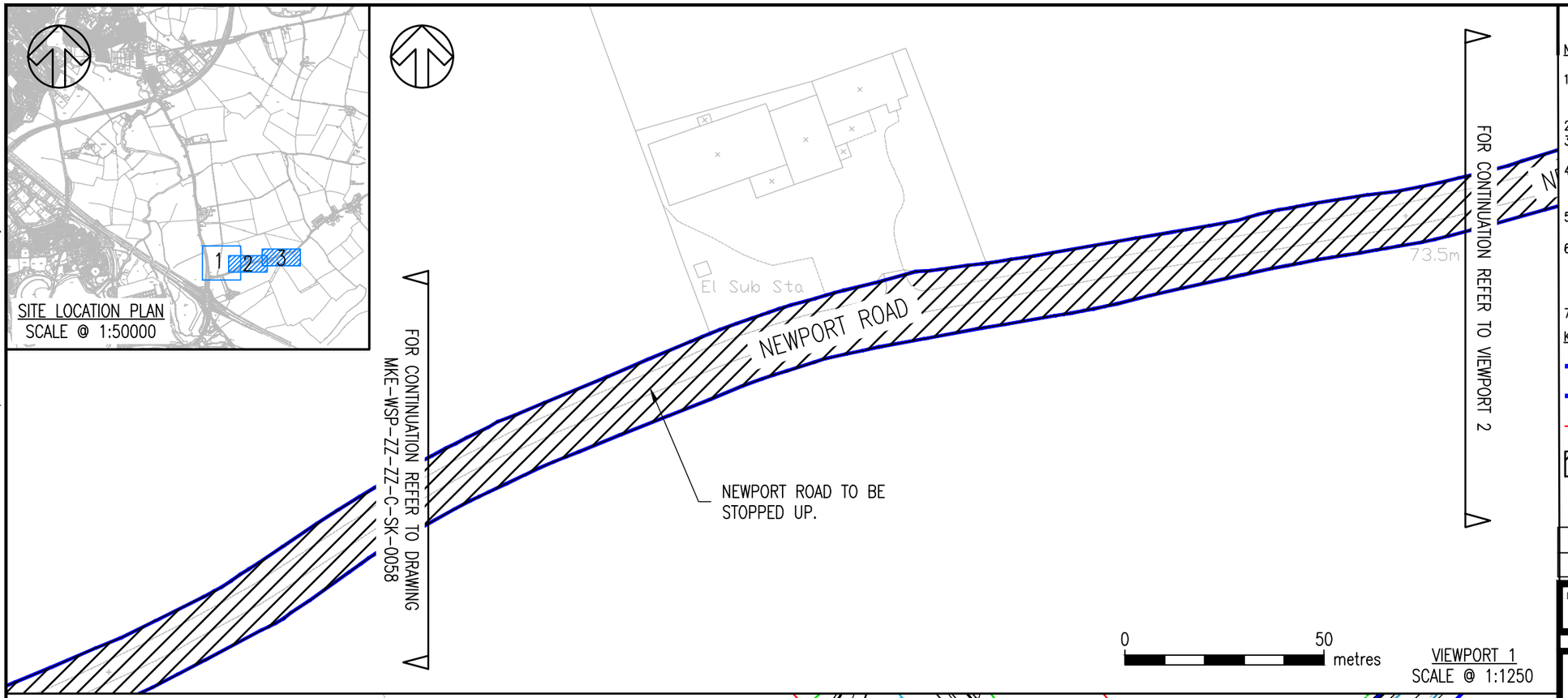
PROJECT: MILTON KEYNES EAST

TITLE: PROPOSED AREAS OF PUBLIC HIGHWAY TO BE STOPPED UP UNDER S247 OF THE TCPA SHEET 1 OF 2

SCALE @ A3:	CHECKED:	APPROVED:
AS SHOWN	AJN	AJN

PROJECT No:	DESIGNED:	DRAWN:	DATE:
70057521	-	MEC	March 21

DRAWING No:	REV:
MKE-WSP-ZZ-ZZ-C-SK-0058	P01



DO NOT SCALE

NOTES:

1. DRAWINGS ARE PREPARED TO SUPPORT DETAILED PLANNING APPLICATION FOR THE STRATEGIC HIGHWAY INFRASTRUCTURE ASSOCIATED WITH MILTON KEYNES EAST (MKE) DEVELOPMENT.
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
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4. THE MILTON KEYNES HIGHWAY BOUNDARY IS TAKEN FROM INTERACTIVE HIGHWAY BOUNDARY MAPPING FOUND ON THE MILTON KEYNES COUNCIL'S WEBSITE.
5. THE HIGHWAYS ENGLAND HIGHWAY BOUNDARY PROVIDED BY HIGHWAYS ENGLAND
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KEY:

- MKC HIGHWAY BOUNDARY
- HIGHWAYS ENGLAND HIGHWAY BOUNDARY
- PROPOSED HIGHWAY TRANSPORT CORRIDOR
- PROPOSED AREAS OF PUBLIC HIGHWAY TO BE STOPPED UP UNDER S247 OF THE TCPA

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	19/03/2021	MEC	FIRST ISSUE	AJN	AJN

DRAWING STATUS: S2 - FOR INFORMATION

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PROJECT: MILTON KEYNES EAST

TITLE: PROPOSED AREAS OF PUBLIC HIGHWAY TO BE STOPPED UP UNDER S247 OF THE TCPA SHEET 2 OF 2

SCALE @ A3:	CHECKED:		APPROVED:
AS SHOWN	AJN		AJN
PROJECT No:	DESIGNED:	DRAWN:	DATE:
70057521	-	MEC	March 21

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Appendix I

INDICATIVE SIGNAGE STRATEGY


Tongwell
Willen
Bedford
A 422
Wellingboro'
(A 509)
Milton Keynes
North
Buckingham
A 422
Milton Keynes North
& West
Central Milton Keynes
Buckingham
(A5)
Northampton
Aylesbury
Luton
(M1)
Buckingham
Milton Keynes North
A422
Motorway
(M1)
Newport
Northampton
North Keynes
(M1)
Milton Keynes A509
Luton (A4146)
Northampton
Wavendon 4
Woburn Sands 5
Newport Pagnell
Tongwell
Pineham
Northfield
Fox Milne
V11 Tongwell Street
South
Willen
Willen Park
Bolbeck Park
Pineham
Northfield
Fox Milne
Tongwell
V11 Tongwell Street
South
Pineham
Northfield
Fox Milne
Newport Pagnell
Willen
Willen Park
Bolbeck Park
Moulsoe only
Moulsoe
Bedford (A422)
(M1)
Aylesbury
Northampton
Luton
Airport
Moulsoe
Moulsoe only
(M1 South)
(M1 North)
London
Luton
Milton Keynes
A509
Airport
Moulsoe
The
Carrington
Arms
Cranfield
Airport
Moulsoe
The
Carrington
Arms
7.5t
Except for
loading
INTERCHANGE
PARK
A422
A509
M1
Great Linford
Manor
Park (The
Parks Trust)
Great Linford
Tongwell
Willen Park
Pennyland
Neath Hill
Downhead
Park
INEHAM
Moulsoe
Newport Rd
Tongwell St
Willen Rd
Danstead Way
H3 Monks Way
B4034
Fen St
The Parks Trust
Gullivers Dinosaur
and Farm Park
Google
Proposed Weight restriction signs for Willen Estate
Signage Affected by Introduction of Eastern Perimeter Road (Non-HIF)
Signage Affected by Introduction of HIF Infrastructure


Signage Affected by Introduction of Eastern Perimeter Road (Non-HIF)
Signage Affected by Introduction of HIF Infrastructure
Potential to add Bedford traffic to be directed via new M1 bridge
Potential to add Bedford as a destination via new M1 bridge
Potential for Bedford traffic to be directed via new M1 bridge
Potential for Newport Pagnell traffic to be directed via new M1 bridge
Potential for Newport Pagnell traffic to be directed via new M1 bridge
Willen
PINEHAM
Willen Lake
FOX MILNE
Broughton
Downhead Park
David Lloyd Milton Keynes
Temporarily closed
Gulliver's Land Theme Park Resort
Campbell Park
and Farm Park
Temporarily closed
Springfield
Woolstone
A509
A5130
M1
H6 Childs Way
V11
V10
Tongwell St
Newport Rd
Countess Way
Northampton
Bedford
Luton
A509 (M1) (A 5130)
Aylesbury
Dunstable
(A 4146)
Buckingham A509 (A5)
Milton Keynes North & West
Central Milton Keynes
Central Shopping
(M1 North) (A509)
(M1 South) (A5)
Milton Keynes North & West
Central Milton Keynes
Buckingham
A509 (A5)
Northampton
Bedford
Luton
A509 (M1)
(A5130)
Newport Pagnell
Brooklands
Northfield
Coachway
Park and Ride
Willen
Pineham
Fox Milne
Woburn Sands
Wavendon
Monkston
Broughton
Kingston
V11 Tongwell Street
North
South
Woolstone
Willen Lake
Pineham
Fox Milne
Newport Pagnell
Brooklands
Northfield
Coachway
Park and Ride
M1 Childs Way
East

Appendix J

MOBILITY PROVIDERS LETTERS

Suzanna Massingue

Consultant - Future Mobility WSP

WSP House

70 Chancery Lane

London, WC2A 1AF

18th August 2020

Dear Suzanna,

Further to ongoing discussions we write to thank you for engaging with us early on the opportunity for us to help achieve your Client, Berkeley's vision for delivering a holistic, integrated mobility strategy for their site at Milton Keynes East.

As you are aware, GRIDSERVE Sustainable Energy Ltd ('GRIDSERVE') has developed the Electric Forecourt® to meet the growing infrastructure demands of electric vehicle users and owners. The Electric Forecourt® is the new generation of filling station and will help the country de-carbonise transport and improve local air quality by providing a much needed network of charging infrastructure to support and encourage the uptake of electric vehicles.

GRIDSERVE are currently on site with their first forecourt in Braintree, Essex and are planning a roll out of 100 sites throughout the UK. It has been conceived from extensive research into the limitations and frustrations with existing charging infrastructure and will offer predominantly ultra-rapid EV charging supported by a range of ancillary services, designed to maximise the customer experience of vehicle charging and optimise the use of the associated dwell time.

Vehicle charging will be available in ultra rapid (175 – 350kW), rapid (90kW) as well as some lower powered yet fast (22kW) and will accommodate wherever possible all vehicle types, from hatchback to Public Service Vehicles and Heavy Goods Vehicles. It should be noted that domestic home charging capacities range from 3 to 7kW.

We understand that the development allocation at Milton Keynes East is for circa 5,000 homes, a secondary school, primary schools, local centre and around 4Mft^2 of employment and that the vast majority of that allocation sits within land under your client, Berkeley's control.

It is our view that this scale of development, alongside the wider sustainable travel aspirations and commitments of Milton Keynes Council (MKC) for the MK borough would fully support the introduction of ultra rapid EV charging to support a zero carbon transport plan and EV use across the development.

We have many examples of schemes that are being promoted across the UK where our service is planned to be introduced, as part of a wider set of travel options for people. Our product the Electric Forecourt® is well placed to promote a shift away from polluting internal combustion engine vehicles.

The GRIDSERVE Electric Forecourt® will be powered by clean, zero carbon solar energy, and will include battery energy storage required to ensure carbon emission targets can be met, whilst keeping prices low for customers. The UK Government has already announced an end to the sale of petrol and diesel cares by 2040, and are currently consulting on bringing this forward to 2035 to include hybrid cars. This, together with the recent UK Government pledge to achieve zero net carbon emissions is now encouraging a dramatic rise in electric vehicles on today's roads. The Electric Forecourt® aims to provide key infrastructure to meet the needs of electric vehicle owners

Each site, City and development is different, and you will appreciate that it is difficult at this time to accurately predict the likely level of use or modal shift which could be achieved through the implementation of the Electric Forecourt® alongside other technologies in Milton Keynes East.

We would however anticipate similar levels of uptake would be seen in Milton Keynes compared to other Cities and locations. Based on our research and experience elsewhere, it is our view that MKCs aspiration of a 50/ 50 balance between private car and non-car modes by 2050 not only is achievable and deliverable through the introduction of a number of mobility choices, including our own, but could also be improved on in the future.

GRIDSERVE would welcome the opportunity to partner with Berkeley to help develop a strong offering for the Milton Keynes East site, with the potential to explore an early enabling development near to M1 junction to support a zero carbon transport strategy. Please see below a recent design that might form the basis for installation at MKE.

We look forward to exploring the opportunities with you in the future but in the meantime if you have any questions or require any further information from us then please do not hesitate to contact me.

Yours sincerely,

GRIDSERVE Sustainable Energy Ltd

An example of a design for a GRIDSERVE Electric Forecourt

Suzanna Massingue
WSP
WSP House
70 Chancery Lane
London
WC2A 1AF

9th July 2020

Dear Suzanna,

Further to ongoing discussions, we write to thank you for engaging with us early on the opportunity for us to help achieve your Client, Berkeley's vision for delivering a holistic, integrated mobility strategy for their site at Milton Keynes East.

As you are aware, Moovit is the leading Mobility as a Service (MaaS) provider and developer of the world's most popular urban mobility app. Moovit's goal is to simplify urban mobility all around the world, making getting around town via transit easier and more convenient. By combining information from public transit operators and authorities with live information from the user community, Moovit offers travelers a real-time picture, including the best route for their journey.

- Moovit supports the urban mobility needs for over 800 million users with service in over 3,300 cities across 104 countries, 45 languages and coverage for more than 7,500 transit agencies.
- Moovit was named Best Local App by Google in 2016 and one of Apple's Best Apps of 2017
- Moovit owns and manages the world's largest, most accurate repository for mobility data with over 7 million transit stops and generating over 8 Billion (GDPR complaint) mobility data points a day.
- Micro-transit services : 346 providers across 268 metros with 317K vehicles
- Moovit has a proven integration framework with thousands of pre-integrated data sources including over 1,000 GTFS feeds, 1,100 real-time feeds, 3,205 service alerts, 14 car-share, 278 docked bike-share and 159 dockless bike/scooter/moped-share integrations.

Moovit's MaaS platform will enable the management of all modes of transport, public and private, within a single application. Moovit's Transport On Demand offering can also be one of the modes, offering riders the ability to reserve rides and see in real-time the location of the vehicle. Clients have the ability to have a custom-branded application in which it can select what mobility providers to showcase, integrate with payment and ticketing systems, and have enhanced communication tools. We do this all in a vendor-agnostic environment so that you can pivot with the changes in the mobility vendor ecosystem and provide your customers and partners with the best and most complete network of service solutions.

Moovit's Mobility as a Service (MaaS) Platform is the backbone of the Suite of Services that Moovit provides. As transportation needs are rapidly changing, cities are lacking the tools and data needed to provide efficient mobility to their employees. Serving as the interface between riders, transit providers

and cities, Moovit's MaaS Platform enables passengers to combine all public, shared and Transport On Demand mobility options with a book-and-pay functionality. More reliable and easily understood information helps make public transit the preferred option for your employees. It leverages everything we've learned within our award winning consumer application. door-to-door solutions that encompass every aspect of a commuter's daily travel, from payment systems to multimodal route planning.

We understand that the development allocation at Milton Keynes East is for circa 5,000 homes, a secondary school, primary schools, local centre and around 4Mft2 of employment and that the vast majority of that allocation sits within land under your client, Berkeley's control.

It is our view that this scale of development, alongside the wider sustainable travel aspirations and commitments of Milton Keynes Council (MKC) for the MK borough would fully support the introduction of shared mobility services alongside more traditional bus, walking and cycling strategies.

We have many recent examples of schemes that have been implemented across the UK where our MaaS platform has been introduced, or is planned to be introduced, as part of a wider set of travel options for people. Our MaaS platform is very well placed to promote a shift away from private car use.

Each site, City and development is different, and you will appreciate that it has historically been difficult to accurately predict the likely level of use or modal shift which could be achieved. Moovit uses our huge repository of transit data to be able to fully understand the movements of people within a certain area and how best to deploy resources especially with regards to On Demand services.

By delivering a branded journey planning app, we will be able to instantly inform the residents of Milton Keynes East of all of their travel options, across all modes. Based on our research and experience elsewhere, it is our view that MKCs aspiration of a 50/ 50 balance between private car and non-car modes by 2050 not only is achievable and deliverable through the introduction of a number of mobility choices, including our own, but could also be improved on in the future.

Moovit would welcome the opportunity to partner with Berkeley to help develop a strong offering for the Milton Keynes East site in due course.

We look forward to exploring the opportunities with you in the future but in the meantime if you have any questions or require any further information from us then please do not hesitate to contact me.

Yours Sincerely

Brad Lee
Moovit UK

Re: Milton Keynes East - Sustainable Shared Transport Solution

Dear Suzanna (and projects partners),

Further to ongoing discussions we write to thank you for engaging with us early on the opportunity for us to help achieve your Client, Berkeley's vision for delivering a holistic, integrated mobility strategy for their site at Milton Keynes East.

As you are aware, Zeelo has been liaising with the partners of the scheme to show how an innovative bus-sharing model could work in the long term. We feel that Zeelo has a unique offering which can serve social, business and health needs for the residents of the site. We are able to analyse where people need and want to travel too, and provide a direct fixed route solution using executive eco-friendly vehicles. Our core aim is not to compete against existing transport modes, but to convert people from private car users to shared transport.

We understand that the development allocation at Milton Keynes East is for circa 5,000 homes, a secondary school, primary schools, local centre and around 4Mft^2 of employment and that the vast majority of that allocation sits within land under your client, Berkeley's control.

It is our view that this scale of development, alongside the wider sustainable travel aspirations and commitments of Milton Keynes Council (MKC) for the MK borough would fully support the introduction of shared mobility services alongside more traditional bus, walking and cycling strategies.

We have many recent examples of schemes that have been implemented across the UK where our service has been introduced, or is planned to be introduced, as part of a wider set of travel options for people. For example, last year across all of the businesses we worked with (Jaguar Land Rover, Prologis DRIFT, Ocado, Silverlink Business Park and many more) 70% of our users shifted from the private car, and our Trust Pilot score averaged 9.6 out of 10!

We would however anticipate similar levels of uptake would be seen in Milton Keynes compared to other Cities and locations. Based on our research and experience elsewhere, it is our view that MKCs aspiration of a 50/ 50 balance between private car and non-car modes by 2050 not only is achievable and deliverable through the introduction of a number of mobility choices, including our own, but could also be improved on in the future. For example, just take one example with our Jaguar Land Rover service, we converted up to 7% of their staff to use Zeelo in just 6 months (350 regular users).

Zeelo would welcome the opportunity to partner with Berkeley to help develop a strong offering for the Milton Keynes East site in due course.

We look forward to exploring the opportunities with you in the future but in the meantime if you have any questions or require any further information from us then please do not hesitate to contact me.

Yours Sincerely

Jack Holland

Sales Development Manager - UK

SNRG STATEMENT OF SUPPORT

COMMUNAL MOBILITY ON DEMAND

Dear Suzanna,

Further to ongoing discussions we write to thank you for engaging with SNRG early on and the opportunity for us to help achieve your Client, Berkeley's vision for delivering a holistic, integrated mobility strategy for their site at Milton Keynes East (MKE).

As you are aware, SNRG offer a white labelled New Build Community App. Which enables people to access everything from aggregated services such as energy/heating/ childcare, doctors appointments, cleaning and care services plus includes a Communal capability to access on-demand mobility (eBus/Shuttle/EV car/share/scooters/bikes etc). The functionality is too broad in capability to cover in detail here and we are happy to demonstrate the capabilities to your client in due course.

The development at MKE is not dissimilar in size to that at Otterpool (Folkestone) where we are providing a similar solution. Our Partners there include BYD, the largest eBus provider in the UK, at another of our sites we are engaging with Gordon Murray design to include the deployment of their on-demand autonomous pods as a means of further reducing on-site traffic and car ownership.

We understand that the development allocation at Milton Keynes East is for circa 5,000 homes, a secondary school, primary schools, local centre and around 4Mft2 of employment and that the vast majority of that allocation sits within land under your client, Berkeley's control.

It is our view that this scale of development, alongside the wider sustainable travel aspirations and commitments of Milton Keynes Council (MKC) for the MK borough would fully support the introduction of shared mobility services alongside more traditional bus, walking and cycling strategies.

We are happy to introduce planned examples of schemes that form part of the Master Developer Planning process where our service / product (SNRG Connect) is planned to be introduced, as part of a wider set of travel options for people. SNRG Connect, is well placed to promote a shift away from private car use. Indeed our own SNRG Communities rental developments are car free.

Each site, City and Community development is different, and you will appreciate that it is difficult at this time to accurately predict the likely level of use or modal shift which could be achieved through the implementation of SNRG Connect, but we are already in discussions with StageCoach, one of the bus operators in MK, at one of our developments in Cambridge alongside multi-modal partners. Through Cambridge CC we already have links into MK Council who are a progressive Authority and always looking for innovation that reduces congestion whilst supporting the broader environmental, sustainability and C02 reduction agenda.

Providing we plan for a cost effective and convenient mobility strategy at the early stage of development with the right partnerships, we anticipate high levels of shared mobility uptake in Milton Keynes compared to other Cities and locations. Based on our research and experience elsewhere, it is our view that MKCs aspiration of a 50/ 50 balance between private car and non-car modes by 2050 not only is achievable and deliverable through the introduction of a number of mobility choices, including our own, but could also be improved on in the future.

SNRG would welcome the opportunity to partner with Berkeley to help develop a strong offering for the Milton Keynes East site in due course.

We look forward to exploring the opportunities with you in the future but in the meantime if you have any questions or require any further information from us then please do not hesitate to contact me.

Yours Sincerely

Shane Hussain

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Appendix K

AECOM (MKC) TECHNICAL NOTES

Appendix K.1

AECOM - TN29 (MKMMM BASELINE UPDATE AND REVALIDATION)

Project:	**Milton Keynes Model**	Job No:	**60624806**
Subject:	**MK East Model Update**		
Prepared by:	**Steve Wybar**	Date:	**13 March 2020**
Checked by:	**Alistair Shepherd**	Date:	**27 March 2020**
Approved by:	**Steven Wood**	Date:	**07 April 2020**

1. Introduction and Overview

1.1.1 In December 2019 AECOM were commissioned by Milton Keynes Council (MKC) to test the impacts of a proposed development of land to the northeast of Milton Keynes; Milton Keynes East (MKE). This proposed development consists of approximately 5000 dwellings and 6330 jobs.

1.1.2 In March 2019 MKC submitted a Housing Infrastructure Fund (HIF) bid to central government for an additional crossing of the M1 between Junction 14 and the A422. This additional crossing is required to overcome capacity constraints on the road network. Without this additional infrastructure the site is not feasible. The cost and timing for the required infrastructure means it cannot be financed using the normal developer contributions and as such if the HIF bid is not successful the development will not come forward.

1.1.3 The bid was approved in March 2020 and the current programme envisages submission of a planning application by September 2020.

1.1.4 While the Milton Keynes Multi-Modal Model (MKMMM) was considered appropriate for use to support the HIF bid, further refinement in the locality of the MKE site would ensure it is sufficiently robust to support the planning application.

1.1.5 The developer's consultants, WSP, have outlined the suggested modelling approach in a Technical Note1. There are three main elements to the modelling approach:

- Update the local ca/val around MKE
- Update the forecast Reference Case
- Development Scenario Testing

1.1.6 This Technical Note details the first main element; the update of the base year local recalibration and validation focussed around MKE.

2. Existing Model

2.1 Model Description and Specification

2.1.1 The traffic assignment model was built in SATURN version 11.3.12W and the SATURN network originated from the existing 2009 model and was updated.

[1] Milton Keynes East Transport Technical Note: Modelling Approach for MKE Planning Application, March 2019

2.2 Time Periods

2.2.1 The base year represents an average Monday to Thursday in June 2016. The modelled time periods remain unchanged as most historic MKC data has been collected for 60-minute periods commencing at the start of each hour. These periods being:

- AM peak – 0800-0900;
- PM Peak – 1700-1800; and
- Inter-peak – average of 1000-1600.

2.3 Link Flow Calibration and Validation Criteria

2.3.1 The UK Department for Transport (DfT) guidelines have been used as a measure of the model calibration and validation in terms of link flows, screenline and journey time comparisons (Modelled against observed) and model convergence criteria. The WebTAG guidelines for modelled and observed link flow comparisons are listed in Table 1.

Table 1: Link Flow and Turning Movement Validation Criteria and Acceptability Guidelines

Criteria	Description of Criteria	Acceptability Guideline
1	Individual flows within 100 veh/h of counts for flows less than 700 veh/h	>85% of cases
	Individual flows within 15% of counts for flows from 700 to 2,700 veh/h	>85% of cases
	Individual flows within 400 veh/h of counts for flows more than2,700 veh/h	>85% of cases
2	GEH < 5 for individual flows	>85% of cases

Source: WebTAG Unit M3.1 Table 2

2.4 Journey Time Validation Criteria

2.4.1 Similarly to the flow criteria, the DfT WebTAG guidelines as shown in Table 2, have been used as guidance for the journey time validation

Table 2: Journey Time Validation Criterion and Acceptability Guideline

Criteria	Acceptability Guideline
Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)	> 85% of routes

Source: WebTAG Unit M3.1 Table 3

Vehicle and User Classes

2.4.2 The SATURN model has been built using the three vehicle classes based on what can be separately classified in traffic survey data:

- Cars;
- Light Goods Vehicles (LGV); and
- Heavy Goods Vehicles (HGV).

2.4.3 For model assignment purposes cars are defined as being one of three trip purposes, commuting, business or other. This results in there being five user classes for highway assignment purposes as shown in Table 3 along with their corresponding vehicle class:

Table 3: Model User and Vehicle Classes

User Class	Vehicle Class	Purpose
1	1	Car Commute
2	1	Car Employer's Business
3	1	Car Other
4	2	LGV
5	3	OGV

2.4.4 Bus routes and services in and around Milton Keynes have been extracted from the Emme Public Transport Model and coded as fixed flows in the model.

2.5 Assignment Algorithm and Method

2.5.1 Assignment of trips to the highway network was undertaken using a user-equilibrium assignment according to the first of Wardrop's principles, assumed to govern the routes chosen by drivers travelling from a given origin to a given destination.

2.5.2 This principle of equilibrium is such that: 'The journey times on all the routes actually used are equal and less than those which would be experienced by a single vehicle on any unused route'.

2.5.3 User-equilibrium, as implemented in SATURN version 11.3.12, is based on the Frank-Wolfe algorithm, which employs an iterative process based on successive all-or-nothing assignments to generate a set of combined flows on links that minimise an objective function. The travel costs are re-calculated for each iteration and then compared to those from the previous iteration. The process is terminated when the costs obtained from successive iterations do not change significantly. At this point, the model is said to have converged to a pre-defined degree.

3. Update to Generalised Cost Formulation and Parameter Values

3.1.1 The cost of travel is expressed in terms of generalised cost, which combines time and money, using a specified 'Value of Time' to convert money into time separately for each defined journey purpose. SATURN uses two parameters: pence per minute (PPM) and pence per kilometre (PPK), and calculates generalised cost in minutes as:

Time + PPK/PPM x Distance + toll (pence)/PPM.

3.1.2 The values of Time (VoT) and Vehicle Operating Costs (VoC) used in the updated base year model have been calculated from the latest WebTAG data book released in May 2019 and are shown in Table 4. The value of time applicable to HGV trips is uplifted by a factor of two as suggested in WebTAG Unit M3.1 paragraph 2.8.8.

Table 4: Values of Time and Vehicle Operating Costs as PPM and PPK Values

User Class	AM Peak		Inter-Peak		PM Peak	
	PPM	PPK	PPM	PPK	PPM	PPK
1: Car Commute	20.27	5.45	20.60	5.45	20.34	5.45
2: Car Employer's Business	30.22	11.58	30.97	11.58	30.66	11.58
3: Car Other	13.98	5.45	14.89	5.45	14.64	5.45
4: LGV	21.36	13.11	21.36	13.11	21.36	13.11
5: HGV	43.38	46.25	43.38	46.25	43.38	46.25

4. Calibration and Validation Data

4.1 Data Requirements

4.1.1 As part of the data required for the planning application and the analysis supporting the planning updates to the MKMMM, a programme of traffic surveys was undertaken on junctions and links around MKE. The 2019 counts allow for further refinement in the locality of the MKE site, ensuring the 2016 base model is sufficiently robust to support the planning application.

4.1.2 Where 2019 counts were found to be on the same or adjacent links as existing counts, or the count appeared suspect, the existing count was used as detailed in Table 5 below.

Table 5: 2019 Count Data Information

Site no.	Survey type	Location	Notes
1	MCC Link	A4146 Tongwell Street	
2	MCC Link	A5130	
3	ATC	Newport Road	
4	MCC Link	Tongwell Street	Duplicate of Original Count – NOT INCLUDED
5	ATC	Carleton Gate	Spigot in model - NOT INCLUDED
6	ATC	Millington Gate	Spigot in model - NOT INCLUDED
7	ATC	Delaware Drive	Spigot in model - NOT INCLUDED
8	ATC	Hooper Gate	Spigot in model - NOT INCLUDED
9	MCC Link	Beaufort Drive	Spigot in model - NOT INCLUDED
10	ATC	Landsborough Gate	Spigot in model - NOT INCLUDED
11	MCC Link	Willen Road	Duplicate of Original Count – NOT INCLUDED
12	MCC Link	Brickhill Street	Set to Calibration
13	MCC Link	A422 Monks Way	Duplicate of Original Count – NOT INCLUDED
14	ATC	Wolverton Road	Duplicate of Original Count – NOT INCLUDED
15	ATC	Wolverton Road	
16	ATC	Marsh End Road	
17	ATC	High Street	
18	ATC	Marsh End Road	Count on adjacent link to existing – NOT INCLUDED
19	ATC	B526 Tickford Street	
20	ATC	North Crawley Road	Duplicate of Original Count – NOT INCLUDED
21	ATC	Renny Park Road	
22	ATC	B526 London Road	Duplicate of Original Count – NOT INCLUDED
23	MCC Link	A422	
24	MCC Link	A509	
25	MCC Link	A509 London Road	
26	ATC	A422 Newport Road	
27	ATC	A509 High Street	
28	ATC	Weston Road	
29	ATC	Drift Way	
30	MCC Link	Cranfield Road	
31	ATC	Cranfield Road	
32	ATC	Unnamed Road	
33	ATC	Cranfield Road	

4.1.3 It was agreed that these new counts (i.e. 2019) could be factored down to the 2016 levels to present a consistent base year model.

4.1.4 Data for some of the sites indicate that the 2019 flows are higher than that recorded in 2016 and the vice versa. It was considered that the 2019 flows are, on average, relatively similar to 2016 recorded volumes.

4.1.5 Average two-way factors were derived by WSP[2] using the 2019 count data and the limited 2016 count data available at the same locations. The factors were calculated by dividing the 2016 counts by the 2019 values, resulting in values that could be used to factor the 2019 flows to 2016 levels.

4.1.6 These factors calculated across all sites and directions were then averaged to produce Peak Hour and Inter Peak Period factors for Mon-Thu average.

4.1.7 Table 6 below summarises the average two-way factors enabling the 2019 flows to be recalculated to 2016 values calculated by WSP and agreed with MKC. These were blanket factors for each time period that could be applied to the 2019 data set. Note that the Inter-Peak factor was calculated, but it was agreed not to use this in the model as five sites were removed from the analysis due to missing data. As such, the Inter-Peak 2019 data remained unfactored (i.e. Factor is 1).

Table 6: Factors used to recalculate 2019 data to 2016 values

Time Period	Hours	Factor (Mon – Thu Average)
AM Peak hour	08:00 - 09:00	0.993
IP (average hour)	10:00 - 16:00*	1.027 (not used in model)
PM Peak Hour	17:00 - 18:00	0.954

[2] TECHNICAL NOTE – Review of Growth between 2016 and 2019 – Traffic Data (version 2), February 2020

4.2 Screenlines and Cordons

4.2.1 As shown in Figure 1 the additional counts do not form a cordon or screenline in the same way as the existing counts. Therefore these were used as a calibration tool to strengthen the model in the MK East area.

4.2.2 In the previous iteration of the model, the A422 screenline (shown by black line in Figure 1) was used for calibration, while the Northern screenline (shown by yellow line in Figure 1) was used for validation.

4.2.3 For the purposes of the model update, these two screenlines were reversed i.e. the Northern screenline is now set to Calibration and the A422 set to validation. The reason for this reversal ensured that calibrating the screenline closer to the MK East development strengthened the model in this area.

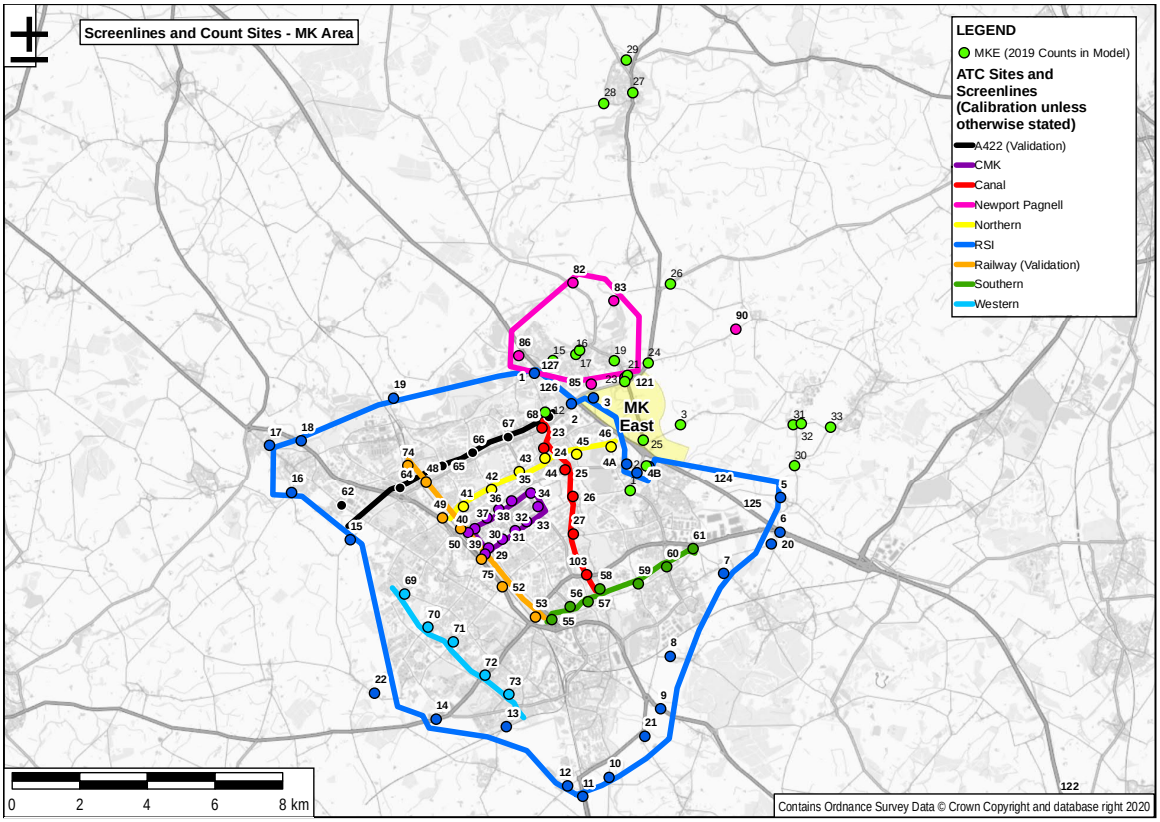


Figure 1. Cordons and Screenlines

5. Network Development

5.1.1 The existing network was reviewed with focus in the vicinity of MKE. This was to identify potential network issues and areas for improvement. The network was further refined as part of the recalibration and validation process

5.1.2 Two specific updates were requested by WSP and agreed with MKC. The zoning in MKE was disaggregated. This was so the forecast development trips and loading could better reflect the emerging development masterplan. Drift Way in Olney was coded into the network to increase the level of detail, as Olney is considered an area of interest in terms of potential traffic impacts from the development.

5.1.3 The full list of network edits as listed in Table 7 below were applied to update the model.

Table 7: List of Network Edits

Node/Zone	Location	Edit Type	Description
1524 Z	Haversham>MK East	Zone Shift	Moved dormant zone to MK East Development
1529 Z	Haversham>MK East	Zone Shift	Moved dormant zone to MK East Development
1566 Z	Haversham>MK East	Zone Shift	Moved dormant zone to MK East Development
1567 Z	Haversham>MK East	Zone Shift	Moved dormant zone to MK East Development
1521 Z	MK East	Zone Shift	Moved to accommodate MK East shifted zones
1523 Z	MK East	Zone Shift	Moved to accommodate MK East shifted zones
1525 Z	MK East	Zone Shift	Moved to accommodate MK East shifted zones
1572 Z	MK East	Zone Shift	Moved to accommodate MK East shifted zones
1087 Z	Tongwell Roundabout	Connector Shift	Zone connector changed to load onto node 1515
1929	Renny Park Road	New Link	Added link between node 1928 and 1929 (two-way)
1929	North Crawley Road	HGV Ban	Added HGV ban to link 1929-1628
1929	North Crawley Road	GAP Change	Reduced GAP to 1.3s (from default 2.0s)
4581	North Crawley Road	Connector Shift	Zone connector changed to load onto node 4581
1273	Marsh End Rdbt	Exploded Rdbt	Roundabout exploded to improve modelling capabilities
1273	Marsh End Rdbt	GAP Change	Increased GAP to 2.3s on all approaches (from default 2.0s)
1564	M1 Junction 14	Node Removed	Removed node 1564
1565	M1 Junction 14	Lane Change	Removed two lanes
1566	M1 Junction 14	New Link	Added link between 2008 and 1566 (one-way)
1566	M1 Junction 14	GAP Change	Increased GAP to 2.5s (from 0.5s)
	M1 Junction 14	LCY Change	All nodes hard-coded to 84 LCY
2005	M1 Junction 14	Signal Change	Signal green times changed to 20s (from 16s) and 55s (from 57s)
2008	M1 Junction 14	Signal Change	Signal configuration changed to reflect New Link (2008-1566)
1924	B526 Newport Pagnell	Speed Change	Speed on link 1924-1229 changed to 40kph (two-way)
91097	Folly Lane	SF Curve Change	Speed flow of link 91097-91093 (two-way) changed to 121 (from 118)
90165	Drift Way (Olney)	New Link	Added link between 90165 and 90081 (two-way)
1628	London Road	HGV Ban	Added HGV ban to link 5515-1628
1628	London Road	Lane Change	Removed one lane from link 1628-1629 to reflect addition of Renny Park Road
1928	Renny Lodge Rdbt	GAP Change	Increased GAP to 2.5s (from 1s)
5515	Tickford Rdbt	GAP Change	Increased GAP to 2.2s (from 0.8s)
1629	A509-Newport Road	Lane Change	Added a second lane northbound A509 from Newport Rd Junction
5715	Brickhill Rdbt	GAP Change	Increased GAP to 2.2s (from default 2.0s)
1917	Caldecote Street	Distance Change	Increased distance from 115m to 210m (two-way)
1272	Marsh End Road	Lane Change	Removed one lane from section of road and updated coding to manual
95546	MK East (N)	Spigot Shift	MK East (N) now loads from new node instead of Renny Lodge Rdbt
1410	Chaffron Way Rdbt	GAP Change	Reduced GAP to 1.3s (from default 2.0s)
1372	Childs Way Rdbt	Lane Change	Removed one lane from Eastbound approach
4166	Pineham Rdbt	Lane Change	Added one lane to Northbound exit

5.1.4 The zone relocation as listed in Table 7 is shown below in Figure 2. This change should allow for a more accurate and detailed model of the impacts of MK East and the surrounding area. All of the zones that were relocated had zero trips in the matrix and as such would not impact the demand.

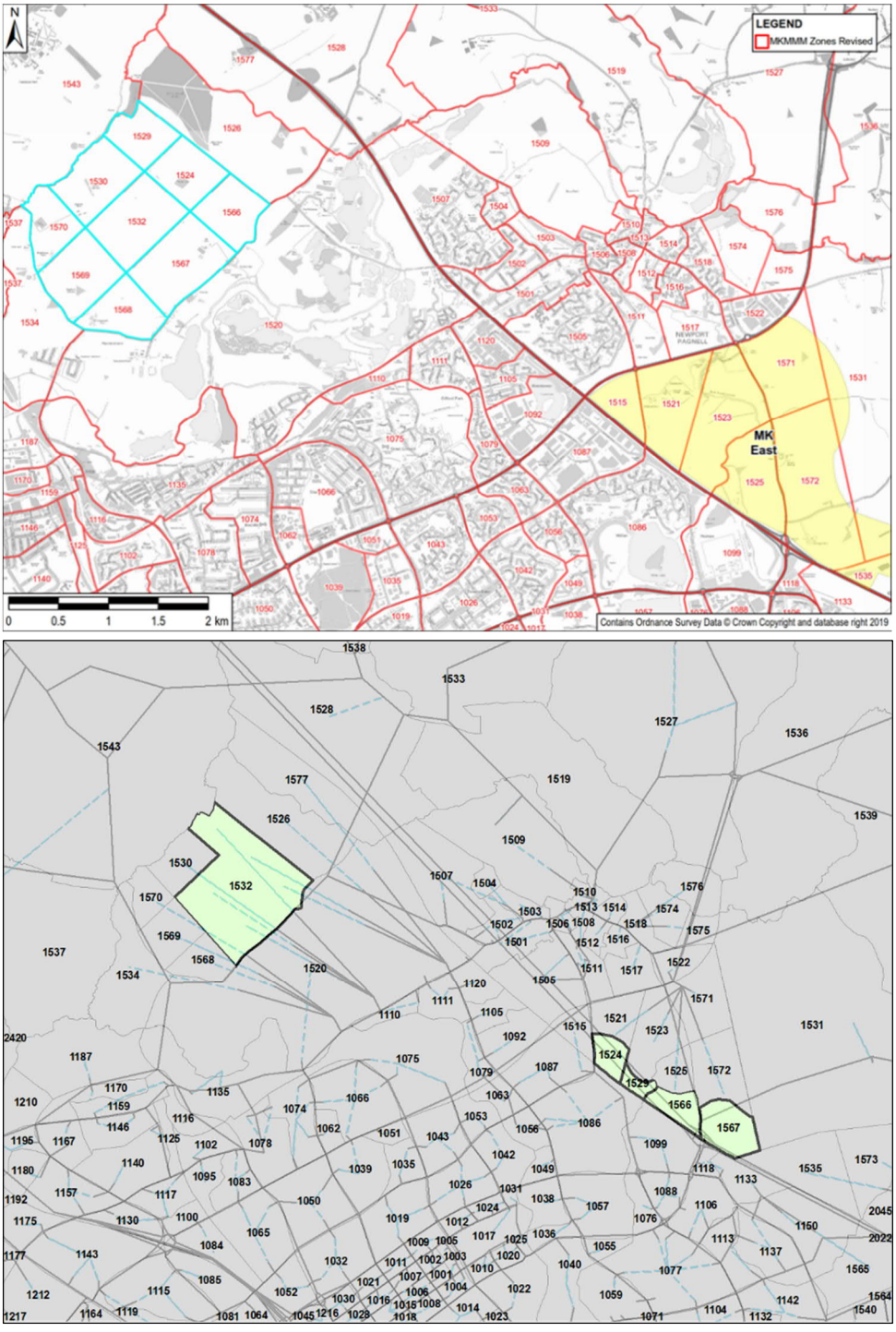


Figure 2. Changes to zones between previous model and current model

5.1.5 Further to the list of edits shown in Table 7. Figure 3 shows where new nodes and links have been added to the network, with version 2.5 shown in red, against version 1.9 shown in grey. with an inset map of the additional link in Olney. Additional nodes were included to aid the future comparisons between with and without scheme scenarios.

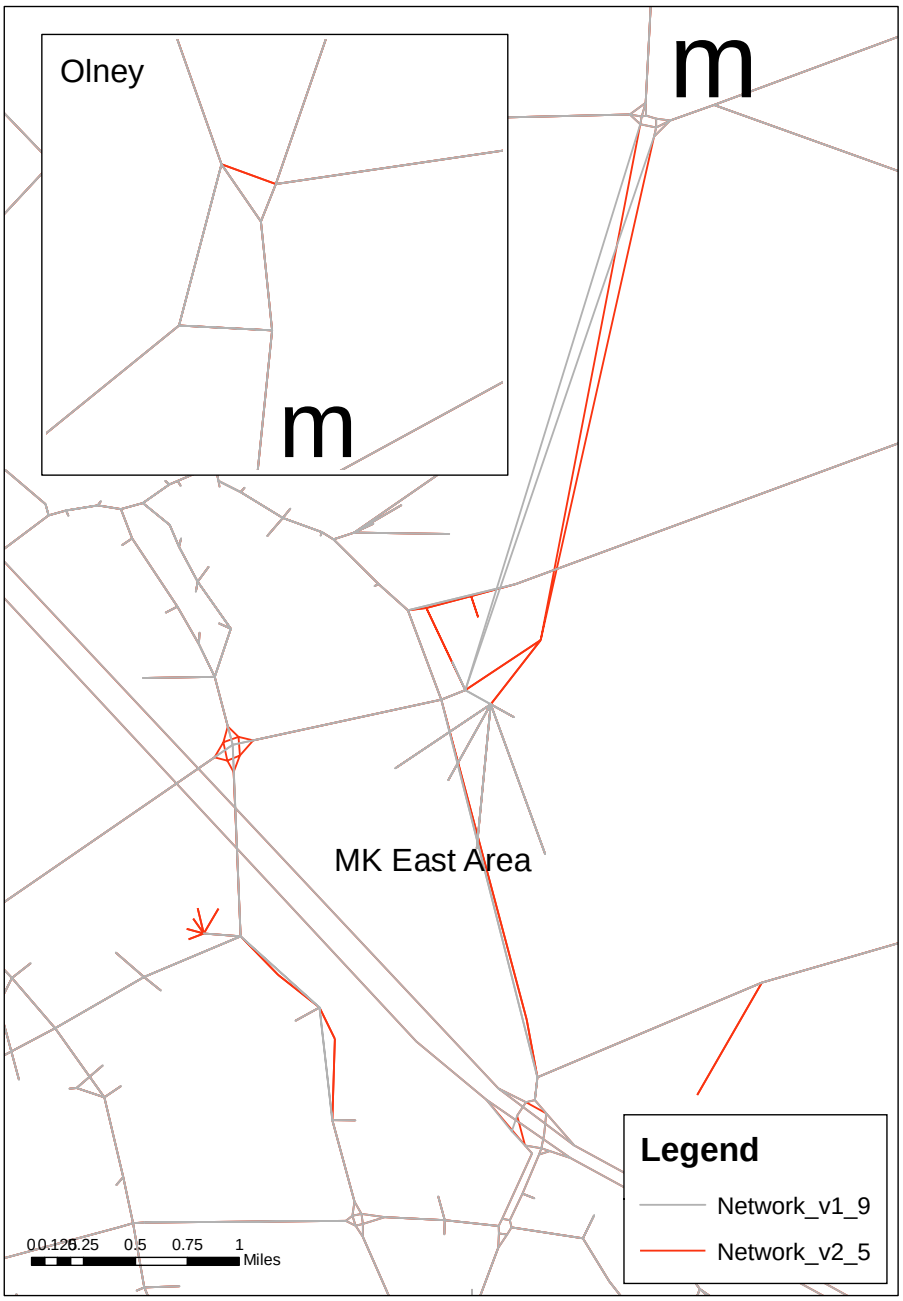


Figure 3. Network changes between previous model and current model

6. Network Verification

6.1.1 The network verification process was conducted to identify issues in the network causing long unrealistic delay, excessive queued flows or too much supressed demand. This was carried out in tandem with the network updates and for example identified the issue of speed flow curve capacities in the buffer network.

6.2 Stress Test

6.2.1 A final 'stress' test was carried out on the network based around artificially increasing the matrix flows to identify pinch points in the network. Trips in the prior matrix were increased by 25% and assigned to the network. In this way delays between the test run and the original prior matrix assignment could be compared and very large increases in delay at unrealistic or unexpected pinch points in the model identified. This test was carried out using the AM and PM models but not the IP model due to lower flows which may not trigger such issues in the network.

6.2.2 As shown in Figure 4 and Figure 5 there were significant increases in delay with the 25% increase in trips. However no specific issues were highlighted. The largest delay increase in the AM model was at the junction between Renny Park Road and the A509, with an increase of 350 seconds, or just under 6 minutes. The largest increase in delay in the PM was southbound on the A509 toward Junction 14, an increase of 178 seconds, or nearly three minutes.

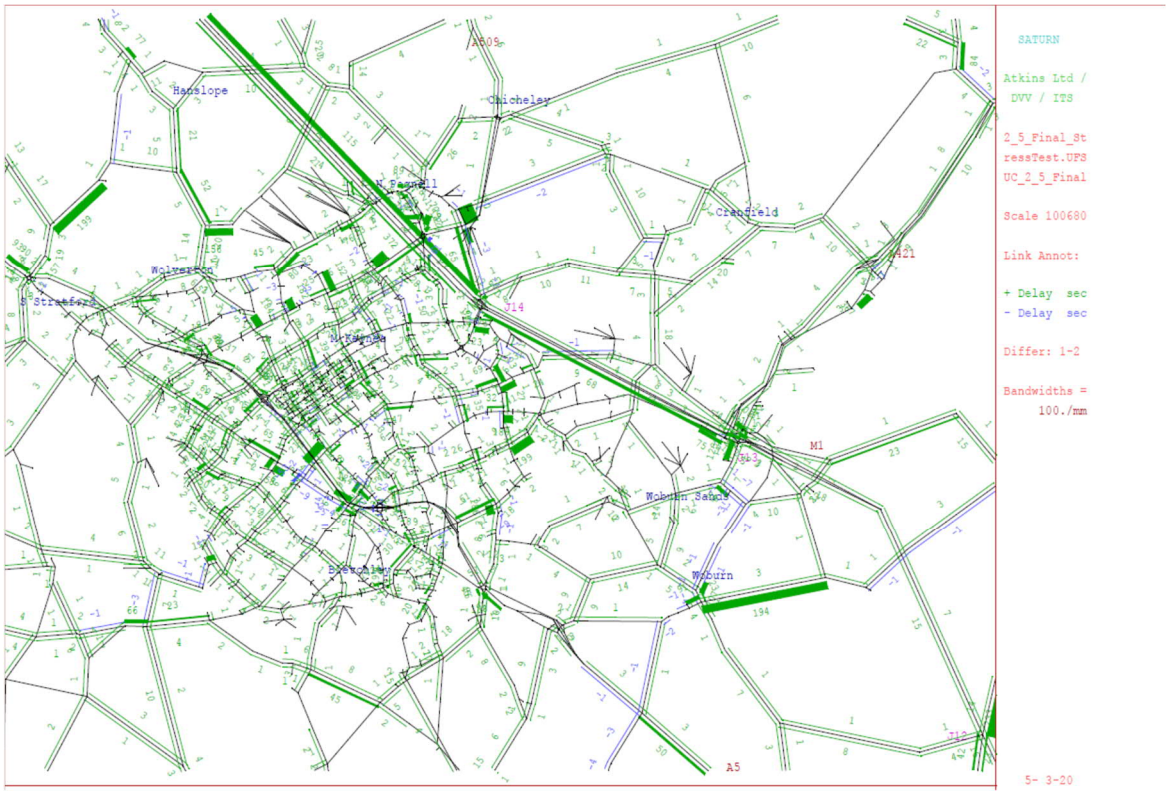


Figure 4. Total delay comparison, Stress Test – Prior - AM

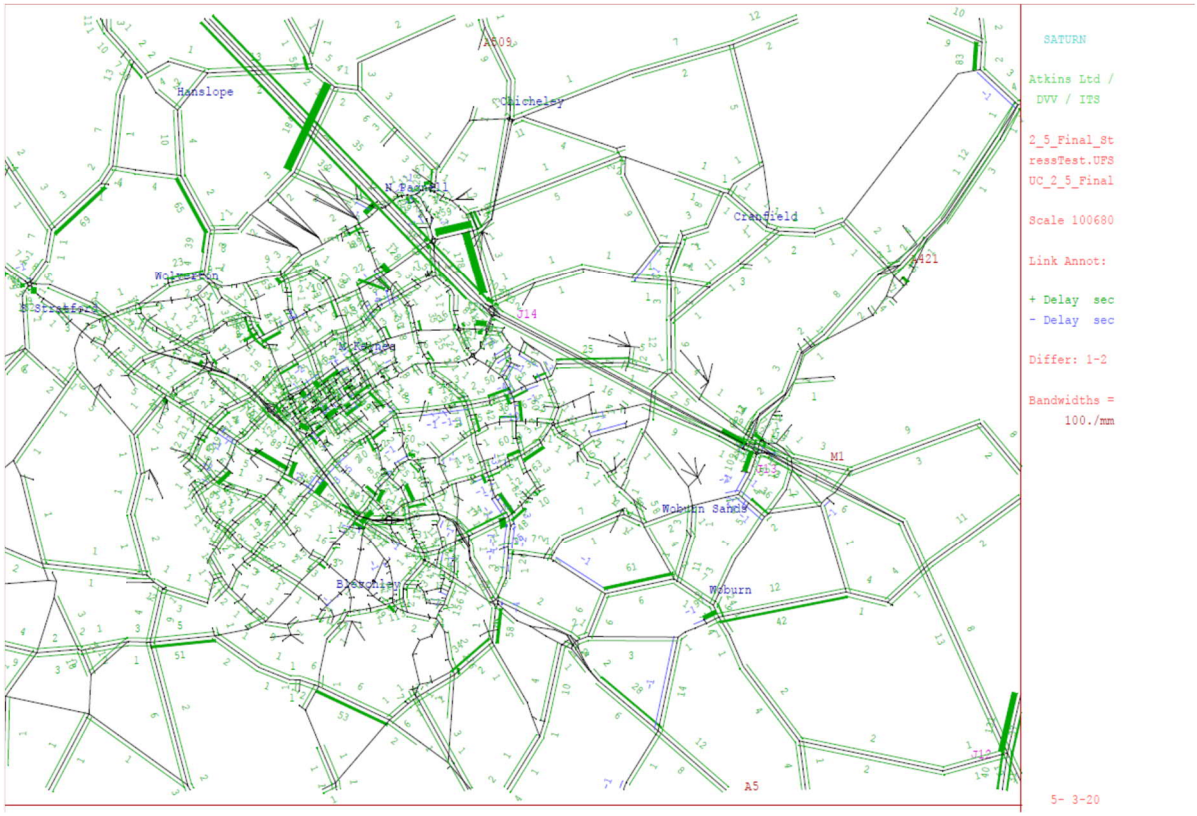


Figure 5. Total delay comparison, Stress Test – Prior - PM

7. Route Choice Calibration and Validation

7.1 Introduction

7.1.1 Further checks were made to ensure that traffic was taking sensible routes between a selection of zone pairs covering a number of key routes across and into Milton Keynes. In parallel with this exercise, flows on key roads in Milton Keynes were checked to ensure that their origins and destinations were sensible.

7.2 Route choice Calibration

7.2.1 Route choice calibration was conducted as part of the wider count and journey time calibration and validation process. Where it was thought count differences were due to inappropriate routeing, measures were taken to adjust speeds or change speed flow curves as appropriate to address the routeing in tandem with improving the count calibration.

7.2.2 A final check on routeing was conducted by using 'forest plots' between zone pairs covering a number of routes across and into Milton Keynes. The forest plots are similar to tree paths but show the percentage of assigned traffic from the matrix as the result of the iterative assignment process.

7.2.3 An example of the route choice checks is between Bedford and Milton Keynes where the A421 and A422 offer alternative route choices. Figure 6 shows the forest plot from South Bedford to Central Milton Keynes for the AM period with traffic routing via the A421. Figure 7 shows a forest plot from North Bedford to Central Milton Keynes for the AM indicating that traffic routes via the A422.

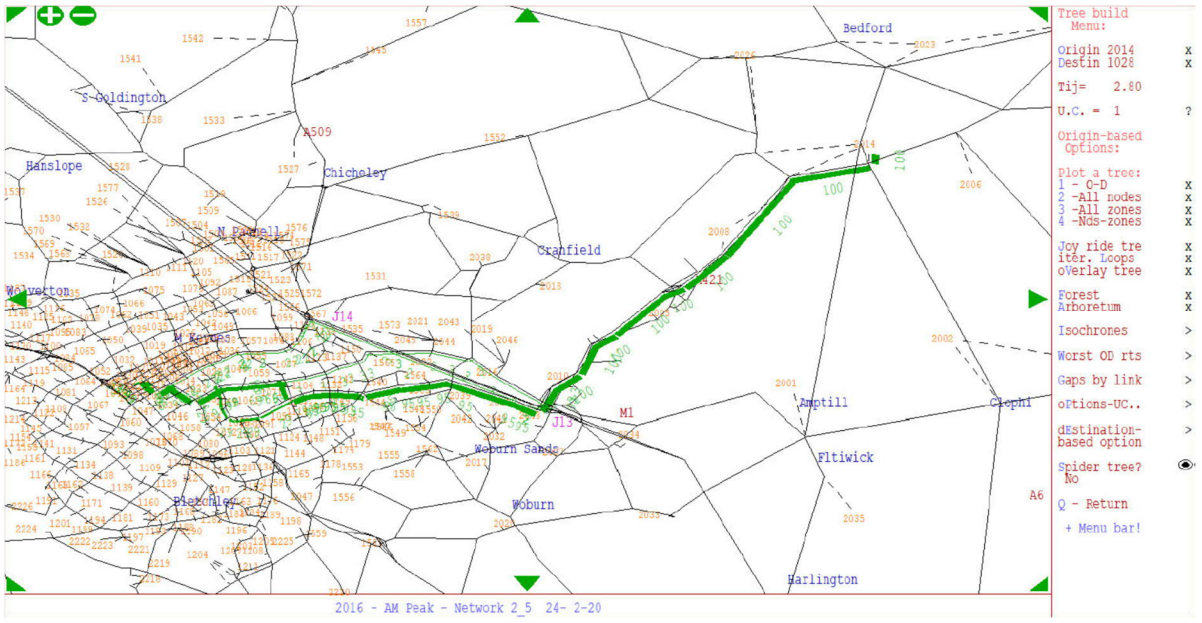


Figure 6. Forest Plot - South Bedford to Central Milton Keynes

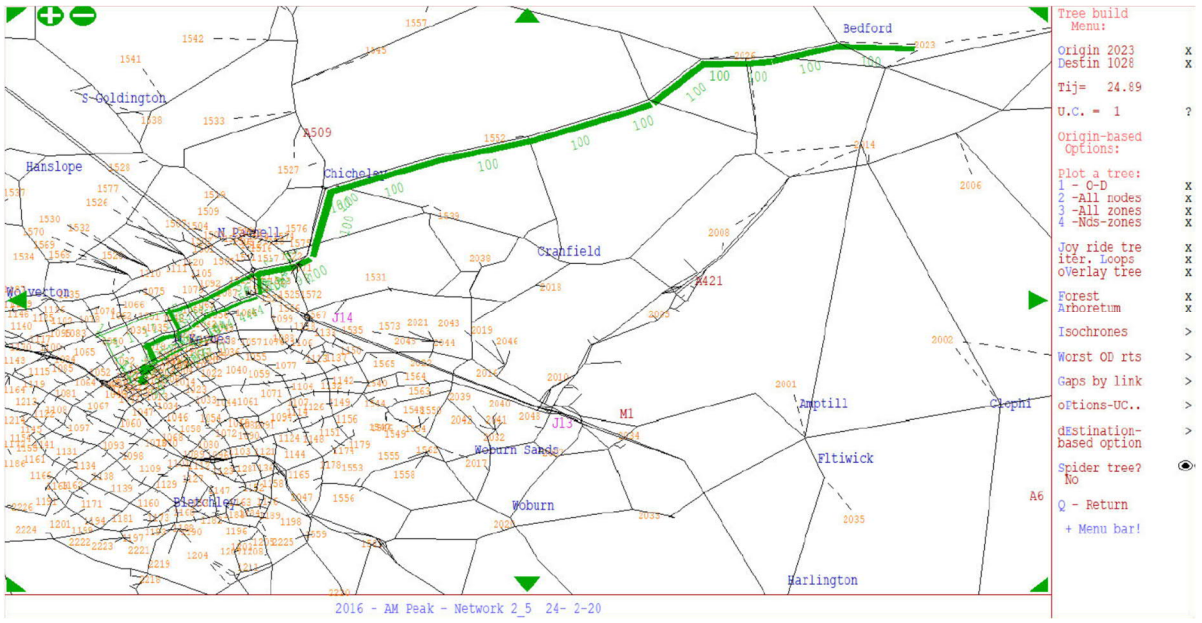


Figure 7. Forest Plot – North Bedford to Central Milton Keynes

7.2.4 All the forest plots for the final post matrix estimation (ME) assignment are shown in Appendix A. These consist of trips between the following origins and destination in each direction for each time period:

- North Bedford to central Milton Keynes
- South Bedford to central Milton Keynes
- Leighton Buzzard to central Milton Keynes
- South Buckingham to South Bedford
- North Buckingham to South Bedford
- Northampton to Luton
- Potterspury to Woburn Sands
- South Buckingham to Milton Keynes
- Bletchley to central Milton Keynes
- Wolverton to central Milton Keynes
- Newport Pagnell to Milton Keynes

7.2.5 Overall it can be seen that the model behaves realistically and gives sensible route choices.

7.3 Route Choice Validation

7.3.1 To check routeing within the model a series of select link analyses were conducted on three corridors in Milton Keynes, the A421, A5 and A509. This was to check that the directions from where traffic was originating from and traveling to, were sensible.

7.3.2 Appendix B shows the results in full, with Figure 8 to Figure 10 showing an example of each select link corridor analysis for a single direction.

7.3.3 Figure 8 shows the traffic routeing SB along the A5 originates from the A422, A5 to the north and A508, travelling into Milton Keynes or continuing down the A5 and A4146 all of which are sensible route choices.

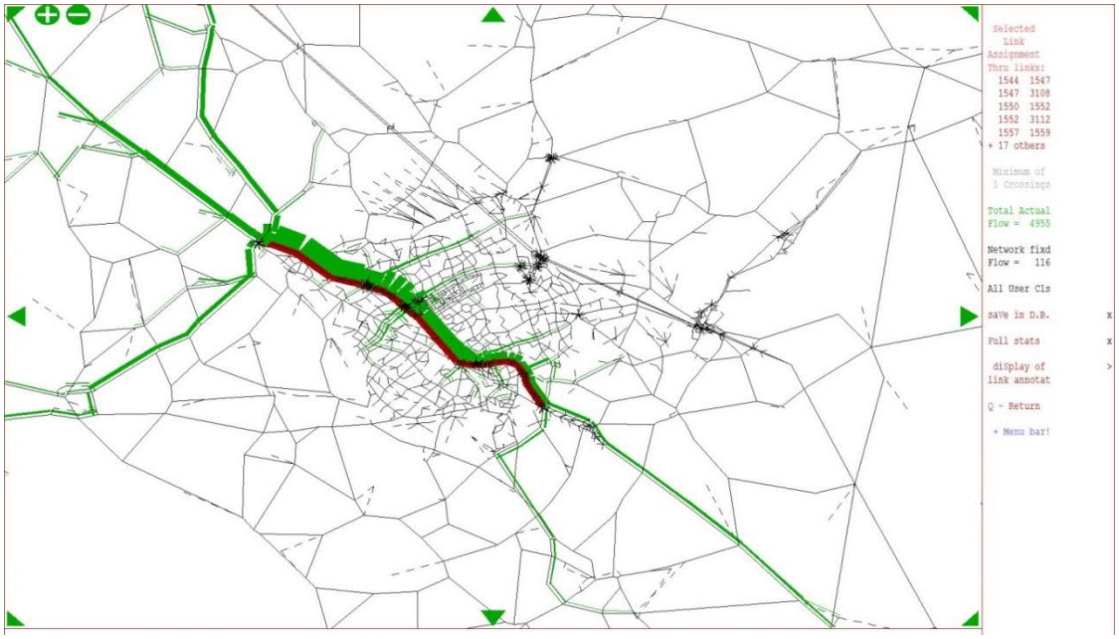


Figure 8. Select Link – A5 Corridor, SB – AM

7.3.4 Figure 9 shows the majority of traffic WB along the A421 originates east of M1 along the A421 towards Bedford and from M1 NB south of J13. Most traffic is destined towards Milton Keynes with a significant number continuing toward Buckingham.

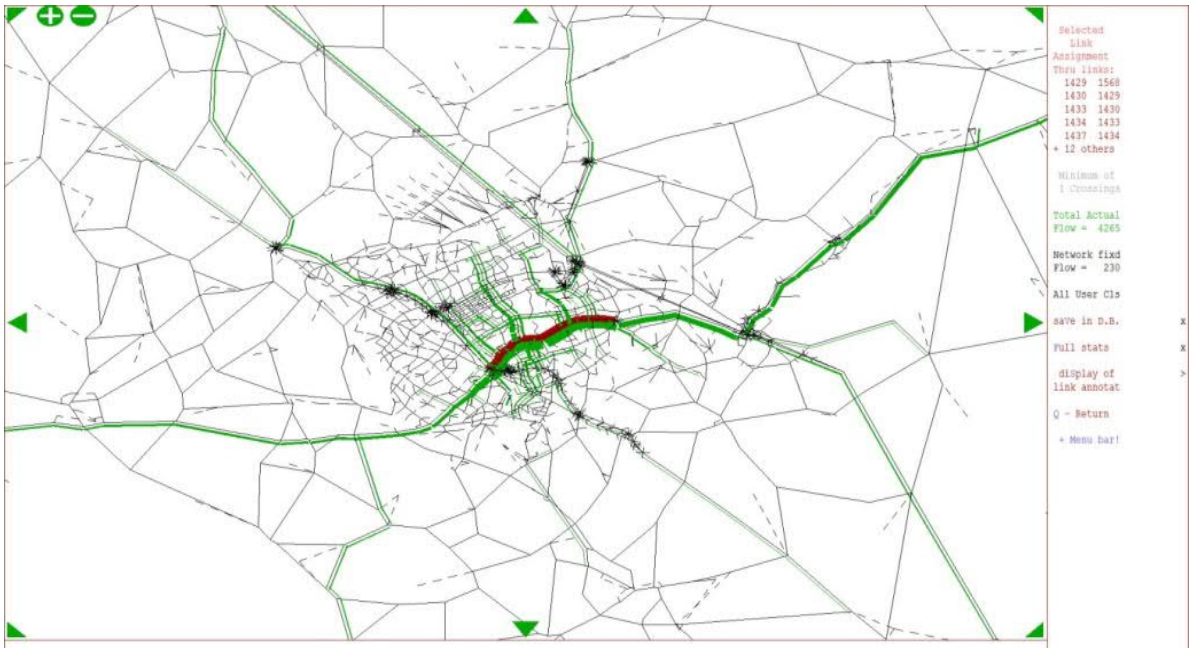


Figure 9. Select Link – A421 Corridor, WB - AM

7.3.5 It can be seen in Figure 10 that the majority of the traffic using the A509 is travelling into Milton Keynes originating from A509 to the North and the A422. Again this routing is considered appropriate.

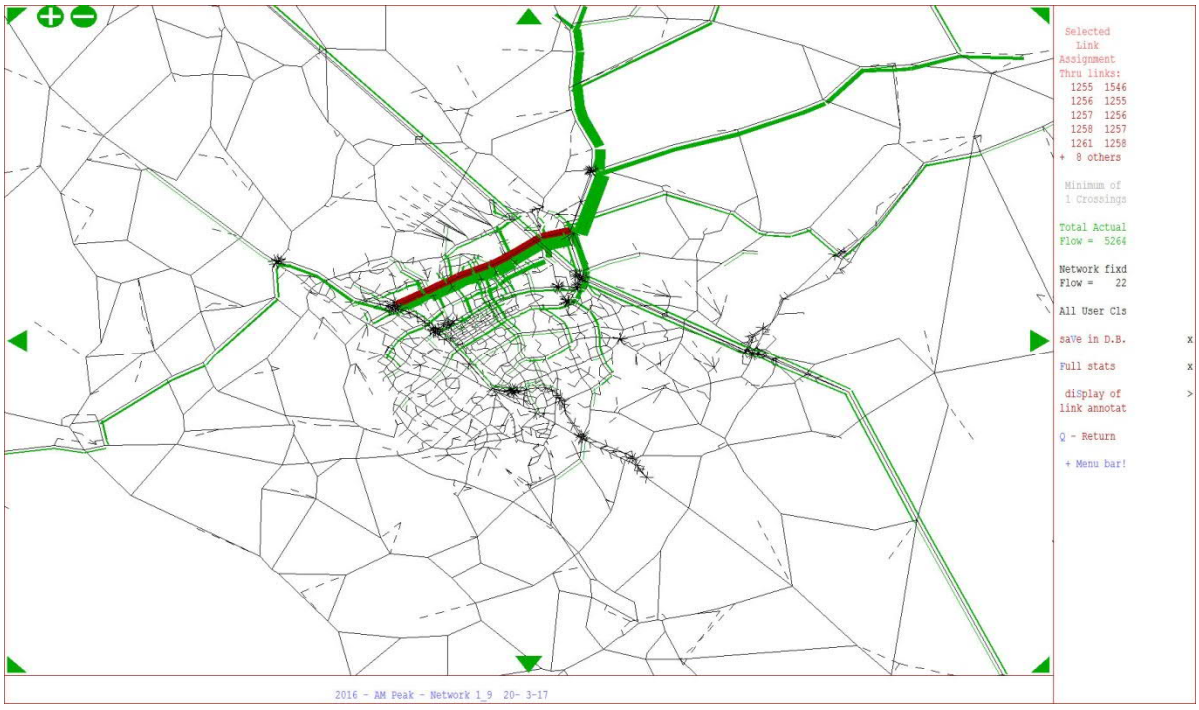


Figure 10. Select Link – A509 Corridor, WB - AM

8. Trip Matrix Calibration and Validation

8.1 Introduction

8.1.1 This section provides an overview of the process adopted to produce assignments that replicated the observed set of traffic counts on the links described in section 4 within appropriate tolerances. This followed a two staged process below;

- The network was calibrated by comparing modelled results produced using the prior matrices, using link journey times and screenline flows.
- The model was then further adjusted primarily with amendments to the matrix using Matrix Estimation (ME) but also further network edits where appropriate, so that the differences between modelled and observed data sets were within acceptable tolerances.

8.2 Matrix Estimation and Monitoring

8.2.1 Matrix estimation was conducted using the SATPIJA and SATME2 modules of the SATURN modelling package. The process adjusts the matrix by factoring origin and destination pairs to better match the observed count data. The process is purely mathematical with no behavioural basis so ideally it should be used for refinement rather than significant changes. Hence the aim to minimise the impacts of ME to the prior matrix in line with section 4.2 of WebTAG Unit M3.1, Highway Assignment Modelling (January 2014). As such the network calibration was conducted using the factored prior matrices to a suitable point before running ME.

8.2.2 The Matrix Estimation Process is shown in Figure 11. The original prior matrices were factored up to address the general shortfall of trips within the RSI Cordon. It was these factored prior matrices that were used in the matrix estimation process.

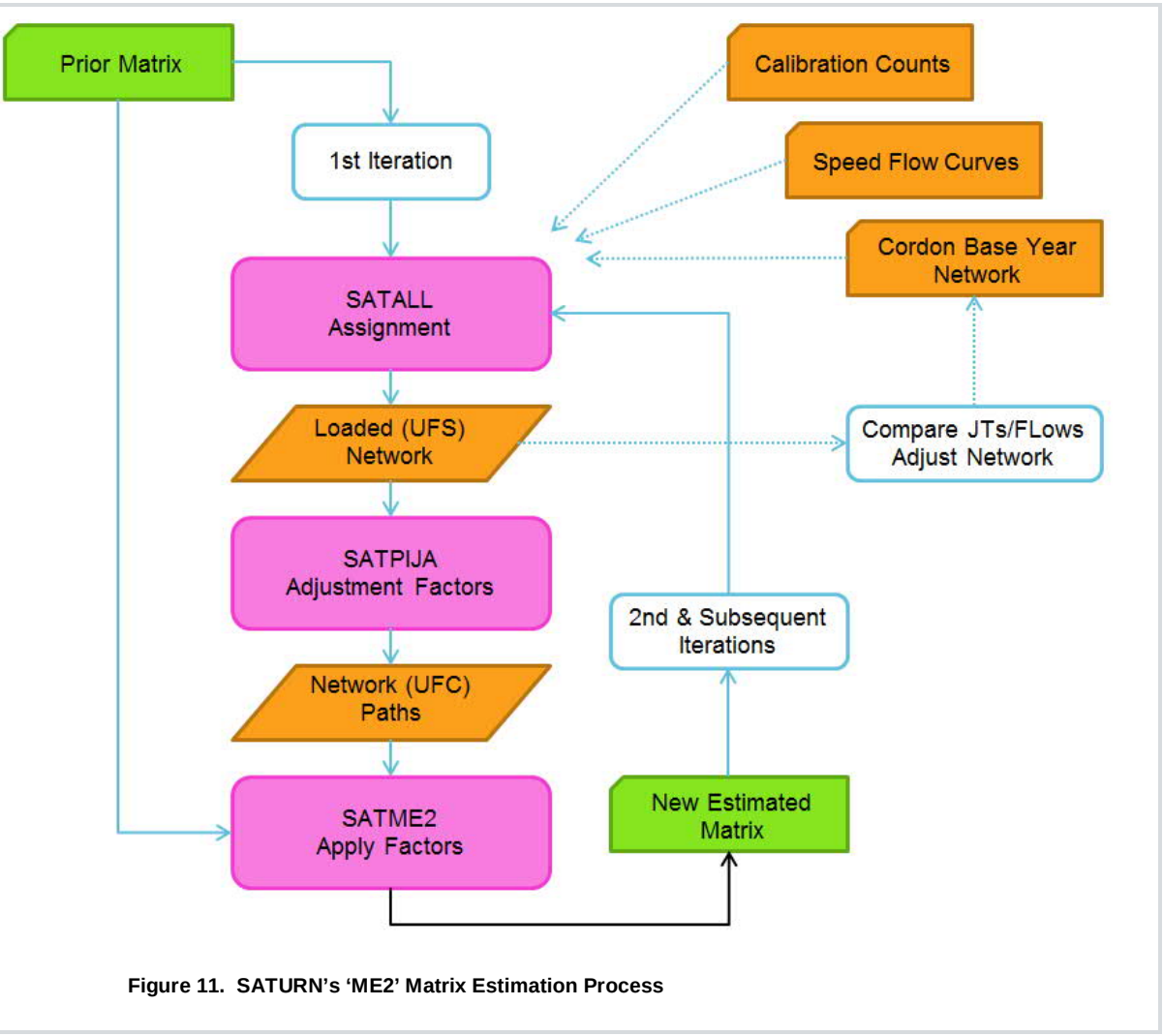


Figure 11. SATURN's 'ME2' Matrix Estimation Process

8.3 Final Results

8.3.1 To measure the impact of the ME process the following measures were used:

- Scatter plots and regression of modelled against observed flows,
- Post and factored prior ME trip length distributions,
- Post and factored prior ME trip end scatter plots and regressions statistics.

8.3.2 WebTAG guidelines (Section 3.2 TAG Unit M3.1, Highway Assignment Modelling Jan 2014) were used as a measure of the model validation.

8.4 Comparison of Modelled Flows against calibration counts

8.4.1 Modelled and observed calibration counts are compared with a linear regression trend line in Figure 12 to Figure 14. These show that calibration was to a good standard. The R^2 values being 0.987, 0.998 and 0.994 for AM, IP and PM respectively with the slopes all close to a value of 1, indicating a strong correlation between counts and modelled flows.

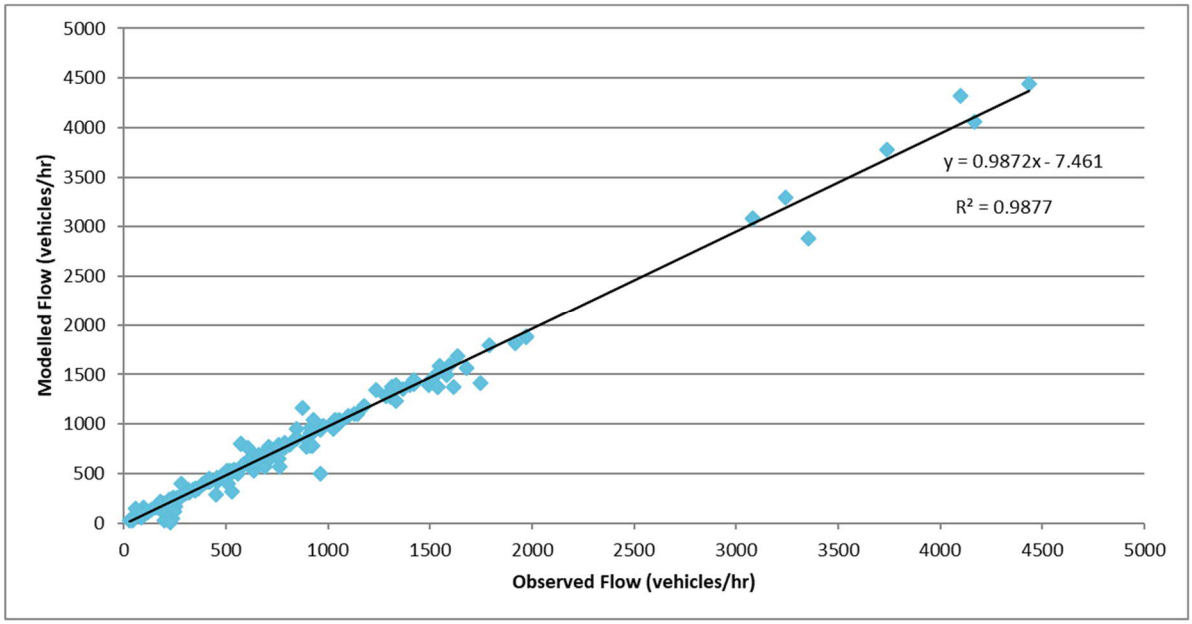


Figure 12. Comparison of Modelled against Observed Calibration Flows - AM

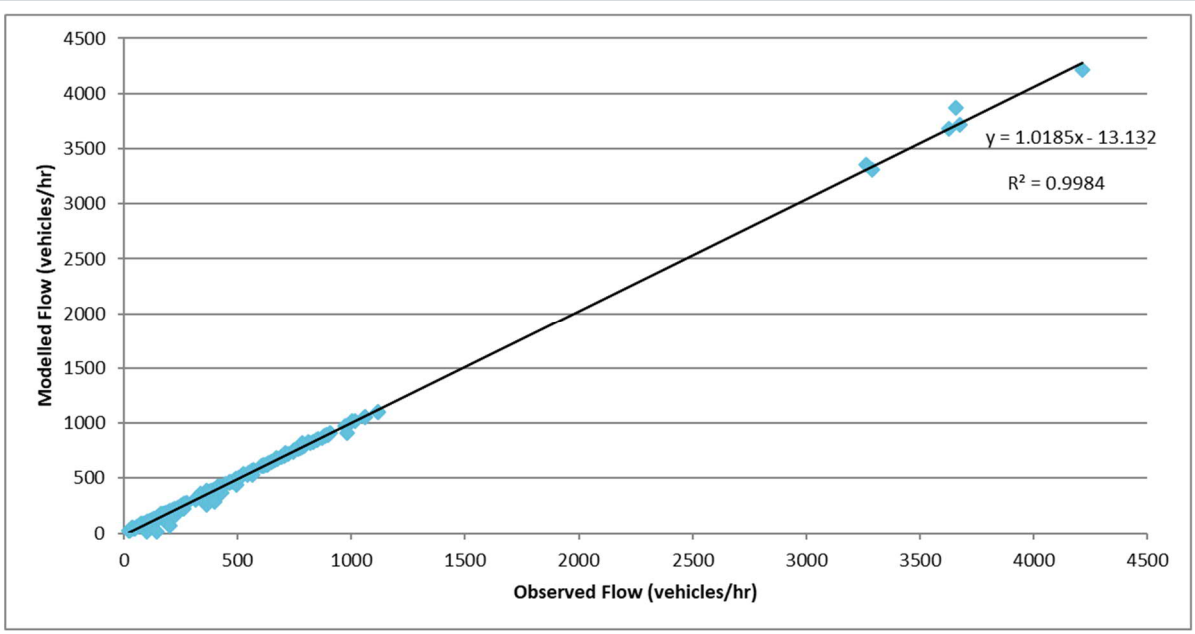


Figure 13. Comparison of Modelled against Observed Calibration Flows - IP

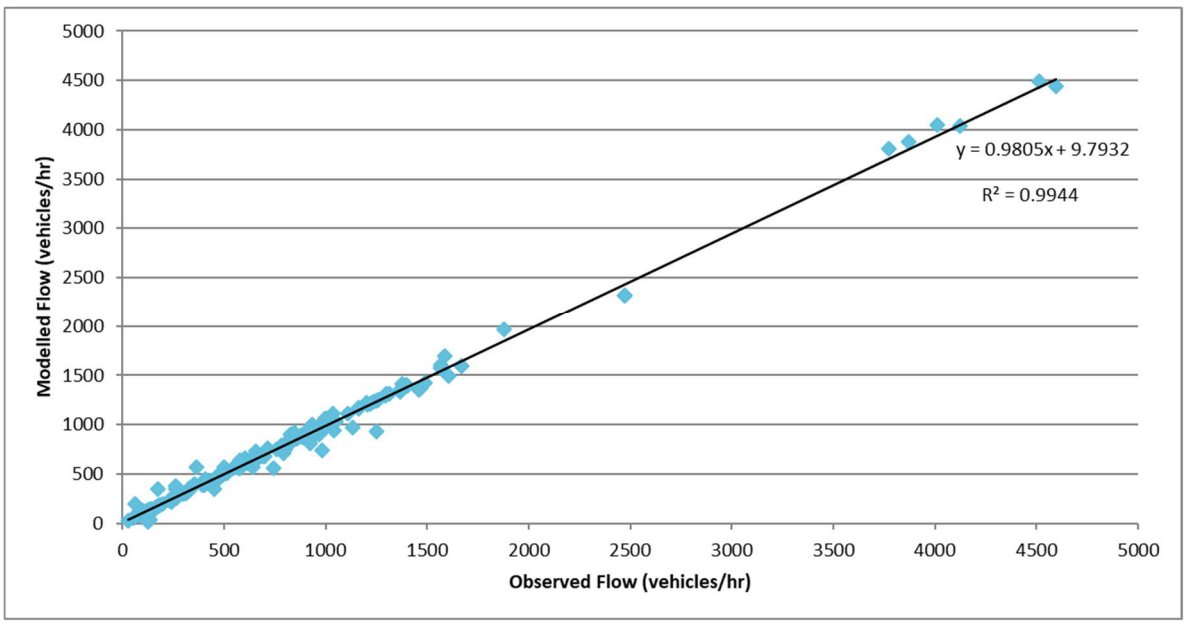


Figure 14. Comparison of Modelled against Observed Calibration Flows - PM

8.5 Post ME against prior ME Trip Length Distributions

8.5.1 Changes in trip length distribution as a result of the matrix estimation process were assessed by vehicle type to ensure the matrices had not been distorted by any adjustments applied as part of the process. To better assess the impacts the trips defined as external to external (with both origin and destination outside the RSI cordon) were excluded from the analysis.

8.5.2 Figure 15 to Figure 17 show the Trip Length Distribution (TLDs) post ME against the factored pre ME assignments for the AM period for Car, LGV and HGV. The corresponding plots along with the AM plots are in Appendix C.

8.5.3 The TLD comparisons are similar for car and LGV, with an increase of shorter trips in the 10 to 15km range for car. HGV shows more variation across different trip length ranges but still with an increase in shorter distance trips. The plots for IP and PM show a similar outcome. This is considered logical as in general trips within the RSI cordon in the prior matrix assignment were low so an increase in shorter local trips would be expected.

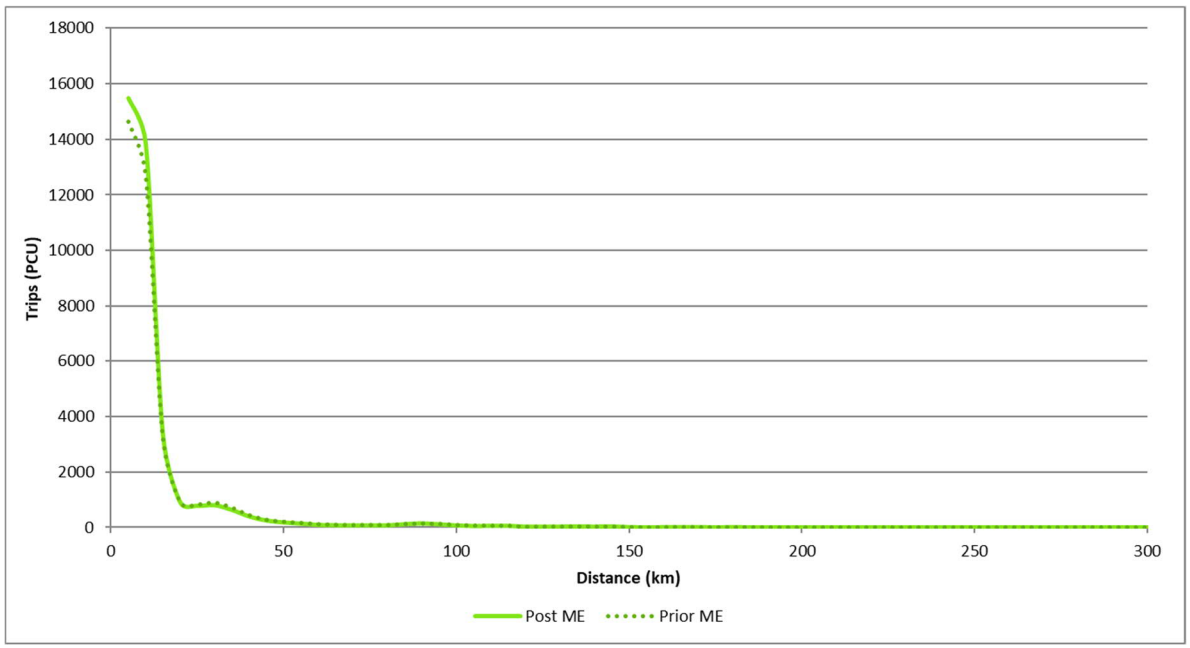


Figure 15. Trip Length Distribution Pre- and Post-ME: AM Car

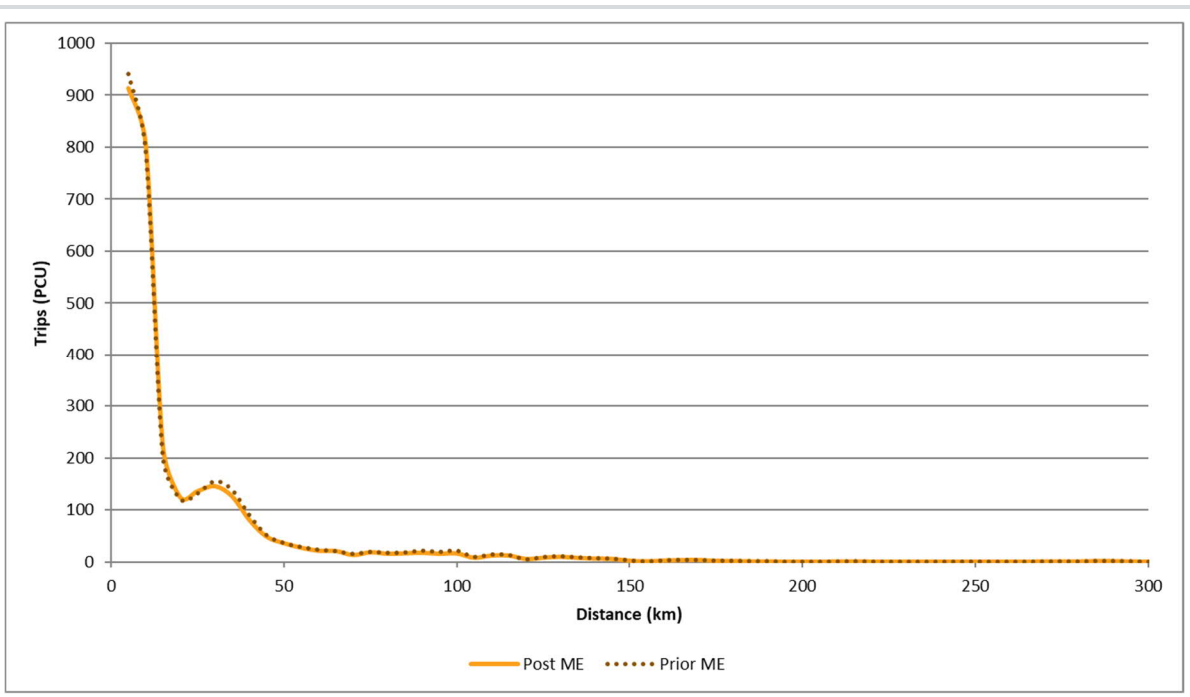


Figure 16. Trip Length Distribution Pre- and Post-ME: AM LGV

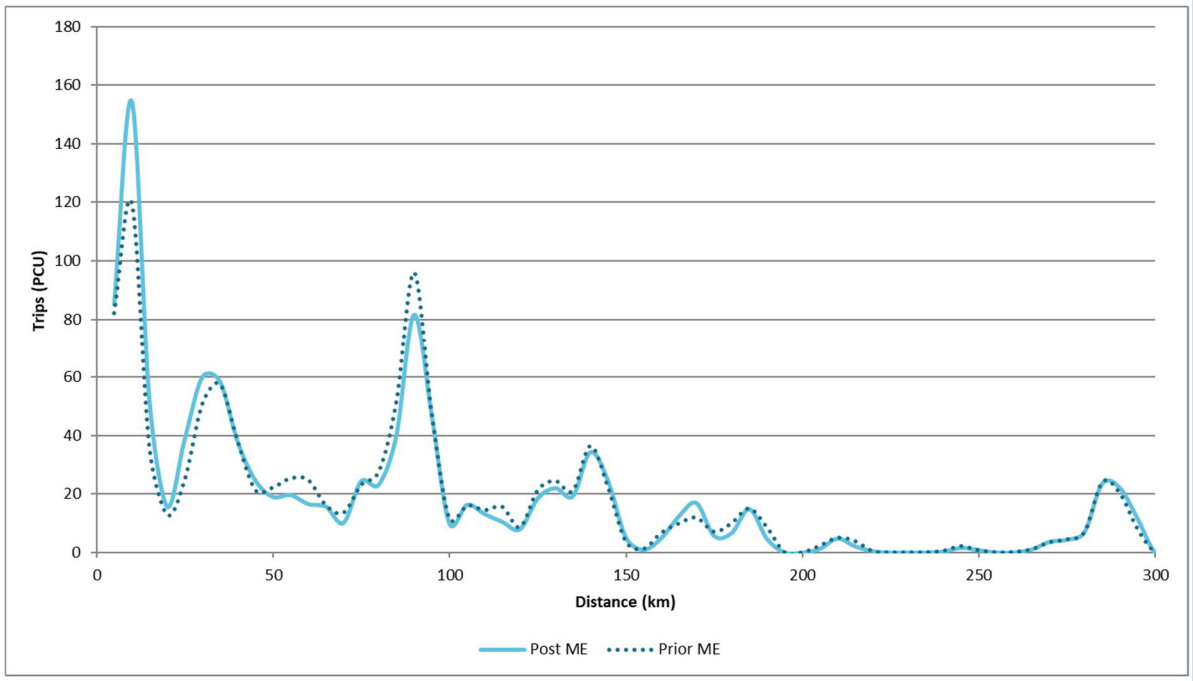


Figure 17. Trip Length Distribution Pre- and Post-ME: AM HGV

8.5.4 The mean distance travelled was calculated for both the post and prior assignments with the results shown in Table 8 to Table 10. As with the TLD plots, these tables exclude the external to external trips. The post ME averages should ideally be within 5% of the prior ME averages. The change in mean distance for car across each time period is close to this value with the AM and IP difference being marginally greater. HGV demand has the largest change in mean trip distance which is also greater in the inter peak period. Considering the level of uncertainty in the prior matrices, due to lack of observed data, the results are considered satisfactory.

Table 8: Change in Average Trip Length Pre- and Post-ME (Excluding Ext Origins): AM

	Car	LGV	HGV	All Vehicles
Prior Mean Trip Length (km)	12.66	21.52	87.40	15.44
Post Mean Trip Length (km)	11.89	20.55	83.00	14.46
Percentage Change	-6.09%	-4.49%	-5.03%	-6.29%

Table 9: Change in Average Trip Length Pre- and Post-ME (Excluding Ext Origins): IP

	Car	LGV	HGV	All Vehicles
Prior Mean Trip Length (km)	12.40	20.37	88.21	16.49
Post Mean Trip Length (km)	11.75	20.29	75.15	15.51
Percentage Change	-5.21%	-0.39%	-14.80%	-5.94%

Table 10: Change in Average Trip Length Pre- and Post-ME (Excluding Ext Origins): PM

	Car	LGV	HGV	All Vehicles
Prior Mean Trip Length (km)	15.93	23.04	88.23	17.01
Post Mean Trip Length (km)	15.28	22.23	82.45	16.45
Percentage Change	-4.10%	-3.55%	-6.55%	-3.28%

8.6 Comparison of post and prior ME Matrix Totals

8.6.1 The internal and external sector totals are listed by user class for post and prior matrix estimation in Table 11 to Table 13 indicating the impacts of M.E. As anticipated the largest changes are within the internal to internal trips with minimal impact on external to external. HGV trips have the largest percentage changes but this is in part due to the lower absolute numbers.

Table 11: Change in Matrix Totals by Sector (Internal/External) Pre- and Post-ME: AM

AM		User Class Total									
		Car Commute		Car EB		Car Other		LGV		HGV	
		Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.
Prior Matrix	Int.	13,645	4,059	2,112	792	13,009	3,049	1,799	1,217	225	930
	Ext.	11,207	2,102,010	1,296	474,540	5,143	2,022,186	1,446	415,866	1,234	176,393
Post ME Matrix	Int.	14,850	3,868	2,166	764	13,785	3,179	1,756	1,209	264	910
	Ext.	11,397	2,101,896	1,320	474,281	5,101	2,021,834	1,418	415,560	1,354	174,644
Change	Int.	8.8%	-4.7%	2.6%	-3.5%	6.0%	4.3%	-2.4%	-0.7%	17.3%	-2.2%
	Ext.	1.7%	0.0%	1.9%	-0.1%	-0.8%	0.0%	-1.9%	-0.1%	9.7%	-1.0%

Table 12: Change in Matrix Totals by Sector (Internal/External) Pre- and Post-ME: IP

IP		User Class Total									
		Car Commute		Car EB		Car Other		LGV		HGV	
		Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.
Prior Matrix	Int.	2,683	821	1,457	699	14,532	4,815	1,826	1,164	235	1,024
	Ext.	994	722,051	682	410,352	4,397	2,857,638	1,101	400,545	1,071	170,421
Post ME Matrix	Int.	3,083	795	1,581	692	16,390	4,844	1,779	1,142	388	1,097
	Ext.	1,005	722,987	713	410,429	4,449	2,855,295	1,089	400,778	1,099	170,420
Change	Int.	14.9%	-3.2%	8.5%	-1.0%	12.8%	0.6%	-2.6%	-1.9%	65.1%	7.1%
	Ext.	1.1%	0.1%	4.5%	0.0%	1.2%	-0.1%	-1.1%	0.1%	2.6%	0.0%

Table 13: Change in Matrix Totals by Sector (Internal/External) Pre- and Post-ME: PM

PM		User Class Total									
		Car Commute		Car EB		Car Other		LGV		HGV	
		Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.
Prior Matrix	Int.	10,989	7,705	2,060	900	15,465	7,880	1,574	1,112	85	367
	Ext.	3,697	1,970,865	533	497,073	5,428	2,903,276	1,174	327,349	410	111,591
Post ME Matrix	Int.	12,855	7,721	2,247	925	17,980	7,687	1,594	1,083	126	514
	Ext.	3,685	1,971,454	612	497,155	5,667	2,903,768	1,092	327,233	433	110,921
Change	Int.	17.0%	0.2%	9.1%	2.8%	16.3%	-2.4%	1.3%	-2.6%	48.2%	40.1%
	Ext.	-0.3%	0.0%	14.8%	0.0%	4.4%	0.0%	-7.0%	0.0%	5.6%	-0.6%

8.7 Comparison of matrix trip end totals before and after ME

8.7.1 The impact of ME on the matrix trip ends is shown in Figure 18 to Figure 23 as scatter plots and regressions by time period for origins and destinations. External to External trips have been excluded from the plots to greater assess the impacts. For each plot the x-axis represents the factored prior matrix and the y axis, the post ME matrix.

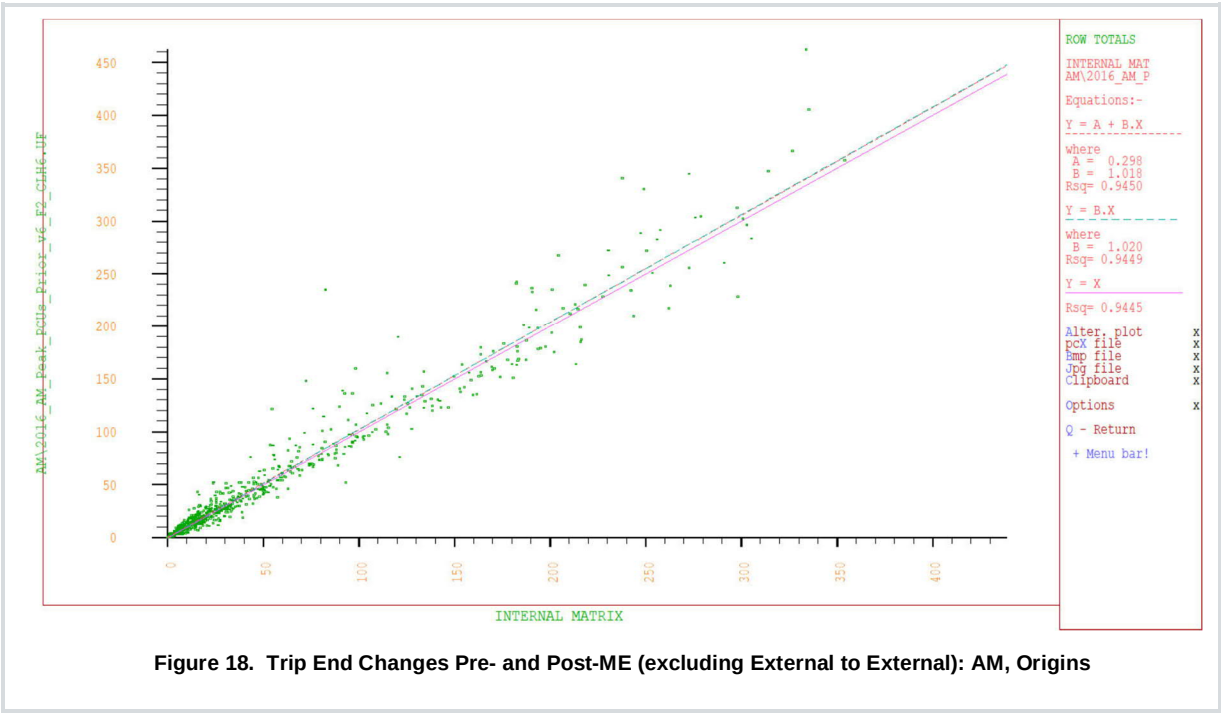


Figure 18. Trip End Changes Pre- and Post-ME (excluding External to External): AM, Origins

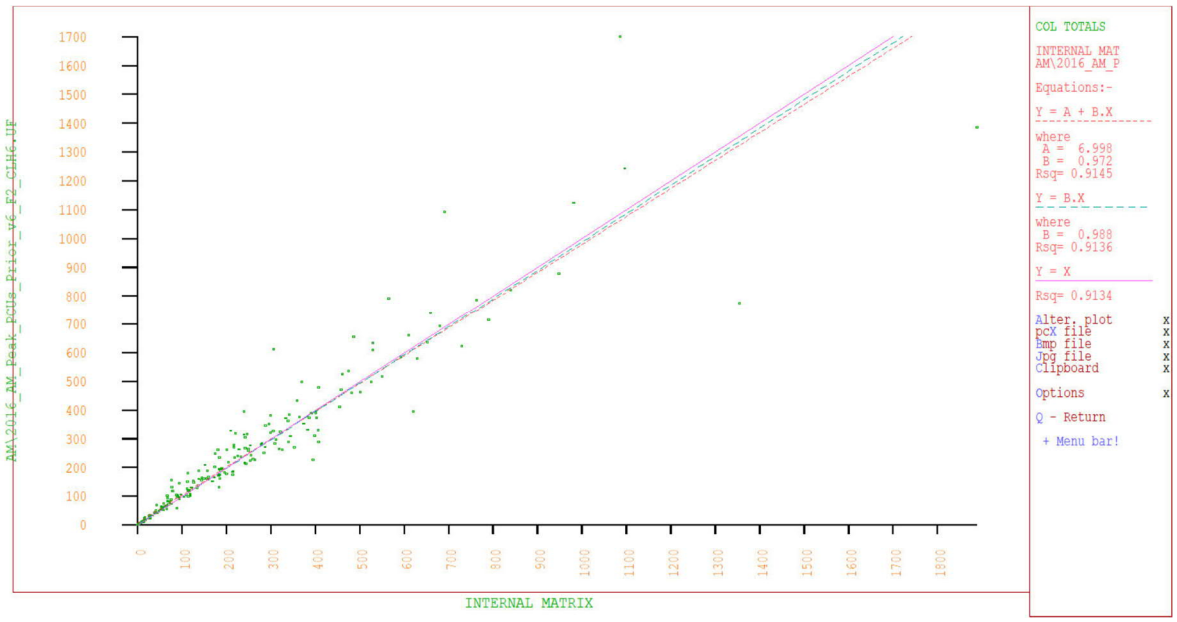


Figure 19. Trip End Changes Pre- and Post-ME (excluding External to External): AM, Destinations

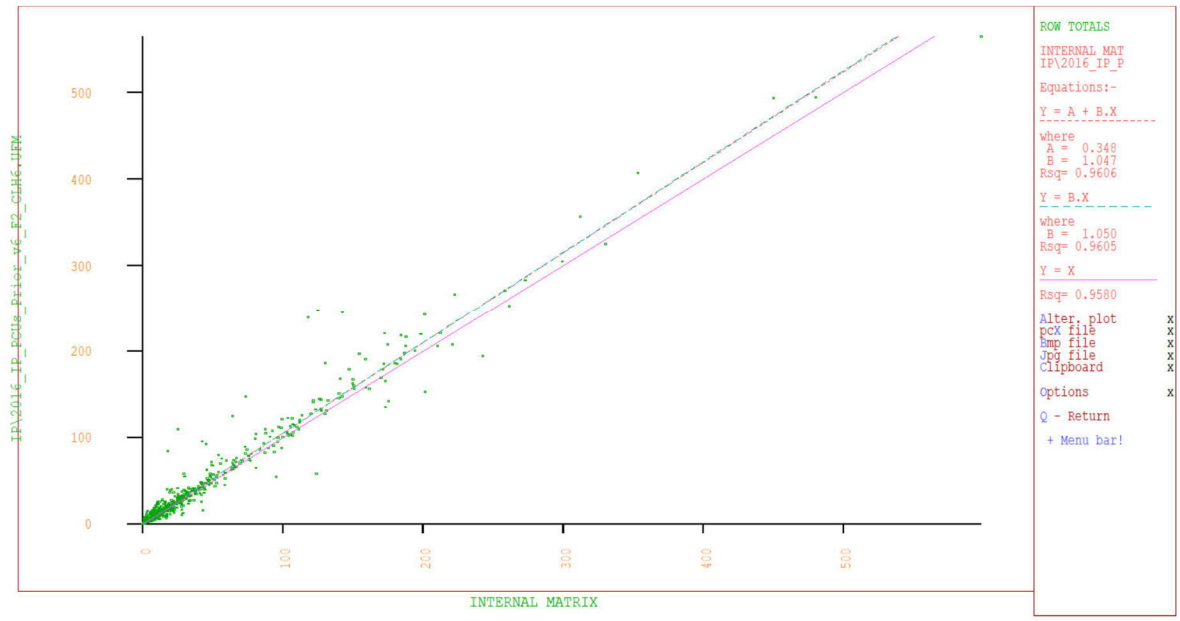


Figure 20. Trip End Changes Pre- and Post-ME (excluding External to External): IP, Origins

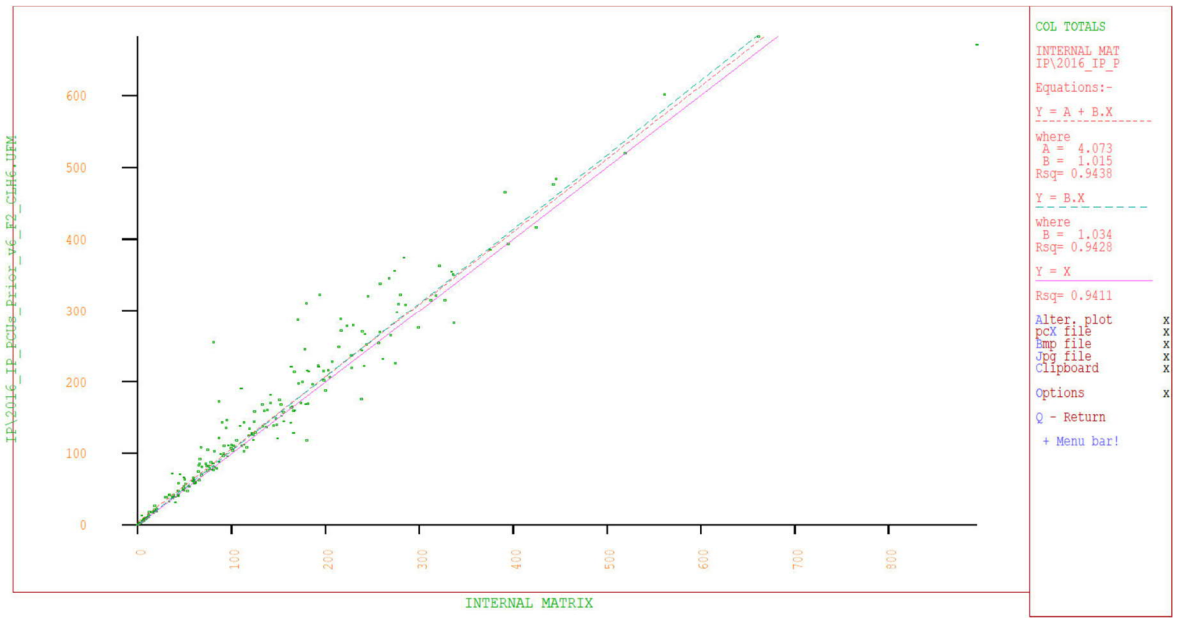


Figure 21. Trip End Changes Pre- and Post-ME (excluding External to External): IP, Destinations

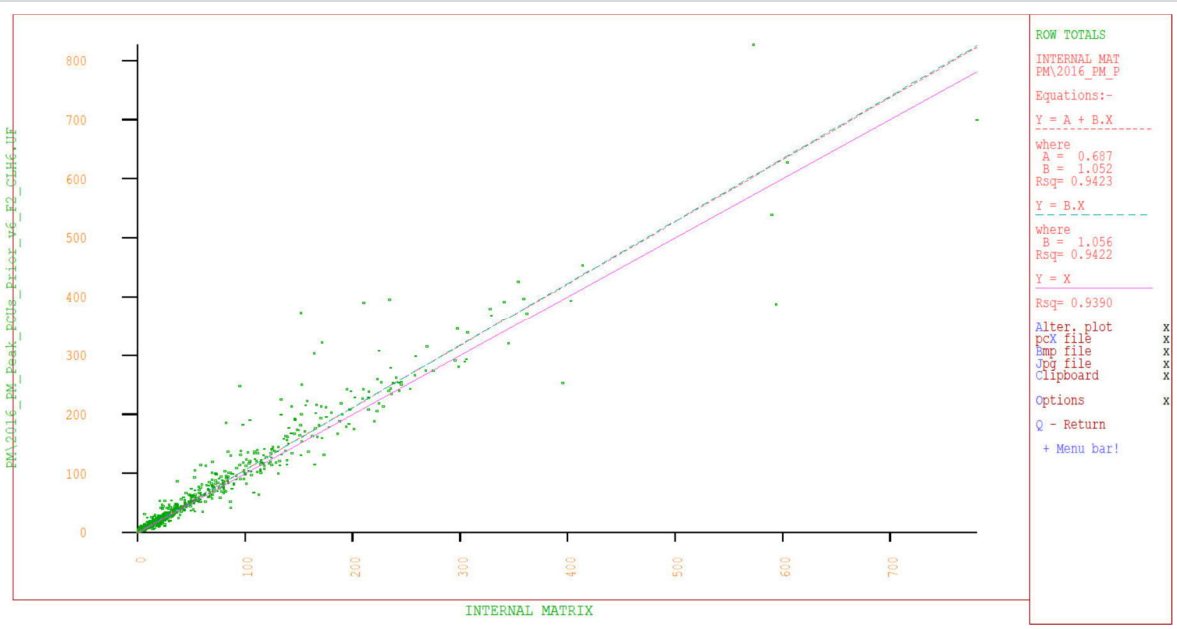


Figure 22. Trip End Changes Pre- and Post-ME (excluding External to External): PM, Origins

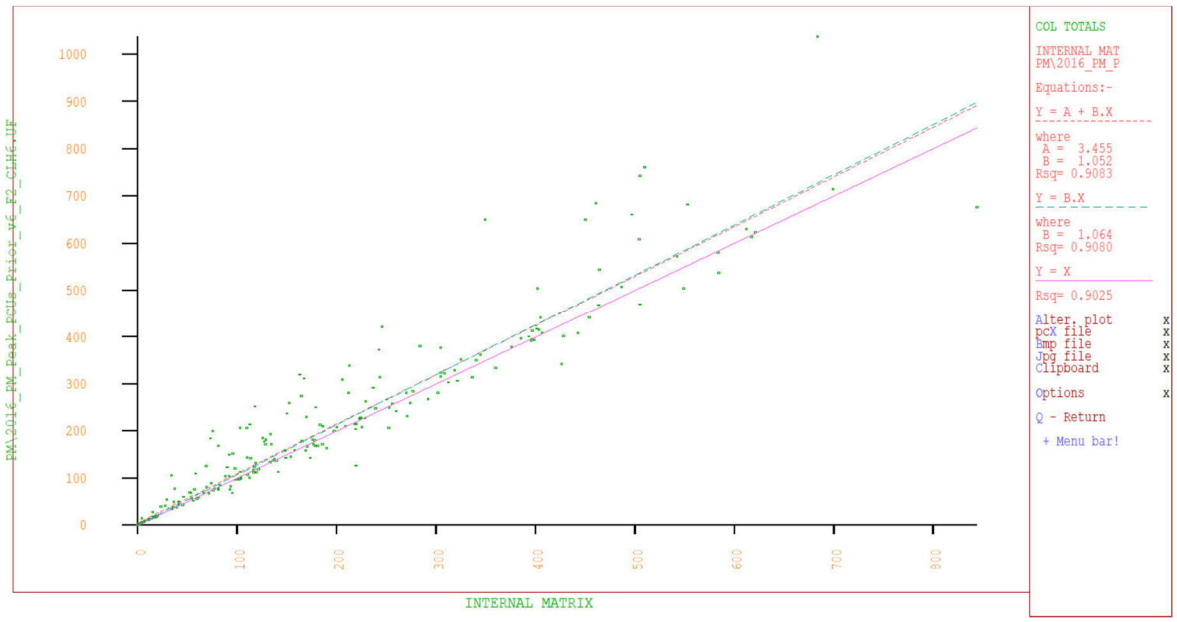


Figure 23. Trip End Changes Pre- and Post-ME (excluding External to External): PM, Destinations

8.7.2 Table 14 shows the regression statistics from the comparison of post and pre ME trip ends, excluding external to external trips. Table 5 of WebTAG Unit M3.1 specifies the following criteria: Slope within 0.99 and 1.01, Intercept near zero and R^2 in excess of 0.98. The intercepts for the origins are close to zero, with those for destinations slightly higher. The slopes are close to the criteria, with R^2 values slightly lower than the criteria specifies. Given the data sources used for the prior matrices as discussed in Section 7.1 of the Local Model Validation Report[3], the results of the regression analysis were considered to be acceptable.

Table 14: Regression Statistics for Matrix Trip Ends Pre and Post-ME (Excluding Ext to Ext)

Time Period	Trip Ends	Intercept	Gradient	R^2
	WebTAG Criteria	Near Zero	Between 0.99 – 1.01	Greater than 0.98
AM	Origins	0.30	1.02	0.95
	Destinations	7.00	0.97	0.91
IP	Origins	0.35	1.05	0.96
	Destinations	4.07	1.01	0.95
PM	Origins	0.69	1.05	0.94
	Destinations	3.46	1.05	0.91

[3] Milton Keynes Multi-Modal Model Update - Highway Model Local Model Validation Report. June 2017

8.8 Comparison of Matrix Cell Values before and after ME

8.8.1 Table 15 shows the regression statistics from the comparison of pre and post ME matrix cell values, excluding external to external trips, by vehicle type. Table 5 of WebTAG Unit M3.1 specifies the following guidelines for the cell variation: Slope within 0.98 and 1.02, Intercept near zero and R^2 in excess of 0.95.

8.8.2 The intercepts are all very close to zero, the gradient for car meets the criteria for AM and PM and is just over for IP. The gradients for LGV and HGV are all slightly low. The individual zone to zone regression fit is not as good as that for the trip ends. This is partly due to the trips internal to Milton Keynes being determined from a synthetic model as no observed origin-destination data was available.

Table 15: Regression Statistics for Matrix Cell Values Pre- and Post-ME (Excluding Ext to Ext)

Time Period	Vehicle Type	Intercept	Gradient	R^2
AM	Car	0.01	0.99	0.76
	LGV	0.00	0.88	0.76
	HGV	0.00	0.85	0.48
IP	Car	0.01	1.04	0.83
	LGV	0.00	0.86	0.73
	HGV	0.00	0.81	0.34
PM	Car	0.01	1.01	0.70
	LGV	0.00	0.79	0.62
	HGV	0.00	0.93	0.33

9. Assignment Calibration and Validation

9.1.1 It is important to ensure the results produced by the model are sensible when the trip matrices are assigned to the network. As such both link count and journey time data were reviewed regularly throughout the process.

9.1.2 The cordons and screenlines as discussed in Section 4 and shown in Figure 1 were monitored by direction. This section provides the results and summarises the 'pass' rate based on the WebTAG criteria detailed in Table 1.

9.2 Assignment Calibration

9.2.1 Journey time comparisons were used to assist in the model calibration process. Where large differences were identified at certain points along a journey time routes steps were taken to address the cause. One approach was to adjust speeds / speed flow curves to better represent the road type or speed limits in place. Where there was an issue at a particular signalised junction across time periods the saturation flows were checked and signal timings adjusted appropriately.

9.2.2 As well as looking at the flows crossing each screenline checks were also made to ensure the modelled and observed flows at individual count sites. Due to the grid system in Milton Keynes and hence the multiple route choices available this was not an insignificant task. Junction coding was reviewed and amended if observed to be causing an unrealistic delay causing trips to route elsewhere.

9.3 Comparison against the Previous Model

9.3.1 The absolute error plots shown in Figure 24 to Figure 27 compare the post matrix estimation counts against the observed counts for the AM and PM time periods between the previous model version and the model update. In both time periods, the calibration is improved upon, particularly along the A509. The validation of the M1 is slightly poorer than the previous model, however this is greatly offset by the improvements in north and east Milton Keynes in the vicinity of MKE.

9.3.2 The Journey time validation through MKE is just as strong with delays shifting from Renny Lodge Roundabout to Tickford Roundabout which better represents reality.

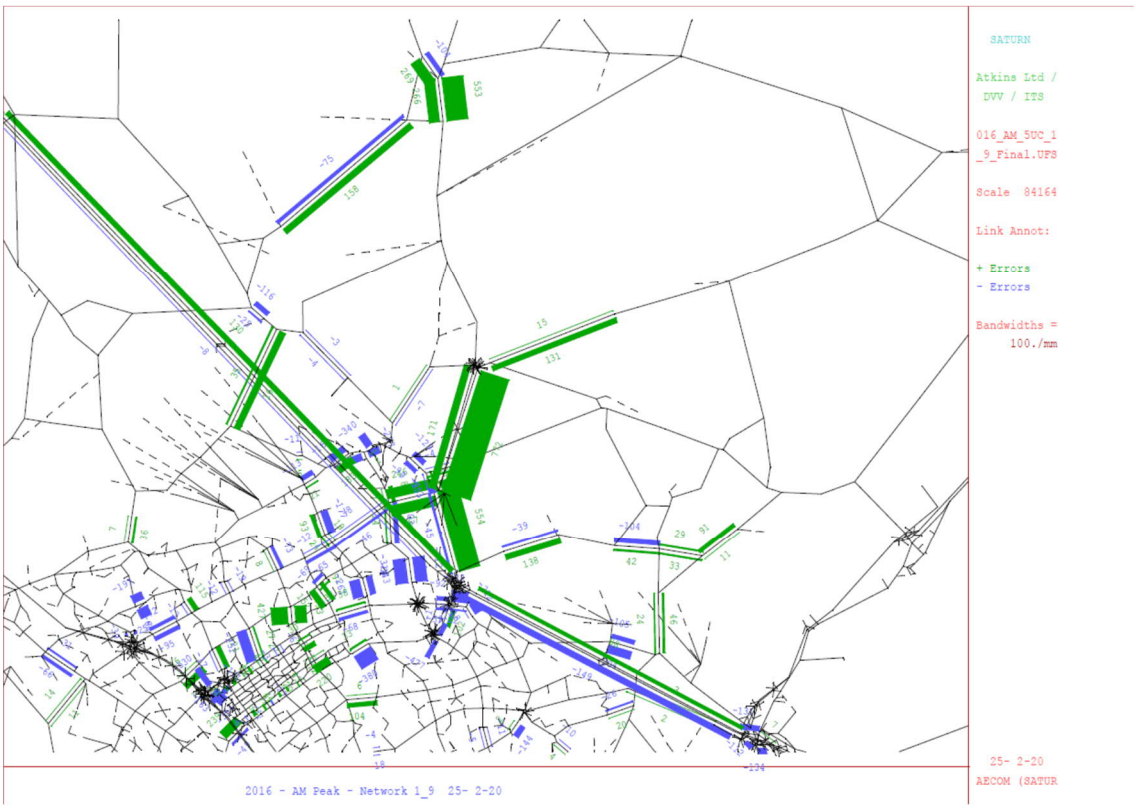


Figure 24. Absolute Error Post Matrix Estimation – Previous Model Version – AM Peak

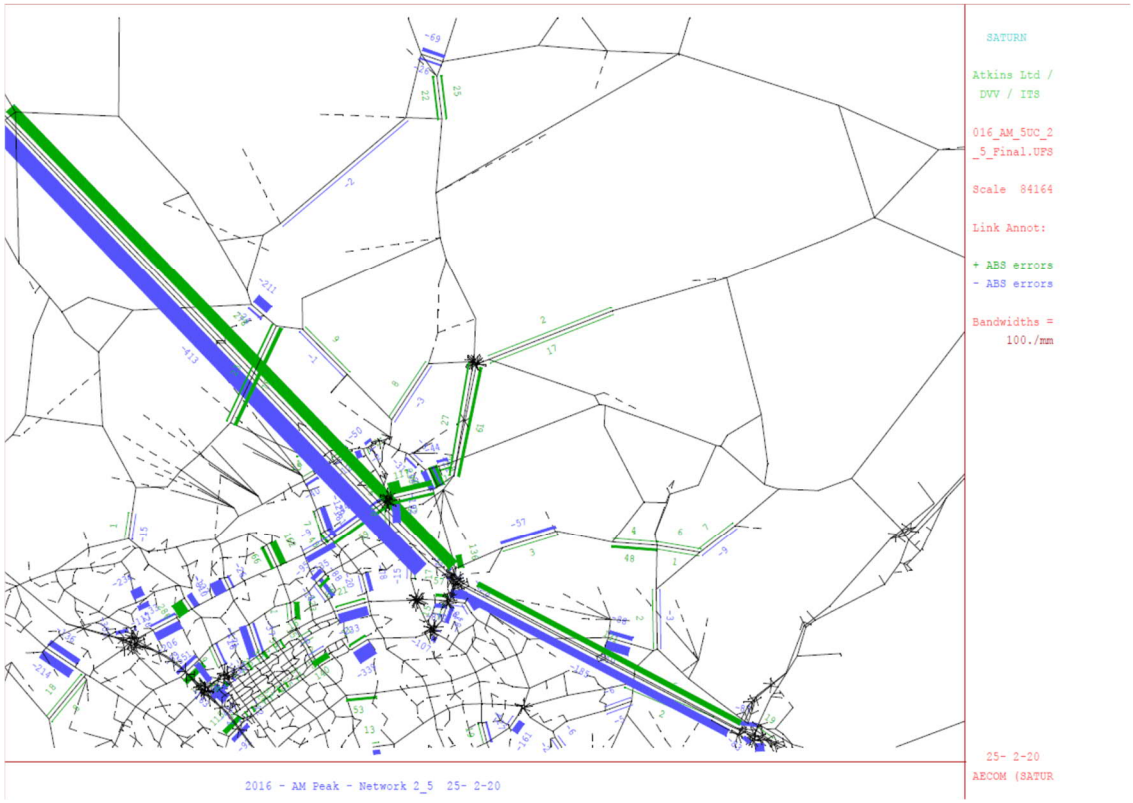


Figure 25. Absolute Error Post Matrix Estimation – Model Update – AM Peak

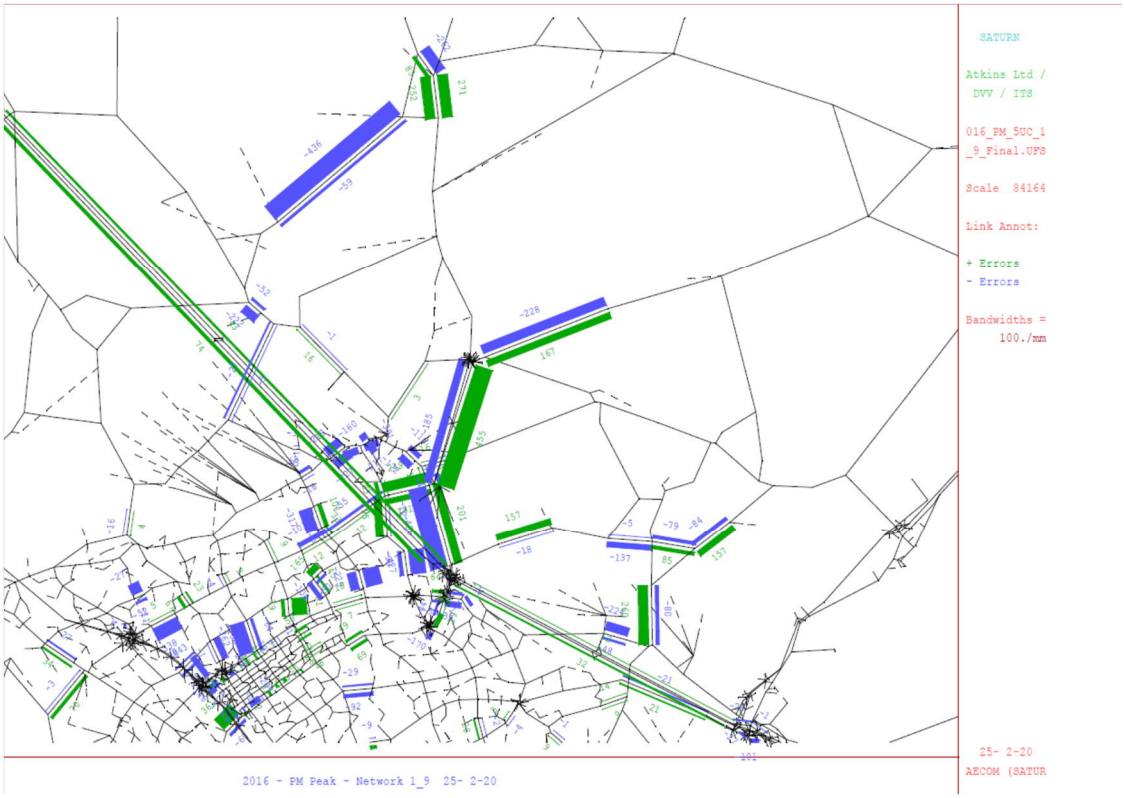


Figure 26. Absolute Error Post Matrix Estimation – Previous Model Version – PM Peak

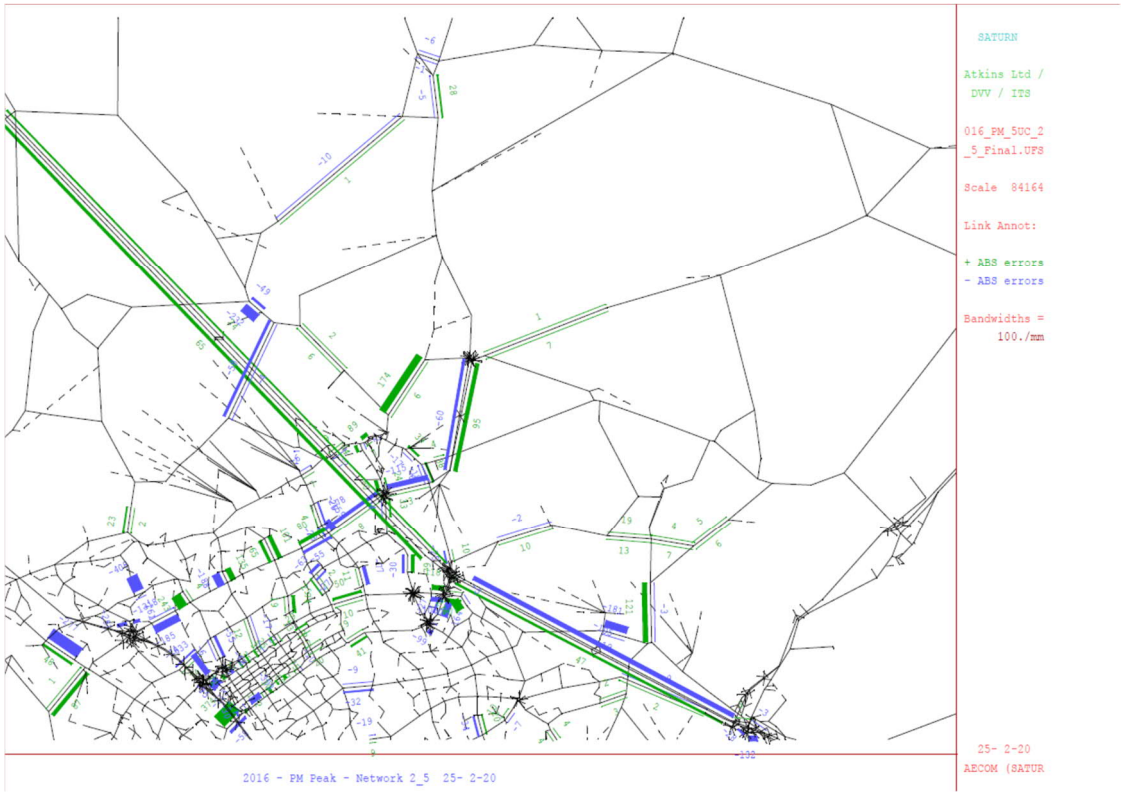


Figure 27. Absolute Error Post Matrix Estimation – Model Update – PM Peak

9.3.3 The largest changes were in the AM peak model. As shown in Figure 28 there is a significant reduction in traffic volumes coming into Milton Keynes from the north-east of the town. There is also a reduction in traffic northbound on the M1 north of junction 14. This is in part because more traffic is leaving this junction to access Milton Keynes. The reason for this appears to be that to balance out the reduction in trips coming into Milton Keynes via the A509, matrix estimation increased the trips into Milton Keynes from the south that use the M1.

9.3.4 The use of the additional counts east of the M1 has impacted the traffic volumes within the cordon. Whilst trips coming into Milton Keynes up the M1 have increased, ME has not been able to fully replace lost external to internal trips with more local trips. Revisiting the prior matrices was beyond the scope of this work and is not consider proportionate given the calibration on the links in the locality of MKE that would be impacted by the development is now stronger compared to the observed count data.

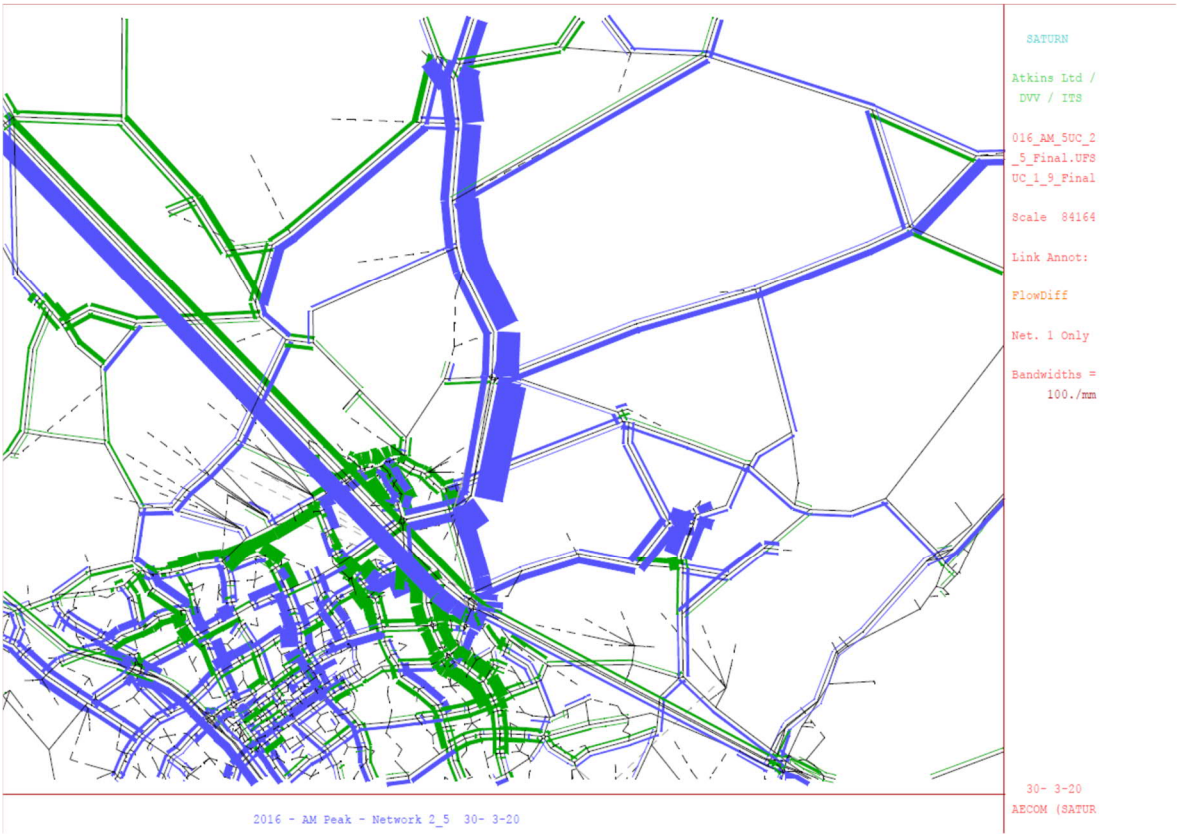


Figure 28. Actual Flow Post Matrix Estimation – New less Previous – AM Peak

9.4 Assignment Validation

9.4.1 The proportion of calibration and validation links where modelled flows passed the WebTAG link flow validation criteria in Table 1 was also reviewed.

9.4.2 Table 16 to Table 18 show the proportion of counts that meet the WebTAG criteria for how well the modelled and observed flows compare with each other. In all time periods the calibration counts meet the WebTAG criteria that >85% of flows meet Criteria A. Fewer validation flows satisfy Criteria A.

Table 16: Total Calibration and Validation Counts (Full Screenlines) - AM Peak

All Sites	Total no. of Counts	Counts that pass	%
Calibration Counts: Flows	190	172	91%
Calibration Counts: GEH	190	172	91%
Calibration Counts Either	190	175	92%
Validation Counts: Flows	26	13	50%
Validation Counts: GEH	26	15	58%
Validation Counts Either	26	15	58%

Table 17: Total Calibration and Validation Counts (Full Screenlines) - Inter-Peak

All Sites	Total no. of Counts	Counts that pass	%
Calibration Counts: Flows	190	187	98%
Calibration Counts: GEH	190	185	97%
Calibration Counts Either	190	187	98%
Validation Counts: Flows	26	11	42%
Validation Counts: GEH	26	13	50%
Validation Counts Either	26	13	50%

Table 18: Total Calibration and Validation Counts (Full Screenlines) - PM Peak

All Sites	Total no. of Counts	Counts that pass	%
Calibration Counts: Flows	190	180	95%
Calibration Counts: GEH	190	181	95%
Calibration Counts Either	190	181	95%
Validation Counts: Flows	26	12	46%
Validation Counts: GEH	26	13	50%
Validation Counts Either	26	13	50%

9.4.3 Table 19 to Table 21 show a breakdown by vehicle class. It can be seen that LGV and HGV have a higher percentage of validation counts that pass Criteria A but this is partly due to lower volumes. Further calibration and validation detail is provided in Appendix D and Appendix E.

Table 19: Total Calibration and Validation Counts (Full Screenlines) by Vehicle Class - AM Peak

All Sites	Total no. of Counts	Car		LGV		HGV	
		Counts that pass	%	Counts that pass	%	Counts that pass	%
Calibration Counts:	190	172	91%	190	100%	190	100%
Calibration Counts:	190	174	92%	183	96%	186	98%
Calibration Counts	190	174	92%	190	100%	190	100%
Validation Counts:	26	14	54%	26	100%	26	100%
Validation Counts:	26	16	62%	21	81%	26	100%
Validation Counts	26	16	62%	26	100%	26	100%

Table 20: Total Calibration and Validation Counts (Full Screenlines) by Vehicle Class - Inter-Peak

All Sites	Total no. of Counts	Car		LGV		HGV	
		Counts that pass	%	Counts that pass	%	Counts that pass	%
Calibration Counts:	190	188	99%	190	100%	190	100%
Calibration Counts:	190	186	98%	189	99%	190	100%
Calibration Counts	190	188	99%	190	100%	190	100%
Validation Counts:	26	11	42%	26	100%	26	100%
Validation Counts:	26	13	50%	21	81%	25	96%
Validation Counts	26	13	50%	26	100%	26	100%

Table 21 Total Calibration and Validation Counts (Full Screenlines) by Vehicle Class - PM Peak

All Sites	Total no. of Counts	Car		LGV		HGV	
		Counts that pass	%	Counts that pass	%	Counts that pass	%
Calibration Counts:	190	183	96%	190	100%	190	100%
Calibration Counts:	190	181	95%	188	99%	190	100%
Calibration Counts	190	184	97%	190	100%	190	100%
Validation Counts:	26	12	46%	26	100%	26	100%
Validation Counts:	26	13	50%	23	88%	26	100%
Validation Counts	26	13	50%	26	100%	26	100%

9.4.4 The journey time data was also used in the model calibration and validation process. The modelled journey times was compared to the observed journey time data extracted from Trafficmaster data.

9.4.5 Table 22 to Table 24 show the journey time comparisons. 92% of the modelled and observed journey times are within bounds defined in WebTAG as detailed in Table 2, for the AM time period, while 96% and 88% of IP and PM respectively are within bounds.

9.4.6 Figure 29 to Figure 34 show journey time comparison plots for Route 4, Portway/Fulmer St to Newport Pagnell and reverse. This route passes through the MK East development The complete set of journey time plots can be found in Appendix F.

Table 22: Observed and Modelled Journey Times - AM Peak

Route	Route Description	Time (s)				% Error	Within Bounds?
		Observed	Range	Modelled	Error		
1EB	A421 to M1 J13	1362	204	1109	-254	-19%	No
1WB	A421 from M1 J13	1266	190	1223	-43	-3%	Yes
2EB	Old Stratford to Chicheley	790	119	804	14	2%	Yes
2WB	Chicheley to Old Stratford	1184	178	1082	-102	-9%	Yes
3SB	Old Stratford to Watling, Little Brickhill	779	117	886	107	14%	Yes
3NB	Watling, Little Brickhill to Old Stratford	905	136	917	12	1%	Yes
4EB	Portway/Fulmer St to Newport Pagnell	941	141	904	-37	-4%	Yes
4WB	Newport Pagnell to Portway/Fulmer St	1130	170	1042	-88	-8%	Yes
5EB	Moulsoe to Child's Way / Tattenhoe St.	1230	185	1122	-108	-9%	Yes
5WB	Child's Way / Tattenhoe St. to Moulsoe	1095	164	1068	-27	-2%	Yes
6SB	Saxon St. / Newport Rd. to A4146 / Stoke Rd	1022	153	1004	-18	-2%	Yes
6NB	A4146 / Stoke Rd. to Saxon St. / Newport Rd	1058	159	989	-70	-7%	Yes
7SB	M1 J15 to M1 J13	1118	168	998	-120	-11%	Yes
7NB	M1 J13 to M1 J15	961	144	985	24	3%	Yes
8SB	Newport Pagnell to Bletchley	1006	151	1091	85	8%	Yes
8NB	Bletchley to Newport Pagnell	913	137	952	39	4%	Yes
9SB	Brickhill Street Southbound	176	26	167	-9	-5%	Yes
9NB	Brickhill Street Northbound	174	26	220	46	27%	No
10SB	A5130 through Woburn Sands SB	444	67	414	-30	-7%	Yes
10NB	A5130 through Woburn Sands NB	466	70	445	-21	-5%	Yes
12EB	MK central to M1 J13 via A421	906	136	849	-57	-6%	Yes
12WB	M1 J13 to MK Central via A421	1071	161	1100	29	3%	Yes
13EB	MK Central to M1 J13 via M1 J14	722	108	720	-3	0%	Yes
13WB	M1 J13 to MK Central via M1 J14	1006	151	1080	74	7%	Yes

Table 23: Observed and Modelled Journey Times - Inter-Peak

Route	Route Description	Time (s)				% Error	Within Bounds?
		Observed	Range	Modelled	Error		
1EB	A421 to M1 J13	963	144	872	-91	-9%	Yes
1WB	A421 from M1 J13	990	148	943	-47	-5%	Yes
2EB	Old Stratford to Chicheley	750	112	740	-10	-1%	Yes
2WB	Chicheley to Old Stratford	791	119	764	-27	-3%	Yes
3SB	Old Stratford to Watling, Little Brickhill	762	114	825	63	8%	Yes
3NB	Watling, Little Brickhill to Old Stratford	800	120	859	59	7%	Yes
4EB	Portway/Fulmer St to Newport Pagnell	787	118	818	31	4%	Yes
4WB	Newport Pagnell to Portway/Fulmer St	800	120	822	22	3%	Yes
5EB	Moulsoe to Child's Way / Tattenhoe St.	930	140	873	-57	-6%	Yes
5WB	Child's Way / Tattenhoe St. to Moulsoe	914	137	869	-45	-5%	Yes
6SB	Saxon St. / Newport Rd. to A4146 / Stoke Rd.	964	145	930	-34	-4%	Yes
6NB	A4146 / Stoke Rd. to Saxon St. / Newport Rd.	971	146	956	-16	-2%	Yes
7SB	M1 J15 to M1 J13	915	137	968	53	6%	Yes
7NB	M1 J13 to M1 J15	935	140	1087	152	16%	No
8SB	Newport Pagnell to Bletchley	862	129	837	-25	-3%	Yes
8NB	Bletchley to Newport Pagnell	858	129	834	-24	-3%	Yes
9SB	Brickhill Street Southbound	165	25	164	-1	0%	Yes
9NB	Brickhill Street Northbound	143	22	153	10	7%	Yes
10SB	A5130 through Woburn Sands SB	444	67	413	-31	-7%	Yes
10NB	A5130 through Woburn Sands NB	467	70	433	-34	-7%	Yes
12EB	MK central to M1 J13 via A421	884	133	824	-60	-7%	Yes
12WB	M1 J13 to MK Central via A421	892	134	842	-50	-6%	Yes
13EB	MK Central to M1 J13 via M1 J14	702	105	708	6	1%	Yes
13WB	M1 J13 to MK Central via M1 J14	681	102	733	52	8%	Yes

Table 24: Observed and Modelled Journey Times - PM Peak

Route	Route Description	Time (s)				% Error	Within Bounds?
		Observed	Range	Modelled	Error		
1EB	A421 to M1 J13	1246	187	1141	-105	-8%	Yes
1WB	A421 from M1 J13	1259	189	1168	-92	-7%	Yes
2EB	Old Stratford to Chicheley	900	135	1044	144	16%	No
2WB	Chicheley to Old Stratford	1023	153	965	-59	-6%	Yes
3SB	Old Stratford to Watling, Little Brickhill	878	132	895	17	2%	Yes
3NB	Watling, Little Brickhill to Old Stratford	1031	155	1026	-5	0%	Yes
4EB	Portway/Fulmer St to Newport Pagnell	1022	153	1095	73	7%	Yes
4WB	Newport Pagnell to Portway/Fulmer St	1001	150	984	-17	-2%	Yes
5EB	Moulsoe to Child's Way / Tattenhoe St.	1431	215	1163	-268	-19%	No
5WB	Child's Way / Tattenhoe St. to Moulsoe	1262	189	1155	-107	-8%	Yes
6SB	Saxon St. / Newport Rd. to A4146 / Stoke Rd.	1050	157	972	-78	-7%	Yes
6NB	A4146 / Stoke Rd. to Saxon St. / Newport Rd.	1094	164	1039	-55	-5%	Yes
7SB	M1 J15 to M1 J13	961	144	985	24	3%	Yes
7NB	M1 J13 to M1 J15	982	147	1055	73	7%	Yes
8SB	Newport Pagnell to Bletchley	982	147	933	-49	-5%	Yes
8NB	Bletchley to Newport Pagnell	1059	159	953	-106	-10%	Yes
9SB	Brickhill Street Southbound	248	37	189	-59	-24%	No
9NB	Brickhill Street Northbound	202	30	192	-10	-5%	Yes
10SB	A5130 through Woburn Sands SB	450	67	429	-21	-5%	Yes
10NB	A5130 through Woburn Sands NB	451	68	437	-14	-3%	Yes
12EB	MK central to M1 J13 via A421	1272	191	1145	-127	-10%	Yes
12WB	M1 J13 to MK Central via A421	913	137	966	53	6%	Yes
13EB	MK Central to M1 J13 via M1 J14	938	141	967	29	3%	Yes
13WB	M1 J13 to MK Central via M1 J14	727	109	754	27	4%	Yes

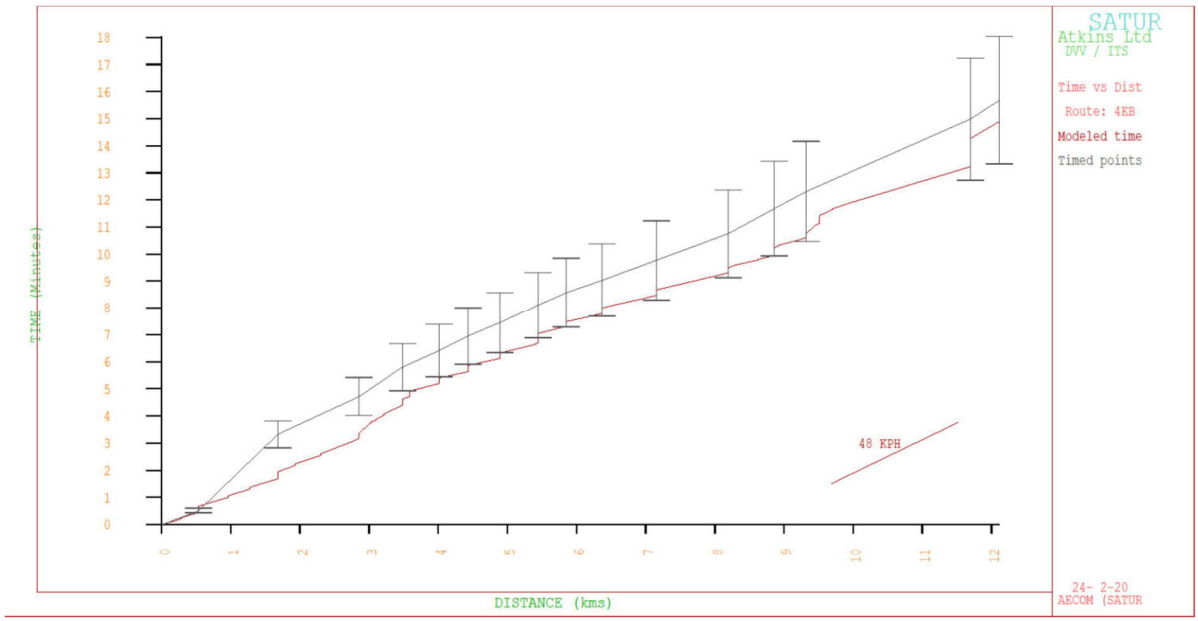


Figure 29. Journey Time Comparison – Route 12 EB, Portway/Fulmer St to Newport Pagnell – AM Peak

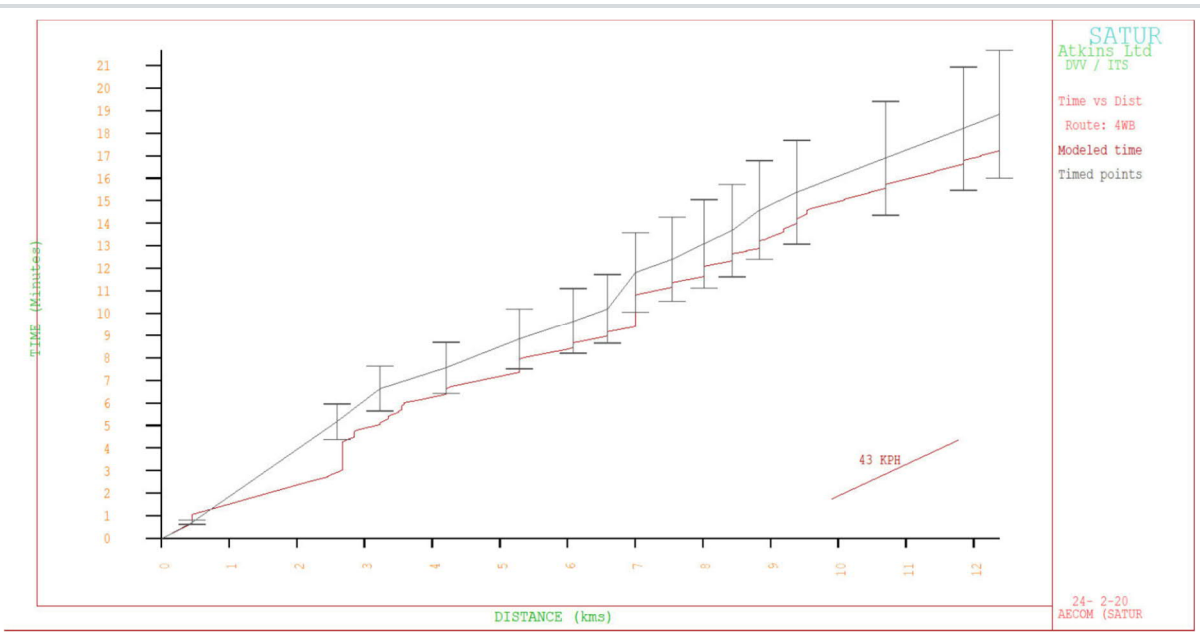


Figure 30. Journey Time Comparison – Route 12 WB, Newport Pagnell to Portway/Fulmer St – AM Peak

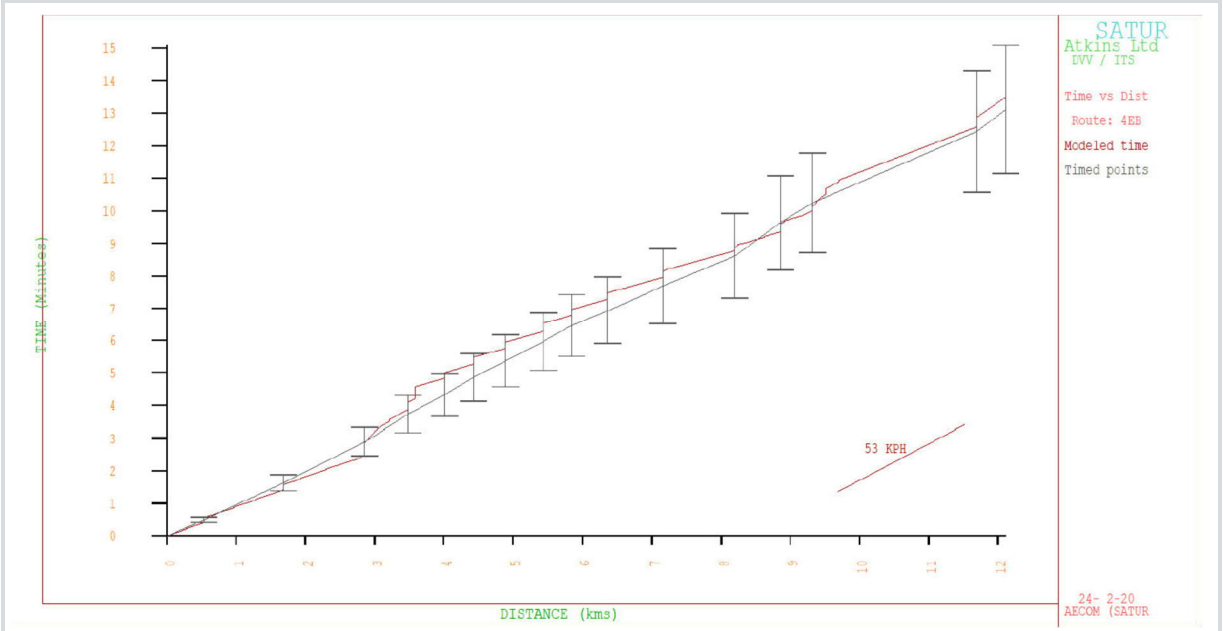


Figure 31. Journey Time Comparison – Route 12 EB, Portway/Fulmer St to Newport Pagnell – Inter-Peak

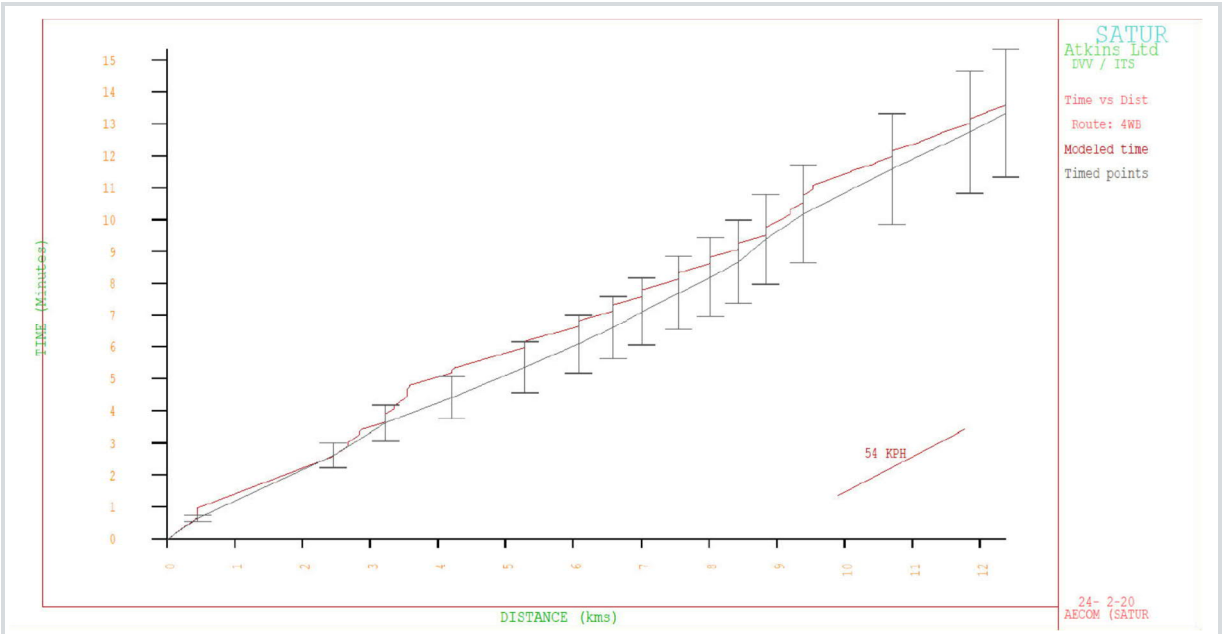


Figure 32. Journey Time Comparison – Route 12 WB, Newport Pagnell to Portway/Fulmer St – Inter-Peak

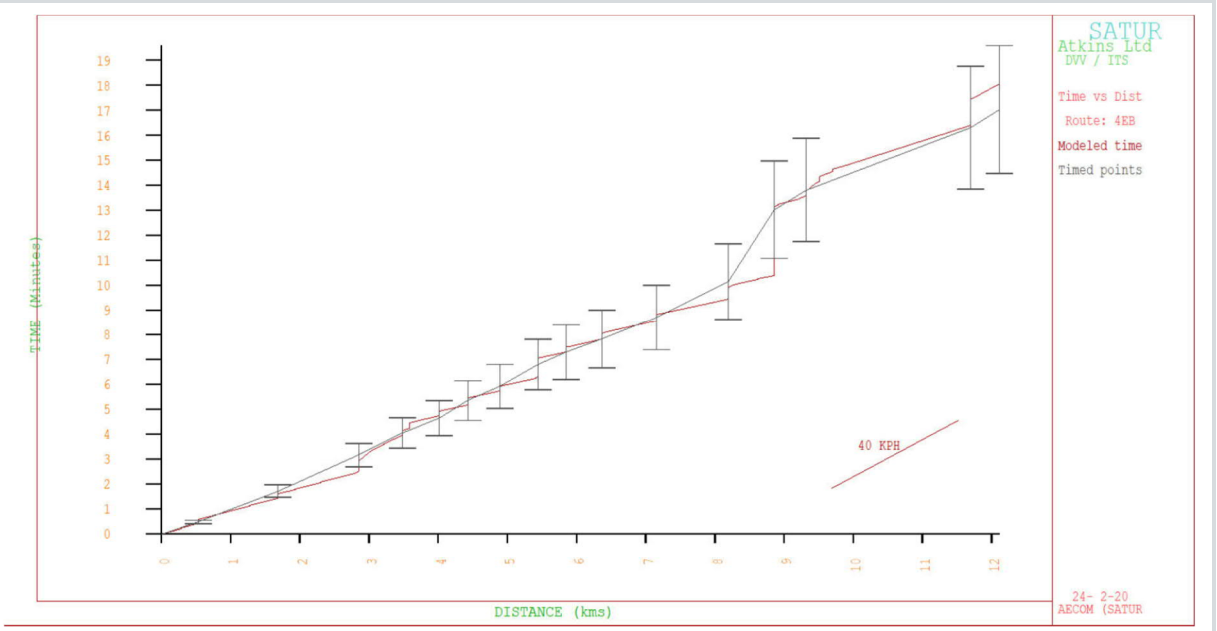


Figure 33. Journey Time Comparison – Route 12 EB, Portway/Fulmer St to Newport Pagnell – PM Peak

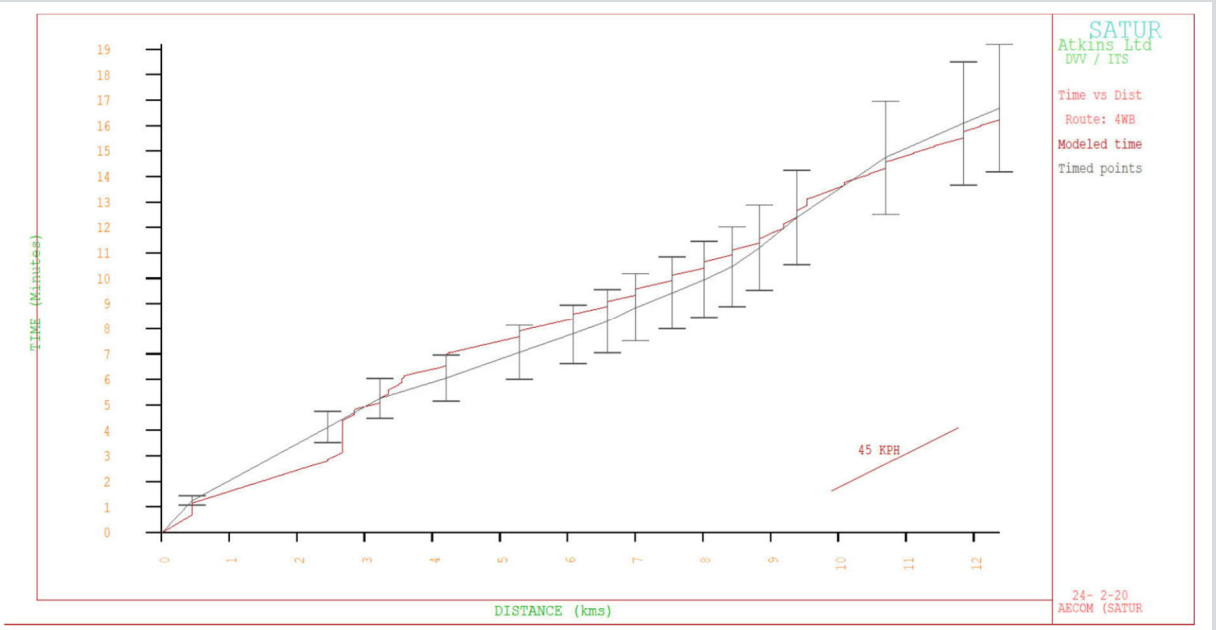


Figure 34. Journey Time Comparison – Route 12 WB, Newport Pagnell to Portway/Fulmer St – PM Peak

9.5 Model Convergence

9.5.1 The parameter %FLOW was used to assess the convergence within the SATURN assignment model. This measures the percentage of links on which flows vary by more than a pre-defined percentage between consecutive assignment iterations.

9.5.2 Convergence was improved with the use of the parameters RSTOP, PCNEAR and NISTOP which were set at 99, 1 and 4 respectively. This defined convergence as being met when link flows on 99% of all links varied less than 1% for four consecutive iterations. This is more stringent than the WebTAG criteria as shown in Table 25.

Table 25. Summary of Convergence Stats

Measure of Convergence	Base Model Acceptable Values
Delta and %GAP	Less than 0.1% or at least stable with convergence fully documented and all other criteria met
Percentage of links with flow change (P)<1%	Four consecutive iterations greater than 98%
Percentage of links with cost change (P2)<1%	Four consecutive iterations greater than 98%
Percentage change in total user costs (V)	Four consecutive iterations less than 0.1% (SUE only)

Source: WebTAG Unit M3.1

9.5.3 WebTAG provides further guidance on model stability in Appendix C of TAG unit M3.1. This recommends that the Average Absolute Difference (AAD) between consecutive iterations and also the Relative Average Absolute Difference (RAAD) in link flows between iterations. It is this which is the preferred measure with a target value of 0.1%.Table 26 to Table 28 list the convergence statistics for each time period. It can be seen that %GAP is well below the 1% criteria, % FLOW meets the 99% criteria and %RAAD is well under 0.1%. So as measured against these criteria it can be said the model is well converged.

Table 26: Summary Convergence Results - AM

Assignment Loop	% GAP	AAD	RAAD	% Flows
1	0.324			
2	0.136	37.739	4.851	39.1
3	0.081	10.667	1.384	49.9
4	0.038	6.089	0.791	59.9
5	0.033	6.266	0.815	55.5
6	0.026	3.012	0.392	72.6
7	0.015	1.928	0.251	80.6
8	0.0084	2.804	0.366	69.7
9	0.0063	2.037	0.266	74.9
10	0.0056	1.267	0.166	87.1
11	0.0039	0.912	0.119	90.2
12	0.0027	0.844	0.11	90
13	0.0018	0.858	0.112	90.2
14	0.0019	0.811	0.106	91.4
15	0.0013	0.505	0.066	95.1
16	0.0011	0.489	0.064	95
17	0.00091	0.412	0.054	96.1
18	0.0011	0.373	0.049	96.6
19	0.00077	0.278	0.036	97.9
20	0.00048	0.254	0.033	98
21	0.00058	0.237	0.031	97.8
22	0.00045	0.174	0.023	98.6
23	0.00055	0.16	0.021	98.9
24	0.00041	0.127	0.017	99.3
25	0.00039	0.116	0.015	99.3
26	0.00034	0.166	0.022	98.6
27	0.00031	0.081	0.011	99.8
28	0.00031	0.127	0.017	98.9
29	0.0003	0.089	0.012	99.5
30	0.00025	0.062	0.008	99.9
31	0.00028	0.104	0.014	99.4
32	0.00024	0.098	0.013	99.4

Table 27: Summary Convergence Results - IP

Assignment Loop	% GAP	AAD	RAAD	% Flows
1	0.036			
2	0.008	16.973	2.787	44.8
3	0.0028	4.542	0.749	61
4	0.0014	2.239	0.37	79.2
5	0.0015	1.228	0.203	89
6	0.00068	0.55	0.091	95
7	0.00067	0.674	0.111	92.3
8	0.00034	0.353	0.058	96.9
9	0.00045	0.381	0.063	95.6
10	0.00037	0.293	0.048	97.5
11	0.00026	0.158	0.026	98.6
12	0.00023	0.231	0.038	97.7
13	0.00033	0.61	0.101	95.2
14	0.00037	0.335	0.055	97.2
15	0.00022	0.143	0.024	99
16	0.00021	0.127	0.021	99.1
17	0.00019	0.128	0.021	99.1
18	0.00018	0.193	0.032	98
19	0.00028	0.201	0.033	98.2
20	0.00018	0.148	0.024	98.7
21	0.00017	0.162	0.027	98.8
22	0.00012	0.171	0.028	98.6
23	0.00012	0.187	0.031	98.5
24	0.00014	0.176	0.029	98.6
25	0.00015	0.093	0.015	99.2
26	0.00011	0.116	0.019	98.9
27	0.0001	0.116	0.019	99
28	0.00011	0.13	0.021	99
29	0.00015	0.09	0.015	99.4
30	0.00011	0.16	0.026	98.6
31	0.0001	0.117	0.019	99
32	0.00016	0.121	0.02	98.9
33	0.00011	0.147	0.024	98.8
34	0.0001	0.113	0.019	99
35	0.0001	0.107	0.018	99.1
36	0.00015	0.088	0.015	99.3
37	0.00011	03:40	0.025	98.7
38	0.00009	0.102	0.017	99.1
39	0.00009	0.104	0.017	99.1
40	0.0001	0.109	0.018	99
41	0.0002	0.171	0.028	98.5

42	0.00017	0.177	0.029	98.8
43	0.00015	0.162	0.027	98.8
44	0.00013	0.129	0.021	99
45	0.00011	0.084	0.014	99.5
46	0.00009	0.122	0.02	99
47	0.00009	0.102	0.017	99.2

Table 28: Summary Convergence Results - PM

Assignment Loop	% GAP	AAD	RAAD	% Flows
1	0.2970			
2	0.1290	38.372	4.699	39.2
3	0.0780	11.752	1.451	49.6
4	0.0460	5.551	0.686	61.1
5	0.0260	4.123	0.51	64.7
6	0.0210	4.354	0.539	61.1
7	0.0130	2.968	0.368	70.4
8	0.0091	2.335	0.289	75.8
9	0.0072	2.243	0.278	75.7
10	0.0066	1.614	0.2	86
11	0.0050	1.274	0.158	88.7
12	0.0038	1.27	0.158	88.2
13	0.0030	1.044	0.13	90
14	0.0033	1.067	0.132	89.6
15	0.0017	0.568	0.071	96.2
16	0.0020	0.737	0.091	92.5
17	0.0017	0.458	0.057	96.2
18	0.0014	0.267	0.033	98.1
19	0.0007	0.325	0.04	97.3
20	0.0010	0.428	0.053	96
21	0.0007	0.353	0.044	97.1
22	0.0006	0.302	0.038	97.6
23	0.0005	0.248	0.031	98.3
24	0.0004	0.206	0.026	98.8
25	0.0003	0.161	0.02	99
26	0.0004	0.171	0.021	98.8
27	0.0004	0.123	0.015	99.5
28	0.0003	0.097	0.012	99.6
29	0.0002	0.097	0.012	99.6
30	0.0002	0.069	0.009	99.8

10. Summary and Conclusions

10.1 Model Development

10.1.1 The Milton Keynes highway assignment model network was originally based on the 2009 SATURN network. The network was updated to represent 2016 and the simulation area extended to the north, east, south and west. 2016 trip matrices were created using the 2009 RSI data, a synthetic model and trips from Highways England's South East Regional Traffic model, SERTM.

10.1.2 The model has been further refined as detailed in this note to improve the model calibration in the vicinity of MKE and therefore provide more robust forecasts to assess the potential impacts of the MKE development. The network was further refined around the MKE area

10.1.3 To improve the calibration, a suite of traffic surveys was undertaken in 2019 on junctions and links around MKE and factored to 2016 values. The majority of the additional data was included in the model calibration.

10.2 Standards Achieved

10.2.1 The WebTAG criteria that > 85% of routes should be within 15% of surveyed times is met for all three time periods. Journey time route pass rates are the same or slightly lower than the previous model, although only by one or two routes in one direction. The journey time validation on routes through MKE is also strong.

10.2.2 Table 29 to Table 31 summarise the key headline statistics of the model update compares with the previous model. The proportion of calibration counts that pass the flow or GEH criteria are broadly the same, if slightly lower, than the previous model although there are now 190 sites rather than 142 in the previous model. These compare favourably with the criteria that 85% of counts pass this flow test.

10.2.3 The counts calibration for the highway assignment model is good and individual counts pass at a comparable level to the previous model version. There is generally lower levels of traffic crossing the screenlines within the cordon, but it is likely that the prior matrices would need revisiting to address this shortfall in traffic. This is beyond the scope of this update and would not be pragmatic given the model has been significantly enhanced in the MKE study area as shown best by the comparison plots in Section 9.3.

Table 29: Summary Calibration Count Results

Calibration Counts	Previous Model Pass %	Model Update Pass %	Difference from Previous Model %
AM	94%	92%	-2%
IP	99%	98%	-1%
PM	96%	95%	-1%

10.2.4 The validation count pass rate is slightly higher compared to the previous model. Although these are less than the WebTAG guidance, the majority of overall validation screenline comparisons were within 5%. The grid system in Milton Keynes makes representation of observed flows particularly challenging. Due to the limited observed data within Milton Keynes, traffic survey and signal timings, the limited timescale and the strong flow calibration which has been improved around MKE and journey time validation these results are acceptable.

Table 30: Summary Validation Count Results

Validation Counts	Previous Model Pass %	Model Update Pass %	Difference from Previous Model %
AM	50%	58%	+8%
IP	42%	50%	+8%
PM	46%	50%	+4%

10.2.5 The WebTAG criteria that > 85% of routes should be within 15% of surveyed times is met for all three time periods. Journey time route pass rates are the same or slightly lower than the previous model, although only by one or two routes in one direction. The journey time validation on routes through MKE is also strong.

Table 31: Summary Journey Time Results

Journey Times	Previous Model Pass %	Model Update Pass %	Difference from Previous Model %
AM	96%	92%	-4%
IP	96%	96%	0%
PM	96%	88%	-8%

10.2.6 The convergence criteria in WebTAG M3.1 is a %GAP of <0.05%. The highway model has the convergence statistics, including the %GAP values, shown in Table 32. These indicate that model converges well in all three time periods.

Table 32: Highway Model Convergence Results

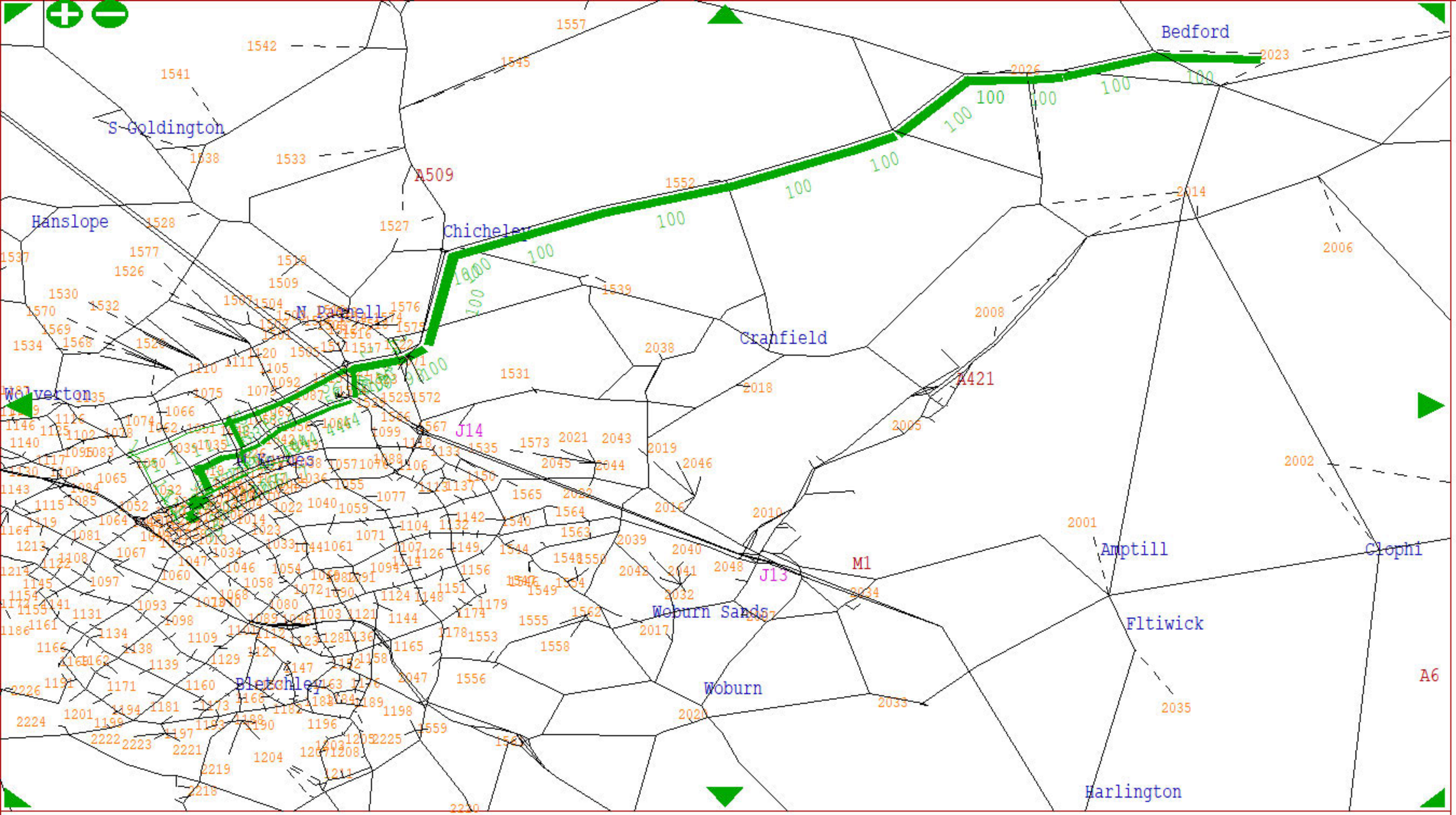
Assignment Loop	% GAP	AAD	RAAD	% Flows
AM Peak	0.00024	0.098	0.013	99.4
Inter-Peak	0.00009	0.102	0.017	99.2
PM Peak	0.00020	0.069	0.009	99.8

10.3 Model Suitability

10.3.1 This note has shown that the model replicates traffic volumes and travel times to a good standard of accuracy in MKE area though the use of the additional count data. As such it is considered that Milton Keynes traffic model is sufficiently robust, particularly in the vicinity of MKE, to be taken forward into the forecasting process to test MKE at a strategic level.

Appendix A:

Route Choice Calibration



Tree build Menu:

Origin 2023 x
Destin 1028 x

Tij= 24.89

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

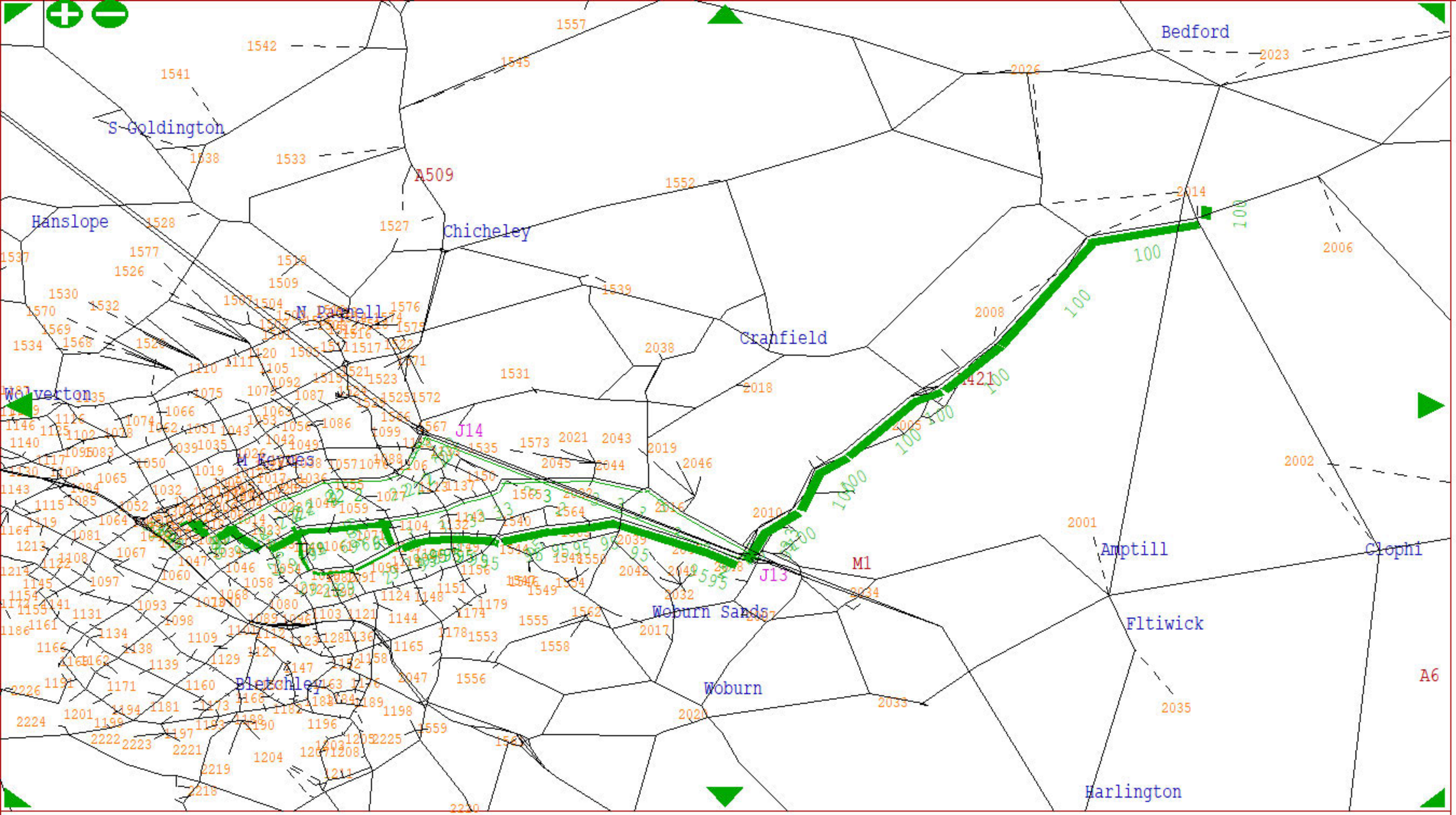
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2014 x
Destin 1028 x

Tij= 2.80

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

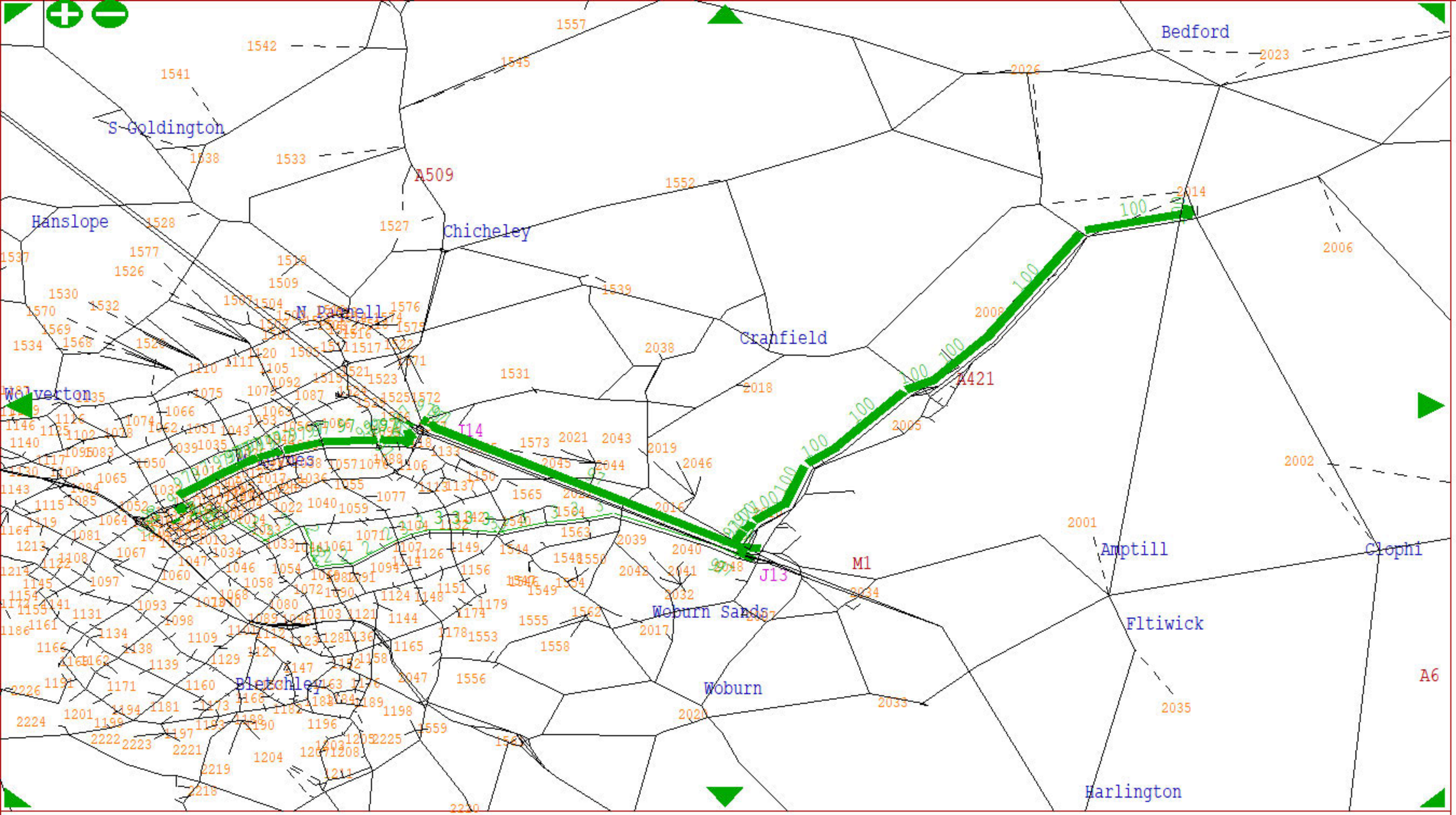
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 1028 x
Destin 2014 x

Tij= 0.46

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

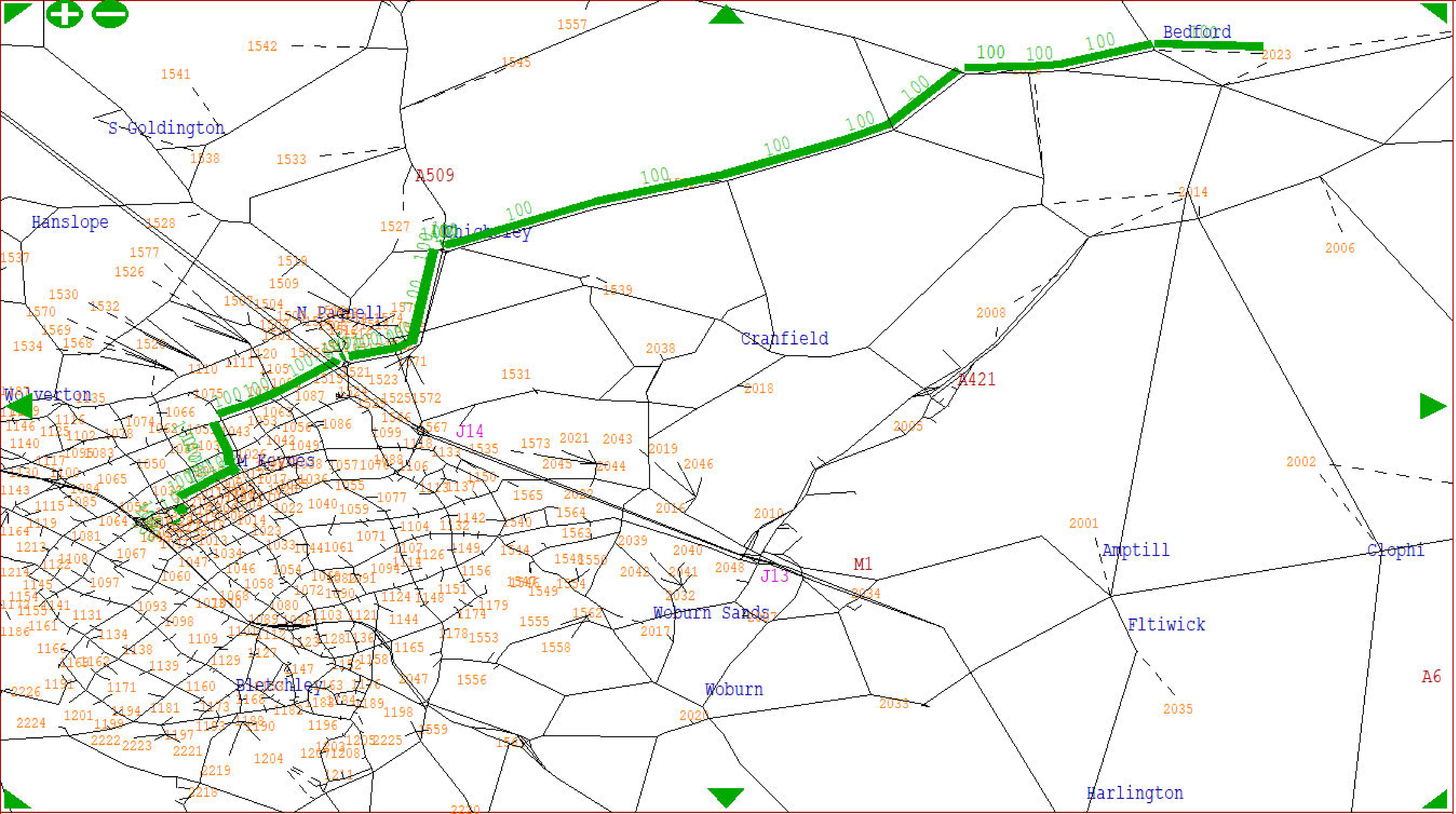
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build
Menu:

Origin 1028 x
Destin 2023 x

Tij= 0.27

U.C. = 1 ?

Origin-based
Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

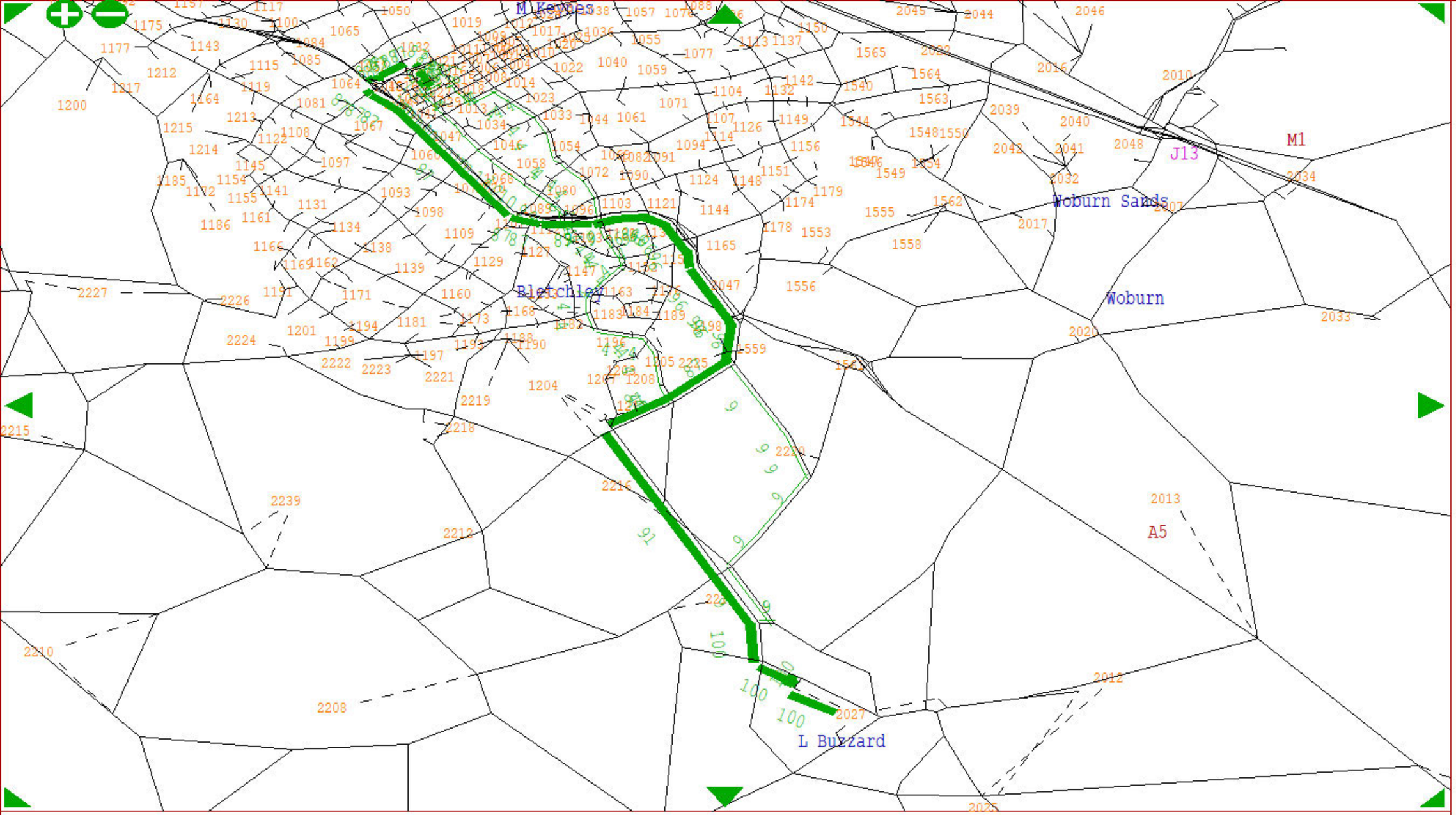
dEstination-
based option >

Spider tree?
No

Q - Return

\+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2027 x
Destin 1028 x

Tij= 14.97

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

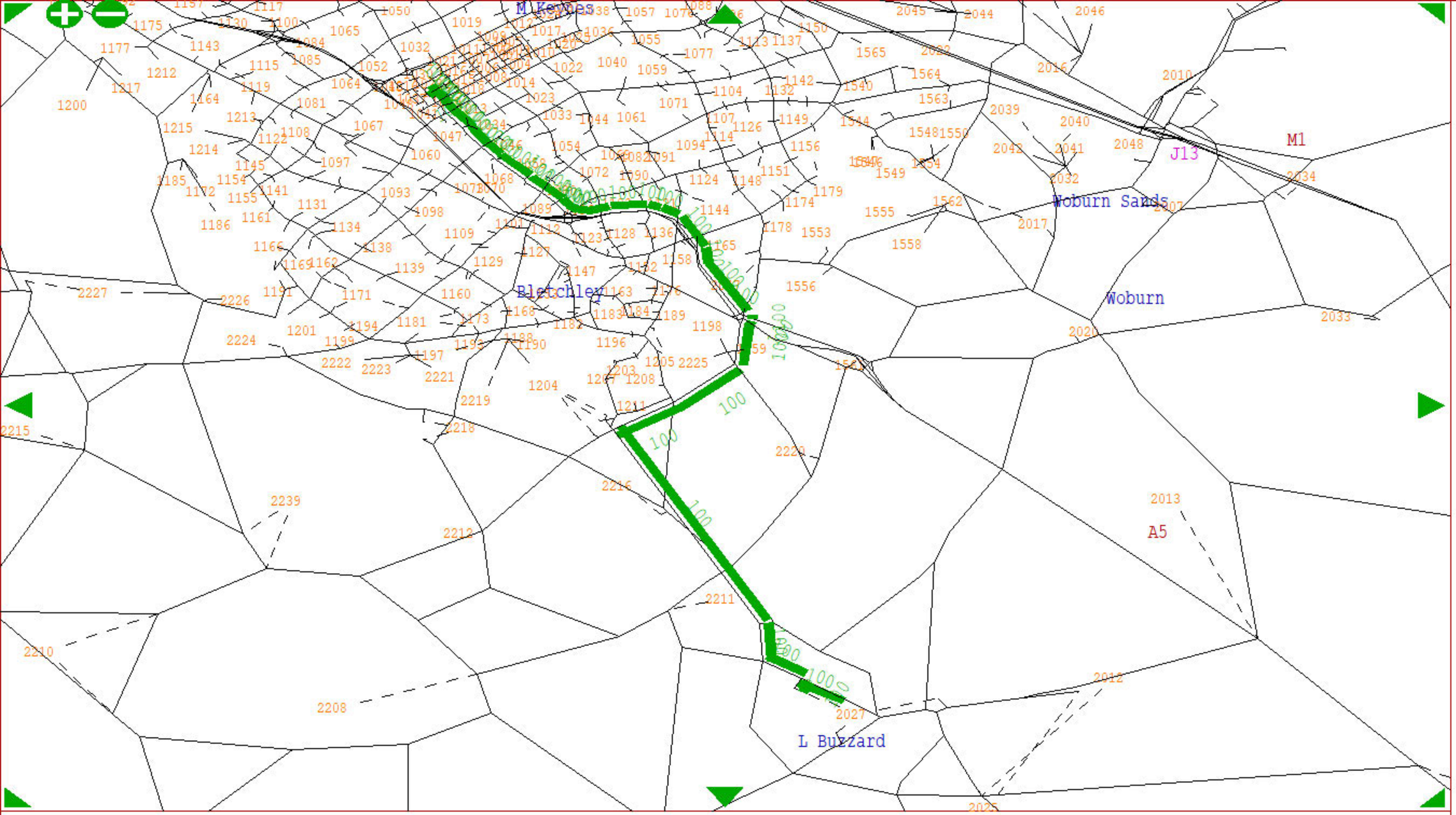
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 1028 x
Destin 2027 x

Tij= 0.52

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

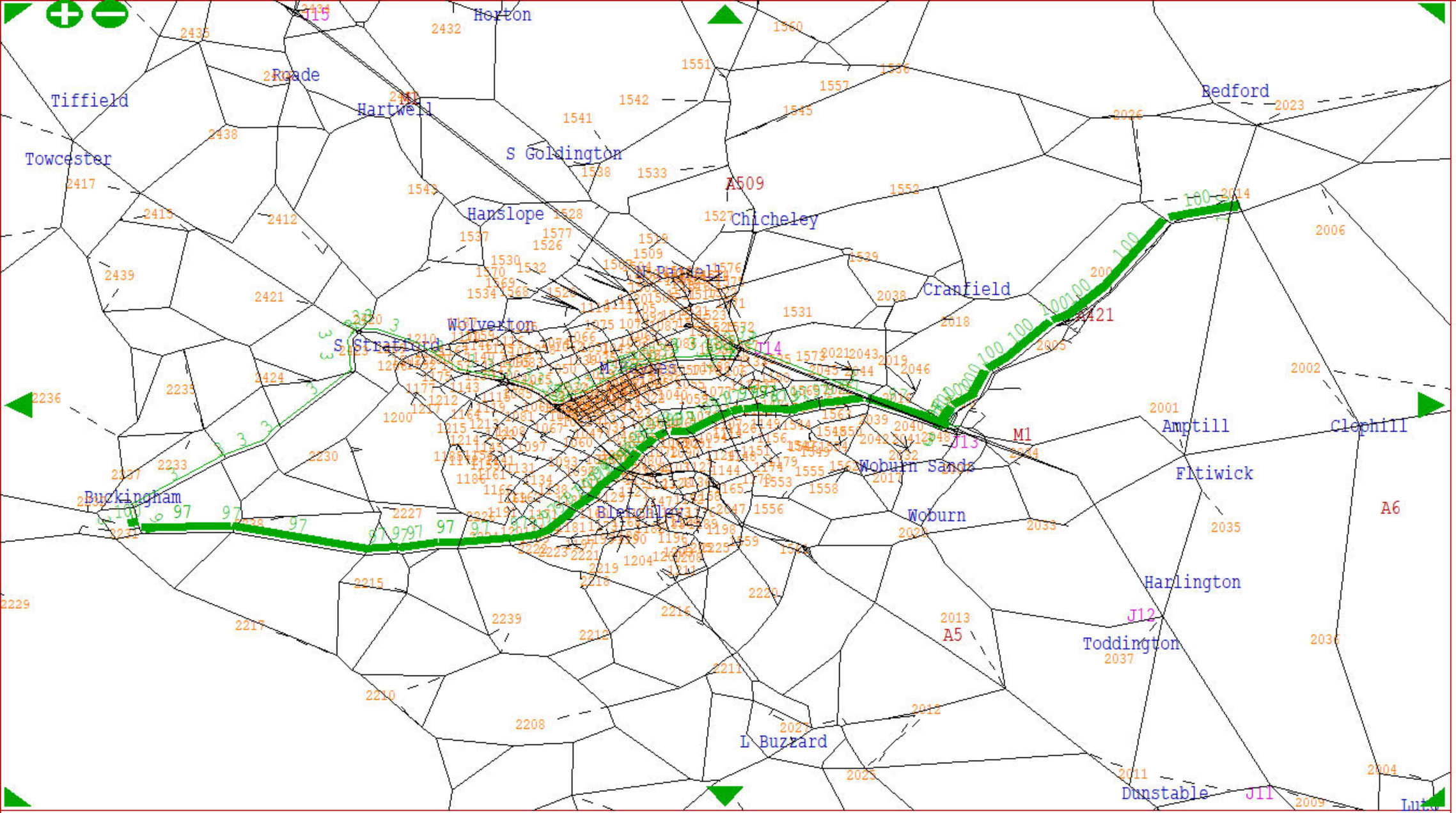
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2231 x
Destin 2014 x

Tij= 4.01

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

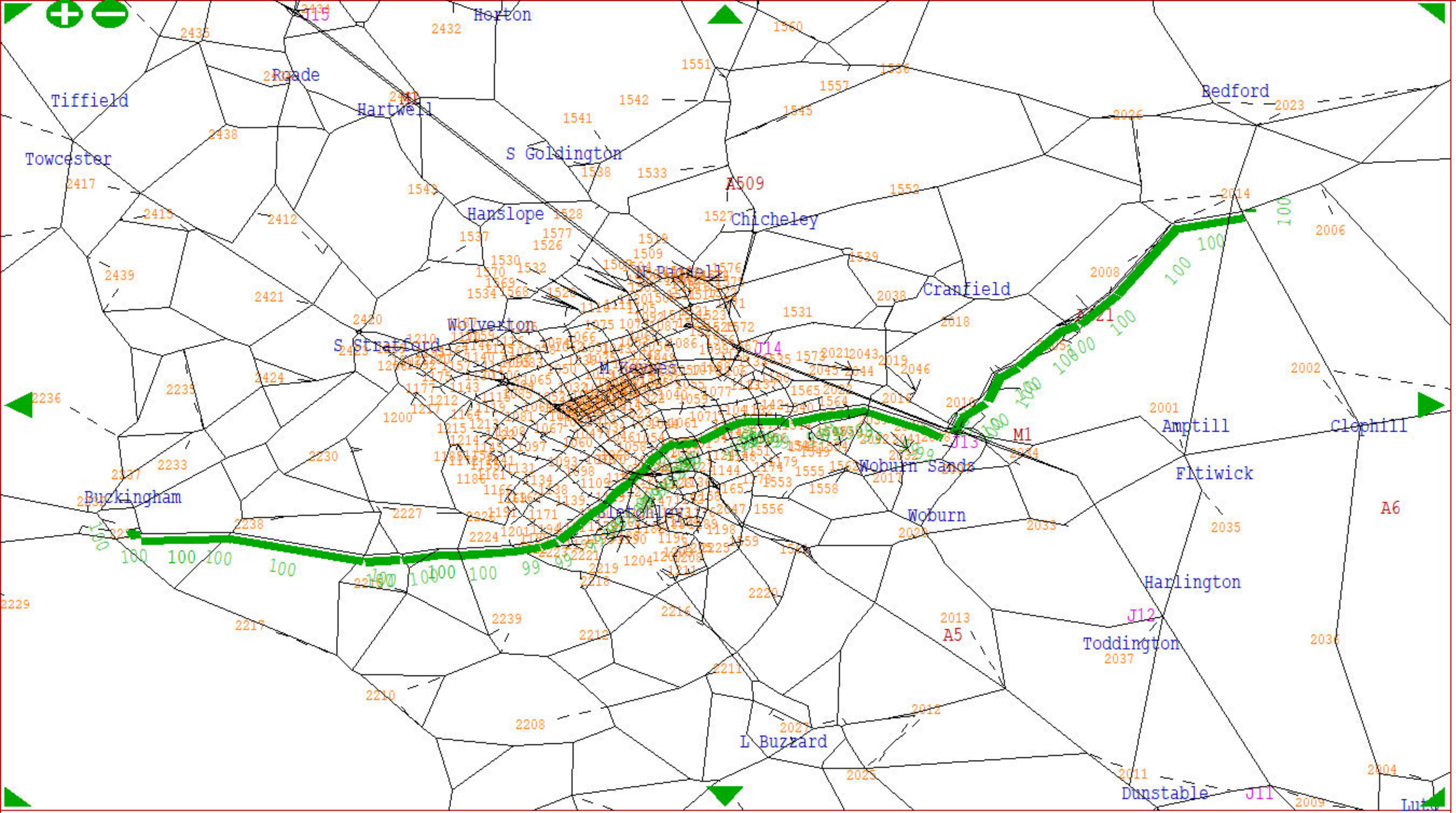
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2014 x
Destin 2231 x

Tij= 2.08

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

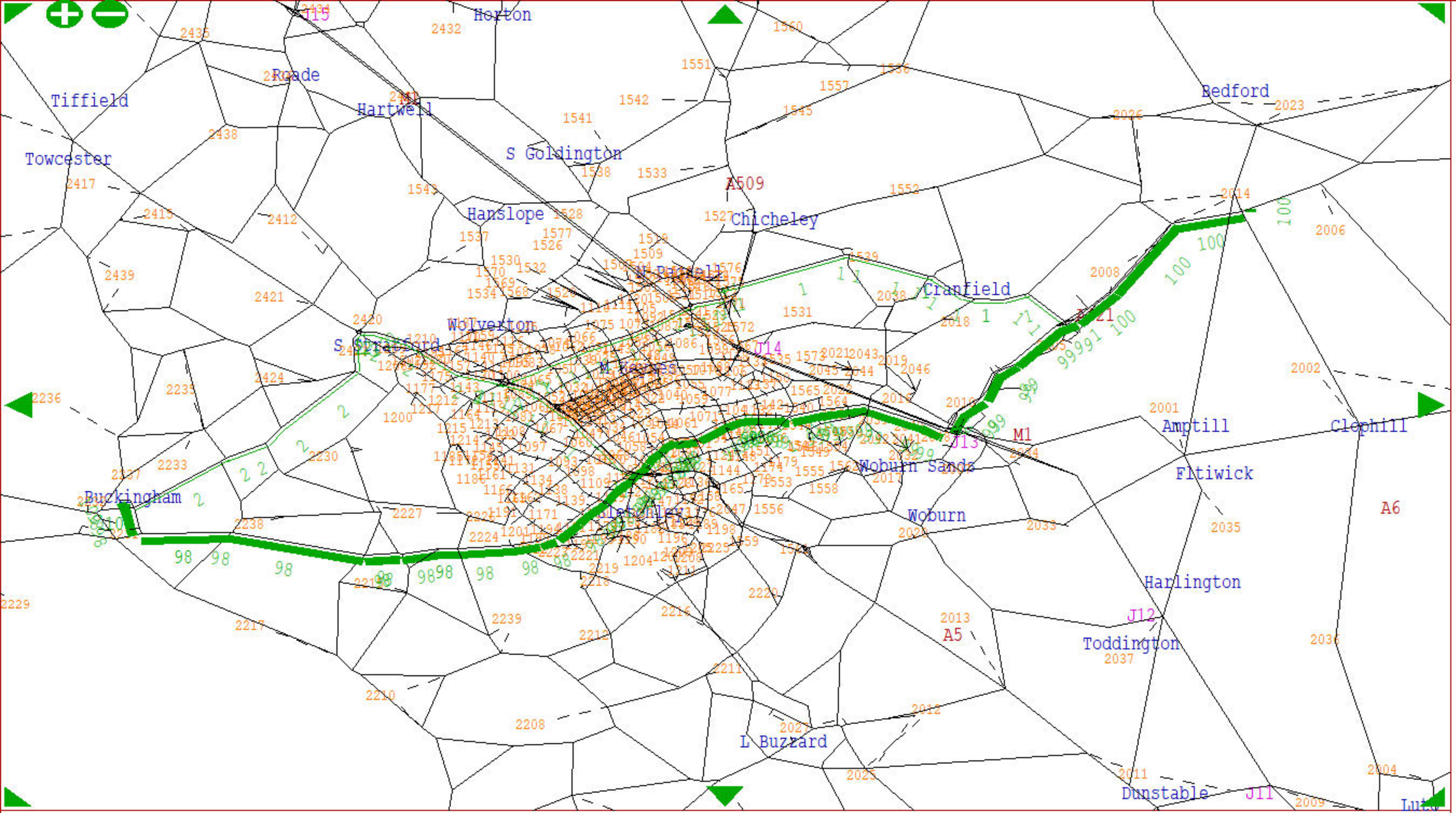
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2014 x
Destin 2232 x

Tij= 1.44

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

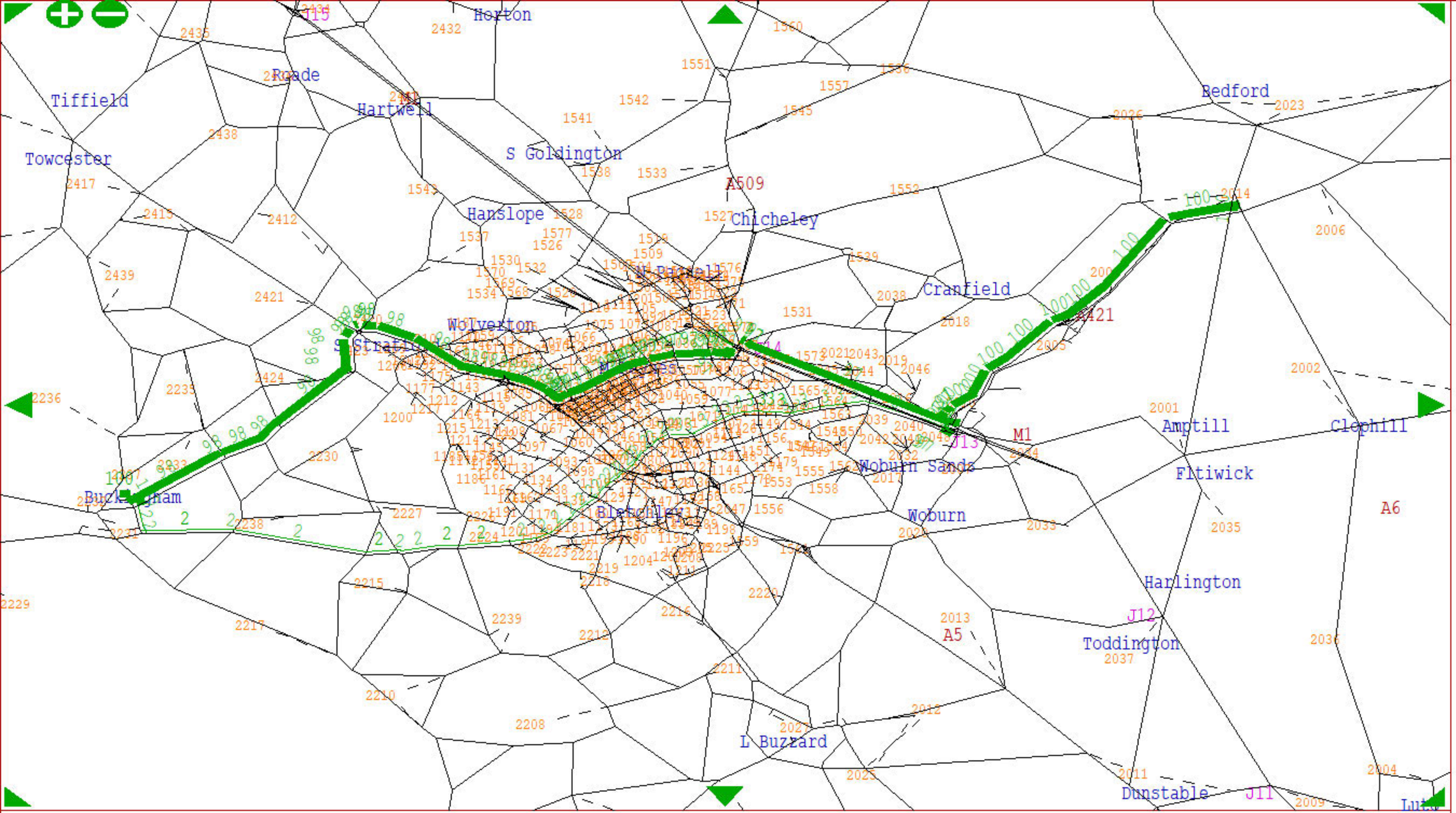
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2232 x
Destin 2014 x

Tij= 2.37

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

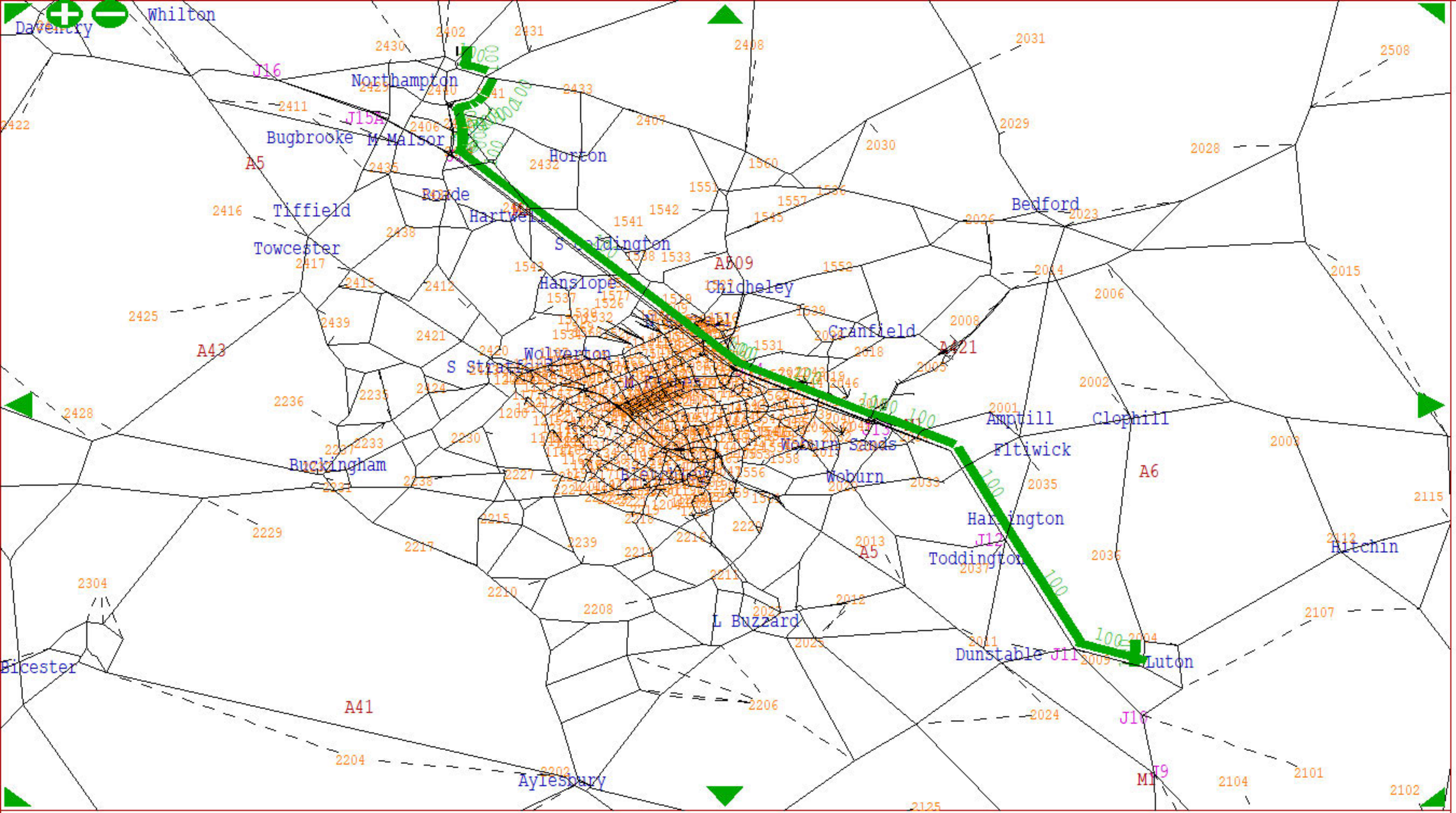
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2402 x
Destin 2004 x

Tij= 0.17

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

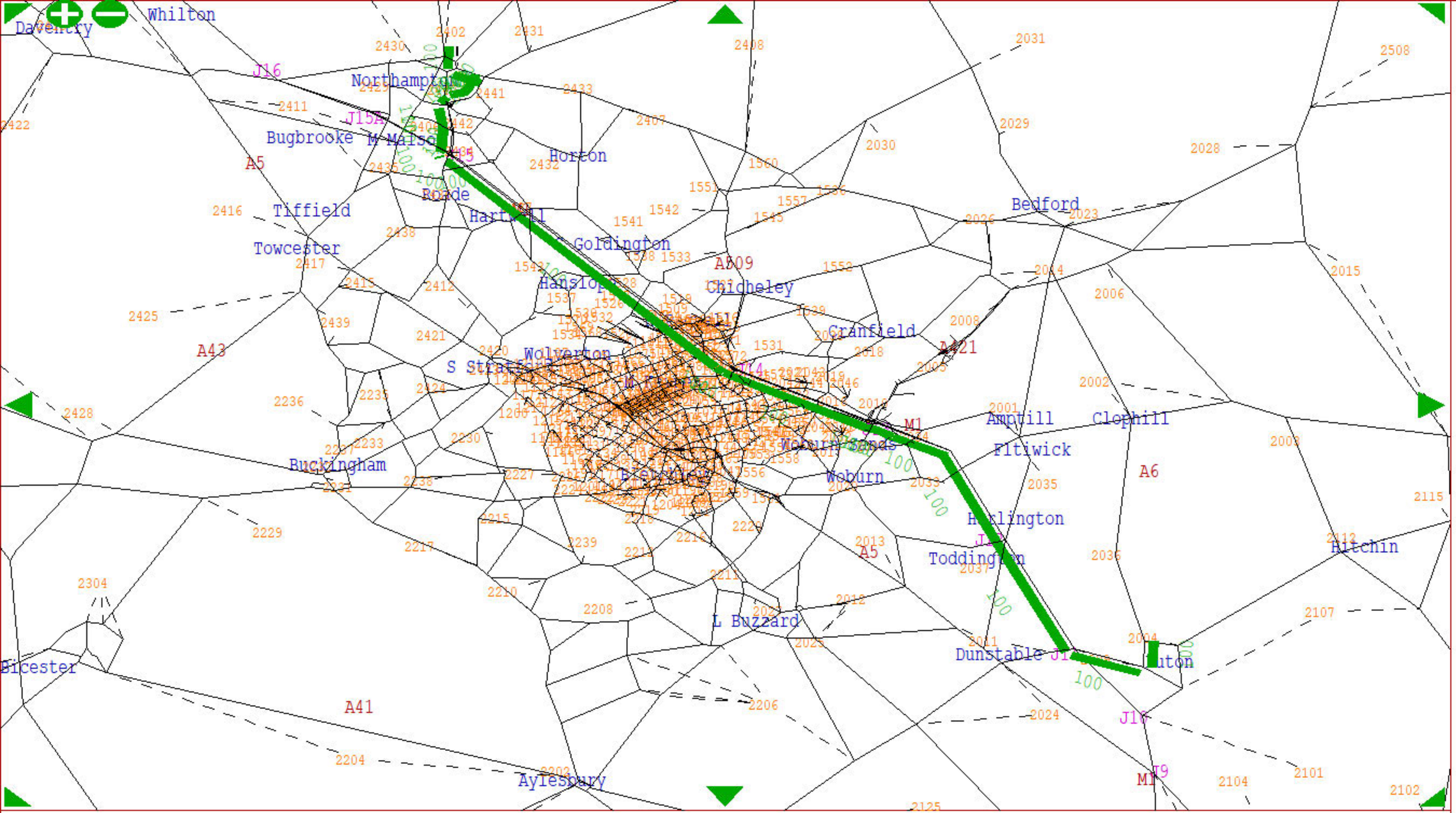
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



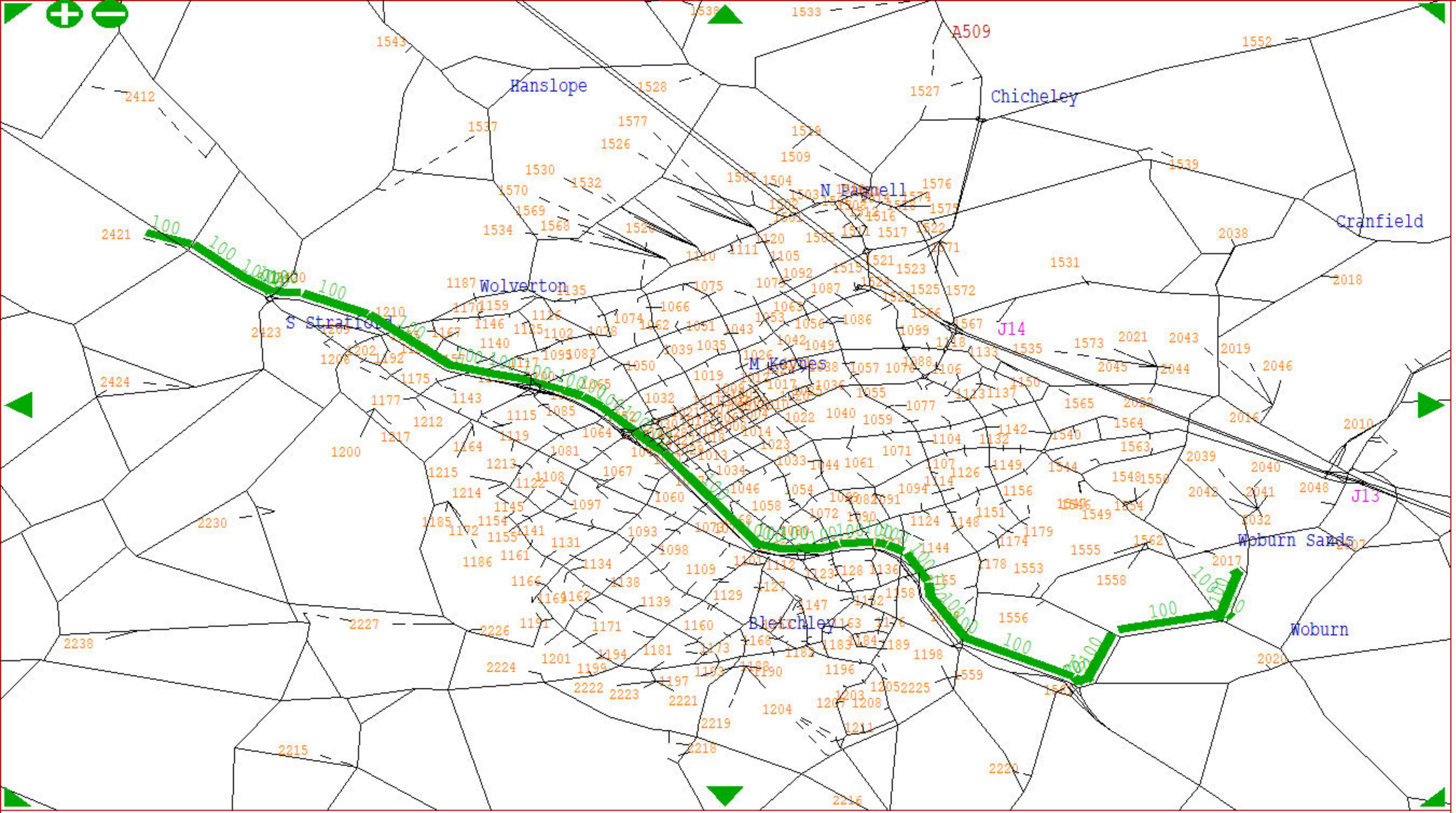
Tree build Menu:

Origin 2004	x
Destin 2402	x
Tij= 2.08	
U.C. = 1	?
Origin-based Options:	
Plot a tree:	
1 - O-D	x
2 -All nodes	x
3 -All zones	x
4 -Nds-zones	x
Joy ride tre	x
iter. Loops	x
oVerlay tree	x
Forest	x
Arboretum	x
Isochrones	>
Worst OD rts	>
Gaps by link	>
oPtions-UC..	>
dEstination-based option	>
Spider tree? No	◉

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2421 x
Destin 2017 x

Tij = 0.0425

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

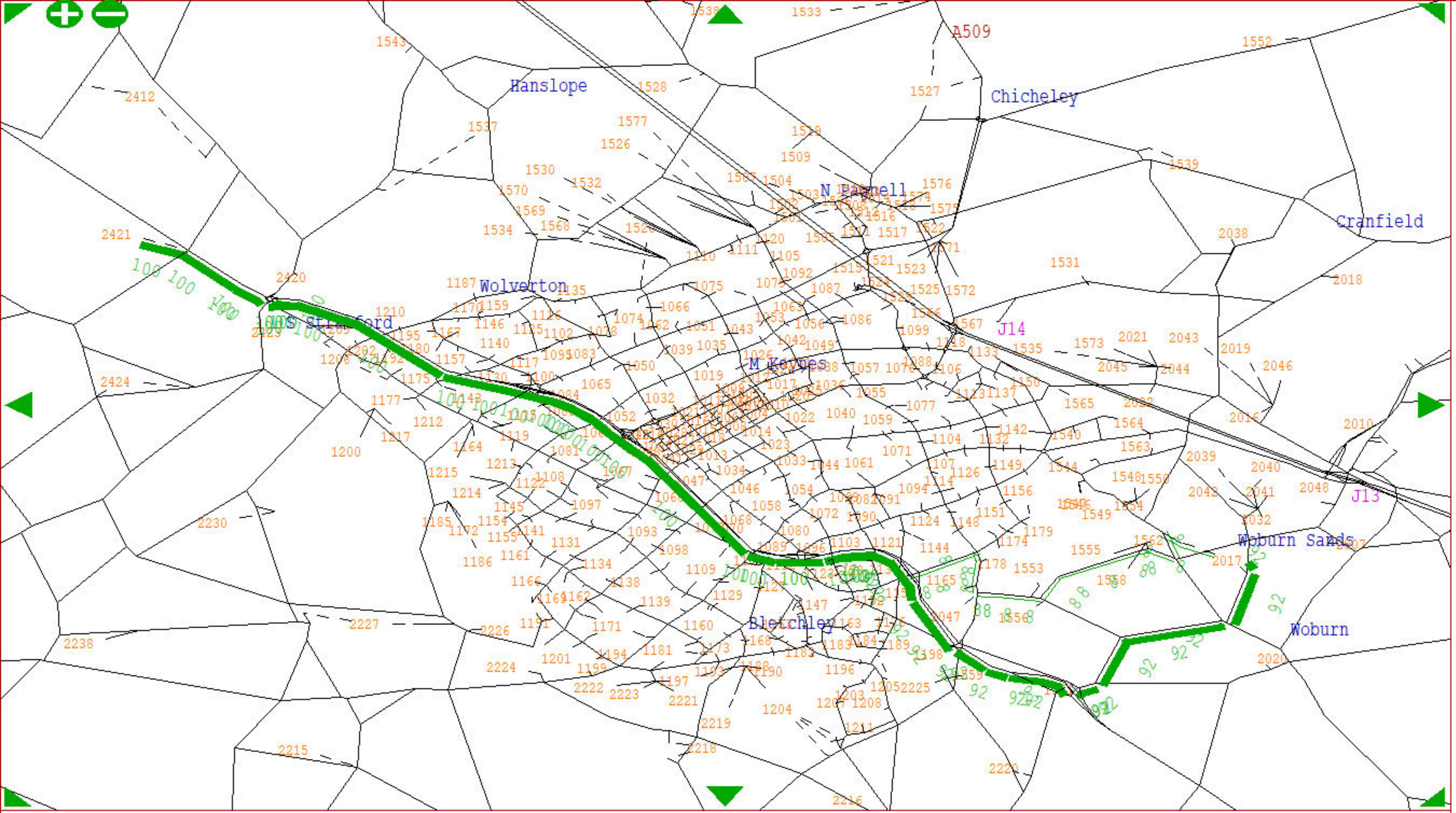
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2017 x
Destin 2421 x

Tij = 0.0295

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

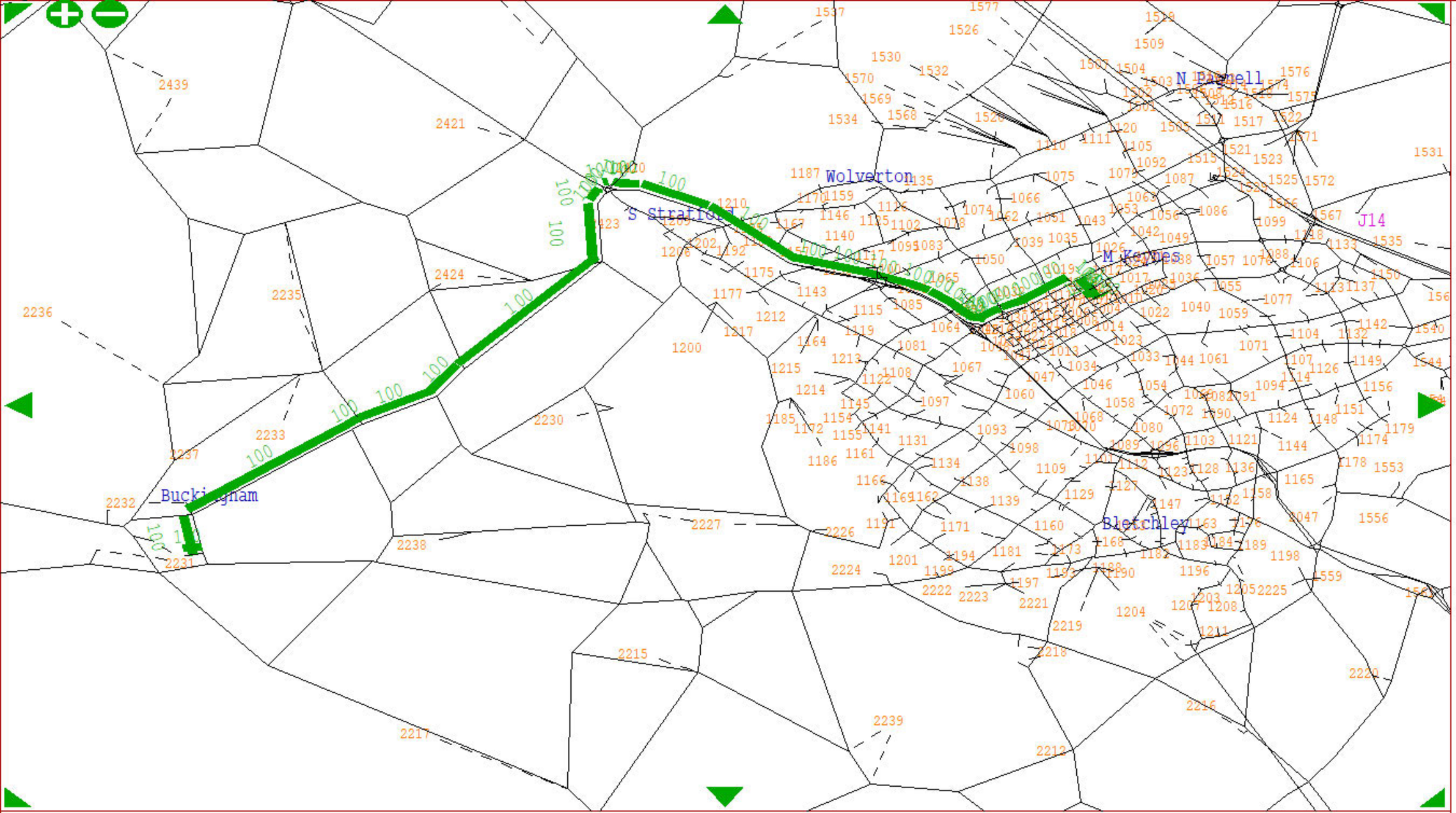
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 2231 x
Destin 1001 x

Tij= 0.16

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

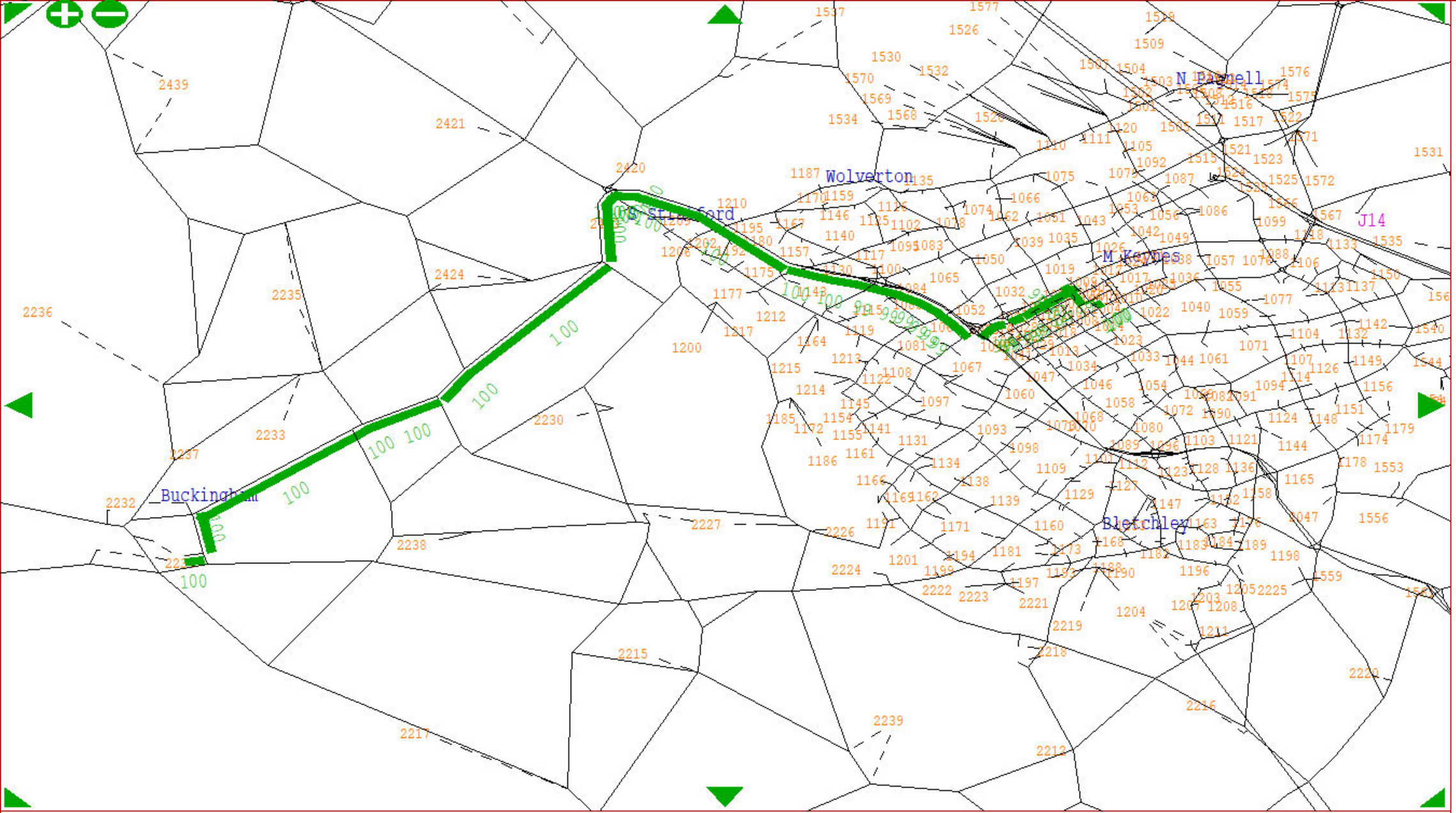
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 1001 x
Destin 2231 x

Tij = 0.0359

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

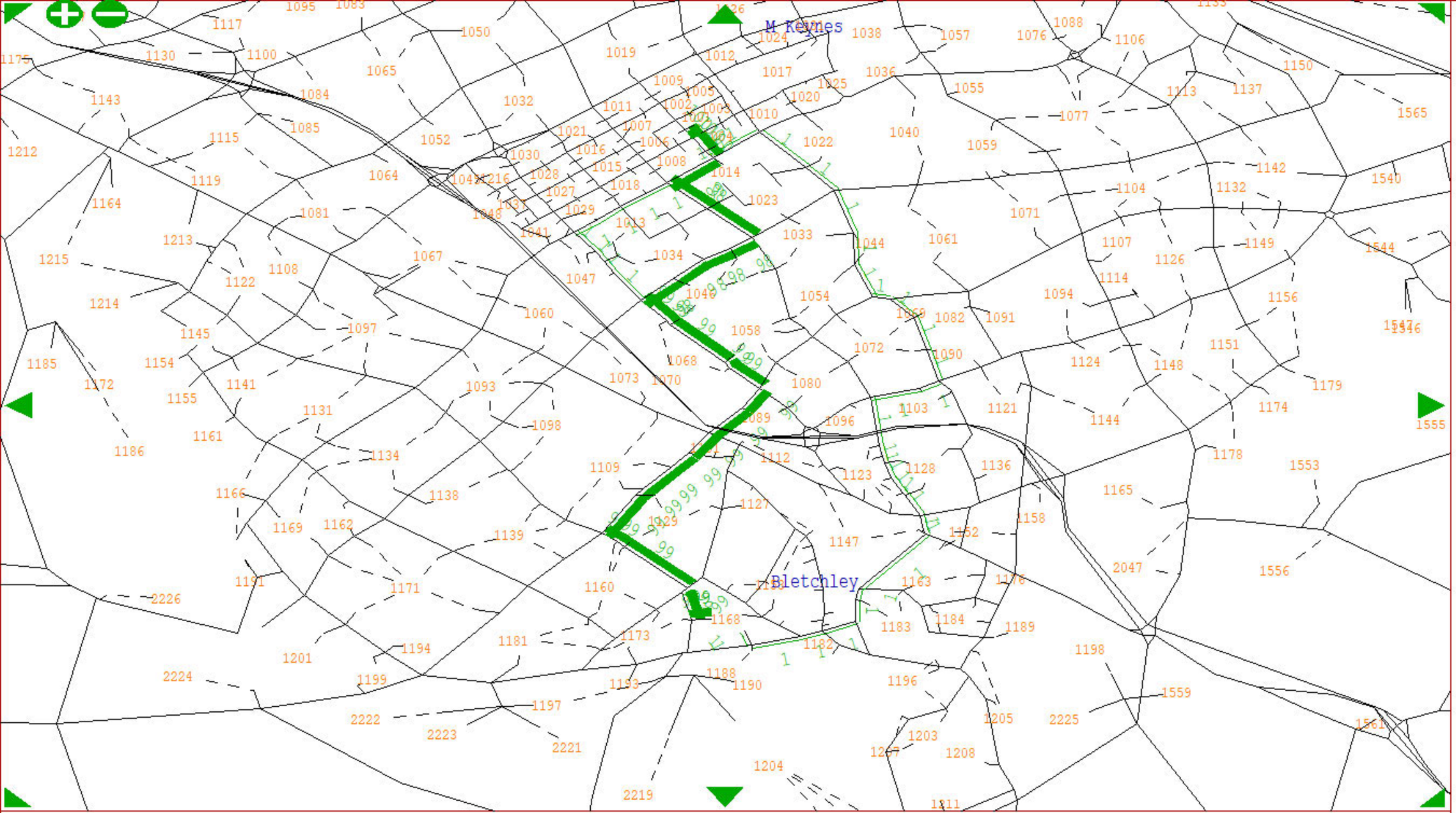
dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

2016 - AM Peak - Network 2_5 24- 2-20



Tree build Menu:

Origin 1001 x
Destin 1168 x

Tij = 0.0295

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

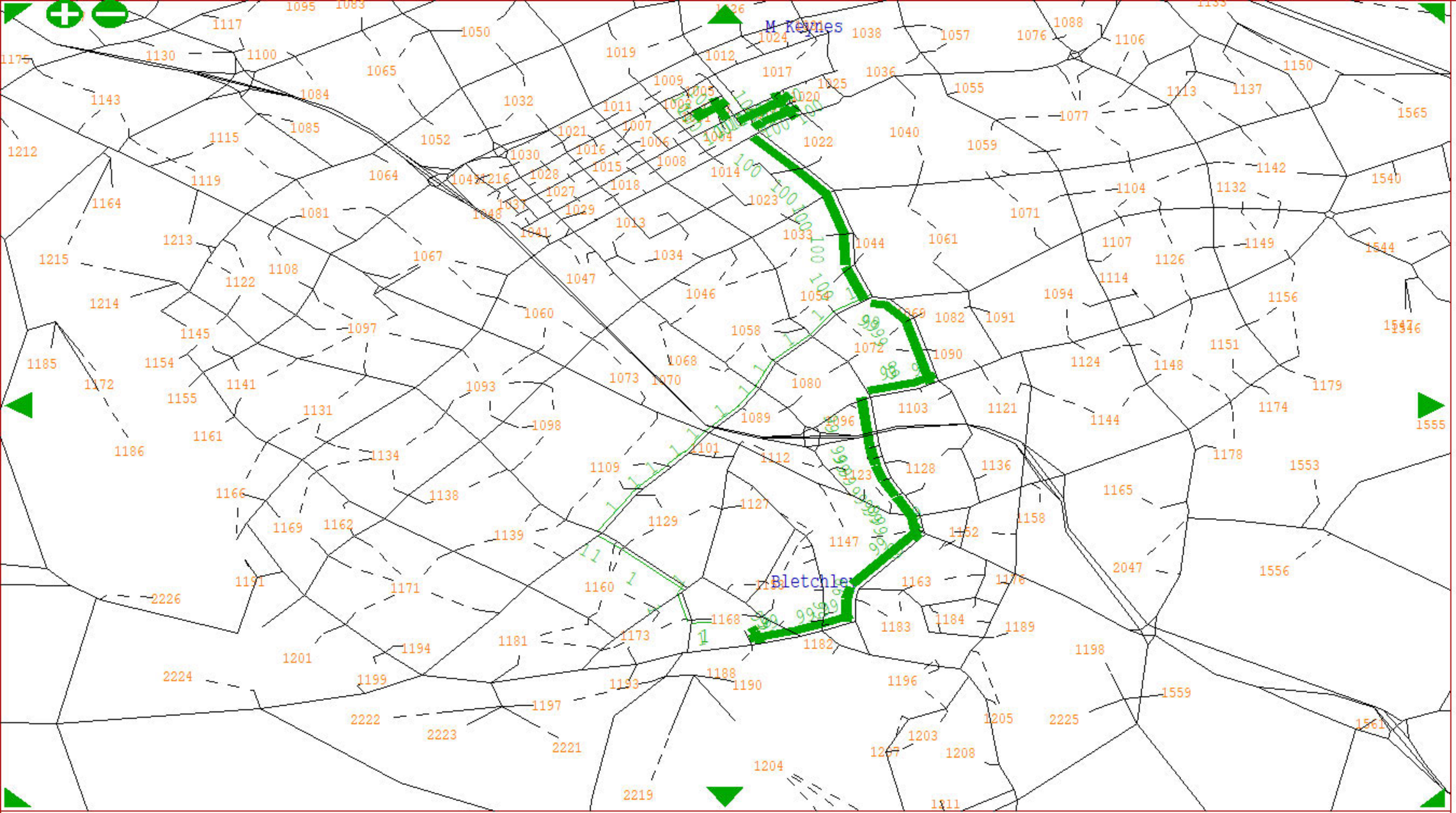
oPtions-UC.. >

dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!



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Tree build
Menu:

Origin 1168 x
Destin 1001 x

Tij = 0.0276

U.C. = 1 ?

Origin-based
Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

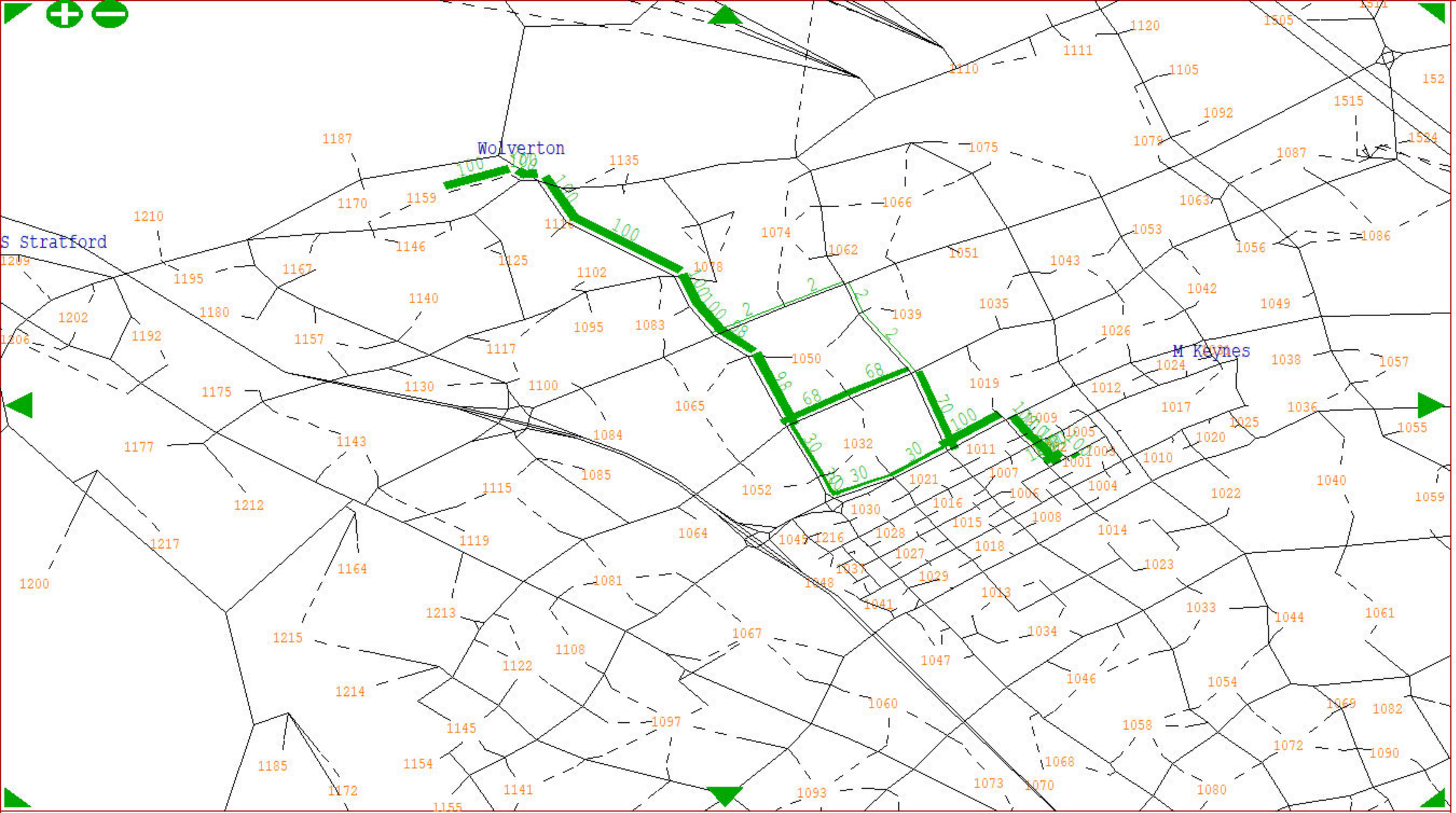
oPtions-UC.. >

dEstination-
based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!



Tree build Menu:

Origin 1159 x
Destin 1001 x

Tij = 0.0421

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

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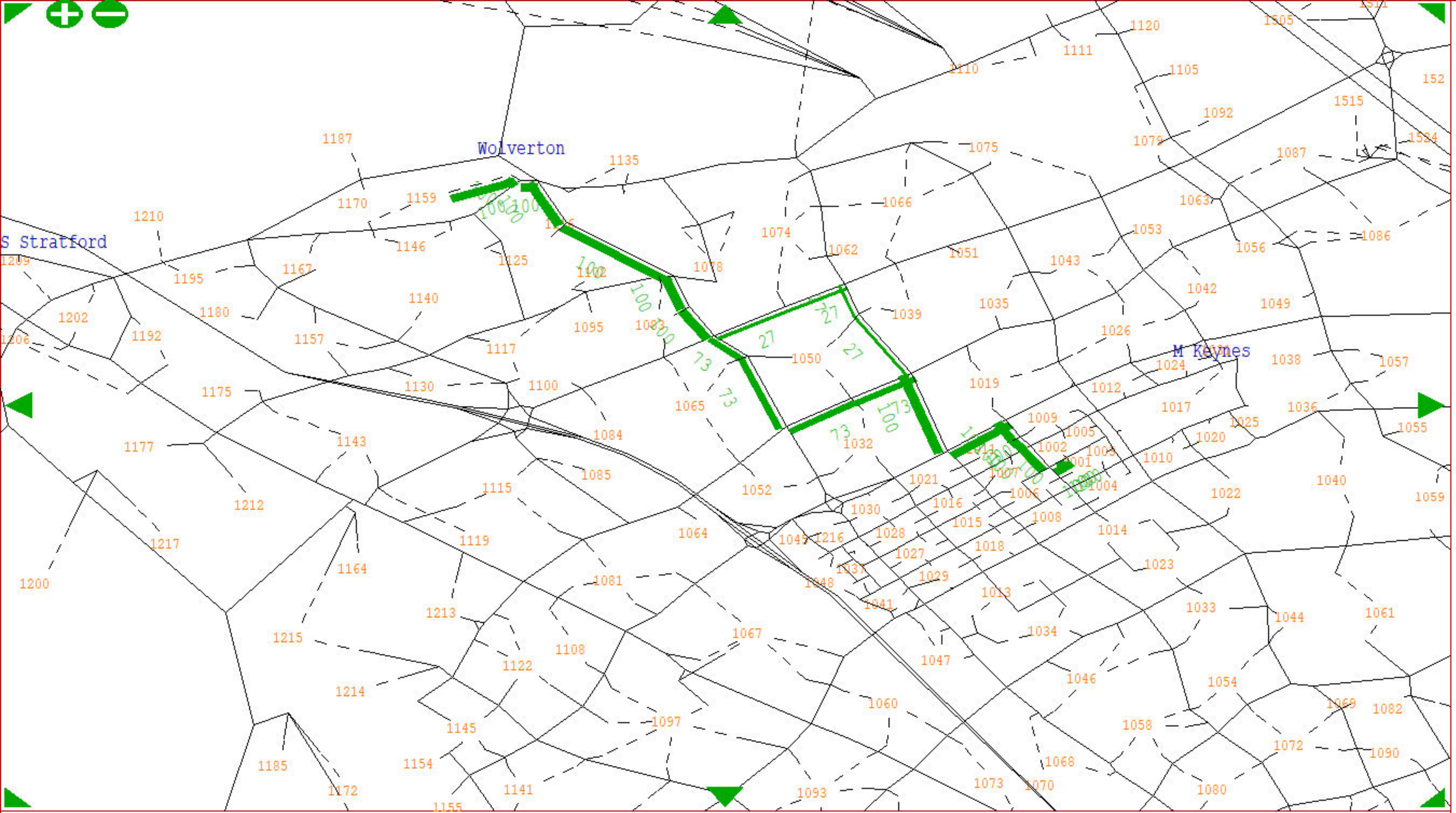

Tree build Menu:

Origin 1001 x
Destin 1159 x

Tij = 0.0569

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

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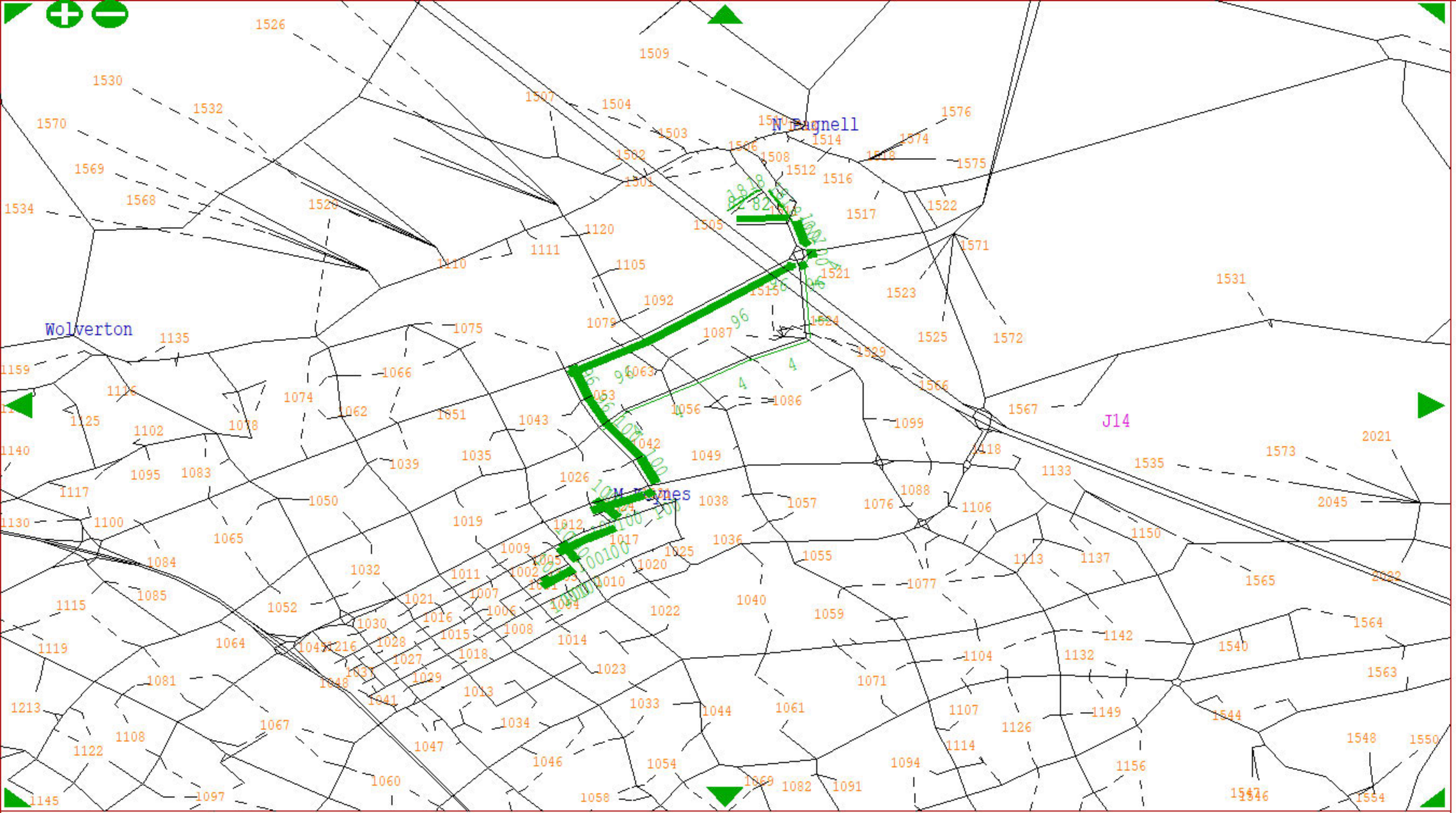

Tree build Menu:

Origin 1505 x
Destin 1001 x

Tij= 0.20

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

dEstination-based option >

Spider tree? No

Q - Return

+ Menu bar!

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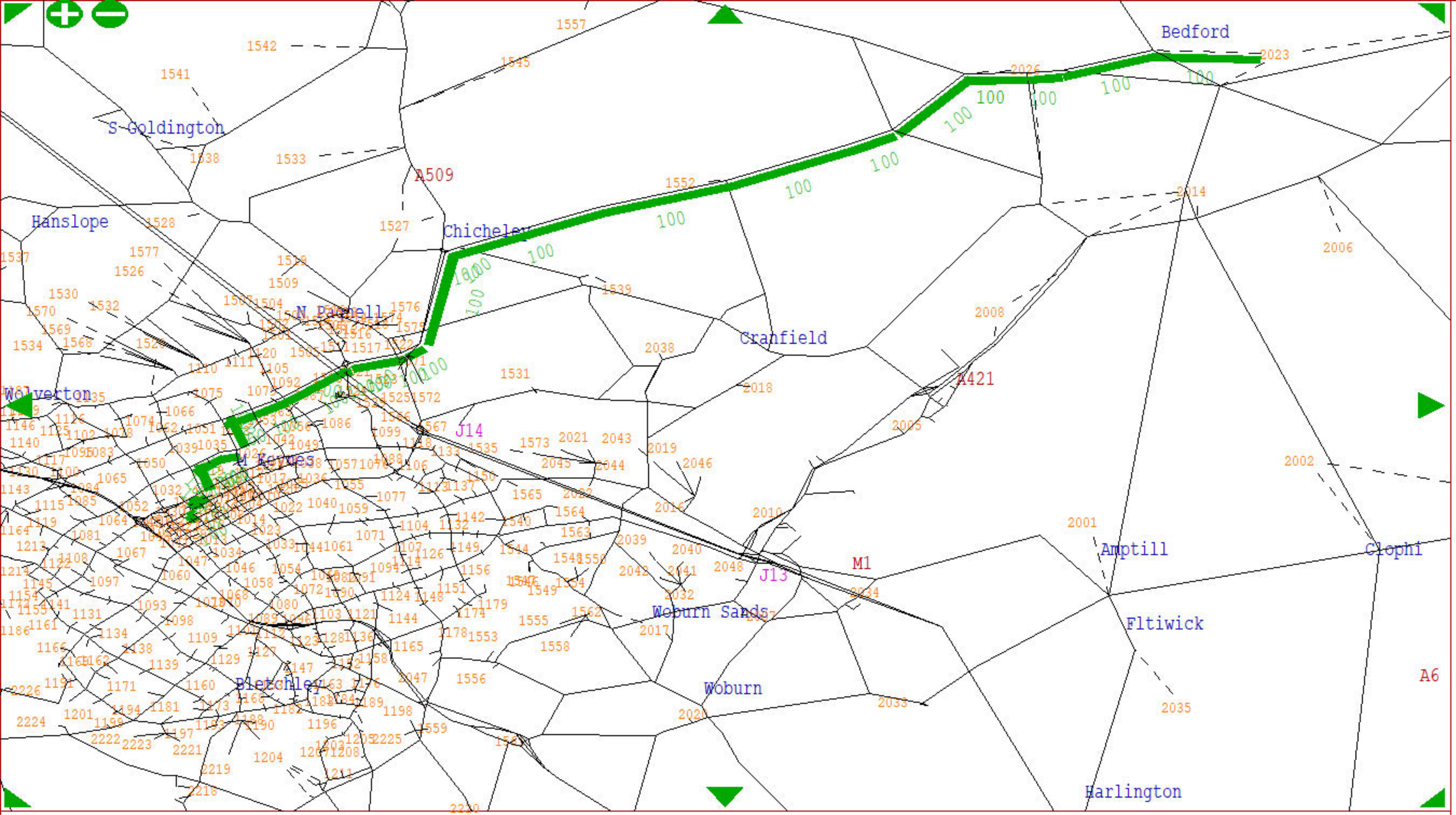

Tree build Menu:

Origin 2023 x
Destin 1028 x

Tij = 0.0930

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

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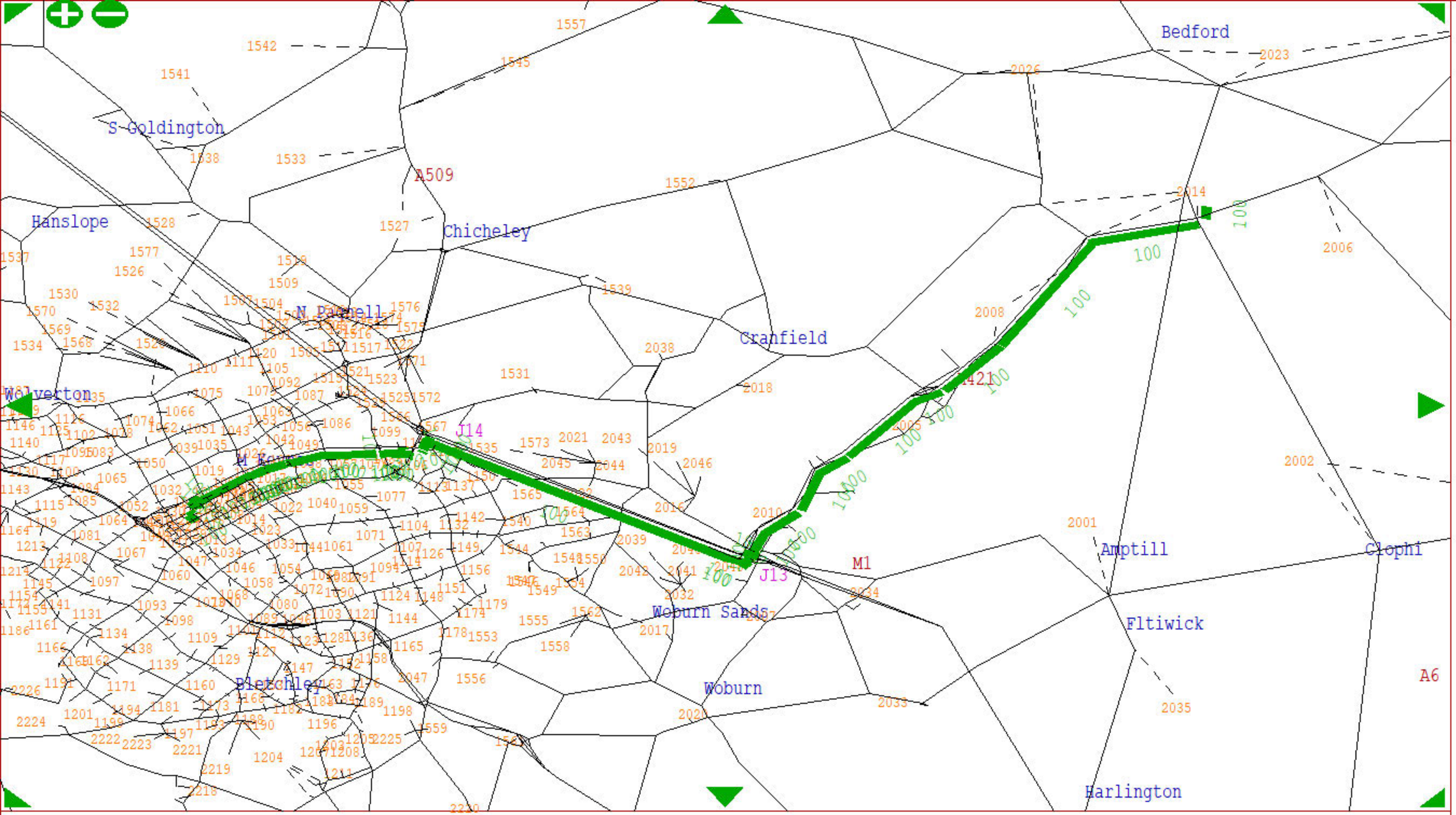

Tree build Menu:

Origin 2014 x
Destin 1028 x

Tij= 0.15

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

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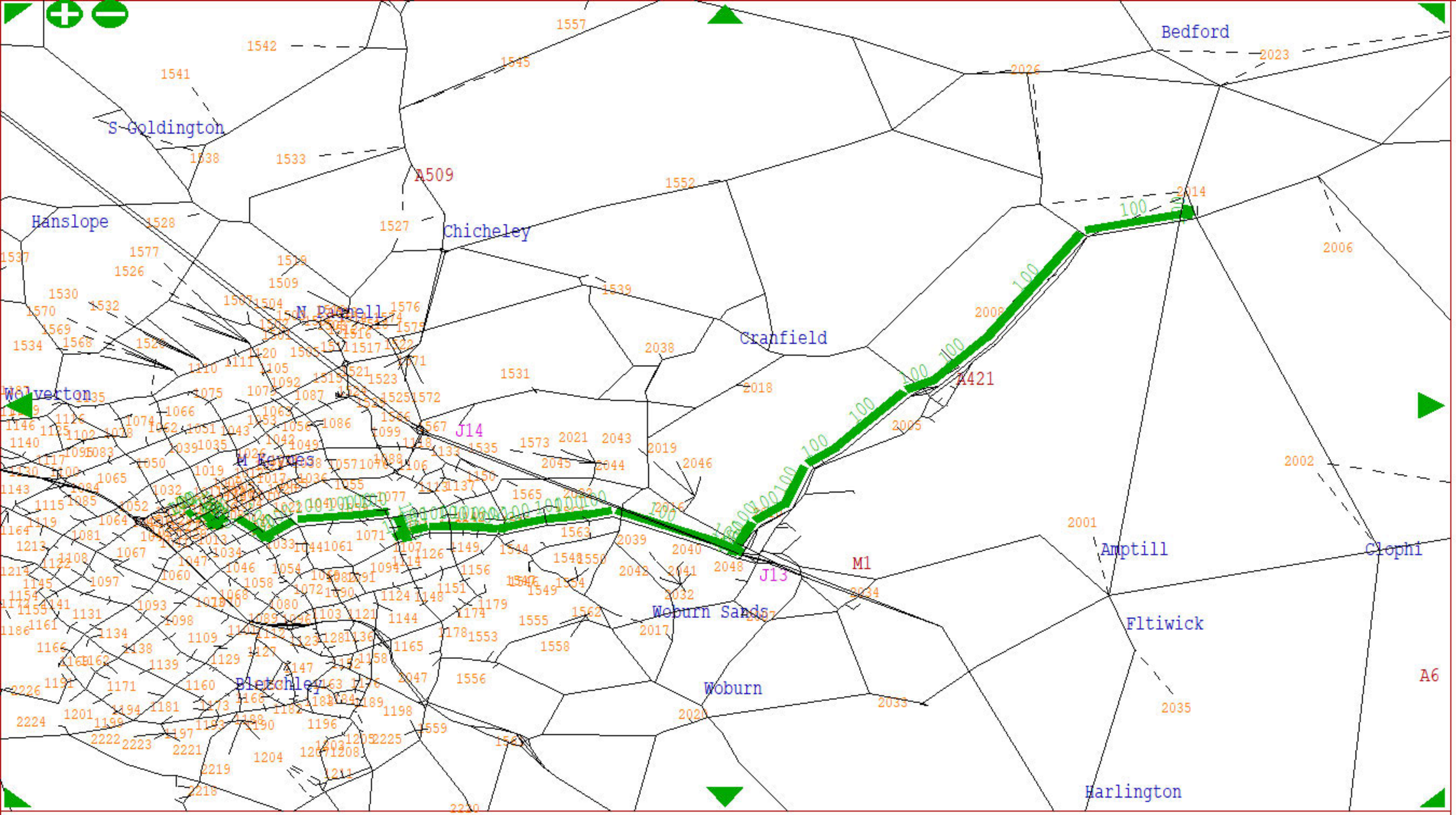

Tree build Menu:

Origin 1028 x
Destin 2014 x

Tij= 0.20

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!

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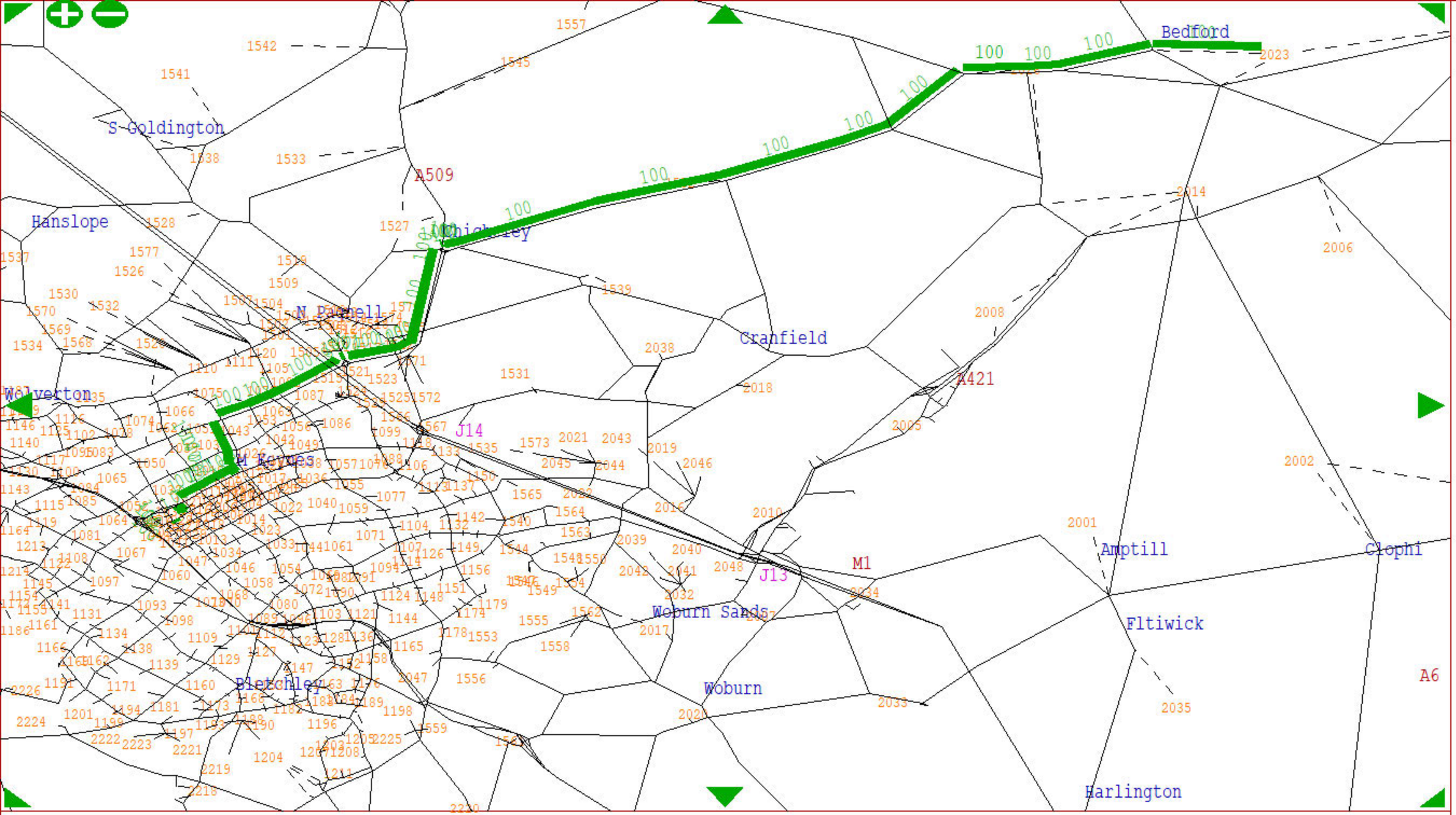


Tree build Menu:

Origin 1028 x
Destin 2023 x

Tij= 0.36

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

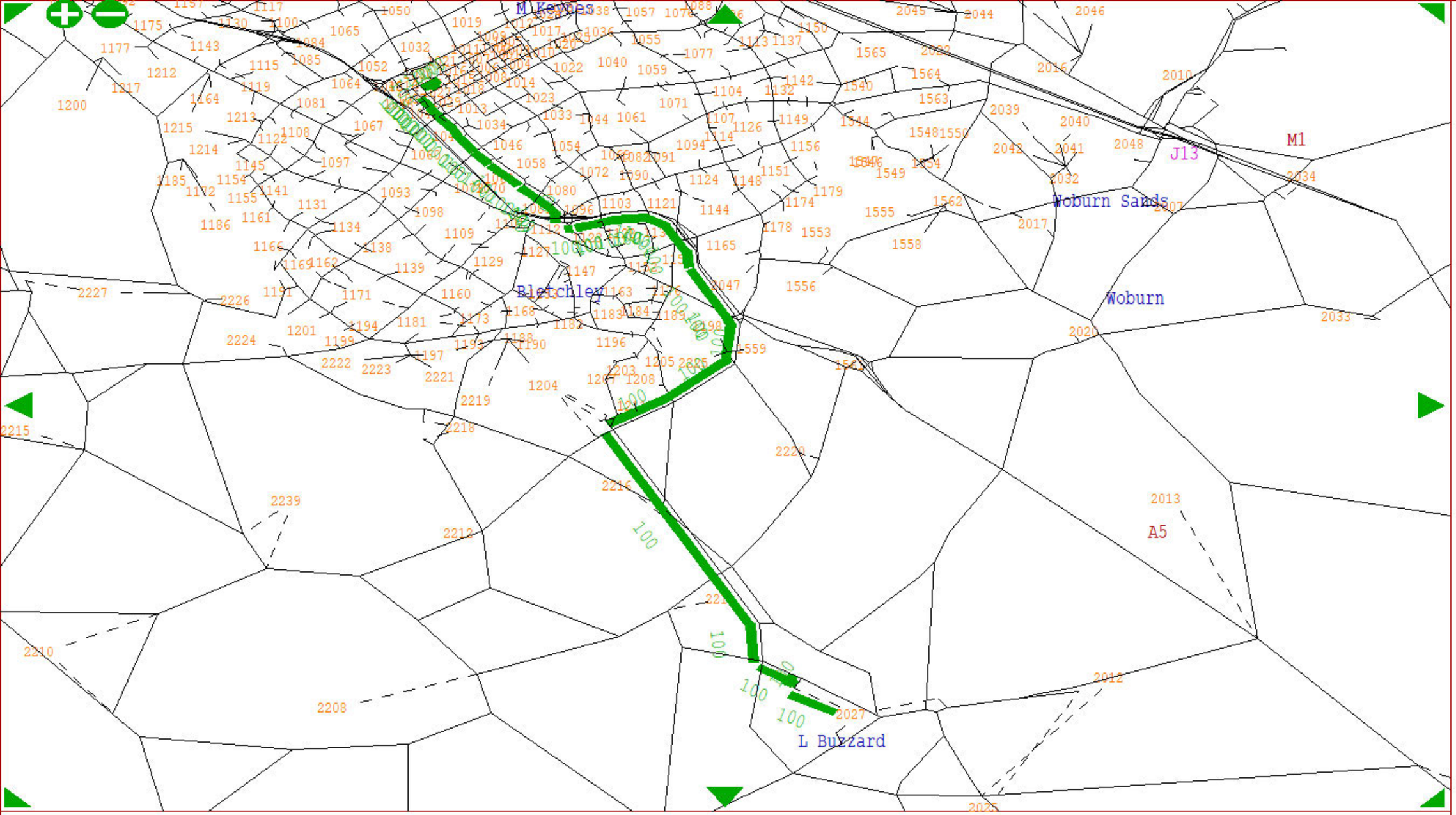
oPtions-UC.. >

dEstination-based option >

Spider tree? ◉
No

Q - Return

+ Menu bar!



Tree build Menu:

Origin 2027 x
Destin 1028 x

Tij= 0.72

U.C. = 1 ?

Origin-based Options:

Plot a tree:
1 - O-D x
2 -All nodes x
3 -All zones x
4 -Nds-zones x

Joy ride tre x
iter. Loops x
oVerlay tree x

Forest x
Arboretum x

Isochrones >

Worst OD rts >

Gaps by link >

oPtions-UC.. >

dEstination-based option >

Spider tree? No

Q - Return

+ Menu bar!

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