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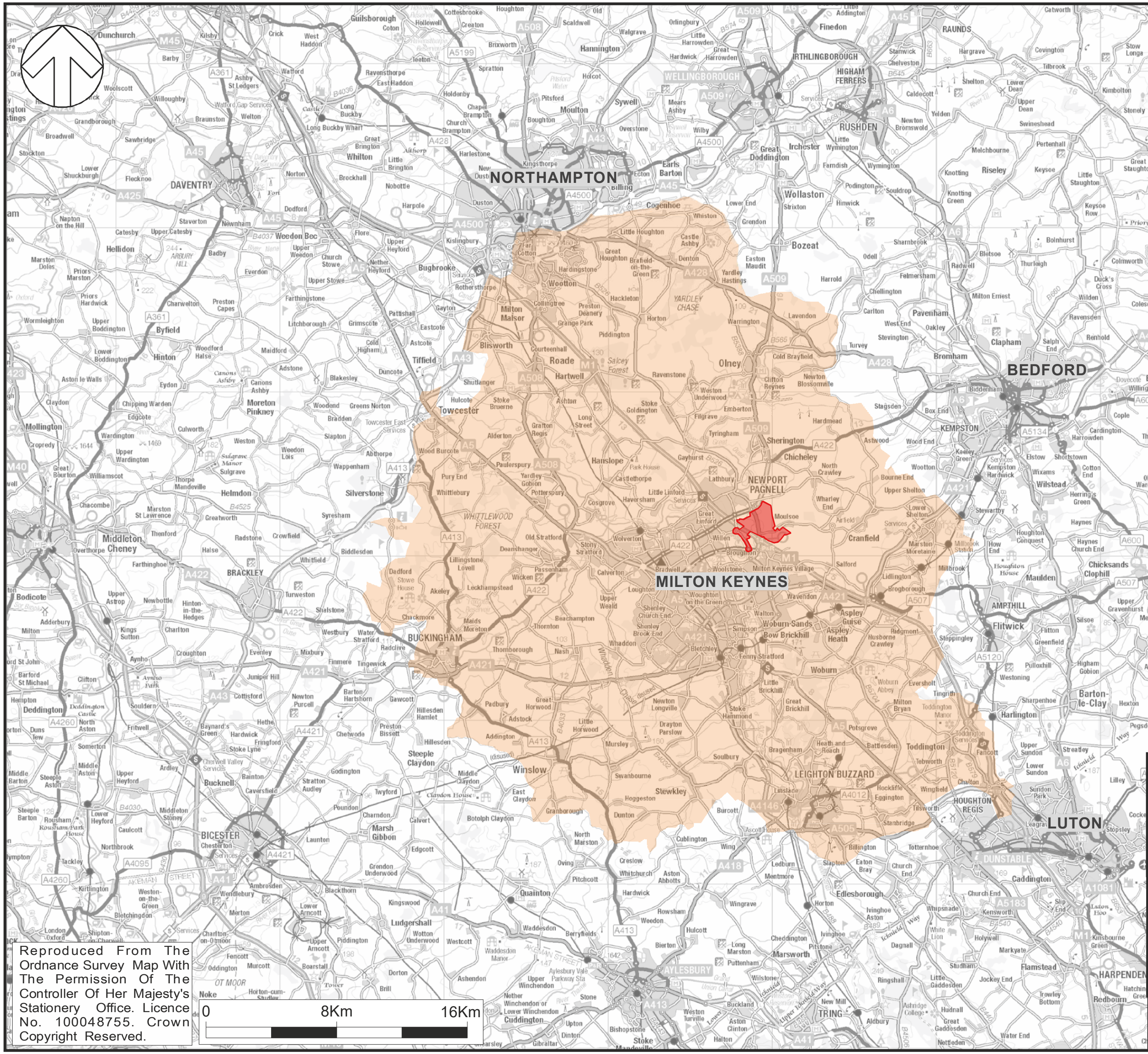


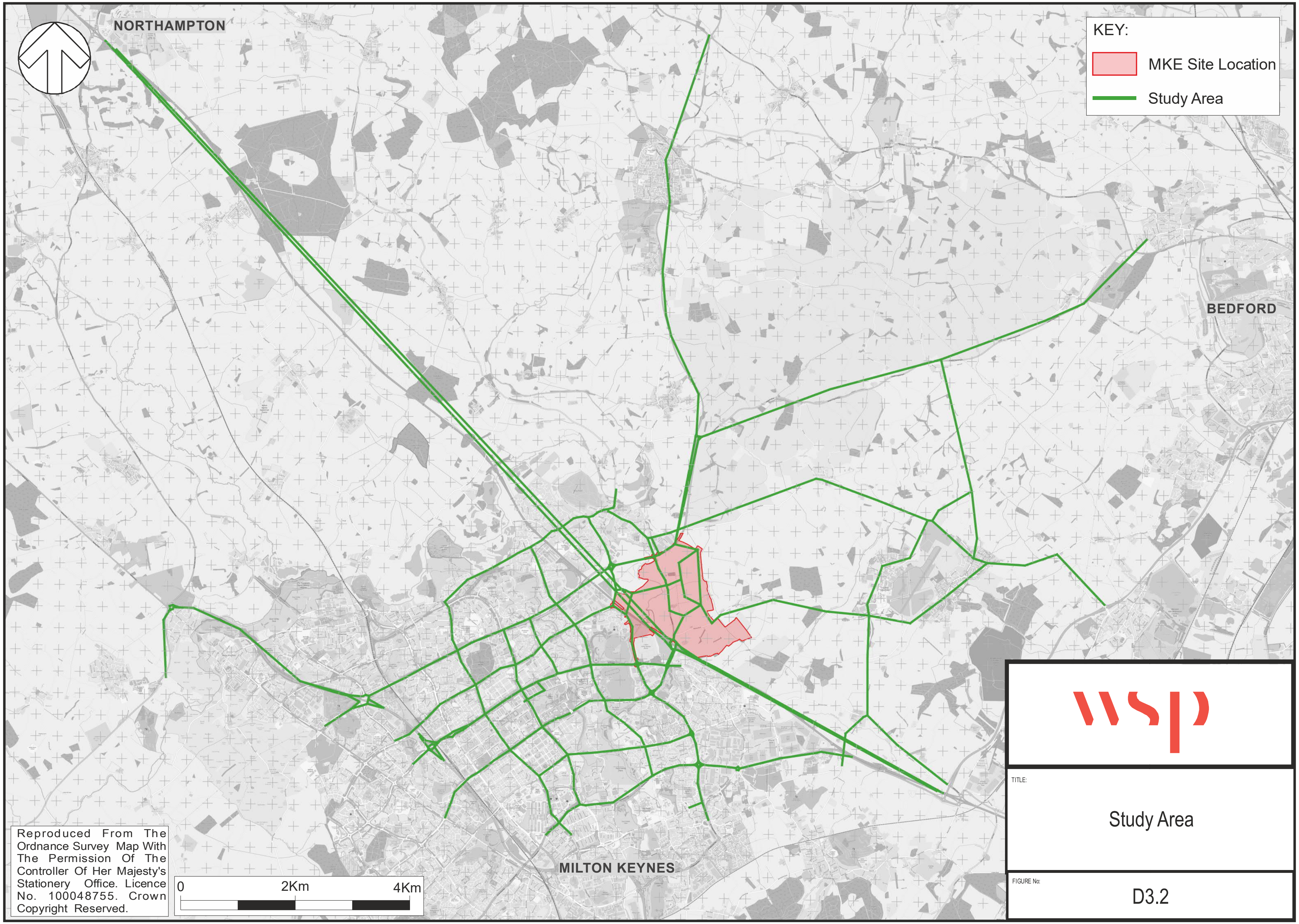
wsp

TITLE:

Geographical Extent of MKMMM

FIGURE No:

D3.1

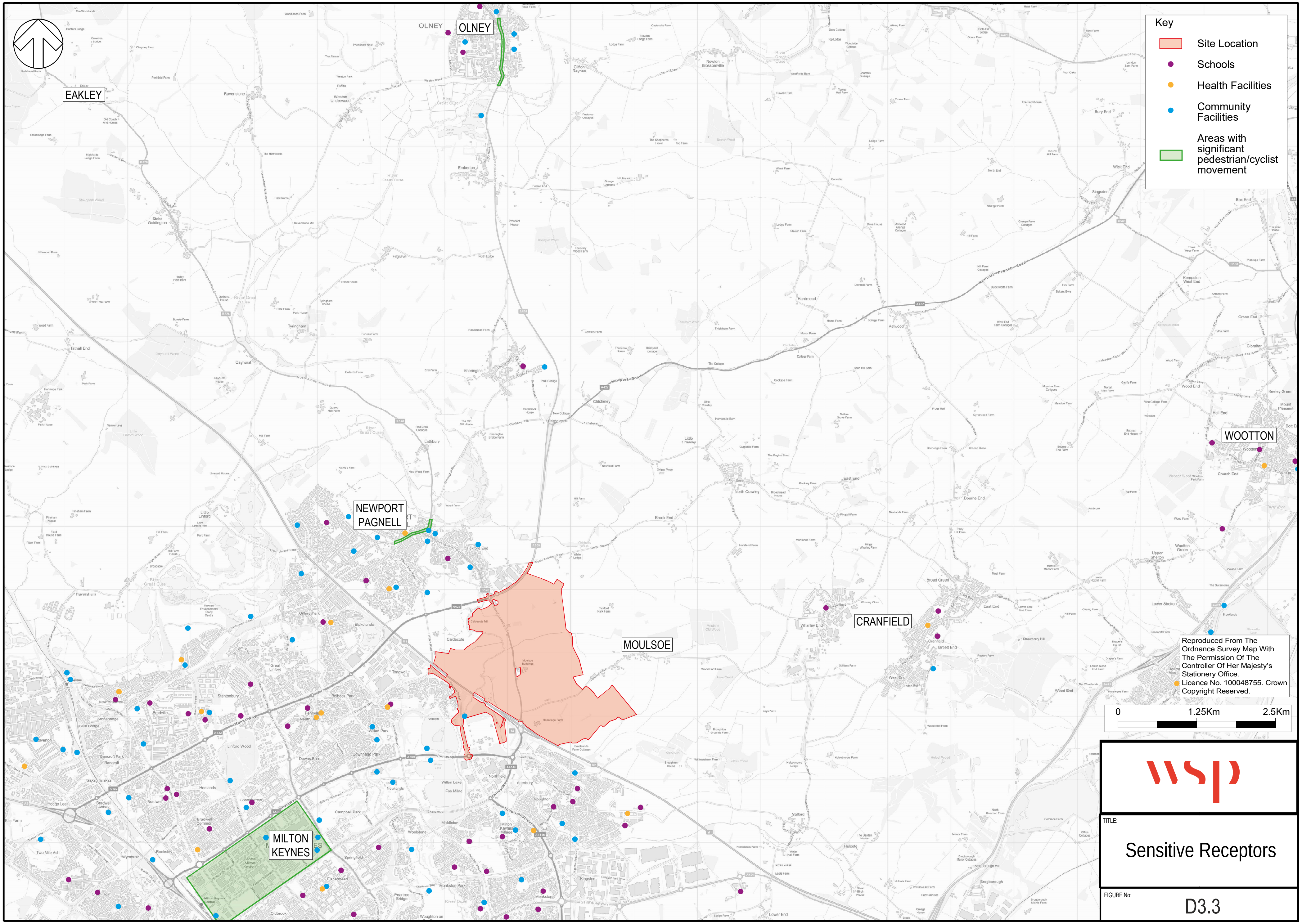


TITLE:

Study Area

FIGURE No:

D3.2



Key
Site Location
Schools
Health Facilities
Community Facilities
Areas with significant pedestrian/cyclist movement
OLNEY
EAKLEY
NEWPORT PAGNELL
MOULSOE
CRANFIELD
WOOTTON
MILTON KEYNES
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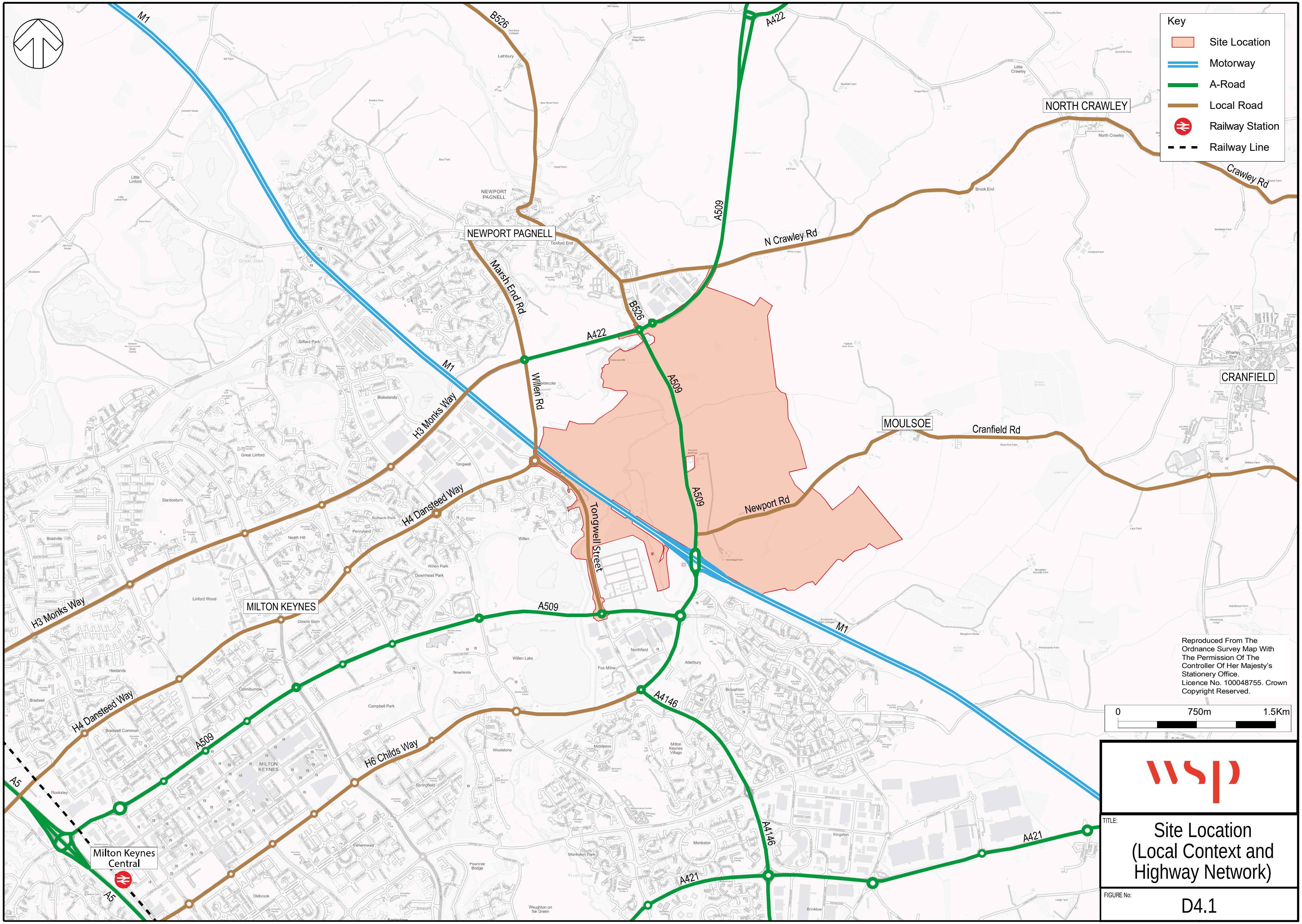
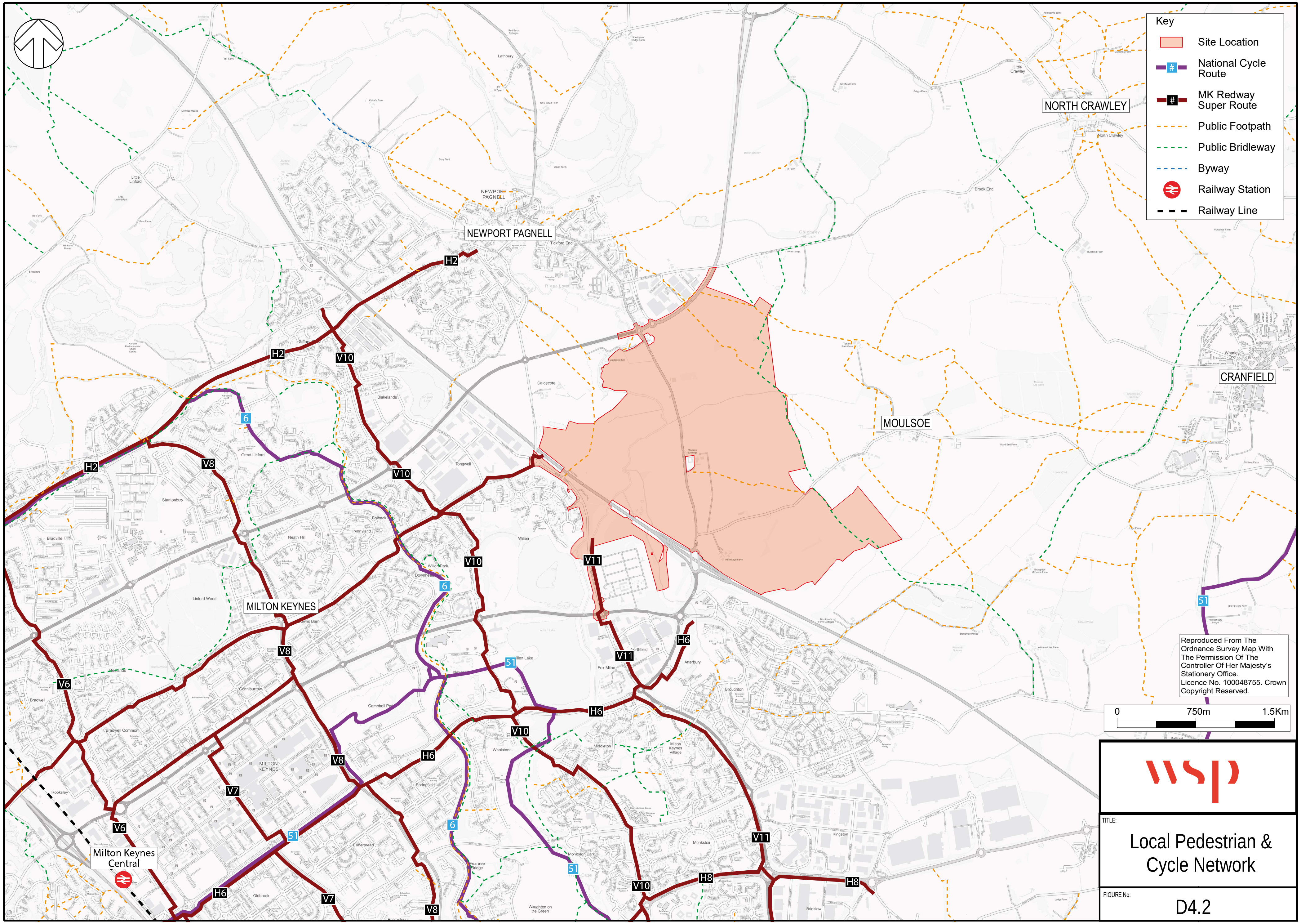
0
1.25Km
2.5Km
wsp
TITLE:
Sensitive Receptors
FIGURE No:
D3.3


Key
Site Location
Motorway
A-Road
Local Road
Railway Station
Railway Line
M1
B526
A422
A509
NORTH CRAWLEY
Crawley Rd
N Crawley Rd
NEWPORT PAGNELL
Marsh End Rd
Willen Rd
H3 Monks Way
CRANFIELD
MOULSOE
Cranfield Rd
Newport Rd
H4 Dansteed Way
Tongwell Street
MILTON KEYNES
A4146
H6 Childs Way
A5
Milton Keynes Central
A421
Reproduced From The Ordnance Survey Map With The Permission Of The Controller Of Her Majesty's Stationery Office. Licence No. 100048755. Crown Copyright Reserved.
0
750m
1.5Km
wsp
TITLE:
Site Location (Local Context and Highway Network)
FIGURE No:
D4.1

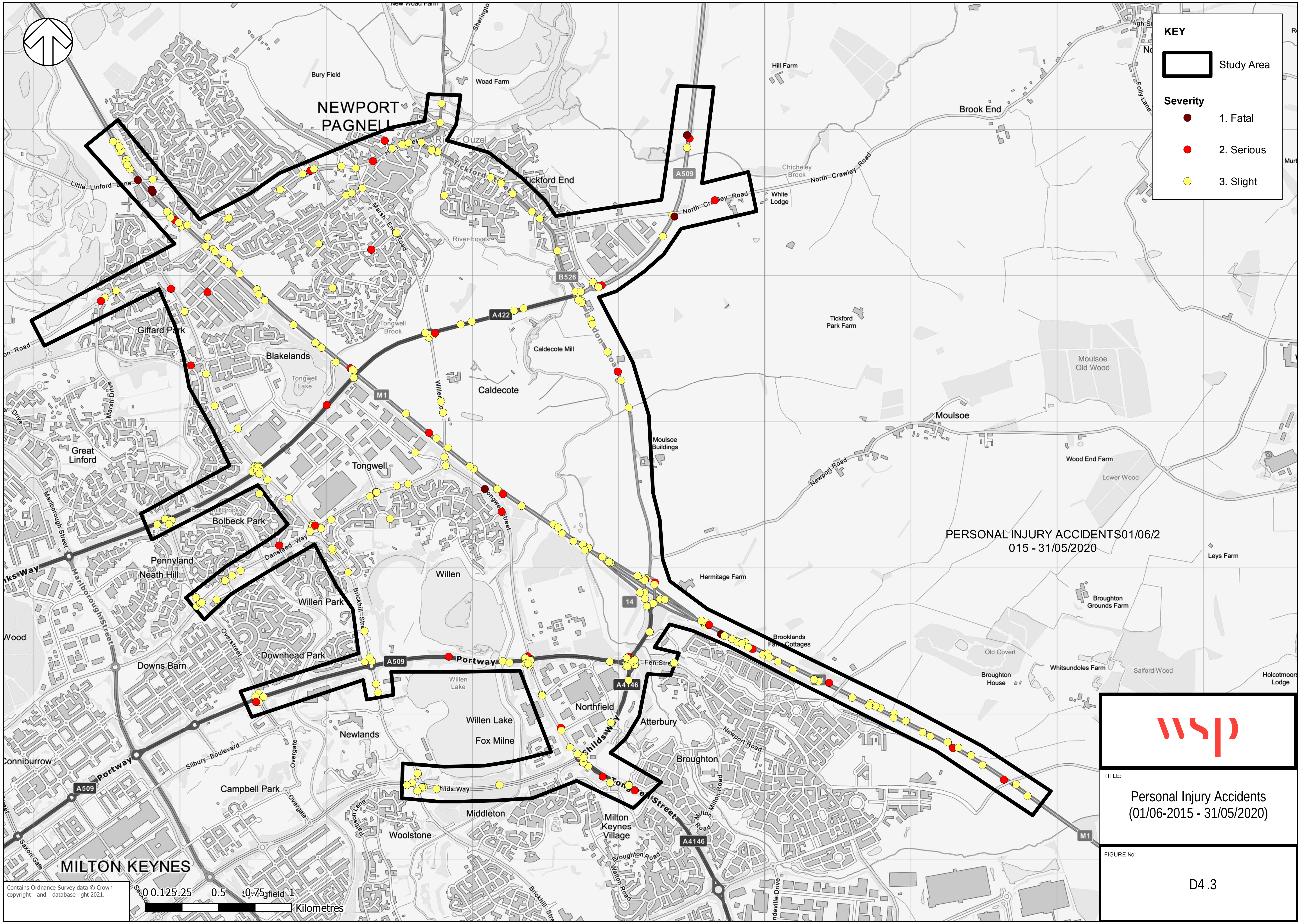


TITLE:

Local Pedestrian & Cycle Network

FIGURE No:

D4.2



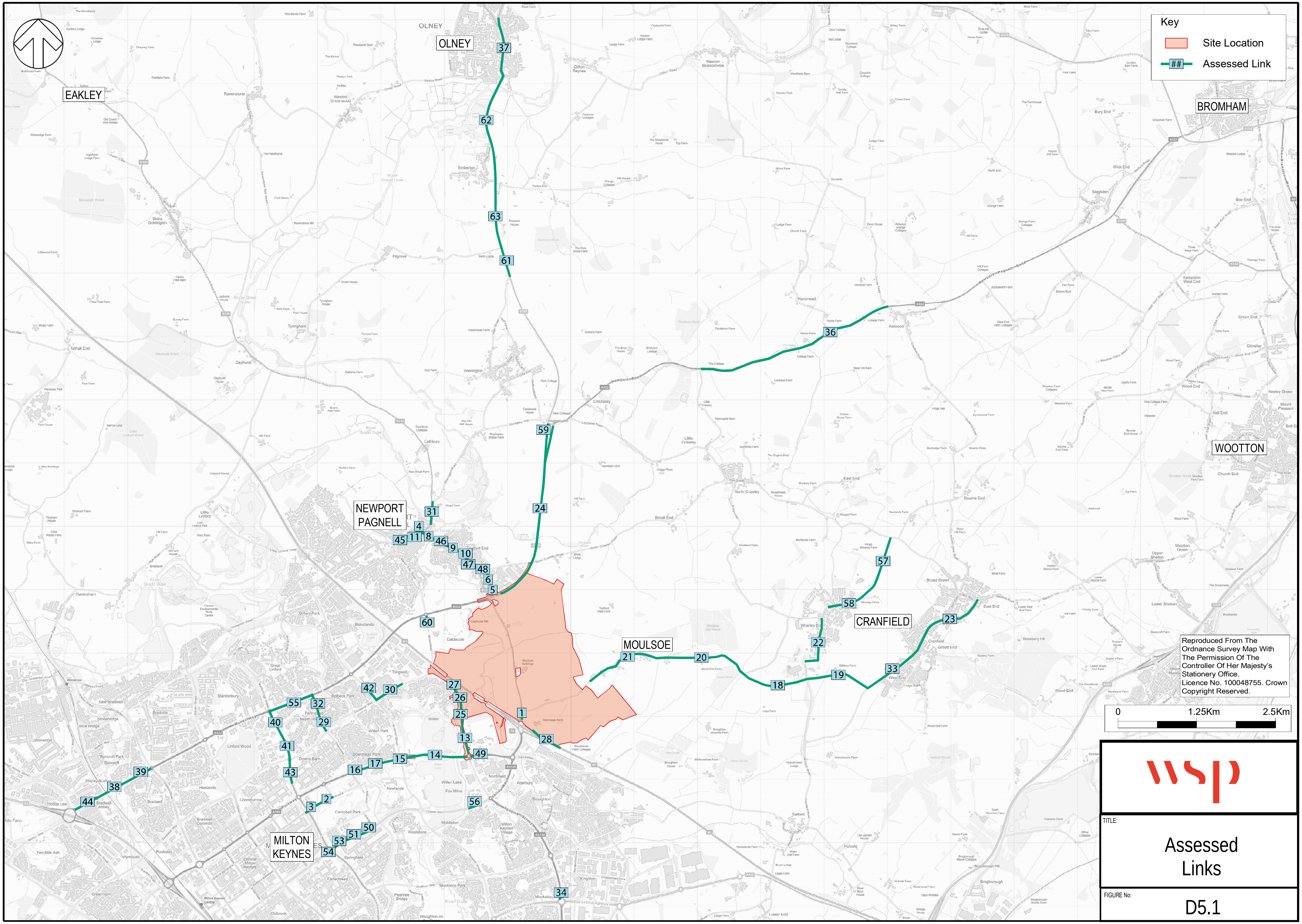
wsp

TITLE:

Personal Injury Accidents (01/06-2015 - 31/05/2020)

FIGURE No:

D4 .3



TITLE: Assessed Links

FIGURE No: D5.1

Appendix D1
Transport Assessment

Berkeley St James

MILTON KEYNES EAST

Transport Assessment

70057521-TA1
MARCH 2021

PUBLIC

Berkeley St James

MILTON KEYNES EAST

Transport Assessment Vol 2: Appendices

TA_APPENDICES
MARCH 2021

PUBLIC

Berkeley St James

MILTON KEYNES EAST

Transport Assessment Vol 2: Appendices

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WSP TRANSPORT TECHNICAL NOTES

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TTN1 – MKE MODELLING APPROACH

Berkeley St James

MILTON KEYNES EAST

Transport Technical Note: Modelling Approach for MKE Planning Application

MP_TTN
MARCH 2019

CONFIDENTIAL

Berkeley St James

MILTON KEYNES EAST

Transport Technical Note: Modelling Approach for MKE Planning Application

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MILTON KEYNES EAST

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1 INTRODUCTION

1.1 MILTON KEYNES EAST SITE

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’).

1.1.2. ‘Milton Keynes East’ (MKE) has been identified as an allocation for a strategic urban extension within Plan:MK. Milton Keynes Council’s (MKC) aspirations for the allocation is set out within Policy SD12 of Plan:MK, stating that the land is allocated *“for a comprehensive residential-led mixed use development of approximately 3,000 dwellings to meet the needs of Milton Keynes up to 2031 and beyond.”*

1.1.3. MKE is strategically well located. It is immediately north-east of Junction 14 of the M1, one of the two main motorway junctions serving Milton Keynes. It is c.3.5 kilometres north-east of Central Milton Keynes, with good and direct walking, cycling and highway links to the city centre. It is well located for proximity to the central business district of Milton Keynes (Central Milton Keynes, or “CMK”).

1.1.4. As set out in Plan:MK, growth east of the M1 is reliant upon 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.

1.2 HOUSING INFRASTRUCTURE FUND (HIF)

1.2.1. The delivery of MKE depends on new strategic transport connections onto, and across, the M1, and links back into Milton Keynes. Other connections will need to include a crossing over the River Ouzel to facilitate housing delivery along both sides of the river corridor and improved connectivity into M1 J14 from the north.

1.2.2. The MKE site seeks to deliver approximately 5,000 homes, with a mix of private and affordable housing types. The site also seeks to deliver around 105Ha of employment alongside other land uses, such as primary, secondary schools and a district centre. The entire MKE allocated site currently includes a number of land ownerships. However, Berkeley are the major landowner and within the land under their control can deliver circa 4,250 homes and around 85Ha of the employment floorspace.

1.2.3. MKC has submitted a bid to central government to secure HIF to extend MK’s existing highway grid system eastwards over the M1 via a new M1 overbridge. The overbridge will assist with connecting the site with the existing MK urban area via Tongwell Street which will also be used for a new public transport corridor. The investment in infrastructure will address capacity constraints on the highway network and, in particular, create new links between the east and west sides of the M1 which currently not only constrain traffic movements but also limit the potential to provide high quality, fast bus services to / from Milton Keynes. These capacity constraints cannot be overcome without significant investment, without which, the MKE allocation cannot be unlocked.

1.2.4. HIF would also be utilised to forward fund a primary school and health centre within the first phase of development, alleviating primary school demand and general medical practice constraints that could otherwise limit the scale of delivery, and helping to quickly shape a sustainable new community to aide swift delivery of new homes.

1.2.5. The cost and timing of these critical up-front infrastructure works to unlock MKE means they cannot be financed through normal developer contributions because of the significant negative impact on project cashflow and viability in the early phases. The risk profile associated with the level of debt would preclude securing private financing for the infrastructure works. The HIF investment will address this market failure, and in doing so, accelerate development of this strategic urban extension as an additional source of housing supply over and above MK's local housing need.

1.2.6. The HIF bid was submitted by MKC on Friday 22 March 2019 and the decision on whether or not the application is successful is expected from June 2019 onwards. The HIF bid was supported by Highways England.

1.3 CONTEXT AND PURPOSE OF THIS TTN

1.3.1. As set out above, the site is subject to a HIF bid to secure the necessary funding required to deliver the associated infrastructure.

1.3.2. To assess the impact of MKE and the associated infrastructure sought to be delivered, the Milton Keynes Multi-Modal Model (MKMMM) was used. The MKMMM is held by MKC and managed by AECOM (MKC's consultants) on MKC's behalf.

1.3.3. There is an understanding that, should the HIF bid be successful, and a planning application were to be pursued then there would be a need to assess to impact of the development on the surrounding highway network in greater detail than has been undertaken to date.

1.3.4. Whilst the MKMMM model was deemed appropriate to assess the scheme as part of the HIF submission, it is considered that some refinement of the model is needed to ensure that it is deemed robust and defensible for use in a planning application. This refinement includes accurately reflecting bespoke trip rates associated with the proposed development and subsequently an accurate representation of development impacts.

1.3.5. In order to refine the model a number of additional traffic surveys will need to be undertaken and further details on this, and the likely refinement necessary is set out at Chapter 3.

1.3.6. Timescales may dictate what alterations can be made and whether they are feasible within the suggested application submission programme.

1.3.7. This note has been prepared such that MKC and Highways England can review the proposed methodology for refining the model and will need to be agreed to ensure that there is adequate data for the application, and that the survey specification is signed off.

1.3.8. There is therefore a need to focus the modelling on an agreed extent and coverage area, and to confirm the actions that need to be taken for a robust understanding of the severity and location of impacts.

1.3.9. This protocol note outlines the modelling process to be undertaken to support a planning application for the MKE site. In addition to setting out the process, timescales and accountability is also set out for specific stages within this process.

1.4 MEETING WITH MKC / AECOM – 11 APRIL 2019

1.4.1. A draft version of this technical note was issued to MKC and AECOM to start discussions and agree, where possible, certain elements of the modelling approach.

1.4.2. A meeting was held at AECOM offices on 11 April 2019 to discuss the suggestions, outline limitations and develop a bespoke approach for MKE and application of the MKMMM model. During the meeting, MKC and AECOM outlined where adjustments could be made and where additional surveys may be useful and warranted.

1.4.3. Meeting notes and updated figures are attached to this note within **Appendix A**. Where appropriate, updates are shown in this version of this Technical Note.

1.5 REPORT STRUCTURE

1.5.1. This technical note is set out in the following chapters:

- Chapter 2: Understanding of current model
- Chapter 3: Surveys and areas for refinement
- Chapter 4: Specific inputs for MKE
- Chapter 5: Modelling Approach
- Chapter 6: Paramics: Detailed Modelling
- Chapter 7: Timeframes and Accountability

2 UNDERSTANDING OF THE CURRENT MKMMM

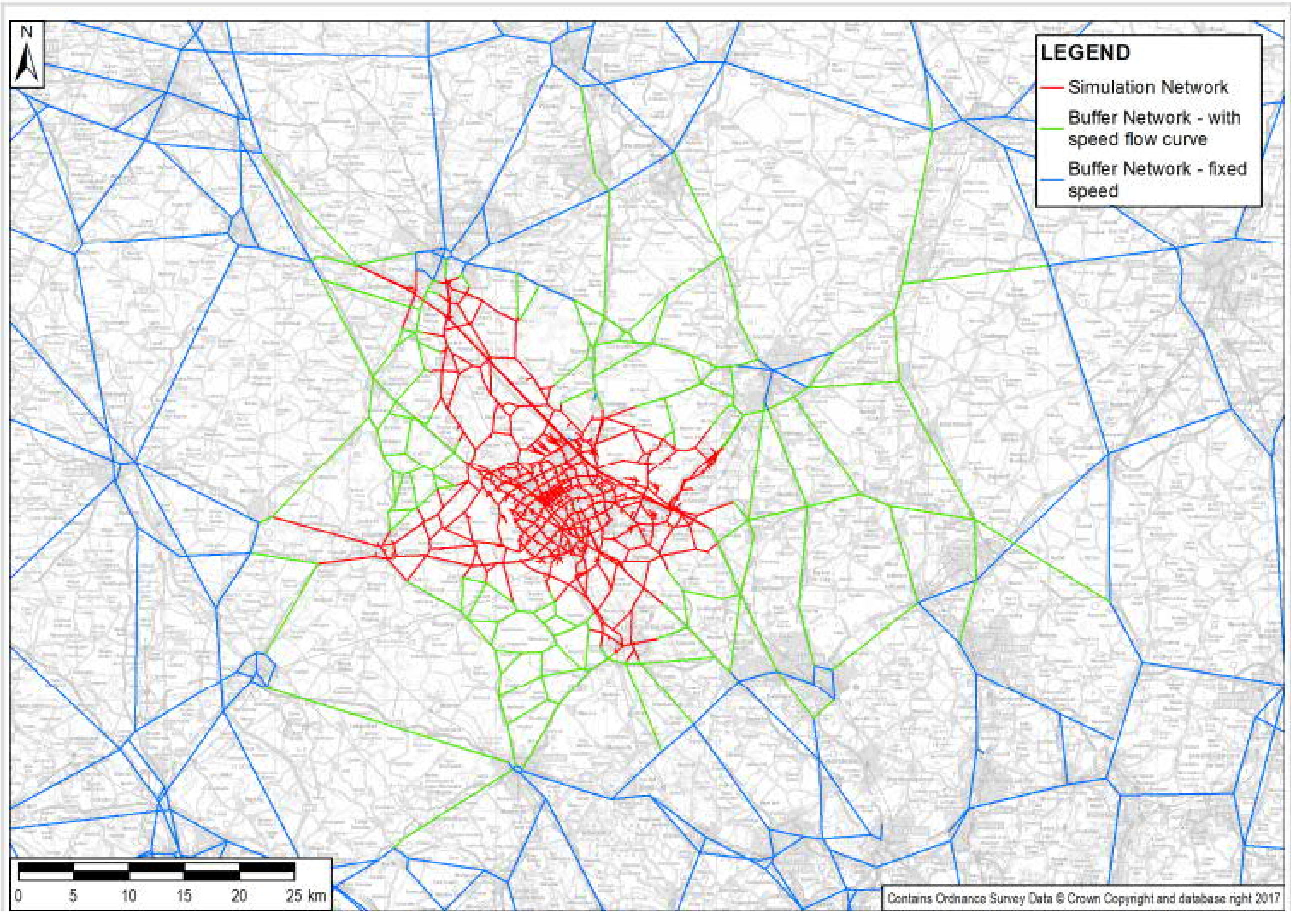
2.1 CONTEXT

2.1.1. During 2016 and 2017, Milton Keynes Council (MKC) updated the Milton Keynes Multi-Modal Model (MKMMM) in advance of the need for its use to test alternative planning options for Plan:MK. The main purpose of the model was to provide a robust means of assessing alternative land-use options and development phasing, and for this to withstand scrutiny. The initial goal was to develop a Reference Case to enable testing of Plan options with a horizon year of 2031 to reflect the Local Plan period.

2.1.2. This required the model to be sufficiently updated, re-validated and recalibrated to 2016 (compared with the previous 2009 model) using additional new data sources. As a result, the model used to assess the proposed infrastructure as part of the HIF application is less than five years old.

2.1.3. Figure 2.1 below shows the current MKMMM model extent – taken from the 2017 LMVR.

Figure 2-1 - Current MKMMM Model Extent and Levels of detail (from LMVR)



2.1.4. In addition to updating the model using new traffic survey data, the simulation network area was extended to better model the impacts of the proposed expansion areas. On the demand side, a variable demand model was developed to estimate the effects of changes in transport infrastructure, rather than choosing different routes which is forecast by the highway and public transport assignment models.

2.1.5. It should be noted that the MKMMM considers a number of scenarios, with those most applicable to the MKE site being the 2031 Reference Case scenario and a 2031 MKE scenario. Bespoke scenarios for the assessment of the MKE scheme is discussed in Chapter 5 below.

2.2 PUBLIC TRANSPORT

2.2.1. It is understood that the highway trips were modelled using the SATURN modelling software package and, as it is not possible to model public transport in SATURN, public transport trips were therefore modelled using Emme software, which was also used to run the demand modelling. A customised version of the Department for Transport's (DfT) trip end model, CTripEnd, was used to produce forecast 2031 trips.

2.2.2. Whilst the MKMMM includes public transport in its current form it is understood that there are limitations on the adjustments that can be included within the platform.

2.2.3. Discussions on coding new public transport services and / or the ability of public transport services to influence travel behaviour will be required and suitable assumptions will need to agreed. However, at this stage based on discussions held to date with both MKC and HE it is considered appropriate to reflect any changes in public transport provision through the mode share and trip rates adopted for the development land uses.

2.3 M1 SMART MOTORWAY PROGRAMME

2.3.1. During the HIF modelling process, Highways England issued the designs they intend to implement along the M1 as part of the SMART motorway project. For reference the HE drawings are as follows;

- HA549348-AMAR-HGN-SWI-DR-CH-400017;
- HA549348-AMAR-HGN-SWI-DR-CH-400018;
- HA549348-AMAR-HGN-SWI-DR-CH-400019; and
- HA549348-AMAR-HGN-SWI-DR-CH-400020.

2.3.2. WSP have undertaken a review, and have agreed with MKC that the HE designs should be taken forward as the basis for all modelling runs (including the reference case). As a result, in late 2018 / early 2019 MKC updated their 2031 Reference Case model and all subsequent MKE model runs such that the current MKMMM is updated to reflect Highways England's changes to the M1 and at J14.

2.4 HIF VERSION OF THE MKMMM

2.4.1. As noted above, during the development of the scenarios and modelling required for the HIF submission some alterations have occurred to the MKMMM. It is suggested that the reference case model used as part of the HIF forms the basis of the planning application modelling. Further updates can then be agreed, as set out below.

2.5 LIMITATIONS

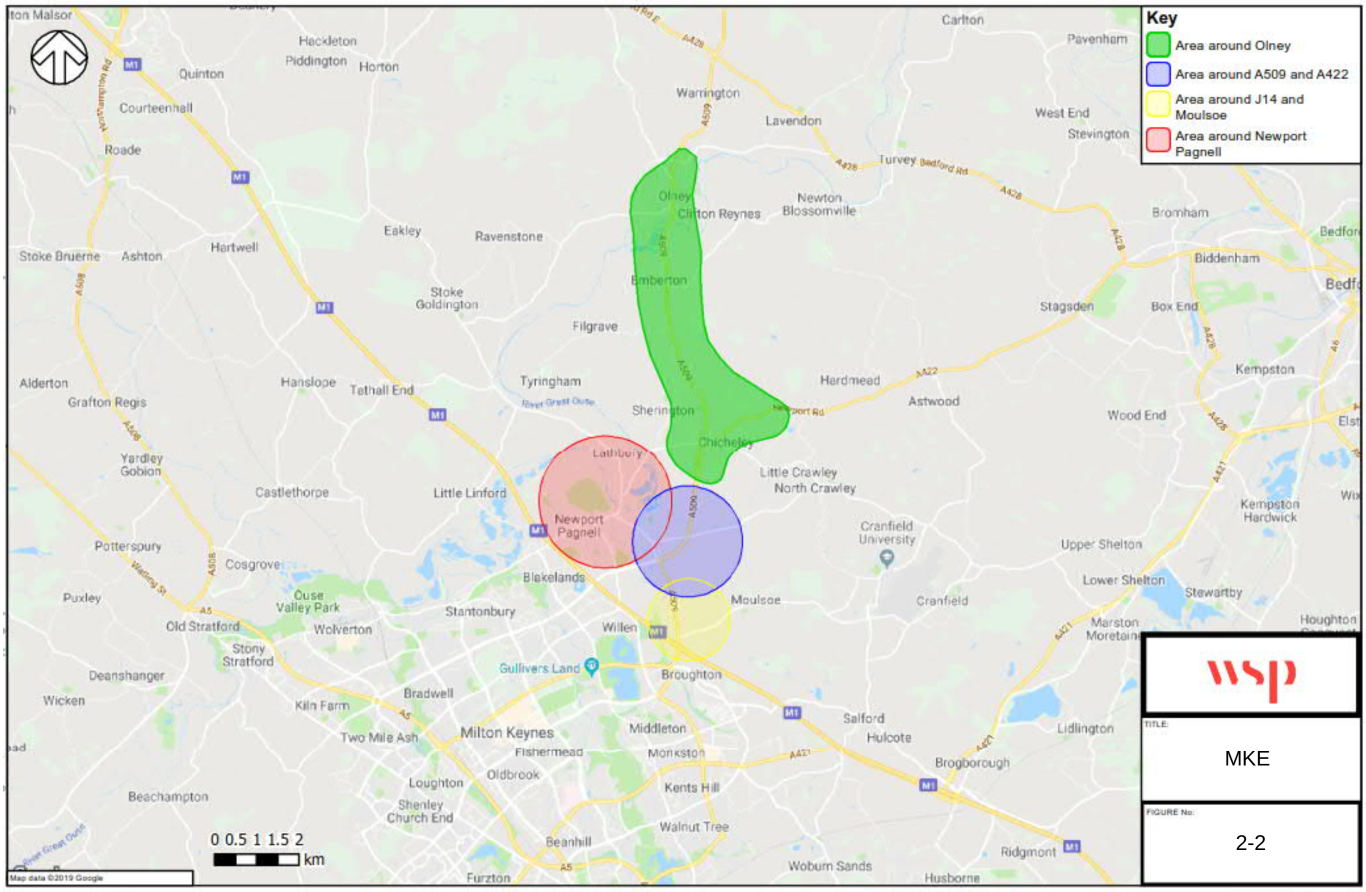
2.5.1. It is acknowledged that the MKMMM is a strategic model and, as such, has been created for a different purpose than to specifically assess a single development or developable area. The MKMMM was considered to be appropriate to assess the scheme for the HIF process.

2.5.2. The current default trip rates in the MKMMM require adjustment to reflect the characteristics of the MKE proposals. This includes the ability of the site to capture trips, also referred to as "internalisation" as residents / staff may not need to travel further afield due to the range of services and land uses available on site.

2.5.3. Additionally, reviewing the current model extent shown in Figure 2-1 above, there is an opportunity to improve the level of detail on the links surrounding the MKE site, including Newport Pagnell and Moulsoe. Figure 2-2 below shows the three areas where refinement would be beneficial. The areas identified are:

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

Figure 2-2 – Potential Areas for Refinement



2.5.4. It is considered appropriate to update the model and provide further traffic surveys in key areas and locations. Chapter 3 discusses the level of surveys and suggested locations for these on which the opinion and agreement from MKC and He is sought.

2.5.5. Refinement could be achieved in the following broad areas. These will need to be reviewed, both in terms of complexity and feasibility of delivery with MKC and their consultants AECOM. The planning programme may dictate which areas of focus are progressed:

- Geography granularity – improving coding and data in key areas which may have less detail;
- Background data – a review of planning growth assumptions in MK and neighbouring authorities in particular central Bedfordshire (see further commentary on this later in the report);
- Validation surveys – to more accurately reflect current turning proportions and assignment;
- Bespoke inputs - for MKE site in terms of trip generation;
- Bespoke inputs – for MKE in terms of PT impacts; and
- Zonal improvements – Smaller, more detailed zone assumption for MKE to reflect the proposed masterplan for the site and the layout of land uses within it.

3 SURVEYS AND AREAS FOR REFINEMENT

3.1 CONTEXT

3.1.1. A number of specific inputs are required in order to develop the modelling scenarios required for the Milton Keynes East Transport Assessment (TA). There is an opportunity to undertake additional traffic surveys and detailed analysis on the areas surrounding the site, including the nearby populaces of Newport Pagnell and Moulsoe to ensure impacts are adequately considered.

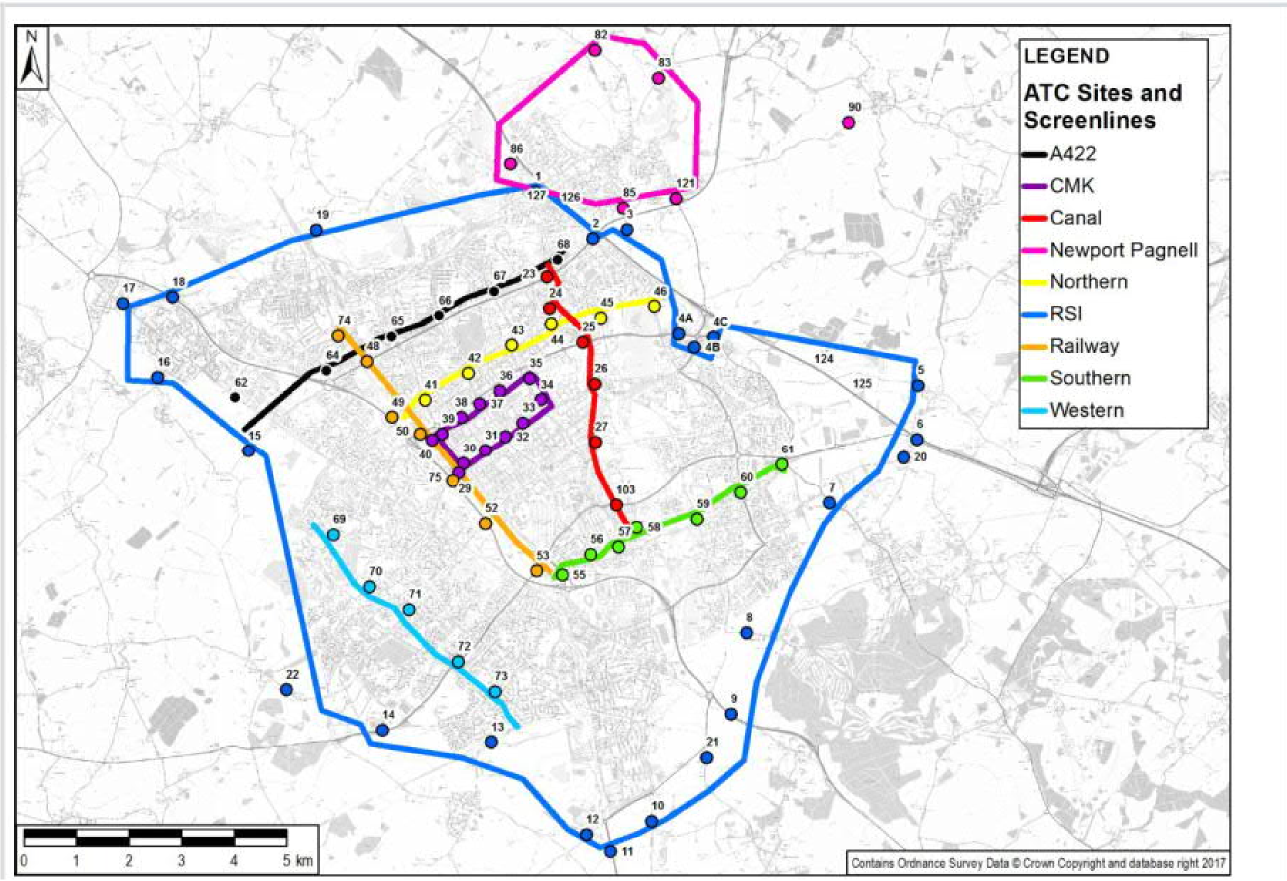
3.1.2. The traffic surveys would be used primarily to inform and support the TA. The data would also be shared with MKC and their modelling consultants (AECOM) for validation, review and potential inclusion in the MKMMM.

3.1.3. A review of the data underpinning the MKMMM has been undertaken to ascertain where there may be overlap and / or where additional traffic surveys are required.

3.2 2016 CORDON LINES

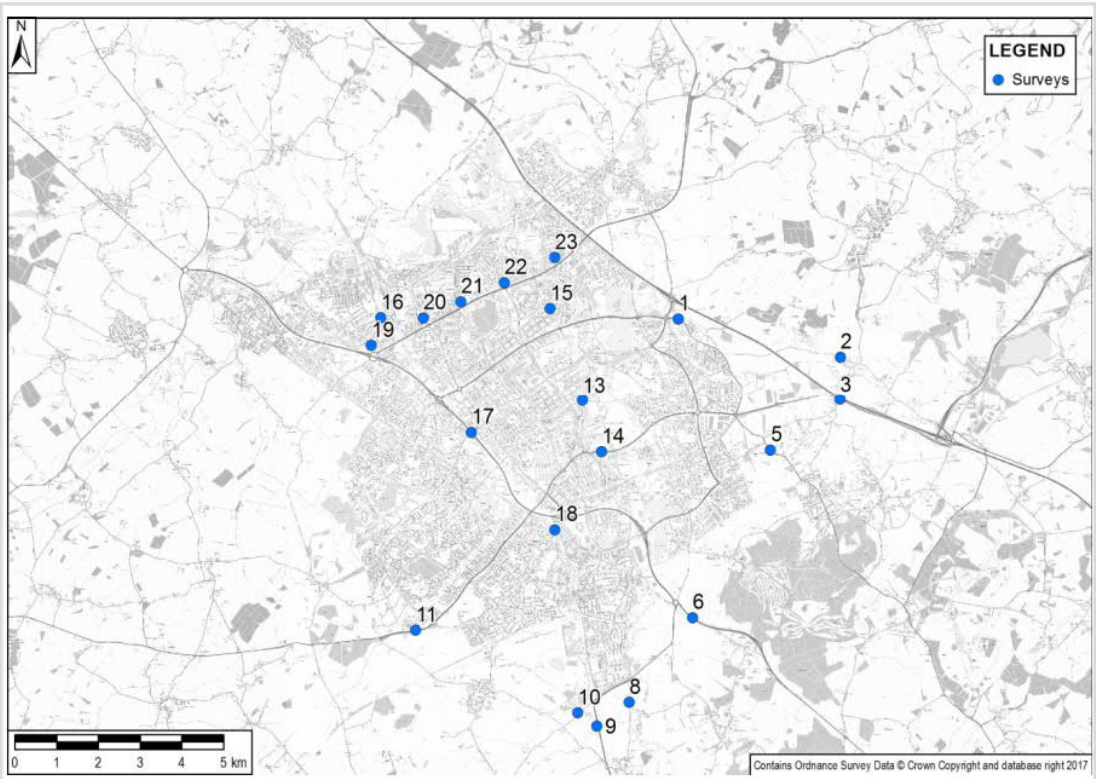
3.2.1. Whilst WSP have an idea of the areas of interest, further input from MKC is required to confirm the specific locations that need to be surveyed. Figure 3-1 below identifies the 2016 MKMMM cordon and screen-lines.

Figure 3-1 - 2016 MKMMM Revised Cordons and Screen-lines



3.2.2. Figure 3-2 shows the additional traffic surveys undertaken in 2016 that were used to update the MKMMM to a 2016 base year.

Figure 3-2 - 2016 (LMVR) additional survey locations



3.3 ADDITIONAL SURVEYS – MCTCS, ATCS, QUEUE SURVEYS, ETC.

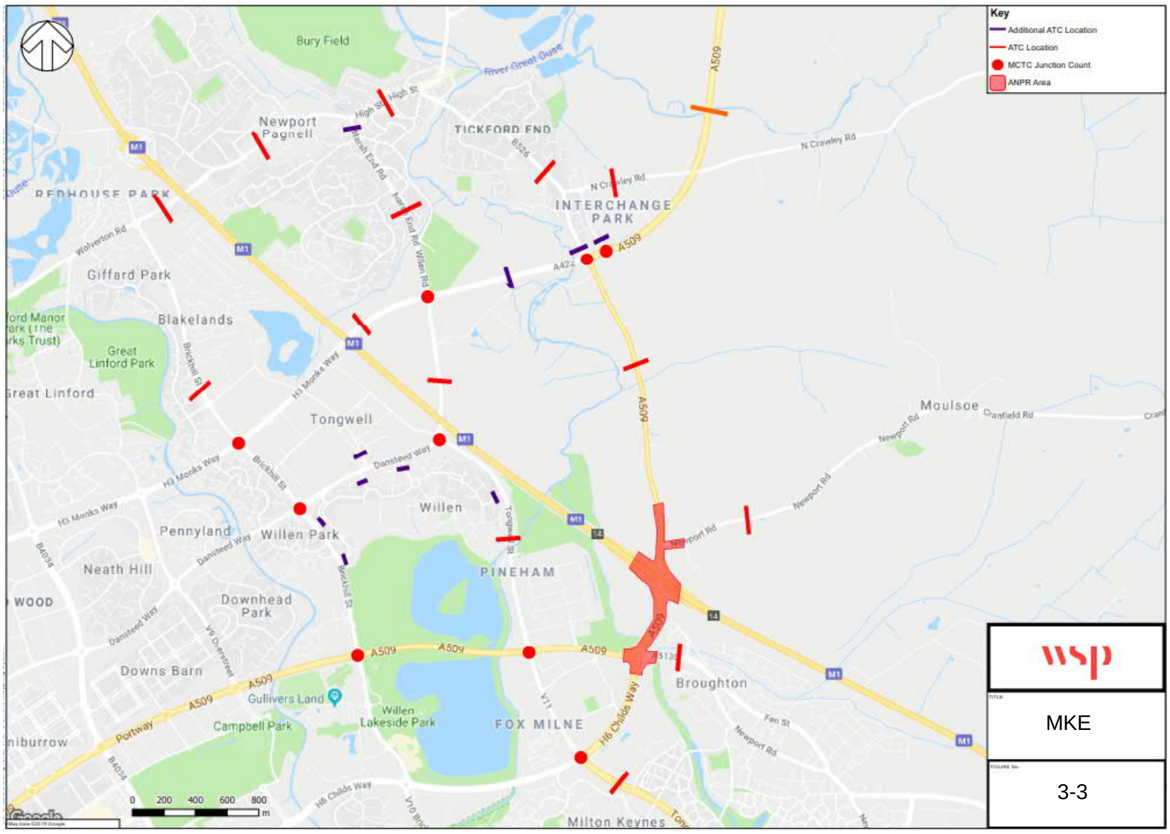
3.3.1. It is intended that the additional surveys would include Automatic Traffic Counts, Manual Classified Turning Counts and Queue Surveys at a number of key junctions. These have been identified based on the off-site impacts likely to be realised as a result of the development following the work undertaken in support of the HIG bid, including:

- Vairous strategic and local links and the following junctions;
- 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

3.3.2. Where possible, and if available, use will be made of traffic surveys recently undertaken at these junctions by others in support of planning applications for other sites, subject to the approval of MKC and Highways England (HE).

3.3.3. Failing this, it is suggested that a suite of surveys is undertaken. During the meeting with MKC and AECOM on 11 April, and as shown in Appendix A – additional surveys were suggested. Figures 3-3, 3-4 and 3-5 below shows the indicative map of further survey locations to support both the planning application for MKE and the MKMMM refinement.

Figure 3-3 - Suggested 2019 Traffic Survey Locations – Core Area 1



3.3.4. Figure 3-3 above outlines the core area surrounding the MKE site and covers the above junctions. Post meeting with MKC and AECOM, is was suggested that a number of additional ATCs should be included to help provide additional data on certain key links and area.

3.3.5. Similarly, Figures 3-4 and 3-5 show the original and suggested additional survey locations in the Cranfield and Olney areas.

Figure 3-4 - Suggested 2019 Traffic Survey Locations - Area 2

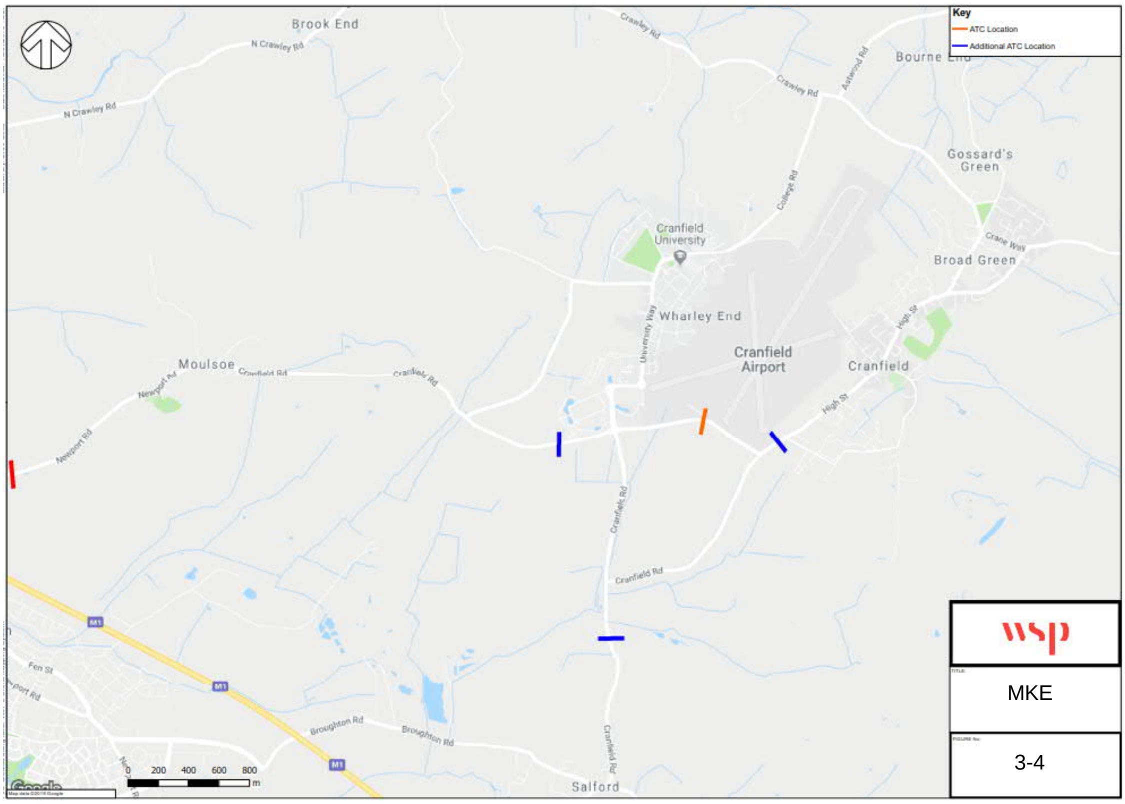
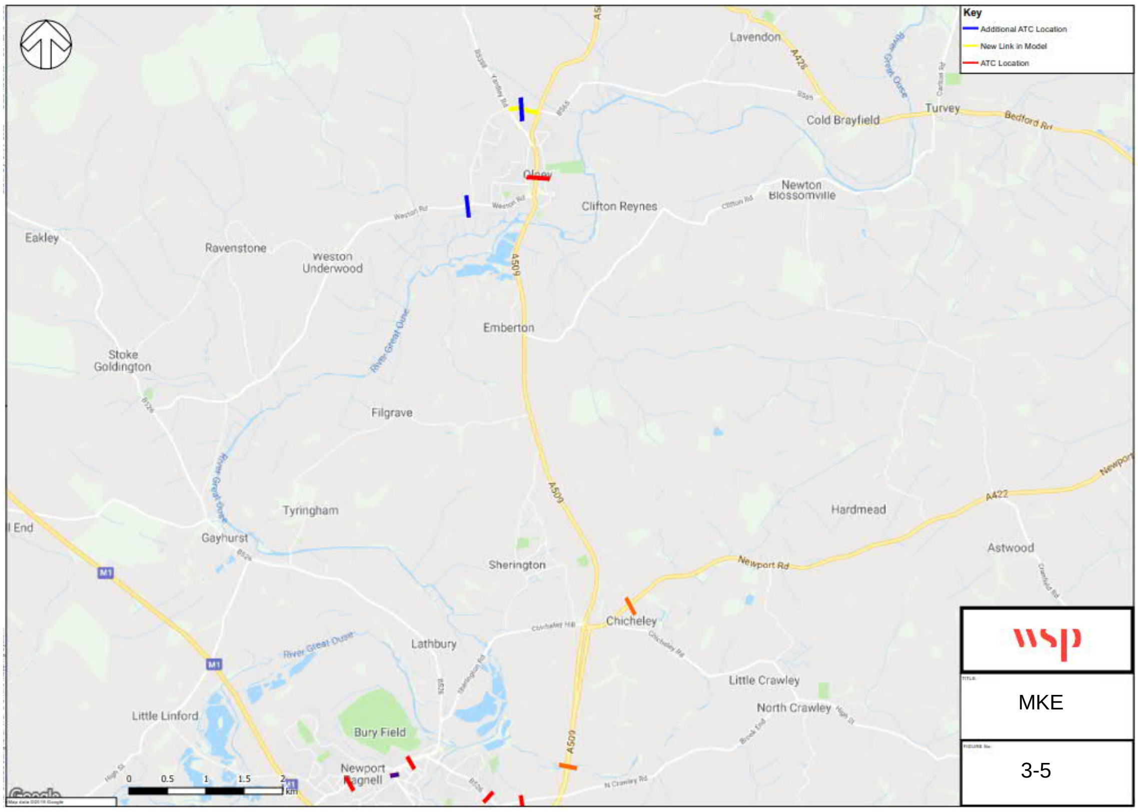


Figure 3-5 - Suggested 2019 Traffic Survey Locations - Area 3



3.3.6. **Appendix A** also contains the figures and subsequent meeting notes.

3.3.7. It is intended that the additional surveys will be used to update the MKMMM base model and then the 2031 Reference Case (or alternative future year), which essentially replicates the Plan:MK scenario, albeit excluding the MKE site, to create a revised future year base scenario for the 2031 Local Plan period.

3.3.8. The proposed development would then be added into the model to create a 'with development' scenario that can be compared against an updated base position. However, as the full build out of development is anticipated to be 2039 it is considered that a new 2039 Reference Case model will need to be developed with assumptions made around background growth between 2031 and 2039; it may be that the growth within the locale of the MKE site between 2031 and 2039 is actually realised solely by MKE itself and hence no additional growth is needed but this will need to be agreed with MKC and HE and again views on this are sought from both parties.

3.3.9. To meeting the current planning programme, the surveys will need to be undertaken in advance of the June half-term period; i.e. ideally in May 2019 / Early June.

3.3.10. It is suggested that the surveys are undertaken using the following standard methodology. The survey specification will be detailed by WSP, but will need to be agreed with MKC and HE to ensure it meets the criteria required for modelling and assessments within the TA.

- Manual Classified Traffic Counts (MCTCs)
  - Times;
    - AM (07:00 - 10:00)
    - Inter (11:00 – 13:00)
    - PM (16:00 - 19:00)
  - Neutral weekday within the ATC period; i.e. not a Monday or Friday;
  - Traffic flows fully classified for all turning movements; and
  - Recorded at 15-minute intervals.
- Queues
  - Recorded at 1-minute intervals at all of the MCTC survey locations;
  - Recorded by approach and by lane;
  - Recorded in metres and vehicles.
- Automatic Traffic Count (ATC)
  - Surveys over a minimum of a seven-day period;
  - The traffic counters to record flow and speed, fully classified.

3.3.11. It is assumed that the MCTC's would be a single day within the week-long survey window with those MTCs then adjusted if required based on the results of the ATCs.

3.3.12. Signal timing information and saturation flow data will also be acquired where appropriate with the former to be provided by MKC / HE.

3.3.13. No pedestrian / cyclist surveys are proposed to be undertaken. No weekend surveys are proposed.

J14 AND NORTHFIELDS ROUNDABOUT

3.3.14. In Figure 3-3, the surveys for M1 Junction 14 and Northfields Roundabout are shown together instead of being treated as two separate junctions. This is because during the review and the analysis undertaken as part of the HIF, it is clear that there is a level of interaction between the two junctions which will need to be captured to ensure that modelling is accurate.

3.3.15. This area is broadly in line with the extent of the current Paramics model (discussed further below) and it is suggested that updated surveys are undertaken to fulfil both MKMMM updates and the Paramics re-validation.

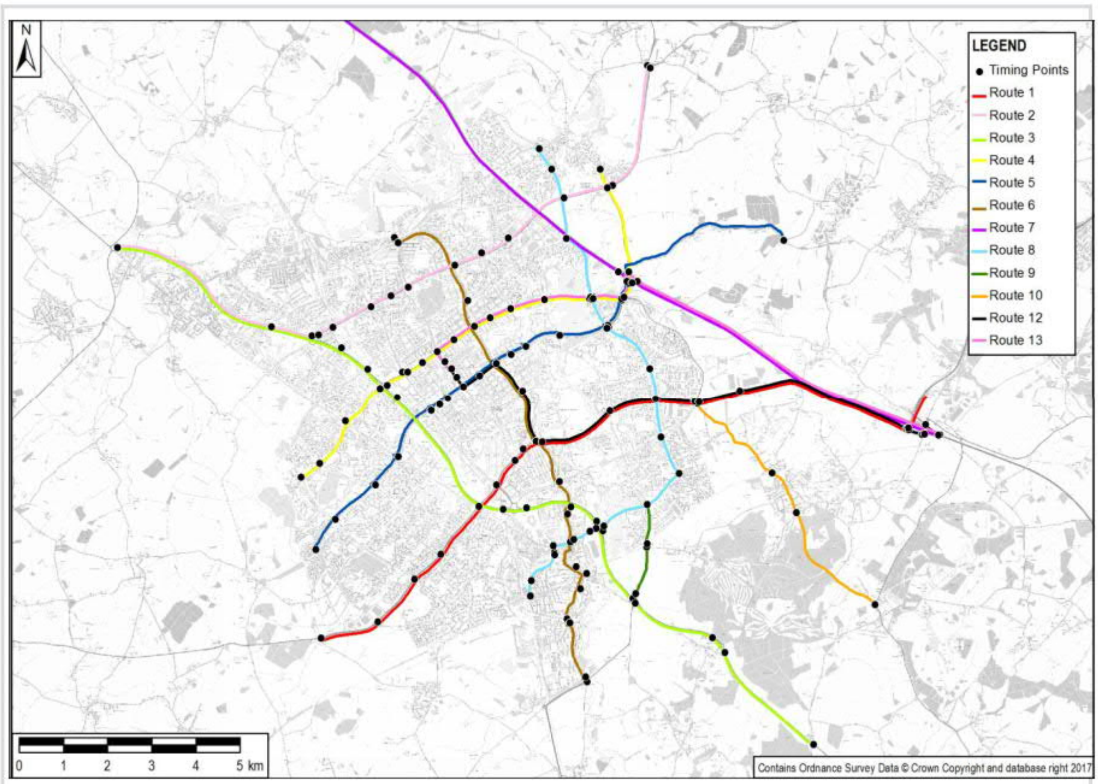
3.3.16. The preferred methodology to survey these junctions would be to adopt Automatic Number Plate Recognition (ANPR) cameras on the junctions and associated slips. ANPR surveys would provide Origin / Destination matrices and journey time outputs and delays. Additional cameras may be warranted to pick up queue profiles on the approaches and the slips.

3.3.17. If due to constraints the use of ANPR is not feasible, then the use of more traditional MCTC's and queues surveys will be adopted. The use of traditional cameras instead of ANPR would still provide adequate information flow and queues information.

3.4 ADDITIONAL SURVEYS – JOURNEY TIMES

3.4.1. Figure 3-4 below provides a snapshot of the journey time routes considered in the 2016 MKMMM. These were developed by MKC through use of Trafficmaster data.

Figure 3-6 - MKMMM 2016 Journey Time routes



3.4.2. The journey time routes covered in the model is considered to provide a good level of detail.

3.4.3. A review of whether up to date Trafficmaster (or equivalent data from SatNav sources, such as TomTom data sets) is available would be beneficial and could provide a basis to calculate multiple routes if further analysis is required.

3.4.4. If this is not available it is suggested that as part of the other traffic surveys, journey time routes can also be surveyed. This would likely take the form of the 'floating car' technique with drivers and GPS logs on the network during the peak hours. Sufficient numbers of vehicles will be required to capture the necessary runs during the time periods.

3.4.5. As part of the Paramics detailed surveys, some journey times would also be recorded on the M1 Junction 14 and Northfields Roundabout.

4 MKE SPECIFIC INPUTS

4.1 INTRODUCTION

4.1.1. This section covers the following elements;

- Proposed development trip generation;
- Proposed development distribution and assignment;
- Zoning; and
- Public Transport.

4.2 PROPOSED DEVELOPMENT TRIP GENERATION

MKE TRIPS AND TRIP RATES

4.2.1. WSP have undertaken a review of the potential adjustments and alternative methodology that could be adopted to reflect the developments proposals. A sensitivity test was adopted including alternative trip rates (residential and employment) as part of the HIF process. This was used to determine the deadweight position and understand the potential dwellings that could be delivered (irrespective of Policy constraints) before further infrastructure is needed.

4.2.2. It is suggested that as part of the planning application, further refinements to the residential trip rates are adopted and those rates are then fed into the MKMMM. This would provide further evidence that the Transport Assessment for the application has assessed the potential impacts from the proposals. The default residential trip rates in MKMMM are believed to be lower than the sensitivity analysis undertaken by WSP and the production of bespoke rates will more accurately reflect the development proposals.

4.2.3. A separate Technical Note detailing the process will be issued to MKC and HE for agreement. For ease of reference, an outline of the methodology is presented below:

MKE RESIDENTIAL TRIP GENERATION METHODOLOGY

- TRICS multi-modal trip rate extracted for Private dwellings to determine the likely trip rate for the development (to calculate Total Person trips)
  - As the development schedule is not yet fixed; the Mixed Housing trip rate will be used (sites comprising houses and flats)
- TRICS multi-modal trip rate extracted for Affordable dwellings to determine the likely trip rate for the development (to calculate Total Person trips)
  - As with the above, a Mixed Housing rate (houses and flats) will be selected.
- Application of these rates to the development mix. It is also envisaged that these trip rates will be applied to the non-Berkeley homes within the MKE site as committed development through to 2039.

Residential Trip Purpose and Internalisation

4.2.4. The below will subsequently be applied to both the affordable and private dwellings separately;

- The Total person trips will be disaggregated by Trips by journey purpose, using National Travel Survey information (NTS0502 - Start time of trips by purpose);

- The Arrival / Departure percentage splits will be applied (taken from the respective TRICS information) for a greater understanding of the movement of vehicles and the tidality of the development;
- 2011 Census information, specifically data from - QS703EW - Method of Travel to Work (2001 specification) will be used to determine the mode with which these journeys are being taken for the employment and business trip purposes, with a specific focus on Car / Van journeys.;
  - A selection of MSOAs have been chosen and averaged (Newport Pagnell North, Newport Pagnell South and Sherington) to reflect varying levels of dwelling density.
- A review of the relevant Trips by Purpose will be undertaken to check if this modal split is accurate considering the development proposals. This will be particularly prevalent for Education trips;
  - Education and Escort Education trips will be broken down by Primary / Secondary / Higher Education to meet the Milton Keynes Local Authority split.
  - NTS0614 will be used to obtain mode by education type (for primary and secondary)
  - TRICS will be used to obtain mode for Higher Education
- The mode splits for other journey purposes will then be adjusted to suit the most appropriate assumptions;
- Indicative Internal / External trip assumptions will be applied; and,
  - Further refinement will be required to ensure that any adjustments made to external educational trips have the correct assumed modal share.
  - If zonal adjustments are made to the development areas within the model, then this could be controlled through the assignment of trips between zones.
- Final summary internal and external trips on the network.

4.2.5. As noted above, the suggested methodology includes refinements accounting for varying levels of internalisation. The internalisation factor is needed to take in to account the proportion of trips that would not leave the site, and therefore not contribute to impacts on the external networks.

4.2.6. Further adjustments to the trip rates could be warranted through the mode share impacts because of the implementation of travel plans; public transport access and park and rides at or near to the site. At this time, any such adjustments are not included in the analysis; however, they will need to be considered as viable tools as they will reduce trip rates and the development impact on the surrounding area.

EMPLOYMENT TRIPS

4.2.7. The Employment trips in the MKMMM have been derived from the number of additional jobs that will be created as part of MKE. Similar to the residential trip generation, WSP has derived an alternative trip generation methodology for the employment elements.

4.2.8. To calculate the employment densities (and correspondingly the number of jobs generated) it is understood that the trip end model applied a blanket job density by classification. AECOM (MKC's consultants) have explained that the Trip end model is a customised version of DfT's CTripEnd.

4.2.9. The employment trip rates and generation is also included in the separate Technical Note, which will be agreed between WSP and MKC. This will consider both the employment proposed within the

MKE site which will be the subject of the planning application and also employment elsewhere within the MKE site which will need to be treated as committed development.

4.2.10. The methodology adopted is based on the following;

- The TRICS vehicular trip rate is extracted for the following employment types:
  - B1c – Business for industrial purposes
  - B2 – General Industrial
  - B8 – Storage and Distribution
- The floor area is applied to each employment type trip rate to determine the number of trips that will be produced by each employment types
- The number of jobs is calculated and used instead of floor area to mirror the AECOM data to allow for easy and accurate comparisons. The number of jobs have been calculated using the HCA Employment Densities guide.

4.3 PROPOSED DEVELOPMENT TRIP DISTRIBUTION AND ASSIGNMENT

4.3.1. It is suggested that the distribution and assignment of the development traffic is calculated using the variable demand calculations within the MKMMM platform.

4.3.2. 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. In view of the very small number of base year trips in the MKE zones, not necessarily being representative of the development, the default is to be overridden for all MKE zones and the gravity model used instead. The gravity model uses calibrated functions developed for the base year matrices (trip-length profiles) to estimate a trip distribution based on available attractions.

4.3.3. It is assumed that the same process will be adopted for the MKE bespoke modelling, however confirmation from MKC / AECOM would be appreciated.

4.4 ZONING

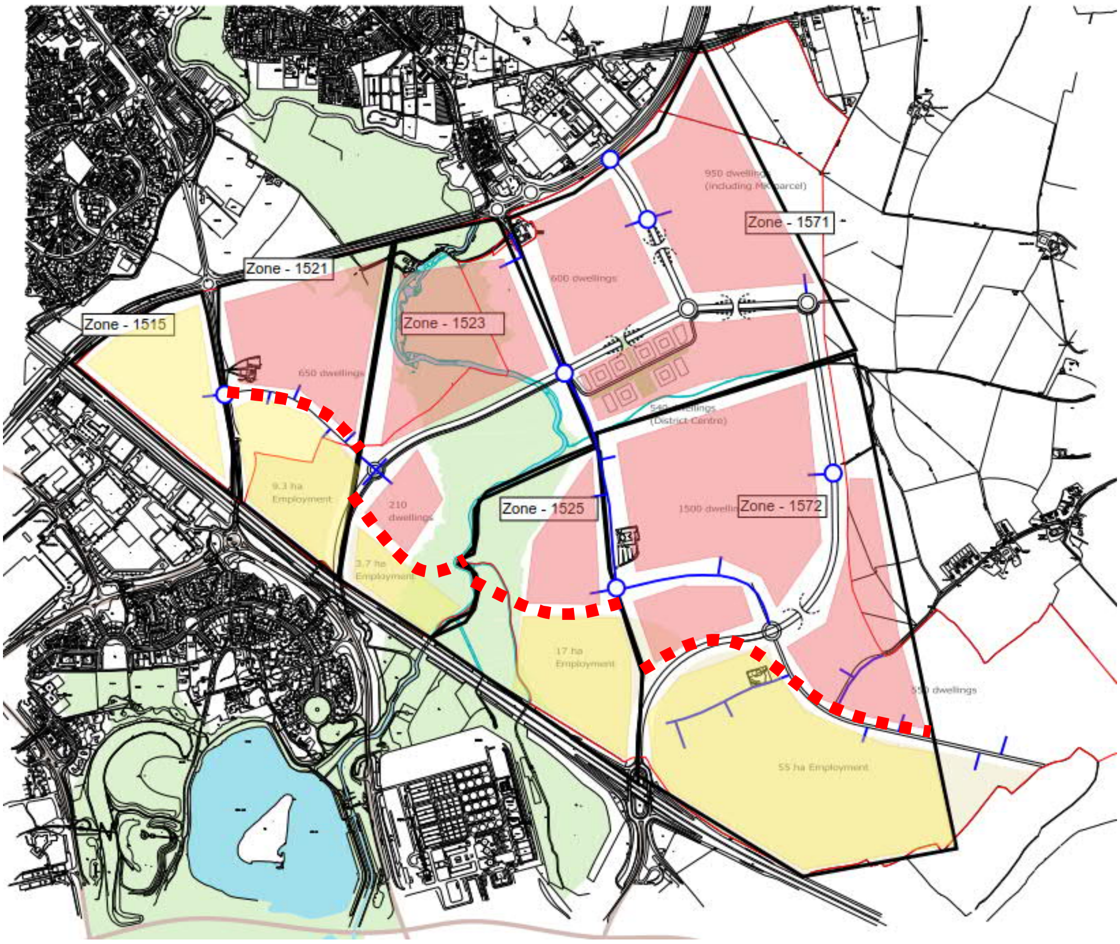
4.4.1. The MKE area is split into six zones within the MKMMM. The zones are shown indicatively in Figure 4-1 below.

Figure 4-1 - MKMMM model zones in MKE Area

4.4.2. At the time of preparation for the HIF modelling, any changes to the zone structure were deemed inappropriate due to timescales.

4.4.3. Considering the application, it may be a good opportunity to add additional zones to reflect the emerging masterplan; Figure 4-2 below shows the current draft masterplan and the areas of residential (in red) and commercial blocks (in yellow). Whilst it may be impractical to split the very small parcels, it could be warranted to better define existing zones to provide greater control over trip generation and impact analysis.

Figure 4-2 - Alternative Zoning Structure - Residential and Commercial Parcels



4.4.4. It is suggested that the following adjustments could be made;

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

4.4.5. As discussed in the meeting with MKC and AECOM, and noted in **Appendix A**, there is the ability to use buffer zones within the MKMMM to update the zones for the MKE development.

4.5 ADJUSTMENTS FOR PUBLIC TRANSPORT

4.5.1. The Public Transport Strategy for the proposed development is under development. As such it is suggested that any improvements in public transport could be shown through reductions in external vehicular based trips and we will set this out within the trip generation note and would welcome comments on this from MKC and HE.

5 MODELLING APPROACH

5.1 CONTEXT

5.1.1. This section covers the following elements;

- Committed infrastructure and developments;
- Future year forecasts and TEMPRO growth adjustments; and
- Model scenarios to be reviewed;

5.2 MODELLING SCENARIOS

5.2.1. To undertake an accurate assessment of the direct impact that the proposed development is forecast to have on the wider highway network, a number of MKMMM modelling scenarios will be tested and compared. It is considered necessary to test scenarios A and B, as outlined in **Table 5-1** and scenario C if mitigation is warranted. Each of the three scenarios will be assessed for the **AM**, **Inter** peak and **PM** peak periods, for the agreed future years (assumed to be 2039 at this stage).

Table 5-1 – Suggested MKE Modelling Scenarios

Scenario	2039 (or appropriate future year) Reference Case (with Committed developments and Committed infrastructure)	MKE	MKE and Mitigation
A	✓	×	×
B	✓	✓	×
C	✓	✓	✓

5.2.2. It is envisaged that the planning application for MKE will be Hybrid with an initial phase of housing in detail. Whilst the quantum of this is still to be determined it is envisaged that it will be relatively modest at say 300 homes. Given the scale of this it is not proposed to assess this using the MKMMM but to assess their impact through independent junction modelling. We would however distribute the trips associated with those 300 homes based on the MKMMM.

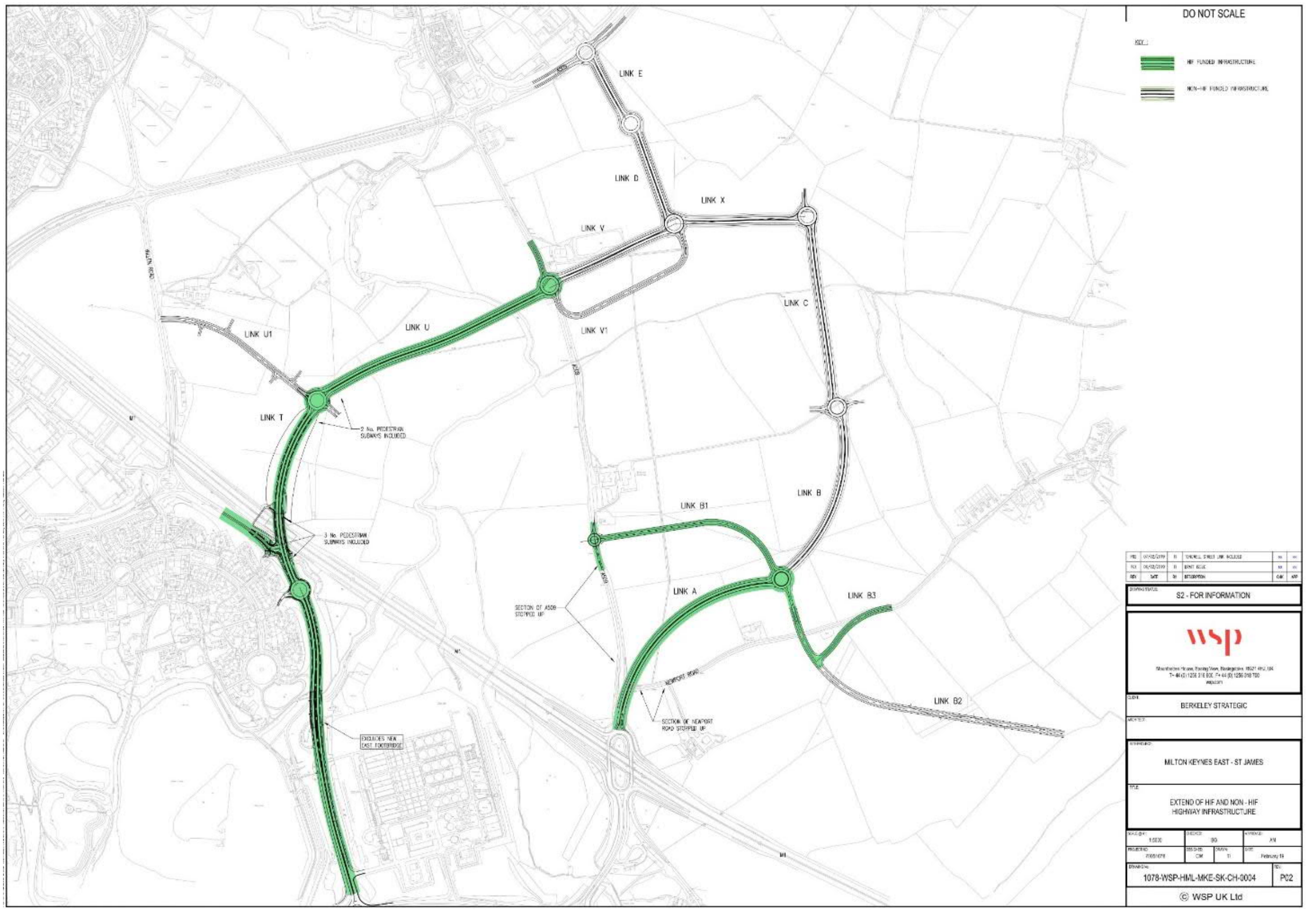
COMMITTED INFRASTRUCTURE

5.2.3. It is assumed that the MKMMM contains the relevant infrastructure in place as part of its future year reference case. There are some changes which will need to be coded for the proposed strategic infrastructure serving the MKE site but this is limited to the shifting of the north-south link from the A509 (labelled as links D and E in the figure below) further east such that it forms a continuation of the eastern perimeter road.

5.2.4. Furthermore, through the modelling work undertaken in support of the HIF it has become apparent that some of the links modelled as dual carriageway can be downgraded to single carriageway (these are non-HIF elements) such as Links B, C, X and Y. Further dialogue is also scheduled to take place around the treatment of how the new M1 overbridge ties in to Tongwell Street and whether the section of Tongwell Street between the bridge landing and Tongwell Roundabout can be removed altogether and this is currently with MKC for consideration.

5.2.5. A number of local junction improvements coming forward as part of other planning applications in the locality may need to be coded in. It is assumed that a list of the infrastructure changes could be provided by MKC and / or their consultants.

Figure 5-1 - MKE Strategic Infrastructure Plan



COMMITTED DEVELOPMENT & FUTURE YEAR GROWTH ASSUMPTIONS

5.2.6. Similar to the above, the MKMMM 2031 forecast technical notes, produced by AECOM, contain the assumptions that have been assumed to create the future year reference case. It is understood that a review of the Bedfordshire planning assumptions will be required to ascertain the potential impacts and planning growth in that area particularly in relation to Marston Moretaine.

5.2.7. It is assumed that MKC and AECOM would undertake a review this element to ascertain how best to implement into the modelling independently of the MKE assessment anyway. We would be grateful for further thoughts on this from MKC.

5.3 ASSESSMENT APPROACH

5.3.1. The updated assignments will be used to test the agreed scenarios relevant to the planning application to determine the impact of the proposed development on the highway network. A list of key junctions, to consider for further detailed assessment will be determined following the intiail model runs.

5.3.2. For a more comprehensive analysis, it is considered appropriate that the Volume Over Capacity (VOC) is provided for all turning movements at each of the listed junctions within the vicinity of the proposed development. The VOC will inform a more refined list of junctions that will be considered for a detailed analysis and junction modelling to assess the development impacts on their operation.

5.3.3. Upon agreement of a refined list of junctions, the following individual turning flow information will be required for each of the junctions for both time periods, AM and PM across both future years:

- Actual flow
- Demand flow
- Delay

5.3.4. In addition, the actual and demand flows and the delay along each link within the vicinity of the proposed development should be provided. Upon review of the development impact versus that of just committed developments (Scenario B compared to Scenario A) a mitigation strategy will be developed, if required.

5.3.5. It is acknowledged that there are key junctions that will be reviewed as part of the modelling process; these will mirror the junctions reviewed as part of the traffic surveys and will also be reviewed as part of the assessments. Based on work undertaken to date it is envisaged that these would include:

- 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.

5.3.6. In addition to the above, a review of the M1 J13 link flows will also be undertaken. Previous meetings with HE in February 2019 outlined that J13 should be reviewed as part of any forthcoming application. J13 is approximately 7.5km south east of J14 and whilst it is not envisaged that traffic from MKE will utilise J13 (in terms of merge or diverge and internal movements) it is important that the development adequately assesses the junction in terms of potential impacts. As such, it is suggested that a link flow comparison with and without the MKE development is undertaken initially. Following a review of the percentage changes in the turning / links flows, if these indicate further analysis is warranted then a review of the junction will be undertaken.

5.3.7. Following review of the MKMMM outputs a junction list for further assessments will be agreed between WSP and MKC. The junctions will be subject to individual modelling to determine development impact, employing the use of Junctions 9 / LinSig with the exception of J14 which as set out previously will be assessed using Paramics. Subject to results of independent junction assessments, mitigation strategies will be developed if required.

5.3.8. It is expected that any mitigation schemes will then be coded into the MKMMM to enable a run of Scenario C. However, no further runs of the individual junction models is then envisaged on the back of that strategic model run.

PARAMICS

5.3.9. Chapter 6 below provides further detail on the suggested methodology of the microsimulation analysis of Junction 14 and Northfields Roundabout. It is suggested that this is undertaken within Paramics.

6 PARAMICS: DETAILED ANALYSIS

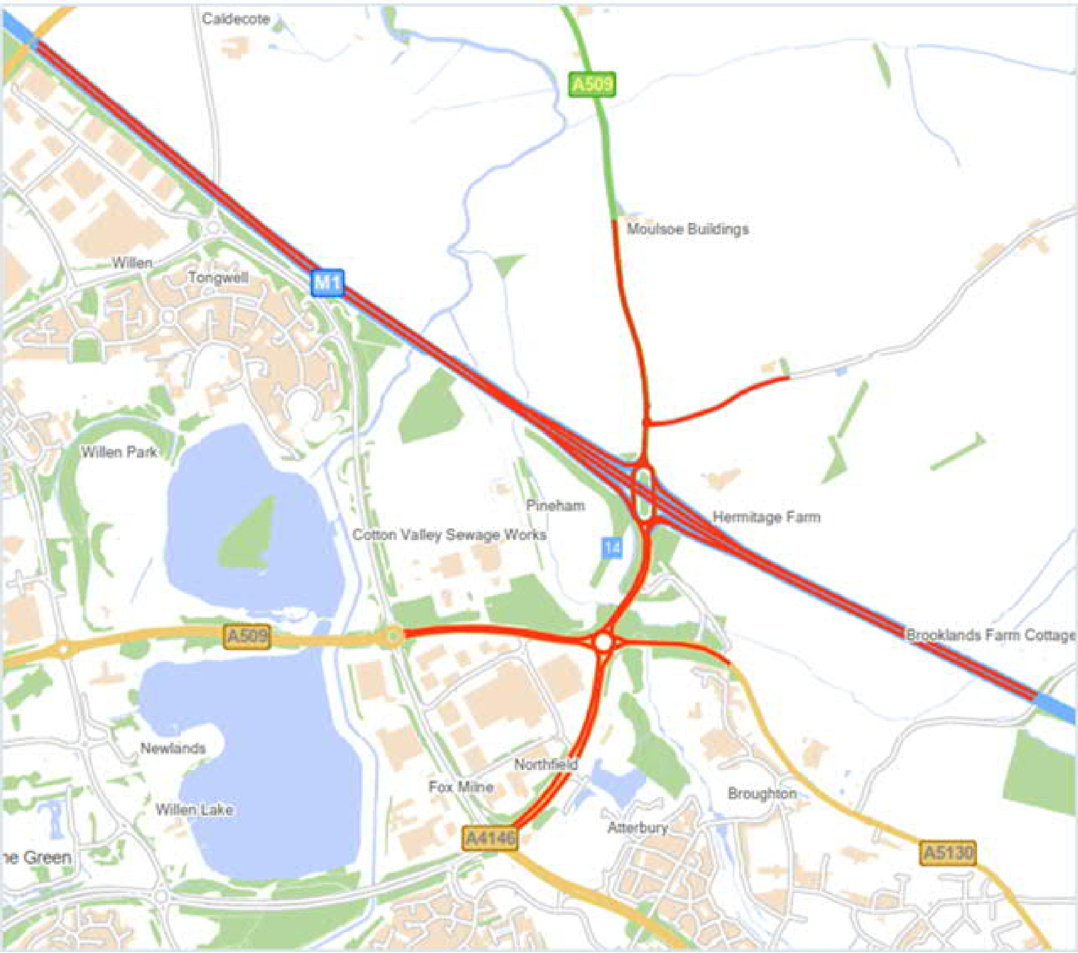
6.1 PARAMICS

DETAILED TRAFFIC MODELLING

6.1.1. Following completion of the strategic modelling work for the MKE scenario, the model outputs will be reviewed to identify which parts of the highway network require more detailed junction assessment, as well as assessing how new infrastructure performs with development traffic on the highway network.

6.1.2. As part of this, it is suggested that the Transport Assessment supporting the planning application employs the use of the Paramics model of the M1 Junction 14 and Northfields Roundabout to assess the key infrastructure in detail. Figure 6-1 shows the extent of the current Paramics model.

Figure 6-1 - Paramics - Current Model Extent



M1 JUNCTION 14 AND NORTHFIELDS ROUNDABOUT

6.1.3. The junctions requiring further assessment will include M1 J14 and its interaction with Northfields Roundabout to the south and, potentially, the proposed southernmost roundabout junction on the proposed eastern link road through the MKE site; i.e the roundabout between Links A and B identified on Figure 5-1.

6.1.4. M1 J14 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 the turning flows, etc. This is subject to timings of the J14 slip road works and how these may affect traffic movements.

6.1.5. In assessing future year scenarios; i.e. the 2031 Reference Case and the 2031 MKE scenario, the Paramics model will use the outputs from the MKMMM and apply the flows to the calibrated and validated base year Paramics model.

6.1.6. For both the Paramics model and off-site junction assessments it is proposed to undertake the assessments for the AM, Inter and PM peak hours. No further assessment is currently proposed and nor is assessment of the J14 slip roads or other parts of the SRN.

6.2 PARAMICS MODELLING APPROACH

6.2.1. The following approach is suggested with regards to the Paramics modelling;

i) Model extent

   a. Base model to stay as current (J14, Northfields and Newport Road);

   b. Forecast model with development will include how the proposed development ties in to the proposed southernmost roundabout (as discussed and agreed with Highways England).

ii) Highway Network

   a. The model has already been amended as part of the HIF process to reflect the Highways England Smart motorways scheme with four-lane running during peak times and amended slip roads (including tiger-tail slip roads facing the M1 south-east of the junction).

iii) Forecasting approach

   a. MKMMM forecast year adopted and used;
   b. As a sense check / alternative approach – we would use up to date 2019 traffic surveys but then include the net trip change from the 2016 to 2031 and 2039 MKMMM flows (this would cater for forecast growth) to create the future year. A comparison exercise would then be undertaken.
   c. We would need to be mindful about proportional change – review turning flows that show a material absolute change versus percentage difference etc. This exercise would ensure that movements do not experience inappropriate growth assumptions if their relative flow is low.

iv) Surveys required

   a. As noted above, updated surveys of M1 J14 and Northfields Roundabout is suggested.

   b. These will be undertaken at the same time as the other suite of traffic surveys.

v) Survey Methodology

   a. Suggestion to use ANPR to capture turning movements, delays and journey times.

      i. If this is not feasible due to constraints - an alternative methodology would be to use camera based recordings, but this would need to survey the interaction between M1 J14 and Northfields.

   b. In addition, we would undertake a review against Highways England's own sources if available.

   c. Mainline M1 flows would be extracted using HATRIS.

vi) Paramics Version and Benefits

   a. We would suggest updating the model to the latest version of Paramics (current 2012 based on previous version).

   b. The new version of Paramics does not allow MOVA to run, however it does allow greater flexibility, quicker run processing and stability. These improvements will provide an easier tool to assess the impacts of the development and to consider further mitigation if required.

   c. The lack of MOVA is not considered an issue, Vehicle Actuation can be tweaked to better replicate surveyed conditions. Existing conditions suggest that in the AM and PM peaks there is likely to be consistent congestion, which is likely to cause maximum green times per approach / phase, reducing the effectiveness of MOVA.

   d. Older version (current) is slow and user intensive. In terms of use, the older version only allows a single model run at time due to the MOVA component.

7 TIMEFRAME AND ACCOUNTABILITY

7.1 PROGRAMME

7.1.1. To enable the swift and efficient delivery of the modelling to be undertaken, it is proposed that the following timeframe continues to be used, as shown in Table 7-1 below:

7.1.2. The timescales set out below are indicative and may be subject to change with a submission pushed back to March 2020. However, we have kept the timescales in for discussion.

Table 7-1 – Suggested Timeframes (indicative)

Date (2019)	Deliverable / Comments	ACTIONS REQUIRED	Responsible Party
March	Discussions with MKC over modelling approach. Agree traffic survey scope and methodology. Prepare trip generation methodology note Issue notes to both MKC and Highways England for review and approval	MKC to confirm if MKMMM modelling refinement approach is acceptable WSP to agree survey specification	MKC WSP
April	Due to the HE review process – it is envisaged that agreement with Highways England over traffic survey approaches and extent of modelling will be undertaken during this time. Liaison with Survey companies	WSP to issue survey specification Meeting to be held with MKC and HE to discuss Sign off on surveys, modelling approach and trip generation methodology	WSP All All
May / June	Traffic surveys commissioned. Traffic Surveys undertaken – May / June.	WSP to liaise and manage with survey company. MKC and HE to confirm any licences required and whether any roadworks are scheduled which could affect the surveys	WSP MKC / HE
June / July	Traffic Survey data analysis and issue of data to MKC / Modelling consultants.	WSP to undertake data analysis WSP to provide MKC with survey information, zoning changes, bespoke trip rates to use and generation for the site, etc. for input into the model.	WSP WSP
July	Update of MKMMM in specific areas to reflect updated traffic survey data.	MKC to integrate data and update	MKC
August	Updated MKMMM - Base model runs.	MKC Highways to issue outputs once data provided	MKC

Date (2019)	Deliverable / Comments	ACTIONS REQUIRED	Responsible Party
		WSP to review and determine junctions to be assessed MKC Highways to confirm suggested outputs	WSP MKC
September / October	Update of MKMMM and future year models. Review of data / discrete models / Paramics Testing.	MKC Highways to provide outputs WSP to provide mitigation strategies	MKC WSP
November	Re-run of strategic model with mitigation. Agreement of mitigation package	MKC Highways to re-run and provide outputs WSP to present Mitigation proposals	MKC WSP
December	Finalisation of TA	WSP to complete	WSP

Appendix A

POST MEETING NOTES (11/04/19 - WSP, MKC AND AECOM)

MKMMM bespoke upgrade for MKE Planning Application: Agenda

AECOM/WSP/MKC 11/04/19

WSP Notes following meeting: Written by AS (Alex Smith - WSP)

Following introductions, it was explained that as part of the forthcoming MKE planning application, certain key time critical elements, of which modelling and traffic surveys, are required to be progressed to reach the intended submission date.

It was agreed between MKC, AECOM (custodians of MKMMM) and WSP that where possible, the adjustments to the MKMMM would be focused on the MKE and surrounding area. This would limit any potential issues where trying to integrate new data with the existing platform.

In Summary; the following high-level items were agreed;

- Traffic survey locations and use of the data to update counts within MKMMM were reviewed, including suggestions for additional count locations,

- Review of existing MKMMM resulted in no need for extension of the simulation network, and the inclusion of one link,

- Additional zones within MKE can be accommodated,

- Further review of connections in Newport Pagnell may be required, however this can be done during the model build process,

- A review of new survey data will be undertaken before deciding on the base year of the MKMMM, however it is envisaged that the 2016 base year will be used for consistency.

It is acknowledged that further details (such as trip generation, development accesses etc) will be required and agreed. However, to progress matters and allow traffic surveys to be organised these notes have been completed for review by all parties, including Highways England.

Using the headlines from the agenda, further notes on specific items are as below;

1. Base Model

1.1 Spatial detail – network and zones

- In general, the areas considered for review were agreed as being appropriate for the bespoke upgrade of the MKMMM.

- The areas largely focus on the MKE area, but also include additional surveys (discussed further below) in the Newport Pagnell, Crawly, Olney and Willen areas.

- It was agreed that the additional zones suggested in the draft Technical Note could be included in MKE. This would utilise existing buffer zones that do not have any trips associated with them. It was explained that this would be far quicker to implement (and therefore can fit in to the suggested timescales) rather than creating new zones. The zones would therefore better reflect the proposed land uses on the MKE site.

- It was agreed that there was no need to extend the simulation network further northwards as the level of detail in the areas was already adequate.

- It was suggested by MKC that the link in Olney (Drift Way) should be included in to the coding of the model.

1.2 Proposed data collection and alternative sources

- MCTC's / ATCS / ANPR / TRAFFIC MASTER

- MKC suggested additional ATC locations on the network.

- Please see updated Figures (1, 2 and 3) that show the survey locations intended. This includes additional counts in Crawley, Willen and Olney (amongst others) to capture additional movements.

- This includes the suggested use of ANPR at J14 and Northfields (this will provide further information for use within the micro-simulation assessments compared to standard counts).

- It was suggested that Trafficmaster data was used to further supplement the journey time data

- Any 2019 data will need to be reviewed against the 2016 counts to ascertain where changes in flow have occurred and as a validation check,

1.3 Options for re-calibration

- It was agreed that a review of the counts will be undertaken before re-calibration is undertaken.

- The counts can then be added in as individual counts within the model.

1.4 Implications for demand/PT models

- It was agreed that it was not necessary to upgrade the PT model for this exercise.

- Any update of the PT model would likely be limited to a full model upgrade, to be undertaken by MKC at a later date.

- It was suggested that the ME2 process would be utilised to integrate the counts where possible. To be reviewed.

1.5 Scope of validation

- AECOM suggested that the Newport Pagnell screenlines could be removed and replaced with the individual counts (both 2016 and new 2019)

- MKC outlined that there was no intention for a full MKMMM upgrade in the near future. A business case may be put forward in the next financial year.

- Considering the bespoke nature of the suggest counts and upgrades for MKE, MKC outlined that they would not ask for re-modelling of the MKE site should an upgrade occur within similar timescales to the application.

- The junctions reviewed match those intended for discrete modelling (using the MKMMM outputs, but in junction specific software, such as Junctions9). A review of the MKMMM outputs will be required to ascertain if all junctions do need testing or not.

2. Forecasting

2.1 Refining CBC planning data

- MKC will review the CBC information and the forecast growth in that area to understand what implications or additional /

2.2 Revised MKE-specific Reference Case to 2039

- Agreed that 2039 is to be the future reference year considering build out forecasts.

- The methodology for the application of growth will need to be finalised and agreed, however it was suggested that the MKE site is likely to form a large proportion of the growth from 2031 to 2039 (from MKPlan period up to new reference case year). An alternative methodology of applying growth factors (such as using NTEM) could be applied.

2.3 Application of bespoke trip rates to MKMMM

- WSP will submit a separate technical note detailing the alternative trip rate assumptions and development zone splits.

- The alternative trip generation adopts a methodology using TRICS and NTS data to disaggregate trips by purpose. Further adjustments are made to account for internalisation of trips.

2.4 Changes to MKE Scheme from HIF

- The scheme is being developed as part of the development framework. The numbers of units per parcel is likely to be updated, alongside any employment provision, however this will be confirmed prior to input into the modelling.

3. Programme and Risk

3.1 Dependent on HIF success

- It is expected that a HIF announcement will be provided mid-June.

- Certain elements are time critical, such as the traffic surveys, to ensure that following the announcement, work can progress on the application and supporting modelling.

3.2 Re-calibration not easy to time-limit

- As noted above, the model may not need full re-calibration as the area of focus will be around the MKE site and associated villages.

3.3 Potential 2016/2019 data mismatch

- Reviews will be undertaken on the data to ascertain which counts can be included.

3.4 Modelling needed well before submission date

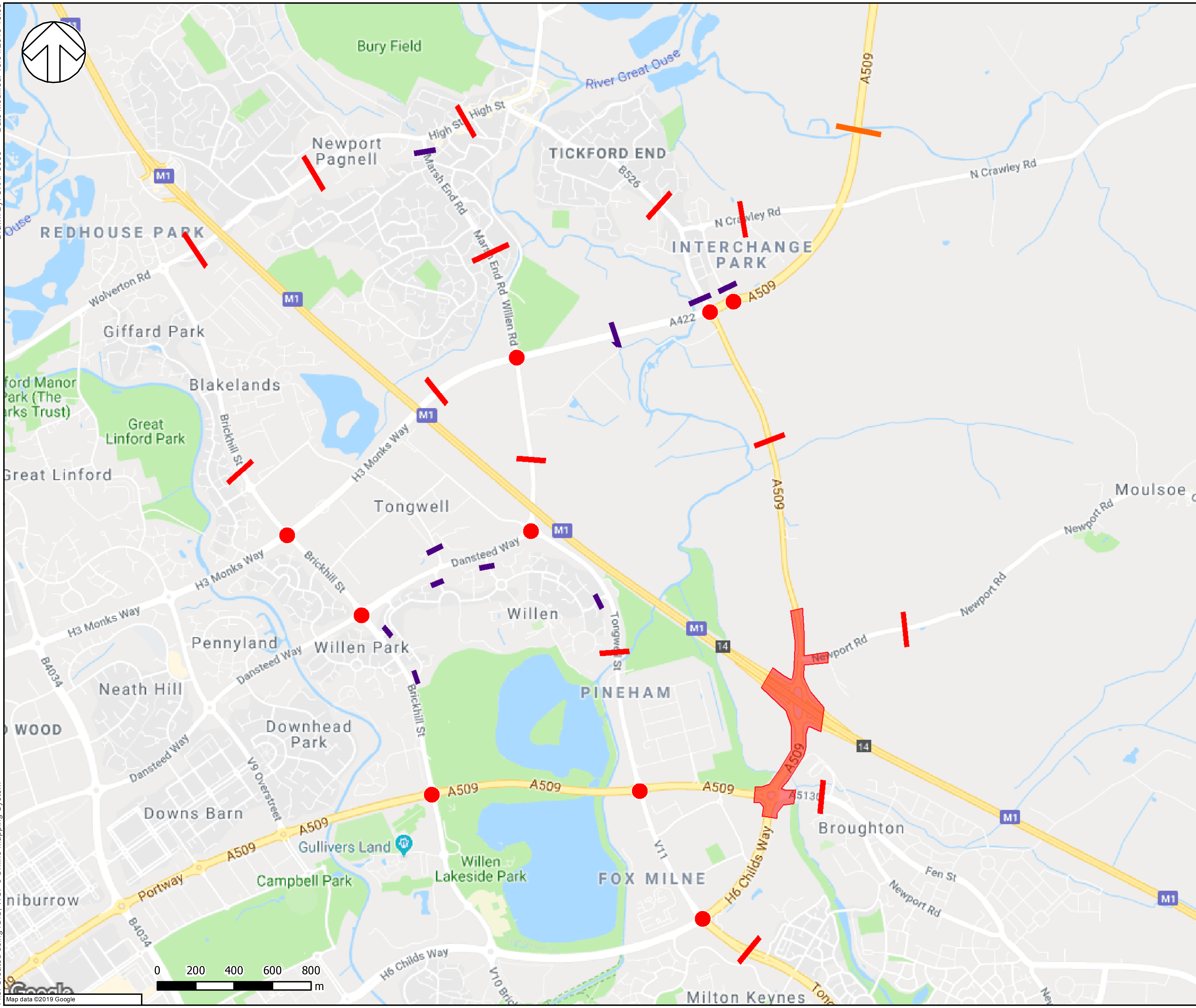
- The timescales as set out in the tech note were discussed and deemed feasible.

- AECOM will need to review when they can start on certain elements, however it was confirmed that the timescales as set out in the note could be achieved.

3.5 Involvement of HE

- This note and the technical note are to be sent to the HE for their review.

- Considering the timescales, there is a pressing need to focus on the traffic surveys element to get this agreed (including suggested surveys at J14).



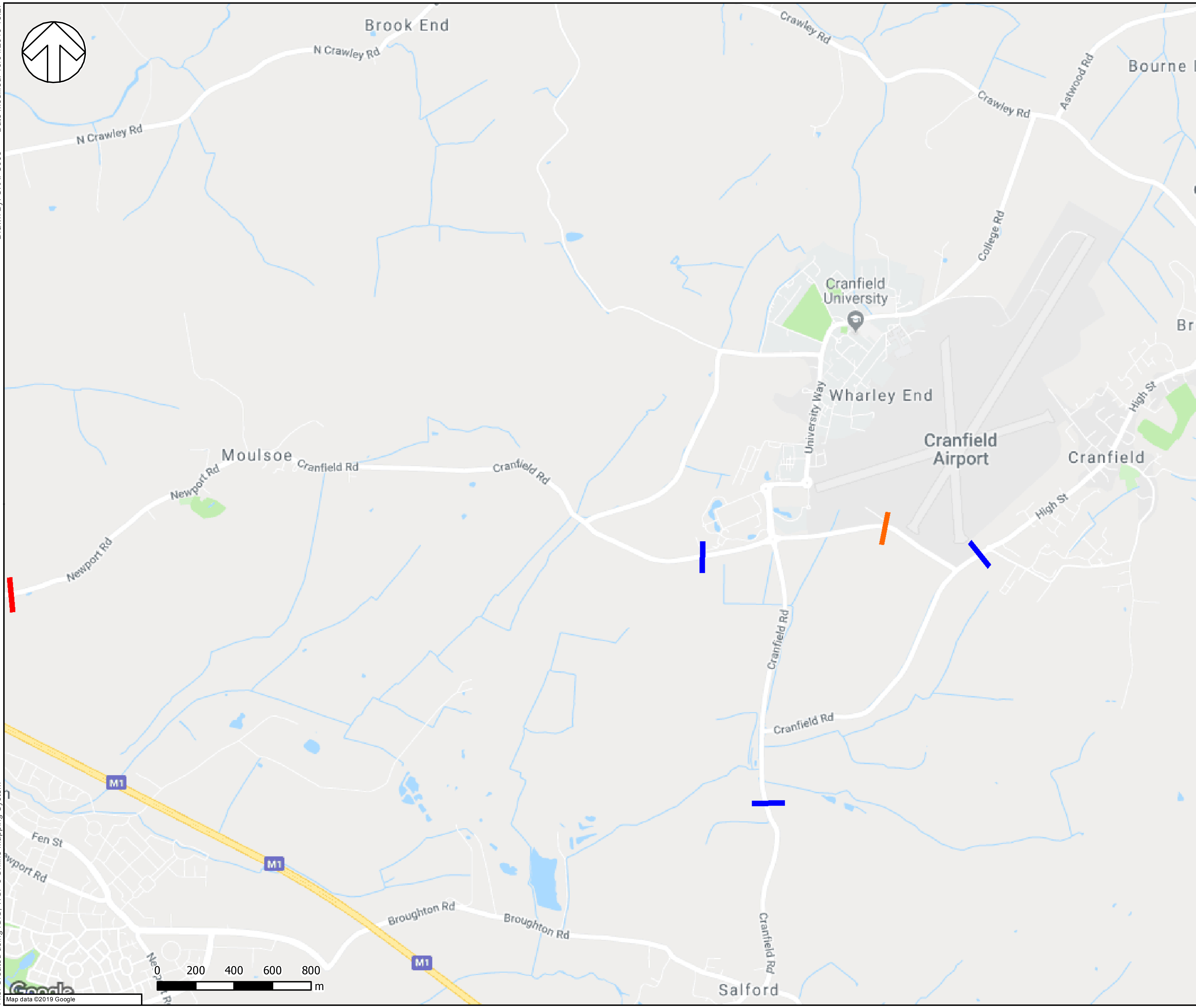
Key
- Additional ATC Location
- ATC Location
- MCTC Junction Count
- ANPR Area

wsp

TITLE:

FIGURE No:

File: Created using iGIS, WSP's Online Mapping System
Drawn By: UKAPS008
Date Modified: 18/04/2019 15:33



Key

- ATC Location
- Additional ATC Location

wsp

TITLE:

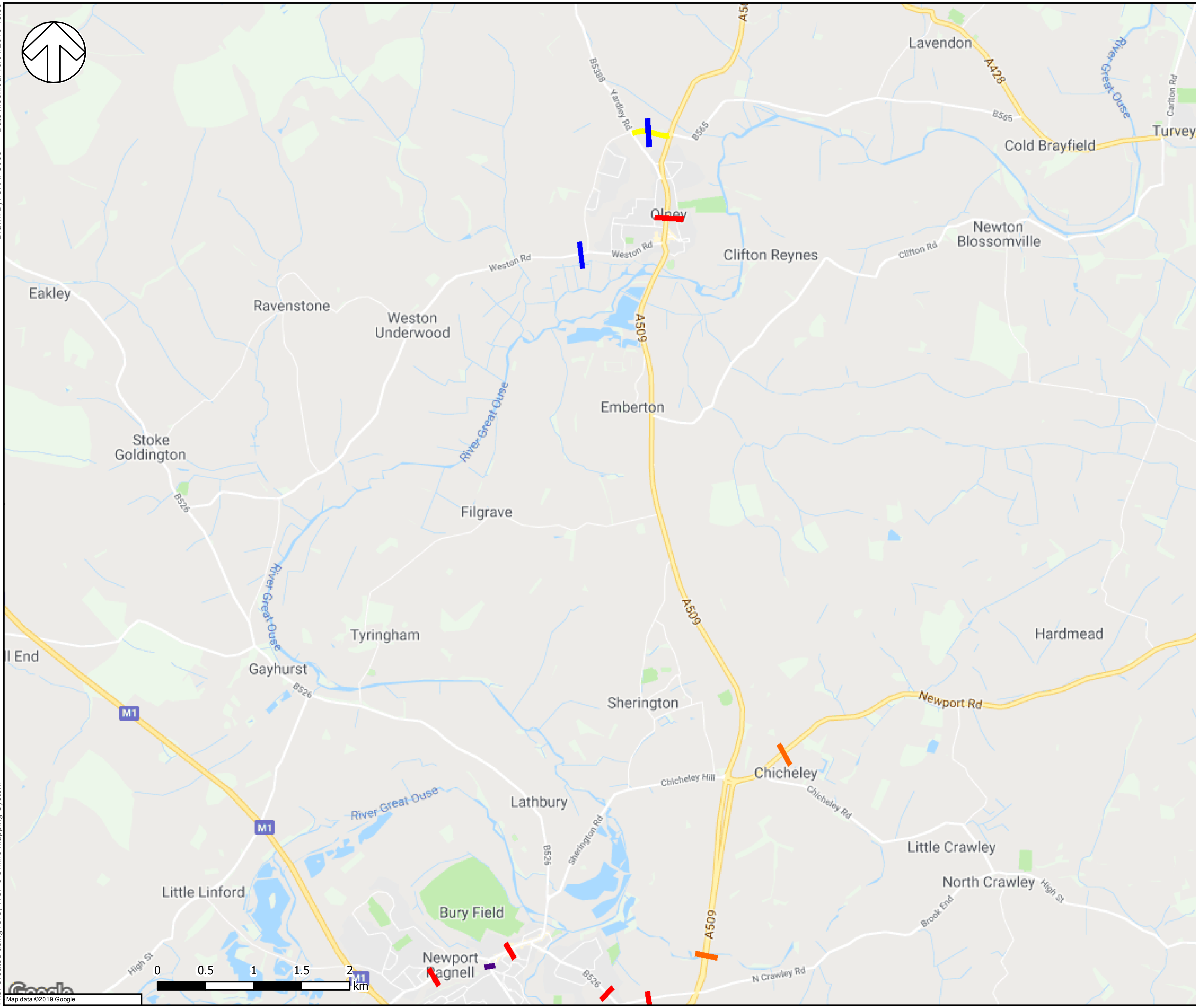
FIGURE No:

File: Created using iGIS, WSP's Online Mapping System

Drawn By: UKAPS008

Date Modified: 18/04/2019 15:27

Date Modified: 18/04/2019 15:35
Drawn By: UKAPS008



Key

- Additional ATC Location
- New Link in Model
- ATC Location

wsp

TITLE:

FIGURE No:

File: Created using iGIS, WSP's Online Mapping System

Mountbatten House
Basing View
Basingstoke, Hampshire
RG21 4HJ

wsp.com

Appendix A.2

TTN2 – 2019 TO 2016 SURVEY COMPARISON

TECHNICAL NOTE – Review of Growth between 2016 and 2019 – Traffic Data (version 2)

DATE:	04 February 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Review of 2016 and 2019 Traffic Data		
PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle / Filip Imramovsky
CHECKED:	A Smith / Filip Imramovsky	**APPROVED:**	A Norcutt

1 INTRODUCTION

1.1.1. 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).

1.1.2. To assess the impact of MKE and the associated infrastructure sought to be delivered as part of the recent Housing Infrastructure Funding (HIF) bid, the Milton Keynes Multi-Modal Model (MKMMM) was used. The MKMMM is held by MKC and managed by AECOM (Milton Keynes Council's consultants) on MKC's behalf.

1.1.3. As part of the modelling required to support the planning application now, updates to the MKMMM have been set out to assess the impact of the development on the surrounding highway network in greater detail than has been undertaken to date.

1.1.4. Discussions over the proposed modelling approached have been held with MKC and Highways England and an area of focus, surrounding the site has been agreed for an upgrade.

1.1.5. As part of the data required for the planning application and the analysis supporting the planning updates to the MKMMM, a suite of traffic surveys was undertaken on junctions and links around MKE.

1.1.6. The current MKMMM base year is 2016. There is a need to review the differences between 2016 and 2019 to allow the inclusion of the new data into the MKMMM model. This approach was set out in a separate Transport Technical Note: Modelling Approach for MKE Planning Application, which was updated following further discussions with MKC and HE in May 2019.

1.1.7. This note prepares a summary of the reviews undertaken and suggests an approach for factoring the 2019 data to be then included in the updated MKMMM for MKE.

2 DATA REVIEWED

2.1.1. Figure 2.1 below illustrates the available survey sites for 2016 and their 2019 counterparts.

2.1.2. MKC provided the 2016 ATC data that was used in the MKMMM base model analysis to enable a review. The 2016 data was captured in across multiple time periods, including June, September, October and November.

TECHNICAL NOTE – Review of Growth between 2016 and 2019 – Traffic Data (version 2)

DATE:	04 February 2020	**CONFIDENTIALITY:**	Public
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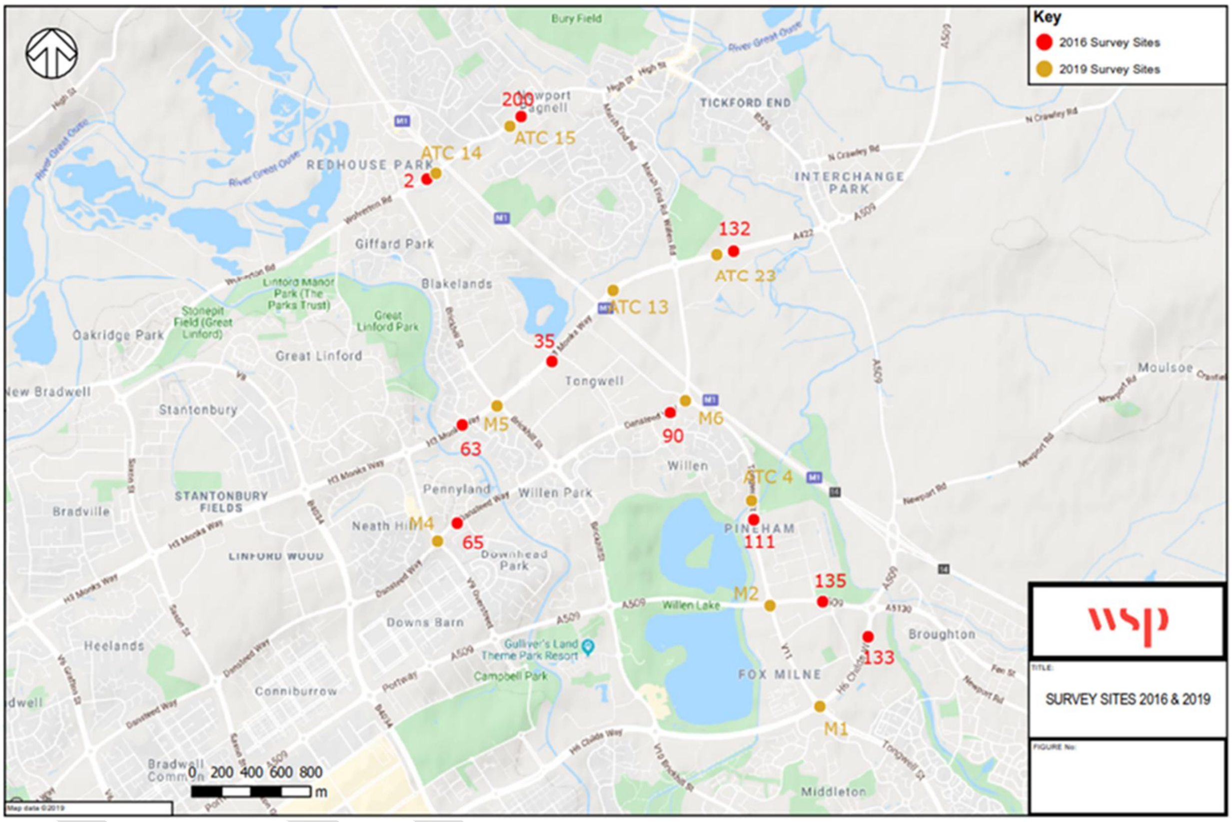
CHECKED:	A Smith / Filip Imramovsky	**APPROVED:**	A Norcutt

2.1.3. As part of the surveys commissioned for MKE, ATC, MCC and Two-Way Link Count data was recorded in June 2019[1]. This data was a subject to comparison to determine the change in traffic on selected links in Milton Keynes.

Figure 2.1 – 2016 and 2019 Survey Locations



2.1.4. The sites were matched, based on the links they provide flow data for. The following pairings were used for the analysis, as shown in Table 2.1:

Table 2.1 – 2016 and 2019 Site Pairings

Year	Survey Location / Number									
2016 Site:	2	35	63	65	90	111	132	135	133	200
2019 Site:	ATC 14	ATC 13	M5	M4	M6	MCC-2W 4*	MCC-2W 23*	M2	M1	ATC 15

*MCC two-way link count

[1] Please note, Pineham Roundabout (M2) was also resurveyed in October 2019 to re-capture the PM period.

TECHNICAL NOTE – Review of Growth between 2016 and 2019 – Traffic Data (version 2)

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CHECKED:	A Smith / Filip Imramovsky	**APPROVED:**	A Norcutt

3 ANALYSIS

3.1.1. Please see **Annex A** containing the supporting spreadsheet with the analysis.

3.1.2. Once the appropriate survey pairings were identified, as illustrated in Figure 2.1 above, the flows at these sites were compared for both directions of travel, as well as combined two-way movements.

3.1.3. An average flow at each location was calculated using the data. These average flows formed a basis of a Mon-Thu average, a 5-day average (Weekday) or a 7-day average (Mon-Sun) calculations. The calculations were completed for both 2016 and 2019 datasets to allow for direct comparison and a factor illustrating the differences between the flows to be determined.

3.1.4. Recent discussions with MKC and their MKMMM consultants AECOM considered the appropriate methodology of including the 2019 counts into the revised MKMMM model. It was agreed that any new counts (i.e. 2019) could be factored down to the 2016 levels to present a consistent base year model.

3.1.5. As demonstrated in the spreadsheet provided in **Annex A**, data for some of the sites indicate that the 2019 flows are higher than that recorded in 2016 and the vice versa. It is considered that the 2019 flows are, on average, relatively similar to previously (i.e. 2016) recorded volumes.

3.1.6. Average two-way factors were computed using the two datasets. 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 (either down or up) to 2016 levels.

3.1.7. These factors across all sites and directions were then averaged to produce Peak Hour/Period and Inter Peak Period factors for Mon-Thu average a 5-day average and a 7-day Average. It is understood that the MKMMM uses hourly flows in the AM peak hour of 08:00-09:00, PM peak hour of 17:00-18:00 and average of 10:00-16:00 flows for the inter-peak (IP). The model also works only with the Mon-Thur data as the Friday flows tend to differ from the rest of the weekdays. However, the spreadsheet provides factors for other periods for completeness.

3.1.8. During the review of the traffic survey information, where it was identified that the data may contain errors (such as a direction missing, or a noticeable differing in traffic volumes potentially indicating a tube malfunction) this data was excluded from the analysis - the spreadsheet provided in **Annex A** highlights where this is the case. Averages by direction and two-way were calculated for each site pair individually as well as for all sites combined.

3.1.9. Table 3-1 below summarises the calculated average two-way factors enabling the 2019 flows to be recalculated to 2016 values. The factors are provided across the time periods required by MKMMM as outlined above. This is a blanket factor that can be applied to the 2019 data set. A value of above 1 would indicate that the 2019 flows are lower than 2016, whereas a value below 1 would indicate that 2019 flows are higher than 2016 flows.

TECHNICAL NOTE – Review of Growth between 2016 and 2019 – Traffic Data (version 2)

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CHECKED:	A Smith / Filip Imramovsky	**APPROVED:**	A Norcutt

Table 3-1 – Average two-way factors for AM, Inter and PM periods

Time Period	Hours	Mon – Thu Average
AM Peak hour	08:00 - 09:00	0.993
IP (average hour)	10:00 - 16:00*	1.027
PM Peak Hour	17:00 - 18:00	0.954

The 2019 MCC data is only available between 11:00 and 13:00 and such, the calculated factor is based only on sites with the full data available. Sites 63-M5, 65-M4, 90-M6, 133-M1 and 135-M2 were excluded from the IP calculation.

3.1.10. As shown in Table 3-1 above, the results for the AM and PM peak hours indicate that 2019 flows were, on average, higher than 2016 and as such would require to be factored down to match the 2016 baseline. Conversely, the factor calculated for the IP exceeds 1, which suggests a decrease in the traffic volume in 2019 relative to 2016. However, it should be highlighted that five sites were removed from the analysis due to missing data.

3.1.11. Notwithstanding the above, the changes in the traffic volumes between 2016 and 2019 range from -2.7% in the IP to +0.7% in the AM and +4.6% in the PM peak hour.

4 REVIEW AGAINST PLANNED GROWTH IN THE AREA

4.1.1. A further high-level review of TEMPRO growth data was undertaken to ascertain whether the average reduction in traffic volumes (comparing 2019 to 2016 across all sites) outlined above is consistent with the forecast trip ends.

4.1.2. The results of the TEMPRO analysis were used as a comparison for the analysis. Data from the entire Milton Keynes region were extracted for 2016 to 2019, alongside MSOA Milton Keynes 002 (which represents where the site is located), MSOA Milton Keynes 007 and MSOA Milton Keynes 017 (which represents areas alongside Newport Road and Tongwell Street as a proxy for residential and employment areas). National Trip End Model (NTEM) adjustments were also applied, selecting 'urban' area types and 'all' road types.

4.1.3. Table 4-1 below summarises the factors generated by TEMPRO:

Table 4-1 – Review of TEMPRO / NTEM Growth factors for 2016 to 2019

Time Period	Milton Keynes	MSOA MK – 002	MSOA MK – 007	MSOA MK – 017
AM Period	1.0483	1.0471	1.0503	1.0360
INTER Period	1.0576	1.0587	1.0576	1.0442
PM Period	1.0478	1.0477	1.0484	1.0368

4.1.4. The TEMPRO analysis shows that the NTEM forecasts an increase of approximately 4-6% between 2016 and 2019. The growth in MSOA 017 is forecast to be lower compared to the other MSOAs or the general Milton Keynes area reviewed.

4.1.5. From the forecast growth outlined in Table 4-1 above is evident that the NTEM expects an increase in the traffic volume between 2016 and 2019 higher than that calculated based on the observed survey results discussed in Section 3 above.

4.1.6. Given that the factors provided in Section 3 above are based on the actual traffic surveys rather than a model, it is considered appropriate to apply the blanket factors as provided in Table 3-1 above instead the TEMPRO/NTEM adjustment to the 2019 data. Reducing 2019 flows by 4-6% (if adopting TEMPRO) to 2016 numbers would likely underestimate the volume of traffic currently on the network. The factors derived as part of this exercise are considered to be more robust.

5 SUMMARY

5.1.1. Factors were developed to enable the integration of the 2019 survey data in the MKMMMM to correspond with the 2016 base year flows.

5.1.2. The survey data analysis indicates that 2019 flows slightly vary from 2016 flows and that a reduction of 2.7% and 4.6% in the AM and PM peak hour respectively would be required. Conversely, the traffic in the interpeak period decreased in 2019 compared to 2016, and a modest increase of 0.7% would be required.

5.1.3. A review of planned forecast growth using TEMPRO (and NTEM) was undertaken to ascertain whether a higher factor should be adopted. The factors derived from TEMPRO suggest that more significant reductions, in order of 4-6%, would be required to get 2019 values to 2016 base year levels.

5.1.4. It is therefore suggested that a blanket factor, as shown in Table 3-1, is applied to the 2019 survey data (already provided to MKC and AECOM) and implemented in the MKMMM.

TECHNICAL NOTE – Review of Growth between 2016 and 2019 – Traffic Data (version 2)

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CHECKED:	A Smith / Filip Imramovsky	**APPROVED:**	A Norcutt

ANNEX A – SPREADSHEET ANALYSIS

Milton Keynes East - 2016 to 2019 Survey comparison

DISCLAIMER

This spreadsheet model and any information contained within it has been prepared for the named Client and strictly for the purpose of the titled project and has been developed by WSP based on certain data sources and assumptions. No third parties shall have a right to rely on the model without the written permission of WSP .

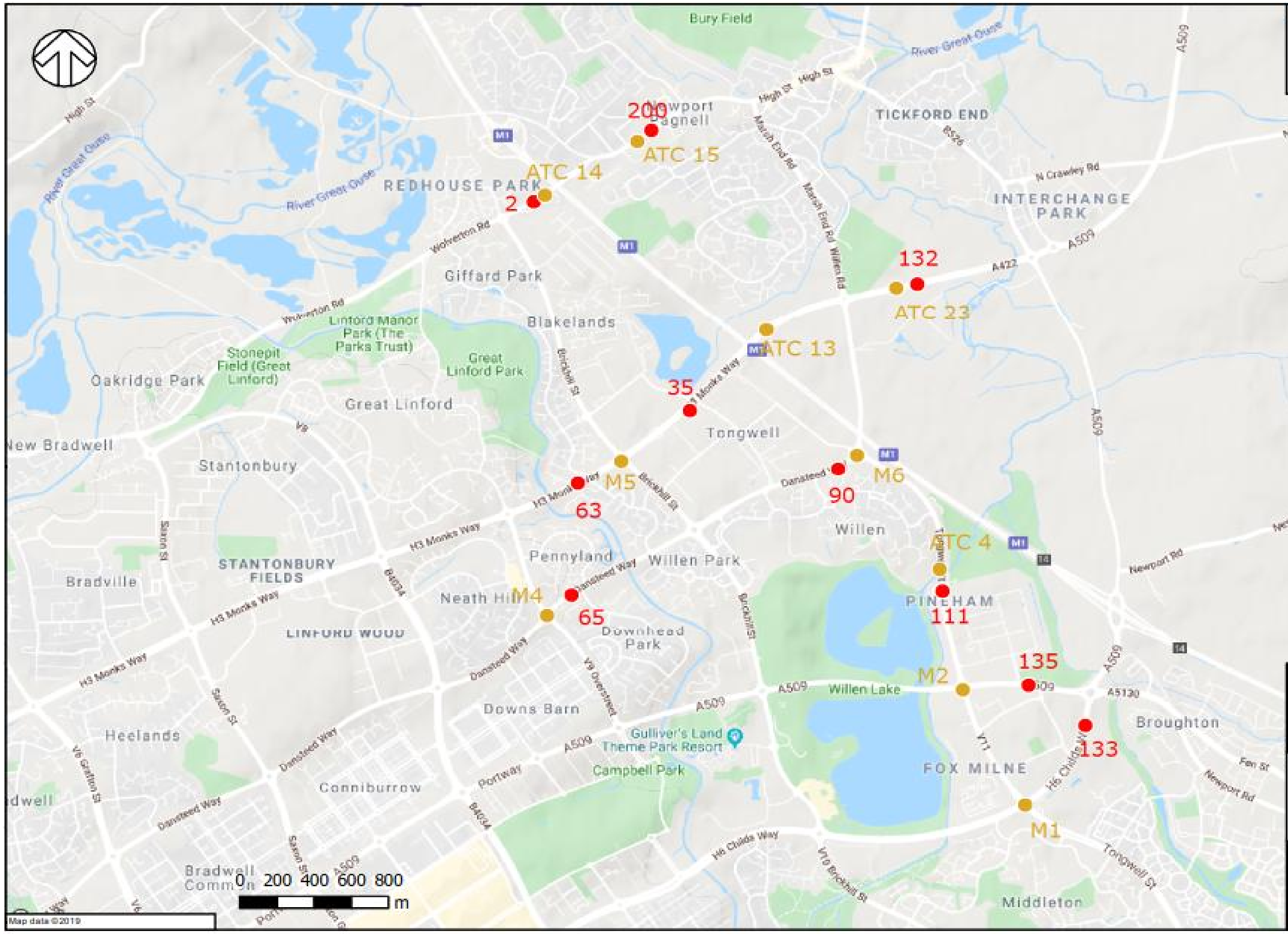
WSP accepts no liability [to any third party] whatsoever for any use of the model and gives no warranty express or implied as to the adequacy, accuracy, completeness, or reasonableness of the model or the information used or contained within it. The recipient of the model should make (and will be deemed to have made) its own review of the model. In no event will WSP be liable for any decision made or action taken as a result of any use or reliance of the model that is not expressly

Quality Management

	Version	Name	Date	Level of Checking	Comments	Linked Spreadsheets
Prepared by	1	*Rachel O'Boyle*	13-16/01/2020	*Created/Cross-check*		
Checked by		*Alex Smith*	17-21/01/2020	*Check of logic*		
Approved By		*Alex Smith*	22/01/2020	*Review of data*	*Please see supporting information and emails with additional data*	*Linked to survey data. Survey results provided separately*
Prepared by	2	*Rachel O'Boyle*	03/02/2020	*Formulas updated*		
Checked by		*Filip Imramovsky*	03/02/2020	*Formulas checked*		
Approved By		*Filip Imramovsky*	03/02/2020	*General review*	*Please see supporting information and emails with additional data*	*Linked to survey data provided previously*
Prepared by	3					
Checked by						
Approved By						

Notes:
Use of Factors to be agreed with MKC
2016 Survey data provided by MKC
Please note some 2019 MCCs are a single day and have been compared against the ATC average
The factor shows what would be required to get the 2019 counts to 2016 values.
- if a factor is below 1.00 then this indicates that 2019 counts are higher than the corresponding 2016 counts
- if a factor is above 1.00 then this indicates that 2019 counts are lower than the corresponding 2016 counts
An average whole area factor has been analysed for the AM, Inter and PM time periods
Note that the MCC's only surveyed between 11:00 - 13:00 and the factor has used that time period only.
Site 135 did not have any Westbound data for 2016

2016	2019
2	ATC14
35	ATC13
63	M5
65	M4
90	M6
111	MCC Link Count 4
132	ATC23
135	M2
133	M1
200	ATC15



wsp

TITLE:

SURVEY SITES 2016 & 2019

FIGURE No:

EASTBOUND

Two-Way

2016 SITE 2

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	30	35	30	33	42	63	83	34	45	32
01:00	9	9	8	7	22	29	39	11	18	8
02:00	1	5	5	1	12	16	19	5	8	3
03:00	4	3	4	3	9	11	10	5	6	4
04:00	8	11	4	7	5	5	9	7	7	8
05:00	37	29	40	35	42	29	22	37	33	35
06:00	85	97	96	95	82	46	35	91	77	93
07:00	289	288	268	270	268	90	62	277	219	279
08:00	477	505	515	520	540	189	112	511	408	504
09:00	289	282	300	294	302	278	157	293	272	291
10:00	287	261	299	318	313	345	274	296	300	291
11:00	323	321	327	333	363	413	333	333	345	326
12:00	395	414	326	425	387	432	389	389	395	390
13:00	363	348	392	472	396	390	399	394	394	394
14:00	430	458	473	437	515	387	355	463	436	450
15:00	553	545	568	492	597	393	383	551	504	540
16:00	660	703	677	621	768	406	376	686	602	665
17:00	1023	1065	1031	872	867	397	332	972	798	998
18:00	591	643	622	688	577	359	290	624	539	636
19:00	378	390	412	401	438	274	243	404	362	395
20:00	310	246	236	274	286	198	187	270	248	267
21:00	238	187	190	207	187	162	121	202	185	206
22:00	136	147	140	139	152	147	104	143	138	141
23:00	69	67	51	73	92	97	46	70	71	65

2019 ATC 14

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
24	28	25	21	20	52	74	24	35	25
14	9	17	15	15	26	38	14	19	14
5	11	7	12	9	25	24	9	13	9
5	11	15	8	7	16	12	9	11	10
11	10	8	14	14	18	16	11	13	11
35	38	42	36	32	26	23	37	33	38
103	82	99	73	82	55	34	88	75	89
221	272	260	252	241	92	72	249	201	251
396	436	465	454	463	229	97	443	363	438
324	278	338	279	314	330	156	307	288	305
327	304	320	322	319	427	282	318	329	318
336	320	377	329	372	463	333	347	361	341
384	392	358	382	456	482	431	394	412	379
385	361	418	375	461	421	405	400	404	385
459	488	482	531	531	397	371	498	466	490
559	559	548	535	647	378	386	570	516	550
749	847	759	829	884	364	321	814	679	796
915	1012	1046	932	800	348	340	941	770	976
600	576	663	608	573	300	271	604	513	612
391	431	419	404	396	260	231	408	362	411
257	280	291	305	293	202	164	285	256	283
182	163	231	232	183	144	117	198	179	202
117	158	156	147	165	167	90	149	143	145
51	67	86	71	117	97	58	78	78	69

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-6	-7	-5	-12	-22	-11	-9	-10	-10	-8
01:00	5	0	9	8	-7	-3	-1	3	1	6
02:00	4	6	2	11	-3	9	5	4	5	6
03:00	1	8	11	5	-2	5	2	4	5	6
04:00	3	-1	4	7	9	13	7	4	6	3
05:00	-2	9	2	1	-10	-3	1	0	0	3
06:00	18	-15	3	-22	0	9	-1	-3	-2	-4
07:00	-68	-16	-8	-18	-27	2	10	-28	-18	-28
08:00	-81	-69	-50	-66	-77	40	-15	-68	-45	-67
09:00	35	-4	38	-15	12	52	-1	14	16	14
10:00	40	43	21	4	6	82	8	22	29	27
11:00	13	-1	50	-4	9	50	0	14	16	15
12:00	-11	-22	32	-43	69	50	42	5	17	-11
13:00	22	13	26	-97	65	31	6	6	10	-9
14:00	29	30	9	94	16	10	16	35	30	41
15:00	6	14	-20	43	50	-15	3	19	12	11
16:00	89	144	82	208	116	-42	-55	128	77	131
17:00	-108	-53	15	60	-67	-49	8	-31	-28	-22
18:00	9	-67	41	-80	-4	-59	-19	-20	-26	-24
19:00	13	41	7	3	-42	-14	-12	4	0	16
20:00	-53	34	55	31	7	4	-23	15	8	17
21:00	-56	-24	41	25	-4	-18	-4	-4	-6	-4
22:00	-19	11	16	8	13	20	-14	6	5	4
23:00	-18	0	35	-2	25	0	12	8	7	4

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.44	1.29	1.31
0.79	0.94	0.60
0.57	0.60	0.34
0.54	0.57	0.36
0.61	0.54	0.70
1.01	1.00	0.93
1.04	1.02	1.04
1.11	1.09	1.11
1.15	1.12	1.15
0.96	0.94	0.96
0.93	0.91	0.92
0.96	0.95	0.96
0.99	0.96	1.03
0.99	0.98	1.02
0.93	0.94	0.92
0.97	0.98	0.98
0.84	0.89	0.84
1.03	1.04	1.02
1.03	1.05	1.04
0.99	1.00	0.96
0.95	0.97	0.94
1.02	1.03	1.02
0.96	0.97	0.97
0.89	0.91	0.95

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.34	1.21	1.22
0.88	0.92	0.70
0.69	0.78	0.63
0.69	0.76	0.53
0.64	0.56	0.64
0.97	0.97	0.94
1.00	1.00	1.01
0.93	0.93	0.93
1.08	1.06	1.07
1.01	0.99	1.00
0.95	0.93	0.95
0.95	0.95	0.95
0.98	0.98	1.00
0.99	0.98	1.02
0.93	0.95	0.93
0.99	0.98	0.98
0.93	0.96	0.93
1.04	1.04	1.03
1.05	1.06	1.04
0.99	1.02	0.95
0.98	0.99	0.99
1.02	1.02	1.04
1.00	1.01	1.03
0.90	0.90	0.92

WESTBOUND

2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	23	19	19	18	30	45	70	22	32	20
01:00	8	12	5	9	15	19	50	10	17	9
02:00	11	7	5	10	9	22	22	8	12	8
03:00	4	9	10	9	13	17	22	9	12	8
04:00	16	13	13	20	20	7	5	16	13	16
05:00	75	75	75	66	77	44	27	74	63	73
06:00	201	218	227	223	197	71	47	213	169	217
07:00	741	774	757	726	676	153	94	735	560	750
08:00	1082	1096	1096	1071	935	288	150	1056	817	1086
09:00	551	501	543	524	564	413	271	537	481	530
10:00	346	341	365	361	380	437	392	359	375	353
11:00	301	336	311	389	375	429	372	342	359	334
12:00	349	325	345	387	365	431	402	354	372	352
13:00	362	354	363	419	397	412	335	379	377	375
14:00	372	368	342	316	379	398	326	355	357	350
15:00	532	568	514	460	584	358	330	532	478	519
16:00	443	452	471	502	506	381	310	475	438	467
17:00	489	482	497	441	497	328	313	481	435	477
18:00	413	437	440	448	463	325	255	440	397	435
19:00	302	350	345	326	399	273	248	344	320	331
20:00	285	205	212	204	234	186	197	228	218	227
21:00	200	140	140	143	157	131	117	156	147	156
22:00	102	115	112	103	125	121	97	111	111	108
23:00	51	47	47	52	94	102	45	58	63	49

2019

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
22	16	21	13	19	49	62	18	29	18
13	9	13	6	8	37	45	10	19	10
9	9	11	8	13	14	23	10	12	9
11	9	16	12	8	20	15	11	13	12
26	22	33	19	23	22	13	25	23	25
78	77	78	76	81	44	25	78	66	77
202	208	226	239	208	68	45	217	171	219
837	869	878	831	770	165	96	837	635	854
1003	1076	1066	1034	871	362	149	1010	794	1045
519	463	554	513	528	460	277	515	473	512
371	350	384	346	420	482	406	374	394	363
340	373	351	364	380	436	399	362	378	357
377	339	359	381	379	418	368	367	374	364
358	365	395	362	424	384	378	381	381	370
370	363	378	362	424	376	334	379	372	368
509	530	526	534	538	388	403	527	490	525
420	401	431	439	466	331	369	431	408	423
486	439	433	472	480	286	291	462	412	458
358	405	459	458	386	277	252	413	371	420
310	370	365	359	332	202	222	347	309	351
193	192	253	230	234	194	205	220	214	217
132	122	177	156	172	147	122	152	147	147
75	99	114	103	134	127	73	105	104	98
44	51	57	71	96	110	64	64	70	56

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-1	-3	2	-5	-11	4	-8	-4	-3	-2
01:00	5	-3	8	-3	-7	18	-5	0	2	2
02:00	-2	2	6	-2	4	-8	1	2	0	1
03:00	7	0	6	3	-5	3	-7	2	1	4
04:00	10	9	20	-1	3	15	8	9	10	10
05:00	3	2	3	10	4	0	-2	4	3	5
06:00	1	-10	-1	16	11	-3	-2	4	2	2
07:00	96	95	121	105	94	12	2	102	75	104
08:00	-79	-20	-30	-37	-64	74	-1	-46	-23	-42
09:00	-32	-38	11	-11	-36	47	6	-22	-8	-18
10:00	25	9	19	-15	40	45	14	15	19	10
11:00	39	37	40	-25	5	7	27	20	19	23
12:00	28	14	14	-6	14	-13	-34	13	2	13
13:00	-4	11	32	-57	27	-28	43	2	4	-5
14:00	-2	-5	36	46	45	-22	8	24	15	19
15:00	-23	-38	12	74	-46	30	73	-5	12	6
16:00	-23	-51	-40	-63	-40	-50	59	-44	-30	-44
17:00	-3	-43	-64	31	-17	-42	-22	-19	-23	-20
18:00	-55	-32	19	10	-77	-48	-3	-27	-26	-15
19:00	8	20	20	33	-67	-71	-26	3	-11	20
20:00	-92	-13	41	26	0	8	8	-8	-4	-10
21:00	-68	-18	37	13	15	16	5	-4	0	-9
22:00	-27	-16	2	0	9	6	-24	-6	-7	-10
23:00	-7	4	10	19	2	8	19	6	7	7

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.21	1.11	1.10
1.02	0.91	0.83
0.80	0.97	0.89
0.80	0.92	0.67
0.65	0.58	0.62
0.95	0.96	0.94
0.98	0.99	0.99
0.88	0.88	0.88
1.05	1.03	1.04
1.04	1.02	1.03
0.96	0.95	0.97
0.95	0.95	0.94
0.96	0.99	0.97
1.00	0.99	1.01
0.94	0.96	0.95
1.01	0.98	0.99
1.10	1.07	1.10
1.04	1.05	1.04
1.06	1.07	1.03
0.99	1.04	0.94
1.03	1.02	1.04
1.03	1.00	1.06
1.06	1.07	1.10
0.91	0.89	0.88

EASTBOUND

2016 SITE 200

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	14	12	14	12	19	45	55	14	24	13
01:00	6	5	5	6	9	22	28	6	12	6
02:00	4	4	4	4	6	13	15	4	7	4
03:00	5	4	5	4	6	9	10	5	6	5
04:00	7	6	6	6	8	7	7	7	7	6
05:00	29	31	31	31	30	18	15	30	26	31
06:00	82	88	89	87	81	36	22	85	69	87
07:00	266	271	273	269	256	88	48	267	210	270
08:00	374	393	399	392	385	196	91	389	319	390
09:00	262	271	279	286	289	276	155	277	260	275
10:00	255	258	256	261	278	331	217	262	265	258
11:00	264	269	271	272	304	355	251	276	284	269
12:00	275	285	279	287	308	342	276	287	293	282
13:00	290	293	295	306	318	324	263	300	298	296
14:00	319	324	329	336	357	300	254	333	317	327
15:00	359	375	380	377	399	291	245	378	347	373
16:00	396	413	414	419	438	275	230	416	369	411
17:00	494	513	519	532	471	277	221	506	432	515
18:00	334	374	385	403	359	250	197	371	329	374
19:00	228	268	259	273	290	219	165	264	243	257
20:00	142	157	160	175	188	148	117	164	155	159
21:00	99	118	114	128	123	104	77	116	109	115
22:00	70	78	81	87	95	92	54	82	80	79
23:00	36	40	42	46	72	77	35	47	50	41

2019 ATC15

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
13	9	18	15	15	47	57	14	25	14
3	4	5	14	7	20	31	7	12	7
5	6	7	6	4	18	19	6	9	6
2	3	4	8	5	8	10	4	6	4
9	12	7	12	13	14	12	11	11	10
35	34	40	41	30	23	16	36	31	38
92	94	99	89	84	47	26	92	76	94
242	277	245	254	243	102	65	252	204	255
316	356	296	316	364	212	98	330	280	321
285	296	295	272	315	272	131	293	267	287
280	246	267	275	286	340	259	271	279	267
265	256	308	269	311	364	268	282	292	275
271	278	258	305	293	352	281	281	291	278
310	294	308	302	342	349	293	311	314	304
306	310	340	353	344	272	249	331	311	327
356	377	368	345	382	277	266	366	339	362
435	438	417	439	477	271	214	441	384	432
485	502	503	506	492	239	222	498	421	499
354	372	423	366	385	205	195	380	329	379
283	301	319	276	284	180	170	293	259	295
172	144	167	200	188	154	131	174	165	171
123	111	160	146	132	116	88	134	125	135
57	98	98	93	99	126	54	89	89	87
33	44	54	50	75	68	34	51	51	45

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-1	-3	4	3	-4	2	2	0	1	1
01:00	-3	-1	0	8	-2	-2	3	1	0	1
02:00	1	2	3	2	-2	5	4	2	2	2
03:00	-3	-1	-1	4	-1	-1	0	-1	0	0
04:00	2	6	1	6	5	7	5	4	4	4
05:00	6	3	9	10	0	5	1	6	5	7
06:00	10	6	10	2	3	11	4	7	7	7
07:00	-24	6	-28	-15	-13	14	17	-15	-6	-15
08:00	-58	-37	-103	-76	-21	16	7	-59	-39	-69
09:00	23	25	16	-14	26	-4	-24	16	7	13
10:00	25	-12	11	14	8	9	42	9	14	10
11:00	1	-13	37	-3	7	9	17	6	8	6
12:00	-4	-7	-21	18	-15	10	5	-6	-2	-4
13:00	20	1	13	-4	24	25	30	11	16	8
14:00	-13	-14	11	17	-13	-28	-5	-2	-6	0
15:00	-3	2	-12	-32	-17	-14	21	-12	-8	-11
16:00	39	25	3	20	39	-4	-16	25	15	22
17:00	-9	-11	-16	-26	21	-38	1	-8	-11	-16
18:00	20	-2	38	-37	26	-45	-2	9	0	5
19:00	55	33	60	3	-6	-39	5	29	16	38
20:00	30	-13	7	25	0	6	14	10	10	12
21:00	24	-7	46	18	9	12	11	18	16	20
22:00	-13	20	17	6	4	34	0	7	9	8
23:00	-3	4	12	4	3	-9	-1	4	1	4

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.00	0.97	0.95
0.91	1.00	0.85
0.71	0.75	0.67
1.14	1.05	1.06
0.66	0.62	0.63
0.83	0.83	0.81
0.93	0.91	0.93
1.06	1.03	1.06
1.18	1.14	1.21
0.95	0.98	0.96
0.97	0.95	0.96
0.98	0.97	0.98
1.02	1.01	1.01
0.96	0.95	0.98
1.01	1.02	1.00
1.03	1.02	1.03
0.94	0.96	0.95
1.02	1.03	1.03
0.98	1.00	0.99
0.90	0.94	0.87
0.94	0.94	0.93
0.86	0.87	0.85
0.92	0.90	0.91
0.92	0.98	0.91

Two-Way

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.06	0.99	1.08
0.97	1.01	0.85
0.76	0.85	0.73
0.73	0.83	0.65
0.68	0.69	0.65
0.87	0.88	0.88
0.92	0.92	0.92
0.98	0.96	0.98
1.16	1.11	1.19
0.96	0.96	0.96
0.98	0.96	0.98
0.98	0.98	0.98
1.00	1.01	0.99
0.99	0.98	1.00
1.00	1.01	1.00
1.02	1.01	1.01
0.99	0.99	0.99
1.04	1.04	1.04
1.00	1.02	1.00
0.91	0.95	0.88
0.93	0.93	0.93
0.87	0.88	0.86
0.89	0.89	0.90
0.97	0.98	0.94

WESTBOUND

2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	16	13	14	15	22	48	59	16	27	15
01:00	6	6	6	7	10	25	33	7	13	6
02:00	5	4	5	5	6	14	16	5	8	5
03:00	5	3	4	3	6	9	11	4	6	4
04:00	8	7	7	8	9	9	9	8	8	8
05:00	34	38	38	37	36	20	13	37	31	37
06:00	86	92	92	92	85	37	25	89	73	91
07:00	303	323	331	327	303	71	45	317	243	321
08:00	383	400	408	403	393	168	77	397	319	399
09:00	284	304	305	293	311	260	145	299	272	297
10:00	259	271	270	270	289	331	236	272	275	268
11:00	273	276	280	287	297	350	270	283	290	279
12:00	295	289	295	296	327	366	294	300	309	294
13:00	297	305	307	304	328	336	262	308	306	303
14:00	311	317	328	321	343	327	255	324	315	319
15:00	386	399	411	394	432	302	251	404	368	398
16:00	378	406	415	408	430	307	251	407	371	402
17:00	440	476	487	476	464	295	228	469	409	470
18:00	340	370	377	389	375	262	208	370	332	369
19:00	249	279	273	284	293	226	178	276	255	271
20:00	168	180	184	202	208	165	137	188	178	184
21:00	104	123	123	126	131	114	88	121	116	119
22:00	69	83	81	88	99	98	63	84	83	80
23:00	34	36	42	50	76	76	33	48	50	41

2019

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
15	9	12	11	24	51	66	14	27	12
6	10	6	7	5	26	30	7	13	7
5	6	8	5	7	10	17	6	8	6
7	10	9	8	6	12	9	8	9	9
10	8	17	9	13	9	8	11	11	11
40	40	41	36	46	18	15	41	34	39
91	104	95	106	96	33	23	98	78	99
366	372	321	327	334	76	63	344	266	347
328	372	303	371	376	227	91	350	295	344
310	279	341	313	307	296	163	310	287	311
281	268	269	255	294	358	249	273	282	268
256	293	288	295	311	348	252	289	292	283
324	286	292	309	316	345	282	305	308	303
290	294	299	292	354	311	270	306	301	294
288	318	329	332	353	336	261	324	317	317
388	381	404	422	417	280	317	402	373	399
386	373	387	399	396	259	325	388	361	386
438	462	461	444	415	251	242	444	388	451
325	343	403	375	353	227	215	360	320	362
270	309	326	316	286	183	179	301	267	305
172	176	225	211	231	163	166	203	192	196
125	112	158	147	152	125	96	139	131	136
59	98	113	95	122	122	50	97	94	91
25	43	41	56	69	90	30	47	51	41

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-1	-4	-2	-4	2	3	7	-2	0	-3
01:00	0	4	0	0	-5	1	-3	0	0	1
02:00	0	2	3	0	1	-4	1	1	0	1
03:00	2	7	5	5	0	3	-2	4	3	5
04:00	2	1	10	1	4	0	-1	3	3	4
05:00	6	2	3	-1	10	-2	2	4	3	3
06:00	5	12	3	14	11	-4	-2	9	5	9
07:00	63	49	-10	0	31	5	18	27	23	26
08:00	-55	-28	-105	-32	-17	59	14	-47	-24	-55
09:00	26	-25	36	20	-4	36	18	11	15	14
10:00	22	-3	-1	-15	5	27	13	1	7	1
11:00	-17	17	8	8	14	-2	-18	6	2	4
12:00	29	-3	-3	13	-11	-21	-12	5	-1	9
13:00	-7	-11	-8	-12	26	-25	8	-2	-5	-10
14:00	-23	1	1	11	10	9	6	0	2	-3
15:00	2	-18	-7	28	-15	-22	66	-2	5	1
16:00	8	-33	-28	-9	-34	-48	74	-19	-10	-16
17:00	-2	-14	-26	-32	-49	-44	14	-25	-21	-19
18:00	-15	-27	26	-14	-22	-35	7	-10	-12	-8
19:00	21	30	53	32	-7	-43	1	25	12	34
20:00	4	-4	41	9	23	-2	29	15	14	13
21:00	21	-11	35	21	21	11	8	18	15	17
22:00	-10	15	32	7	23	24	-13	13	11	11
23:00	-9	7	-1	6	-7	14	-3	-1	1	1

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.13	1.01	1.23
1.03	1.01	0.86
0.81	0.97	0.79
0.50	0.69	0.44
0.70	0.76	0.68
0.91	0.92	0.94
0.90	0.93	0.91
0.92	0.92	0.93
1.13	1.08	1.16
0.96	0.95	0.95
0.99	0.98	1.00
0.98	0.99	0.99
0.98	1.00	0.97
1.01	1.02	1.03
1.00	0.99	1.01
1.00	0.99	1.00
1.05	1.03	1.04
1.06	1.06	1.04
1.03	1.04	1.02
0.92	0.96	0.89
0.93	0.93	0.94
0.87	0.89	0.88
0.86	0.88	0.88
1.03	0.99	0.98

EASTBOUND

2016 SITE 132

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	36	38	34	28	22	54	60	32	39	34
01:00	28	31	21	38	34	52	40	30	35	30
02:00	32	37	39	31	34	33	28	35	33	35
03:00	89	76	75	73	77	42	29	78	66	78
04:00	306	283	281	286	303	129	82	292	239	289
05:00	558	618	562	563	515	195	116	563	447	575
06:00	984	1057	1032	1054	1019	331	192	1029	810	1032
07:00	983	1042	1066	1086	1038	485	255	1043	851	1044
08:00	732	674	793	744	782	696	482	745	700	736
09:00	719	559	608	609	681	786	495	635	637	624
10:00	740	733	690	666	837	807	653	733	732	707
11:00	829	783	791	805	851	933	742	812	819	802
12:00	840	794	811	820	964	957	709	846	842	816
13:00	903	1000	984	1000	1164	849	706	1010	944	972
14:00	1112	1128	1186	1176	1248	839	741	1170	1061	1151
15:00	1603	1689	1683	1667	1635	834	797	1655	1415	1661
16:00	1725	1723	1747	1700	1665	850	660	1712	1439	1724
17:00	1251	1371	1281	1307	1083	577	433	1259	1043	1303
18:00	648	714	703	722	664	474	354	690	611	697
19:00	409	450	425	517	438	357	423	448	431	450
20:00	300	310	321	368	314	236	297	323	307	325
21:00	202	309	257	257	291	283	173	263	253	256
22:00	81	99	104	103	166	181	86	111	117	97
23:00	41	71	66	70	101	126	41	70	74	62

2019 ATC23

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	39	52	59	55	59	126	145	53	76	51
01:00	34	39	43	33	45	77	79	39	50	37
02:00	31	24	18	19	33	59	55	25	34	23
03:00	33	22	39	29	33	33	47	31	34	31
04:00	74	72	66	68	62	53	39	68	62	70
05:00	251	257	254	264	259	120	41	257	207	257
06:00	491	537	572	534	518	226	160	530	434	534
07:00	989	965	935	993	932	322	183	963	760	971
08:00	889	944	980	961	875	559	262	930	781	944
09:00	715	799	746	791	813	785	440	773	727	763
10:00	682	625	661	660	699	910	641	665	697	657
11:00	684	699	723	758	809	990	754	735	774	716
12:00	777	785	759	773	949	943	820	809	829	774
13:00	757	794	837	853	949	942	855	838	855	810
14:00	935	944	968	962	984	831	764	959	913	952
15:00	1062	1112	1106	1132	1226	765	725	1128	1018	1103
16:00	1557	1553	1594	1697	1559	731	730	1592	1346	1600
17:00	1630	1706	1689	1777	1547	682	730	1670	1394	1701
18:00	1132	1203	1467	1144	1109	616	528	1211	1028	1237
19:00	682	828	763	746	753	481	418	754	667	755
20:00	313	373	345	381	384	305	229	359	333	353
21:00	313	373	345	381	384	305	229	359	333	353
22:00	256	247	283	297	314	324	182	279	272	271
23:00	120	130	171	157	226	207	106	161	160	145

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	3	14	25	27	37	72	85	21	37	17
01:00	6	8	22	-5	11	25	39	9	15	8
02:00	-1	-13	-21	-12	-1	26	27	-10	1	-12
03:00	-56	-54	-36	-44	-44	-9	18	-47	-32	-48
04:00	-232	-211	-215	-218	-241	-76	-43	-224	-177	-219
05:00	-307	-361	-308	-299	-256	-75	-75	-306	-240	-319
06:00	-493	-520	-460	-520	-501	-105	-32	-499	-376	-498
07:00	6	-77	-131	-93	-106	-163	-72	-80	-91	-74
08:00	157	270	187	217	93	-137	-220	185	81	208
09:00	-4	240	138	182	132	-1	-55	138	90	139
10:00	-58	-108	-29	-6	-138	103	-12	-68	-35	-50
11:00	-145	-84	-68	-47	-42	57	12	-77	-45	-86
12:00	-63	-9	-52	-47	-15	-14	111	-37	-13	-43
13:00	-146	-206	-147	-147	-215	93	149	-172	-89	-162
14:00	-177	-184	-218	-214	-264	-8	23	-211	-148	-198
15:00	-541	-577	-577	-535	-409	-69	-72	-527	-397	-558
16:00	-168	-170	-153	-3	-106	-119	70	-120	-93	-124
17:00	379	335	408	470	464	105	297	411	351	398
18:00	484	489	764	422	445	142	174	521	417	540
19:00	273	378	338	229	315	124	-5	306	236	305
20:00	13	63	24	13	70	69	-68	36	26	28
21:00	111	64	88	124	93	22	56	96	80	97
22:00	175	148	179	194	148	143	96	168	155	174
23:00	79	59	105	87	125	81	65	91	86	83

Time Begin	2016/2019 5-Day Av	2016/2019 7-Day Av	2016/2019 Mon-Thu	Two-Way 2016/2019 5-Day Av	Two-Way 2016/2019 7-Day Av	Two-Way 2016/2019 Mon-Thu
00:00	0.61	0.51	0.66	0.55	0.49	0.60
01:00	0.77	0.70	0.79	0.70	0.66	0.66
02:00	1.40	0.97	1.51	1.14	0.89	1.17
03:00	2.50	1.96	2.54	1.89	1.60	1.92
04:00	4.27	3.85	4.13	4.25	3.77	4.16
05:00	2.19	2.16	2.24	2.56	2.52	2.64
06:00	1.94	1.87	1.93	2.16	2.09	2.13
07:00	1.08	1.12	1.08	1.02	1.06	1.02
08:00	0.80	0.90	0.78	0.75	0.83	0.73
09:00	0.82	0.88	0.82	0.78	0.86	0.77
10:00	1.10	1.05	1.08	1.01	1.02	0.99
11:00	1.11	1.06	1.12	1.07	1.05	1.09
12:00	1.05	1.02	1.06	1.04	1.02	1.05
13:00	1.21	1.10	1.20	1.15	1.08	1.15
14:00	1.22	1.16	1.21	1.16	1.10	1.15
15:00	1.47	1.39	1.51	1.35	1.28	1.38
16:00	1.08	1.07	1.08	1.12	1.09	1.12
17:00	0.75	0.75	0.77	0.76	0.76	0.76
18:00	0.57	0.59	0.56	0.60	0.64	0.59
19:00	0.59	0.65	0.60	0.59	0.64	0.60
20:00	0.90	0.92	0.92	0.87	0.89	0.88
21:00	0.73	0.76	0.73	0.71	0.73	0.71
22:00	0.40	0.43	0.36	0.43	0.46	0.38
23:00	0.44	0.46	0.43	0.45	0.48	0.44

WESTBOUND

2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	30	25	28	27	18	56	68	26	36	28
01:00	16	20	24	25	30	41	53	23	30	21
02:00	28	30	25	27	33	27	19	29	27	28
03:00	53	53	54	56	56	47	37	54	51	54
04:00	220	243	241	222	228	91	67	231	187	232
05:00	665	714	686	663	583	182	126	662	517	682
06:00	1702	1704	1750	1773	1681	315	170	1722	1299	1732
07:00	1808	1722	1863	1874	1754	729	244	1804	1428	1817
08:00	1051	1282	1228	1047	1116	840	505	1145	1010	1152
09:00	782	788	827	840	888	928	758	825	830	809
10:00	712	729	715	731	784	965	891	734	790	722
11:00	802	736	801	734	796	1010	795	774	811	768
12:00	791	770	820	733	824	898	768	788	801	779
13:00	784	786	787	837	873	814	735	813	802	799
14:00	783	776	861	849	906	684	550	835	773	817
15:00	977	962	1028	989	994	634	570	990	879	989
16:00	1163	1213	1242	1223	1210	626	556	1210	1033	1210
17:00	809	898	922	942	871	516	496	888	779	893
18:00	498	580	523	550	562	425	498	543	519	538
19:00	319	290	302	312	343	332	297	313	314	306
20:00	229	222	222	262	259	251	208	239	236	234
21:00	160	217	184	216	211	200	163	198	193	194
22:00	83	110	85	119	166	201	82	113	121	99
23:00	48	55	40	77	100	121	52	64	70	55

2019

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	46	51	63	43	60	114	165	53	77	51
01:00	31	57	39	31	26	65	92	37	49	40
02:00	22	41	32	25	35	34	43	31	33	30
03:00	23	45	43	42	40	46	38	39	40	38
04:00	44	57	66	54	53	41	42	55	51	55
05:00	214	224	218	220	228	94	29	221	175	219
06:00	765	768	772	753	663	198	110	744	576	765
07:00	1826	1878	1859	1820	1757	333	191	1828	1381	1846
08:00	1648	1789	1589	1612	1348	655	303	1597	1278	1660
09:00	1104	1100	1109	1051	1094	810	541	1092	973	1091
10:00	760	744	835	806	775	860	789	784	796	786
11:00	707	696	729	787	785	967	827	741	785	730
12:00	739	753	723	753	824	892	767	758	779	742
13:00	677	754	740	759	831	813	743	752	760	733
14:00	746	749	760	770	852	739	716	775	762	756
15:00	756	859	785	873	884	692	568	831	774	818
16:00	975	1027	1017	1055	1066	647	600	1028	912	1019
17:00	1121	1201	1170	1211	1097	600	522	1160	989	1176
18:00	820	843	879	816	816	499	536	835	744	840
19:00	486	507	515	519	610	420	402	527	494	507
20:00	231	308	289	311	289	270	235	286	276	285
21:00	231	308	289	311	289	270	235	286	276	285
22:00	201	266	255	241	267	298	161	246	241	241
23:00	118	115	138	126	190	217	100	137	143	124

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	16	26	35	16	42	58	97	27	41	23
01:00	15	37	15	6	-4	24	39	14	19	18
02:00	-6	11	7	-2	2	7	24	2	6	3
03:00	-30	-8	-11	-14	-16	-1	1	-15	-11	-16
04:00	-176	-186	-175	-168	-175	-50	-25	-176	-136	-176
05:00	-451	-490	-468	-443	-355	-88	-97	-441	-342	-463
06:00	-937	-936	-978	-1020	-1018	-117	-60	-978	-723	-968
07:00	18	156	-4	-54	3	-396	-53	24	-47	29
08:00	597	507	361	565	232	-185	-202	452	268	508
09:00	322	312	282	211	206	-118	-217	267	143	282
10:00	48	15	120	75	-9	-105	-102	50	6	65
11:00	-95	-40	-72	53	-11	-43	32	-33	-26	-39
12:00	-52	-17	-97	20	0	-6	-1	-30	-22	-37
13:00	-107	-32	-47	-78	-42	-1	8	-61	-42	-66
14:00	-37	-27	-101	-79	-54	55	166	-60	-11	-61
15:00	-221	-103	-243	-116	-110	58	-2	-159	-105	-171
16:00	-188	-186	-225	-168	-144	21	44	-182	-121	-192
17:00	312	303	248	269	226	84	26	272	210	283
18:00	322	263	356	266	254	74	38	292	225	302
19:00	167	217	213	207	267	88	105	214	180	201
20:00	2	86	67	49	30	19	27	47	40	51
21:00	71	91	105	95	78	70	72	88	83	91
22:00	118	156	170	122	101	97	79	133	120	142
23:00	70	60	98	49	90	96	48	73	73	69

2016/2019

Time Begin	5-Day Av	7-Day Av	Mon-Thu
00:00	0.49	0.46	0.54
01:00	0.63	0.62	0.54
02:00	0.94	0.81	0.92
03:00	1.40	1.29	1.41
04:00	4.22	3.67	4.19
05:00	3.00	2.95	3.11
06:00	2.31	2.26	2.27
07:00	0.99	1.03	0.98
08:00	0.72	0.79	0.69
09:00	0.76	0.85	0.74
10:00	0.94	0.99	0.92
11:00	1.04	1.03	1.05
12:00	1.04	1.03	1.05
13:00	1.08	1.06	1.09
14:00	1.08	1.01	1.08
15:00	1.19	1.14	1.21
16:00	1.18	1.13	1.19
17:00	0.77	0.79	0.76
18:00	0.65	0.70	0.64
19:00	0.59	0.64	0.60
20:00	0.84	0.85	0.82
21:00	0.69	0.70	0.68
22:00	0.46	0.50	0.41
23:00	0.47	0.49	0.44

NORTH - EASTBOUND

2016 SITE 35

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	0	65	46	57	60	90	128	57	74	42
01:00	2	23	42	37	31	73	61	33	45	26
02:00	1	38	37	41	45	35	45	40	40	29
03:00	1	41	38	31	42	48	32	38	39	28
04:00	3	94	88	81	67	49	34	83	69	67
05:00	38	294	327	268	250	110	79	285	221	232
06:00	84	497	512	482	417	155	104	477	361	394
07:00	261	1022	1071	933	838	302	171	966	723	822
08:00	828	1211	1362	1140	1045	452	224	1190	906	1135
09:00	1747	828	907	734	742	647	403	803	710	1054
10:00	140	1793	673	654	635	735	449	939	823	815
11:00	141	181	703	648	691	818	578	556	603	418
12:00	195	210	798	766	866	866	706	660	702	492
13:00	190	190	853	777	911	791	766	683	715	503
14:00	1037	280	932	961	1045	787	684	805	782	803
15:00	4942	339	1083	1050	1260	714	675	933	854	1854
16:00	6201	681	1618	1584	1541	769	749	1356	1157	2521
17:00	3275	770	1755	1815	1703	857	627	1511	1255	1904
18:00	440	540	1289	1328	1167	657	459	1081	907	899
19:00	194	214	707	766	724	505	367	603	547	470
20:00	69	92	476	526	493	313	327	397	371	291
21:00	38	1702	346	370	343	194	219	690	529	614
22:00	39	493	236	286	287	231	161	326	282	264
23:00	2370	111	118	113	183	157	88	131	128	678

data seems too high, has been removed from averages

2019 ATC 13

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
47	57	57	53	55	119	135	54	75	54
33	39	40	34	12	84	92	32	48	37
28	23	21	16	0	55	59	18	29	22
30	22	41	23	0	33	41	23	27	29
67	70	61	59	0	45	31	51	48	64
199	204	202	218	0	111	64	165	143	206
391	444	467	409	0	174	134	342	288	428
806	812	803	836	0	274	154	651	526	814
840	935	876	869	483	482	255	880	710	880
662	725	673	689	750	667	389	700	651	687
633	593	586	593	621	759	560	605	621	601
638	657	664	682	731	793	688	674	693	660
726	761	734	726	900	947	750	769	792	737
750	730	812	759	832	902	797	777	797	763
839	903	884	912	956	781	716	899	856	885
974	1010	1040	1017	1164	724	664	1041	942	1010
1485	1520	1436	1584	1508	698	658	1507	1270	1506
1684	1694	1609	1709	1495	590	702	1638	1355	1674
985	1073	1226	1093	1060	598	474	1087	930	1094
643	755	698	709	699	447	399	701	621	701
315	370	378	378	380	321	225	364	338	360
315	370	378	378	380	321	225	364	338	360
247	250	279	286	316	303	174	276	265	266
106	127	165	172	232	201	115	160	160	143

Appears to be a partial hour (removed from average)

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	47	-8	11	-4	-5	29	7	-3	0	12
01:00	31	16	-2	-3	-19	11	31	-2	3	11
02:00	27	-15	-16	-25	-45	20	14	-23	-11	-7
03:00	29	-19	3	-8	-42	-15	9	-15	-12	1
04:00	64	-24	-27	-22	-67	-4	-3	-31	-21	-2
05:00	161	-90	-125	-50	-250	1	-15	-120	-79	-26
06:00	307	-53	-45	-73	-417	19	30	-135	-73	34
07:00	545	-210	-268	-97	-838	-28	-17	-315	-196	-8
08:00	12	-276	-486	-271	-562	30	31	-310	-196	-255
09:00	-1085	-103	-234	-45	8	20	-14	-103	-59	-367
10:00	493	-1200	-87	-61	-14	24	111	-334	-202	-214
11:00	497	476	-39	34	40	-25	110	119	90	242
12:00	531	551	-64	-40	34	81	44	109	90	245
13:00	560	540	-41	-18	-79	111	31	94	83	260
14:00	-198	623	-48	-49	-89	-6	32	94	74	82
15:00	-3968	671	-43	-33	-96	10	-11	108	88	-843
16:00	-4716	839	-182	0	-33	-71	-91	151	113	-1015
17:00	-1591	924	-146	-106	-208	-267	75	127	100	-230
18:00	545	533	-63	-235	-107	-59	15	6	23	195
19:00	449	541	-9	-57	-25	-58	32	98	74	231
20:00	246	278	-98	-148	-113	8	-102	-33	-33	70
21:00	277	-1332	32	8	37	127	6	-326	-191	-254
22:00	208	-243	43	0	29	72	13	-50	-17	2
23:00	-2264	16	47	59	49	44	27	29	31	-536

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.06	0.99	0.79
1.05	0.93	0.71
2.29	1.39	1.33
1.64	1.42	0.96
1.61	1.45	1.04
1.73	1.55	1.13
1.39	1.25	0.92
1.48	1.37	1.01
1.35	1.28	1.29
1.15	1.09	1.53
1.55	1.33	1.36
0.82	0.87	0.63
0.86	0.89	0.67
0.88	0.90	0.66
0.90	0.91	0.91
0.90	0.91	1.83
0.90	0.91	1.67
0.92	0.93	1.14
0.99	0.98	0.82
0.86	0.88	0.67
1.09	1.10	0.81
1.90	1.56	1.70
1.18	1.07	0.99
0.82	0.80	4.76

Two-Way

2016/2019

5-Day Av	7-Day Av	Mon-Thu
0.98	0.97	0.84
1.05	0.94	0.78
1.74	1.30	1.15
1.18	1.09	0.80
1.41	1.29	1.01
1.53	1.43	1.10
1.21	1.15	0.91
1.32	1.26	0.98
1.15	1.13	1.12
1.14	1.10	1.32
1.29	1.18	1.20
0.92	0.96	0.83
0.94	0.97	0.84
0.98	0.99	0.86
0.94	0.97	0.95
0.98	1.01	1.52
0.94	0.96	1.45
0.98	0.99	1.12
1.03	1.02	0.93
0.94	0.94	0.83
1.16	1.16	1.00
1.51	1.30	1.41
1.06	0.97	0.95
0.84	0.83	3.04

SOUTH - WESTBOUND

2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	46	48	47	49	49	89	142	48	67	48
01:00	29	30	31	34	31	62	77	31	42	31
02:00	24	24	24	28	27	41	39	25	30	25
03:00	23	23	25	33	23	29	25	25	26	26
04:00	60	49	49	38	41	40	31	47	44	49
05:00	205	221	238	220	206	103	46	218	177	221
06:00	533	587	577	543	485	167	117	545	430	560
07:00	1212	1234	1306	1260	1280	278	143	1258	959	1253
08:00	1015	1286	1386	1335	1300	476	223	1264	1003	1256
09:00	1107	1076	998	998	926	707	402	1021	888	1045
10:00	724	709	733	735	729	749	664	726	720	725
11:00	694	641	656	685	733	957	677	682	720	669
12:00	696	707	700	719	812	825	785	727	749	706
13:00	711	713	699	748	796	805	688	733	737	718
14:00	659	669	697	701	789	778	605	703	700	682
15:00	763	801	844	823	933	624	560	833	764	808
16:00	816	864	922	840	875	577	500	863	771	861
17:00	1033	1030	1011	1015	998	560	465	1017	873	1022
18:00	776	832	694	833	746	476	428	776	684	784
19:00	478	547	471	526	570	348	306	518	464	506
20:00	311	337	330	350	366	240	272	339	315	332
21:00	220	279	271	292	258	195	196	264	244	266
22:00	162	187	187	243	224	170	144	201	188	195
23:00	76	90	110	132	150	169	87	112	116	102

2019

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
40	58	73	39	55	97	137	53	71	53
30	48	37	31	3	67	91	30	44	37
21	36	25	18	0	33	44	20	25	25
26	45	42	39	0	43	31	30	32	38
34	58	59	50	0	39	40	40	40	50
202	213	202	203	0	84	50	164	136	205
636	619	633	612	0	184	100	500	398	625
1279	1309	1314	1284	0	283	174	1037	806	1297
1243	1286	1267	1255	545	565	267	1263	981	1263
876	913	964	834	885	723	452	894	807	897
669	648	711	685	699	763	632	682	687	678
644	666	648	660	719	804	696	667	691	655
676	701	696	676	749	819	658	700	711	687
674	653	598	677	723	731	625	665	669	651
636	683	734	657	786	645	578	699	674	678
672	773	730	768	854	595	246	759	663	736
815	857	839	817	894	584	343	844	736	832
938	948	902	939	926	536	432	931	803	932
725	707	726	688	706	432	441	710	632	712
467	442	469	502	579	366	340	492	452	470
221	282	277	280	287	239	202	269	255	265
221	282	277	280	287	239	202	269	255	265
177	249	229	204	238	273	162	219	219	215
106	110	111	131	184	206	86	128	133	115

Appears to be a partial hour (removed from average)

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-6	10	26	-10	6	8	-5	5	4	5
01:00	1	18	6	-3	-28	5	14	-1	2	6
02:00	-3	12	1	-10	-27	-8	5	-5	-5	0
03:00	3	22	17	6	-23	14	6	5	6	12
04:00	-26	9	10	12	-41	-1	9	-7	-4	1
05:00	-3	-8	-36	-17	-206	-19	4	-54	-41	-16
06:00	103	32	56	69	-485	17	-17	-45	-32	65
07:00	67	75	8	24	-1280	5	31	-221	-153	44
08:00	228	0	-119	-80	-755	89	44	-1	-23	7
09:00	-231	-163	-34	-164	-41	16	50	-127	-81	-148
10:00	-55	-61	-22	-50	-30	14	-32	-44	-33	-47
11:00	-50	25	-8	-25	-14	-153	19	-15	-29	-15
12:00	-20	-6	-4	-43	-63	-6	-127	-27	-38	-18
13:00	-37	-60	-101	-71	-73	-74	-63	-68	-68	-67
14:00	-23	14	37	-44	-3	-133	-27	-4	-26	-4
15:00	-91	-28	-114	-55	-79	-29	-314	-74	-101	-72
16:00	-1	-7	-83	-23	19	7	-157	-19	-35	-29
17:00	-95	-82	-109	-76	-72	-24	-33	-86	-70	-91
18:00	-51	-125	32	-145	-40	-44	13	-66	-52	-72
19:00	-11	-105	-2	-24	9	18	34	-26	-12	-36
20:00	-90	-55	-53	-70	-79	-1	-70	-70	-60	-67
21:00	1	3	6	-12	29	44	6	5	11	-1
22:00	15	62	42	-39	14	103	18	18	31	20
23:00	30	20	1	-1	34	37	-1	16	17	13

2016/2019

5-Day Av	7-Day Av	Mon-Thu
0.91	0.94	0.90
1.04	0.96	0.85
1.25	1.19	1.00
0.82	0.81	0.68
1.17	1.10	0.98
1.33	1.30	1.08
1.09	1.08	0.90
1.21	1.19	0.97
1.00	1.02	0.99
1.14	1.10	1.17
1.06	1.05	1.07
1.02	1.04	1.02
1.04	1.05	1.03
1.10	1.10	1.10
1.01	1.04	1.01
1.10	1.15	1.10
1.02	1.05	1.03
1.09	1.09	1.10
1.09	1.08	1.10
1.05	1.03	1.08
1.26	1.23	1.25
0.98	0.96	1.00
0.92	0.86	0.91
0.87	0.87	0.89

NORTH - EASTBOUND

Time Begin	2016 SITE 63 Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu	2019 M5 Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	41	61	58	79	78	124	163	63	86	60								0	0	
01:00	43	27	35	41	47	97	82	39	53	37								0	0	
02:00	24	43	46	42	48	54	66	41	46	39								0	0	
03:00	57	49	55	40	51	55	38	50	49	50								0	0	
04:00	75	75	92	93	83	57	41	84	74	84								0	0	
05:00	346	357	365	326	307	157	119	340	282	349								0	0	
06:00	556	531	581	579	537	234	137	557	451	562								0	0	
07:00	1158	1165	1203	1309	1199	357	216	1207	944	1209				1183				1183	1183	1183
08:00	1677	1731	1780	1678	1697	640	242	1713	1349	1717				1438				1438	1438	1438
09:00	1057	1050	1054	990	937	884	391	1018	909	1038				955				955	955	955
10:00	812	820	795	815	828	893	526	814	784	811								0	0	
11:00	830	822	821	886	915	1000	651	855	846	840				831				831	831	831
12:00	937	966	953	976	1054	1064	840	977	970	958				946				946	946	946
13:00	1064	1109	1078	1102	1186	1025	961	1108	1075	1088								0	0	
14:00	1099	1213	1202	1101	1374	929	866	1198	1112	1154								0	0	
15:00	1295	1391	1410	1301	1567	944	902	1393	1259	1349								0	0	
16:00	1790	1811	1776	1760	1892	975	949	1806	1565	1784				1853				1853	1853	1853
17:00	1961	1939	1984	1902	1890	901	848	1935	1632	1947				1954				1954	1954	1954
18:00	1334	1493	1416	1471	1295	753	629	1402	1199	1429				1379				1379	1379	1379
19:00	812	918	876	934	890	561	423	886	773	885								0	0	
20:00	516	582	594	685	640	421	376	603	545	594								0	0	
21:00	388	501	521	546	431	319	259	477	424	489								0	0	
22:00	271	345	352	330	344	296	176	328	302	325								0	0	
23:00	113	123	132	136	258	252	97	152	159	126								0	0	

Difference

Two-Way

Time Begin	2019-2016 Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu	2016/2019 5-Day Av	7-Day Av	Mon-Thu	Two-Way 2016/2019 5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
03:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
07:00	-	-	-	-126	-	-	-	-24	239	-126	1.02	0.80	1.02	0.99	0.77	1.00
08:00	-	-	-	-240	-	-	-	-275	89	-240	1.19	0.94	1.19	1.12	0.89	1.13
09:00	-	-	-	-35	-	-	-	-63	46	-35	1.07	0.95	1.09	1.16	1.03	1.18
10:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00	-	-	-	-55	-	-	-	-24	-15	-55	1.03	1.02	1.01	1.04	1.06	1.03
12:00	-	-	-	-30	-	-	-	-31	-24	-30	1.03	1.03	1.01	1.06	1.07	1.04
13:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16:00	-	-	-	93	-	-	-	47	288	93	0.97	0.84	0.96	1.01	0.88	1.00
17:00	-	-	-	52	-	-	-	19	322	52	0.99	0.84	1.00	1.00	0.84	1.01
18:00	-	-	-	-92	-	-	-	-23	180	-92	1.02	0.87	1.04	1.06	0.91	1.07
19:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

SOUTH - WESTBOUND

Time Begin	2016 Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu	2019 Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	48	52	51	48	70	100	144	54	73	50								0	0	
01:00	23	33	31	32	41	69	81	32	44	30								0	0	
02:00	12	19	15	28	22	57	39	19	27	19								0	0	
03:00	21	27	24	18	35	44	35	25	29	23								0	0	
04:00	53	43	47	57	51	43	35	50	47	50								0	0	
05:00	229	238	238	214	189	94	79	222	183	230								0	0	
06:00	645	646	663	628	628	220	125	642	508	646								0	0	
07:00	1454	1503	1542	1513	1479	418	190	1498	1157	1503				1539				1539	1539	1539
08:00	1675	1714	1685	1684	1647	715	261	1681	1340	1690				1579				1579	1579	1579
09:00	1336	1342	1317	1218	1247	1006	470	1292	1134	1303				1031				1031	1031	1031
10:00	963	865	989	896	937	1085	886	930	946	928								0	0	
11:00	894	847	842	890	878	1048	926	870	904	868				824				824	824	824
12:00	931	894	922	978	1039	1103	937	953	972	931				874				874	874	874
13:00	896	924	897	899	1105	980	853	944	936	904								0	0	
14:00	952	941	1065	984	1062	907	770	1001	954	986								0	0	
15:00	1047	1067	1055	1057	1251	800	704	1095	997	1057								0	0	
16:00	1166	1288	1305	1262	1282	831	654	1261	1113	1255				1194				1194	1194	1194
17:00	1398	1385	1408	1456	1350	739	552	1399	1184	1412				1379				1379	1379	1379
18:00	1055	1083	1125	1081	1132	590	494	1095	937	1086				976				976	976	976
19:00	648	687	711	790	685	481	391	704	628	709								0	0	
20:00	393	434	472	508	501	307	288	462	415	452								0	0	
21:00	272	326	321	377	348	252	217	329	302	324								0	0	
22:00	266	315	282	311	301	240	192	295	272	294								0	0	
23:00	102	130	133	154	201	175	98	144	142	130								0	0	

Time Begin	2019-2016 Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu	2016/2019 5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-		-	-	
01:00	-	-	-	-	-	-	-	-	-		-	-	
02:00	-	-	-	-	-	-	-	-	-		-	-	
03:00	-	-	-	-	-	-	-	-	-		-	-	
04:00	-	-	-	-	-	-	-	-	-		-	-	
05:00	-	-	-	-	-	-	-	-	-		-	-	
06:00	-	-	-	-	-	-	-	-	-		-	-	
07:00	-	-	-	26	-	-	-	41	382	26	0.97	0.75	0.98
08:00	-	-	-	-105	-	-	-	-102	239	-105	1.06	0.85	1.07
09:00	-	-	-	-187	-	-	-	-261	-103	-187	1.25	1.10	1.26
10:00	-	-	-	-	-	-	-	-	-		-	-	
11:00	-	-	-	-66	-	-	-	-46	-80	-66	1.06	1.10	1.05
12:00	-	-	-	-104	-	-	-	-79	-98	-104	1.09	1.11	1.07
13:00	-	-	-	-	-	-	-	-	-		-	-	
14:00	-	-	-	-	-	-	-	-	-		-	-	
15:00	-	-	-	-	-	-	-	-	-		-	-	
16:00	-	-	-	-68	-	-	-	-67	81	-68	1.06	0.93	1.05
17:00	-	-	-	-77	-	-	-	-20	195	-77	1.01	0.86	1.02
18:00	-	-	-	-105	-	-	-	-119	39	-105	1.12	0.96	1.11
19:00	-	-	-	-	-	-	-	-	-		-	-	
20:00	-	-	-	-	-	-	-	-	-		-	-	
21:00	-	-	-	-	-	-	-	-	-		-	-	
22:00	-	-	-	-	-	-	-	-	-		-	-	
23:00	-	-	-	-	-	-	-	-	-		-	-	

NORTH - EASTBOUND

2016 SITE 65

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	17	22	19	22	23	60	62	21	32	20
01:00	7	8	5	12	14	47	45	9	20	8
02:00	9	7	5	9	9	24	15	8	11	8
03:00	12	12	12	10	7	22	18	11	13	12
04:00	27	24	26	21	23	13	17	24	22	25
05:00	94	75	91	84	88	40	18	86	70	86
06:00	123	128	132	147	132	62	34	132	108	133
07:00	400	401	391	422	413	85	46	405	308	404
08:00	664	709	678	673	679	189	64	681	522	681
09:00	362	305	332	363	312	240	145	335	294	341
10:00	294	308	269	254	307	304	208	286	278	281
11:00	339	337	334	320	362	352	252	338	328	333
12:00	395	400	418	385	408	389	352	401	392	400
13:00	430	372	457	435	455	352	347	430	407	424
14:00	396	418	419	420	453	349	325	421	397	413
15:00	492	448	464	488	522	331	311	483	437	473
16:00	719	534	539	708	696	375	314	639	555	625
17:00	781	646	610	785	699	374	278	704	596	706
18:00	437	477	456	521	477	301	173	474	406	473
19:00	317	313	337	309	327	219	157	321	283	319
20:00	215	218	193	280	251	138	117	231	202	227
21:00	142	154	178	164	169	129	153	161	156	160
22:00	109	139	109	137	133	99	71	125	114	124
23:00	56	39	48	55	105	80	40	61	60	50

2019 M4

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
			489				489	489	489
			766				766	766	766
			410				410	410	410
							0	0	
			334				334	334	334
			420				420	420	420
							0	0	
							0	0	
							0	0	
			582				582	582	582
			518				518	518	518
			438				438	438	438
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	
01:00	-	-	-	-	-	-	-	-	-	
02:00	-	-	-	-	-	-	-	-	-	
03:00	-	-	-	-	-	-	-	-	-	
04:00	-	-	-	-	-	-	-	-	-	
05:00	-	-	-	-	-	-	-	-	-	
06:00	-	-	-	-	-	-	-	-	-	
07:00	-	-	-	67	-	-	-	84	181	67
08:00	-	-	-	93	-	-	-	85	244	93
09:00	-	-	-	47	-	-	-	75	116	47
10:00	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	14	-	-	-	-4	6	14
12:00	-	-	-	35	-	-	-	19	28	35
13:00	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
16:00	-	-	-	-126	-	-	-	-57	27	-126
17:00	-	-	-	-267	-	-	-	-186	-78	-267
18:00	-	-	-	-83	-	-	-	-36	32	-83
19:00	-	-	-	-	-	-	-	-	-	
20:00	-	-	-	-	-	-	-	-	-	
21:00	-	-	-	-	-	-	-	-	-	
22:00	-	-	-	-	-	-	-	-	-	
23:00	-	-	-	-	-	-	-	-	-	

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
0.83	0.63	0.83
0.89	0.68	0.89
0.82	0.72	0.83
-	-	
1.01	0.98	1.00
0.95	0.93	0.95
-	-	
-	-	
-	-	
1.10	0.95	1.07
1.36	1.15	1.36
1.08	0.93	1.08
-	-	
-	-	
-	-	
-	-	
-	-	

Two-Way

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
0.80	0.61	0.81
0.91	0.70	0.90
0.89	0.78	0.91
-	-	-
0.87	0.86	0.86
0.85	0.83	0.85
-	-	-
-	-	-
-	-	-
0.99	0.84	0.96
1.22	1.00	1.24
0.97	0.83	0.97
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

SOUTH - WESTBOUND

2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	16	14	29	22	26	68	63	21	34	20
01:00	6	10	8	7	13	53	40	9	20	8
02:00	4	8	8	8	10	58	27	8	18	7
03:00	8	5	10	9	6	22	20	8	11	8
04:00	16	8	20	10	14	10	19	14	14	14
05:00	50	43	50	53	51	29	11	49	41	49
06:00	162	184	178	192	157	64	40	175	140	179
07:00	590	614	580	575	543	110	59	580	439	590
08:00	958	865	914	949	1003	289	79	938	722	922
09:00	599	574	534	524	500	408	183	546	475	558
10:00	385	367	332	370	369	429	346	365	371	364
11:00	341	361	349	387	371	436	319	362	366	360
12:00	471	419	490	455	459	469	372	459	448	459
13:00	446	421	445	426	473	398	347	442	422	435
14:00	441	418	440	406	513	398	380	444	428	426
15:00	495	463	483	506	543	355	314	498	451	487
16:00	585	593	597	639	722	302	248	627	527	604
17:00	952	924	892	1003	837	296	223	922	732	943
18:00	474	565	526	573	543	299	200	536	454	535
19:00	271	266	322	298	346	240	165	301	273	289
20:00	154	159	172	190	228	150	118	181	167	169
21:00	106	123	107	132	149	133	80	123	119	117
22:00	101	113	133	111	145	91	72	121	109	115
23:00	46	43	39	55	92	82	29	55	55	46

2019

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
			740				740	740	740
			1015				1015	1015	1015
			575				575	575	575
							0	0	
			472				472	472	472
			592				592	592	592
							0	0	
							0	0	
							0	0	
			703				703	703	703
			811				811	811	811
			598				598	598	598
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	
01:00	-	-	-	-	-	-	-	-	-	
02:00	-	-	-	-	-	-	-	-	-	
03:00	-	-	-	-	-	-	-	-	-	
04:00	-	-	-	-	-	-	-	-	-	
05:00	-	-	-	-	-	-	-	-	-	
06:00	-	-	-	-	-	-	-	-	-	
07:00	-	-	-	165	-	-	-	160	301	165
08:00	-	-	-	66	-	-	-	77	293	66
09:00	-	-	-	51	-	-	-	29	100	51
10:00	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	85	-	-	-	110	106	85
12:00	-	-	-	137	-	-	-	133	144	137
13:00	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
16:00	-	-	-	64	-	-	-	76	176	64
17:00	-	-	-	-192	-	-	-	-111	79	-192
18:00	-	-	-	25	-	-	-	62	144	25
19:00	-	-	-	-	-	-	-	-	-	
20:00	-	-	-	-	-	-	-	-	-	
21:00	-	-	-	-	-	-	-	-	-	
22:00	-	-	-	-	-	-	-	-	-	
23:00	-	-	-	-	-	-	-	-	-	

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
0.78	0.59	0.80
0.92	0.71	0.91
0.95	0.83	0.97
-	-	
0.77	0.78	0.76
0.78	0.76	0.77
-	-	
-	-	
-	-	
0.89	0.75	0.86
1.14	0.90	1.16
0.90	0.76	0.89
-	-	
-	-	
-	-	
-	-	
-	-	

EASTBOUND

2016 SITE 90

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	15	24	24	31	34	37	60	26	32	24
01:00	7	16	9	8	13	29	22	11	15	10
02:00	2	10	14	11	9	12	22	9	11	9
03:00	10	10	14	15	12	12	21	12	13	12
04:00	20	20	20	24	18	12	14	20	18	21
05:00	126	122	129	127	114	42	28	124	98	126
06:00	136	157	132	153	157	73	52	147	123	145
07:00	339	327	347	351	389	118	53	351	275	341
08:00	440	428	430	448	437	159	84	437	347	437
09:00	253	279	286	284	283	249	152	277	255	276
10:00	235	256	259	278	302	312	242	266	269	257
11:00	306	301	335	316	320	347	238	316	309	315
12:00	434	397	401	444	496	339	316	434	404	419
13:00	436	389	398	424	479	313	299	425	391	412
14:00	385	444	433	432	486	347	260	436	398	424
15:00	481	482	456	475	528	361	290	484	439	474
16:00	627	680	636	635	711	335	351	658	568	645
17:00	626	591	616	483	578	293	226	579	488	579
18:00	481	517	480	534	438	265	168	490	412	503
19:00	282	350	332	323	286	180	130	315	269	322
20:00	175	195	208	216	217	112	98	202	174	199
21:00	162	186	164	193	143	99	74	170	146	176
22:00	100	105	120	133	123	119	58	116	108	115
23:00	46	55	50	47	97	68	35	59	57	50

2019 M6

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
			367				367	367	367
			432				432	432	432
			310				310	310	310
							0	0	
			332				332	332	332
			434				434	434	434
							0	0	
							0	0	
							0	0	
			727				727	727	727
			650				650	650	650
			460				460	460	460
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	
01:00	-	-	-	-	-	-	-	-	-	
02:00	-	-	-	-	-	-	-	-	-	
03:00	-	-	-	-	-	-	-	-	-	
04:00	-	-	-	-	-	-	-	-	-	
05:00	-	-	-	-	-	-	-	-	-	
06:00	-	-	-	-	-	-	-	-	-	
07:00	-	-	-	16	-	-	-	16	92	16
08:00	-	-	-	-16	-	-	-	-5	85	-16
09:00	-	-	-	26	-	-	-	33	55	26
10:00	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	16	-	-	-	16	23	16
12:00	-	-	-	-10	-	-	-	0	30	-10
13:00	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
16:00	-	-	-	92	-	-	-	69	159	92
17:00	-	-	-	167	-	-	-	71	162	167
18:00	-	-	-	-74	-	-	-	-30	48	-74
19:00	-	-	-	-	-	-	-	-	-	
20:00	-	-	-	-	-	-	-	-	-	
21:00	-	-	-	-	-	-	-	-	-	
22:00	-	-	-	-	-	-	-	-	-	
23:00	-	-	-	-	-	-	-	-	-	

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
0.96	0.75	0.93
1.01	0.80	1.01
0.89	0.82	0.89
-	-	
0.95	0.93	0.95
1.00	0.93	0.97
-	-	
-	-	
-	-	
0.91	0.78	0.89
0.89	0.75	0.89
1.07	0.90	1.09
-	-	
-	-	
-	-	
-	-	
-	-	

Two-Way

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
0.90	0.68	0.89
1.04	0.79	1.04
0.95	0.82	0.97
-	-	-
0.86	0.87	0.84
0.94	0.90	0.91
-	-	-
-	-	-
-	-	-
0.91	0.80	0.89
0.93	0.78	0.94
1.01	0.86	1.02
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

WESTBOUND

2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	15	15	17	28	22	39	52	19	27	19
01:00	8	8	10	11	19	26	39	11	17	9
02:00	6	11	10	12	13	8	16	10	11	10
03:00	13	14	15	16	16	10	24	15	15	15
04:00	22	19	23	25	32	17	17	24	22	22
05:00	80	92	86	86	73	43	30	83	70	86
06:00	210	238	231	235	227	96	47	228	183	229
07:00	783	805	849	810	798	150	69	809	609	812
08:00	1501	1502	1509	1512	1451	326	101	1495	1129	1506
09:00	629	696	613	612	560	352	201	622	523	638
10:00	351	353	374	391	376	399	373	369	374	367
11:00	322	306	316	356	365	426	336	333	347	325
12:00	398	382	395	413	455	445	335	409	403	397
13:00	507	463	458	479	496	404	329	481	448	477
14:00	455	455	409	446	480	429	320	449	428	441
15:00	425	409	471	453	466	343	308	445	411	440
16:00	473	451	471	519	521	291	287	487	430	479
17:00	569	658	594	635	547	280	247	601	504	614
18:00	423	444	398	461	429	279	202	431	377	432
19:00	240	284	232	305	304	198	153	273	245	265
20:00	172	157	176	150	169	129	118	165	153	164
21:00	109	127	129	147	134	111	81	129	120	128
22:00	91	109	129	139	124	123	60	118	111	117
23:00	36	36	57	46	56	74	29	46	48	44

2019

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
			926				926	926	926
			1427				1427	1427	1427
			635				635	635	635
							0	0	
			425				425	425	425
			467				467	467	467
							0	0	
							0	0	
							0	0	
			528				528	528	528
			617				617	617	617
			455				455	455	455
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	
01:00	-	-	-	-	-	-	-	-	-	
02:00	-	-	-	-	-	-	-	-	-	
03:00	-	-	-	-	-	-	-	-	-	
04:00	-	-	-	-	-	-	-	-	-	
05:00	-	-	-	-	-	-	-	-	-	
06:00	-	-	-	-	-	-	-	-	-	
07:00	-	-	-	116	-	-	-	117	317	116
08:00	-	-	-	-85	-	-	-	-68	298	-85
09:00	-	-	-	23	-	-	-	13	112	23
10:00	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	69	-	-	-	92	78	69
12:00	-	-	-	54	-	-	-	58	64	54
13:00	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
16:00	-	-	-	9	-	-	-	41	98	9
17:00	-	-	-	-18	-	-	-	16	113	-18
18:00	-	-	-	-6	-	-	-	24	78	-6
19:00	-	-	-	-	-	-	-	-	-	
20:00	-	-	-	-	-	-	-	-	-	
21:00	-	-	-	-	-	-	-	-	-	
22:00	-	-	-	-	-	-	-	-	-	
23:00	-	-	-	-	-	-	-	-	-	

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
0.87	0.66	0.88
1.05	0.79	1.06
0.98	0.82	1.00
-	-	
0.78	0.82	0.76
0.88	0.86	0.85
-	-	
-	-	
-	-	
0.92	0.81	0.91
0.97	0.82	1.00
0.95	0.83	0.95
-	-	
-	-	
-	-	
-	-	
-	-	

SOUTHBOUND

2016 SITE 111

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	20	44	32	18	24	45	38	28	32	29
01:00	10	32	18	16	24	24	25	20	21	19
02:00	11	38	15	20	13	14	8	19	17	21
03:00	17	46	15	13	12	13	9	21	18	23
04:00	36	28	29	38	28	26	20	32	29	33
05:00	125	142	128	132	138	65	53	133	112	132
06:00	201	230	224	234	220	85	54	222	178	222
07:00	564	587	616	539	577	120	75	577	440	577
08:00	768	851	783	746	735	261	101	777	606	787
09:00	395	634	434	478	410	335	167	470	408	485
10:00	282	306	286	272	337	342	289	297	302	287
11:00	310	278	287	311	307	356	261	299	301	297
12:00	397	389	377	419	399	351	332	396	381	396
13:00	355	347	361	389	379	327	271	366	347	363
14:00	354	317	328	320	355	312	273	335	323	330
15:00	341	374	380	382	419	264	197	379	337	369
16:00	425	432	433	430	519	274	204	448	388	430
17:00	729	691	661	668	607	240	199	671	542	687
18:00	430	440	436	426	394	215	172	425	359	433
19:00	219	256	245	267	249	165	136	247	220	247
20:00	149	251	153	166	149	90	84	174	149	180
21:00	154	256	109	124	111	70	78	151	129	161
22:00	156	193	82	80	92	85	45	121	105	128
23:00	85	107	54	53	53	44	30	70	61	75

2019 TWO WAY LINK COUNT 4

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
16	24	17	19	26	40	36	20	25	19
12	15	21	16	9	26	23	15	17	16
12	9	13	11	0	13	16	9	11	11
8	17	17	11	0	18	11	11	12	13
25	36	31	26	0	15	10	24	20	30
93	100	103	111	0	55	35	81	71	102
209	242	228	220	0	79	45	180	146	225
670	729	696	647	530	162	75	686	497	686
808	913	807	798	659	260	82	797	618	832
404	429	474	407	358	337	206	414	374	429
317	291	330	300	328	372	246	313	312	310
289	302	305	289	335	344	284	304	307	296
352	396	380	410	427	356	280	393	372	385
315	377	345	365	379	301	276	356	337	351
378	387	362	347	375	277	298	370	346	369
381	388	393	455	401	255	234	404	358	404
552	568	571	569	598	257	178	572	470	565
761	835	823	754	625	254	177	760	604	793
421	414	425	439	335	200	199	407	348	425
244	268	262	266	254	145	144	259	226	260
122	115	135	139	147	103	62	132	118	128
122	115	135	139	147	103	62	132	118	128
78	104	89	89	115	84	52	95	87	90
51	30	48	46	71	63	39	49	50	44

Appears to be a partial hour (removed from average)

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-4	-20	-15	1	2	-5	-2	-8	-7	-10
01:00	2	-17	3	0	-15	2	-2	-5	-4	-3
02:00	1	-29	-2	-9	-13	-1	8	-10	-6	-10
03:00	-9	-29	2	-2	-12	5	2	-10	-6	-10
04:00	-11	8	2	-12	-28	-11	-10	-8	-9	-3
05:00	-32	-42	-25	-21	-138	-10	-18	-52	-41	-30
06:00	8	12	4	-14	-220	-6	-9	-42	-32	3
07:00	106	142	80	108	-47	42	0	109	57	109
08:00	40	62	24	52	-76	-1	-19	20	12	45
09:00	9	-205	40	-71	-52	2	39	-56	-34	-57
10:00	35	-15	44	28	-9	30	-43	16	10	23
11:00	-21	24	18	-22	28	-12	23	5	6	0
12:00	-45	7	3	-9	28	5	-52	-3	-9	-11
13:00	-40	30	-16	-24	0	-26	5	-10	-10	-13
14:00	24	70	34	27	20	-35	25	35	23	39
15:00	40	14	13	73	-18	-9	37	25	21	35
16:00	127	136	138	139	79	-17	-26	124	82	135
17:00	32	144	162	86	18	14	-22	89	62	106
18:00	-9	-26	-11	13	-59	-15	27	-18	-11	-8
19:00	25	12	17	-1	5	-20	8	12	6	13
20:00	-27	-136	-18	-27	-2	13	-22	-42	-31	-52
21:00	-32	-141	26	15	36	33	-16	-19	-11	-33
22:00	-78	-89	7	9	23	-1	7	-26	-18	-38
23:00	-34	-77	-6	-7	18	19	9	-21	-11	-31

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.37	1.26	1.50
1.37	1.20	1.19
2.11	1.61	1.87
1.98	1.54	1.72
1.36	1.42	1.11
1.63	1.58	1.29
1.23	1.22	0.99
0.84	0.89	0.84
0.97	0.98	0.95
1.13	1.09	1.13
0.95	0.97	0.93
0.98	0.98	1.00
1.01	1.03	1.03
1.03	1.03	1.04
0.91	0.93	0.89
0.94	0.94	0.91
0.78	0.82	0.76
0.88	0.90	0.87
1.04	1.03	1.02
0.95	0.97	0.95
1.32	1.27	1.41
1.15	1.10	1.26
1.27	1.20	1.42
1.42	1.23	1.71

Two-Way

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.27	1.12	1.39
1.70	1.34	1.50
2.00	1.54	1.70
1.72	1.46	1.43
1.30	1.34	1.04
1.50	1.45	1.18
1.20	1.18	0.97
0.85	0.90	0.85
1.00	1.00	0.97
1.07	1.05	1.07
0.98	0.99	0.98
0.96	0.96	0.95
1.01	1.00	1.02
1.06	1.04	1.07
1.00	1.01	1.00
0.99	0.99	0.98
1.02	1.05	1.03
0.97	0.98	0.96
1.08	1.07	1.06
0.99	1.01	1.00
1.45	1.35	1.52
1.34	1.23	1.48
1.64	1.50	1.83
1.62	1.40	1.95

NORTHBOUND

2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	14	77	26	35	25	47	44	35	38	38
01:00	14	71	15	19	30	17	26	30	27	30
02:00	12	42	17	15	19	18	16	21	20	22
03:00	12	44	14	13	20	23	9	21	19	21
04:00	31	43	32	39	42	21	24	37	33	36
05:00	85	87	84	92	97	45	38	89	75	87
06:00	132	133	145	127	125	59	32	132	108	134
07:00	426	421	461	434	427	91	34	434	328	436
08:00	993	995	1019	924	939	195	51	974	731	983
09:00	366	447	468	378	358	263	115	403	342	415
10:00	255	260	317	261	279	279	175	274	261	273
11:00	306	241	330	264	329	324	248	294	292	285
12:00	382	362	366	400	395	302	331	381	363	378
13:00	441	444	417	434	509	336	296	449	411	434
14:00	434	430	457	517	503	371	321	468	433	460
15:00	454	440	546	522	534	314	304	499	445	491
16:00	651	641	760	774	627	371	317	691	592	707
17:00	665	700	714	685	584	319	247	670	559	691
18:00	477	536	562	540	520	253	199	527	441	529
19:00	302	310	304	339	293	223	185	310	279	314
20:00	304	243	211	219	214	129	115	238	205	244
21:00	290	388	167	159	157	98	92	232	193	251
22:00	461	380	144	152	154	109	84	258	212	284
23:00	193	150	76	55	78	78	32	110	95	119

2019

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
33	39	18	26	30	52	62	29	37	29
12	20	16	18	8	22	33	15	18	17
12	15	16	12	0	16	23	11	13	14
11	20	18	20	0	14	12	14	14	17
38	43	39	28	0	18	14	30	26	37
73	81	86	93	0	37	34	67	58	83
135	136	156	146	0	69	33	115	96	143
477	536	510	484	430	101	50	502	360	502
975	1017	997	1014	793	175	66	959	720	1001
394	442	414	410	361	240	121	404	340	415
275	245	291	245	288	290	183	269	260	264
287	293	346	330	313	341	258	314	310	314
353	358	401	372	410	415	284	379	370	371
366	395	407	410	474	360	334	410	392	395
397	396	433	465	462	361	316	431	404	423
451	484	475	476	534	290	290	484	429	472
517	556	529	542	556	283	261	540	463	536
636	652	684	602	547	288	209	624	517	644
404	453	647	433	427	245	193	473	400	484
268	308	322	314	315	179	172	305	268	303
138	121	166	177	165	145	99	153	144	151
138	121	166	177	165	145	99	153	144	151
124	136	124	158	139	112	79	136	125	136
58	52	59	53	87	82	43	62	62	56

Appears to be a partial hour (removed from average)

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	19	-38	-8	-9	5	5	18	-6	-1	-9
01:00	-2	-51	1	-1	-22	5	7	-15	-9	-13
02:00	0	-27	-1	-3	-19	-2	7	-10	-7	-8
03:00	-1	-24	4	7	-20	-9	3	-7	-5	-4
04:00	7	0	7	-11	-42	-3	-10	-7	-7	1
05:00	-12	-6	2	1	-97	-8	-4	-22	-17	-4
06:00	3	3	11	19	-125	10	1	-17	-12	9
07:00	51	115	49	50	3	10	16	68	32	66
08:00	-18	22	-22	90	-146	-20	15	-15	-11	18
09:00	28	-5	-54	32	3	-23	6	1	-2	0
10:00	20	-15	-26	-16	9	11	8	-5	-1	-9
11:00	-19	52	16	66	-16	17	10	20	18	29
12:00	-29	-4	35	-28	15	113	-47	-2	7	-7
13:00	-75	-49	-10	-24	-35	24	38	-39	-19	-40
14:00	-37	-34	-24	-52	-41	-10	-5	-37	-29	-37
15:00	-3	44	-71	-46	0	-24	-14	-15	-16	-19
16:00	-134	-85	-231	-232	-71	-88	-56	-151	-129	-171
17:00	-29	-48	-30	-83	-37	-31	-38	-46	-42	-48
18:00	-73	-83	85	-107	-93	-8	-6	-54	-41	-45
19:00	-34	-2	18	-25	22	-44	-13	-5	-11	-11
20:00	-166	-122	-45	-42	-49	16	-16	-85	-61	-94
21:00	-152	-267	-1	18	8	47	7	-79	-49	-101
22:00	-337	-244	-20	6	-15	3	-5	-122	-87	-149
23:00	-135	-98	-17	-2	9	4	11	-48	-33	-63

2016/2019

5-Day Av	7-Day Av	Mon-Thu
1.20	1.02	1.31
2.03	1.47	1.80
1.91	1.49	1.56
1.52	1.40	1.20
1.25	1.28	0.98
1.34	1.30	1.05
1.15	1.12	0.94
0.86	0.91	0.87
1.02	1.02	0.98
1.00	1.01	1.00
1.02	1.01	1.04
0.94	0.94	0.91
1.01	0.98	1.02
1.09	1.05	1.10
1.09	1.07	1.09
1.03	1.04	1.04
1.28	1.28	1.32
1.07	1.08	1.07
1.11	1.10	1.09
1.02	1.04	1.04
1.55	1.42	1.62
1.51	1.34	1.67
1.89	1.70	2.10
1.78	1.53	2.14

EASTBOUND

2016 SITE 135

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	41	65	71	67	81	96	110	65	76	61
01:00	24	39	42	35	54	74	68	39	48	35
02:00	20	34	43	39	35	50	45	34	38	34
03:00	40	43	46	43	41	53	43	43	44	43
04:00	73	69	72	88	91	60	57	79	73	76
05:00	257	253	263	273	239	117	96	257	214	262
06:00	405	394	400	423	388	186	117	402	330	406
07:00	710	810	817	765	739	228	147	768	602	776
08:00	747	835	644	706	763	299	200	739	599	733
09:00	497	606	616	586	555	409	274	572	506	576
10:00	423	450	477	507	503	471	401	472	462	464
11:00	496	486	464	545	591	547	508	516	520	498
12:00	551	578	620	624	632	612	648	601	609	593
13:00	597	604	680	665	704	688	644	650	655	637
14:00	658	706	679	687	734	799	688	693	707	683
15:00	706	814	756	889	803	838	759	794	795	791
16:00	869	853	720	752	1014	941	834	842	855	799
17:00	889	890	859	919	926	994	692	897	881	889
18:00	855	849	823	893	736	711	402	831	753	855
19:00	536	480	577	552	558	512	338	541	508	536
20:00	392	338	374	464	395	271	271	393	358	392
21:00	279	275	265	297	297	266	239	283	274	279
22:00	260	252	255	272	312	342	178	270	267	260
23:00	118	120	122	112	166	163	82	128	126	118

2019 M2

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
			834				834	834	834
			870				870	870	870
			498				498	498	498
							0	0	
			469				469	469	469
			566				566	566	566
							0	0	
							0	0	
							0	0	
			1415				1415	1415	1415
			1511				1511	1511	1511
			941				941	941	941
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	
01:00	-	-	-	-	-	-	-	-	-	
02:00	-	-	-	-	-	-	-	-	-	
03:00	-	-	-	-	-	-	-	-	-	
04:00	-	-	-	-	-	-	-	-	-	
05:00	-	-	-	-	-	-	-	-	-	
06:00	-	-	-	-	-	-	-	-	-	
07:00	-	-	-	69	-	-	-	65.8	231.7143	69
08:00	-	-	-	164	-	-	-	131	270.8571	164
09:00	-	-	-	-88	-	-	-	-74	-8.14286	-88
10:00	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	-76	-	-	-	-47.4	-50.5714	-76
12:00	-	-	-	-58	-	-	-	-35	-43.2857	-58
13:00	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
16:00	-	-	-	663	-	-	-	573.4	560.2857	663
17:00	-	-	-	592	-	-	-	614.3333	629.6667	592
18:00	-	-	-	48	-	-	-	109.8	188.2857	48
19:00	-	-	-	-	-	-	-	-	-	
20:00	-	-	-	-	-	-	-	-	-	
21:00	-	-	-	-	-	-	-	-	-	
22:00	-	-	-	-	-	-	-	-	-	
23:00	-	-	-	-	-	-	-	-	-	

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
0.92	0.72	0.93
0.85	0.69	0.84
1.15	1.02	1.16
-	-	
1.10	1.11	1.06
1.06	1.08	1.05
-	-	
-	-	
-	-	
0.59	0.60	0.56
0.59	0.58	0.59
0.88	0.80	0.91
-	-	
-	-	
-	-	
-	-	
-	-	

No Westbound data
Two-Way
Not to be used.
2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
0.34	0.27	0.35
0.26	0.21	0.26
0.37	0.33	0.38
-	-	-
0.48	0.48	0.46
0.53	0.54	0.53
-	-	-
-	-	-
-	-	-
0.39	0.40	0.37
0.39	0.38	0.39
0.50	0.45	0.52
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

WESTBOUND

2016 No westbound data provided

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00										
01:00										
02:00										
03:00										
04:00										
05:00										
06:00										
07:00										
08:00										
09:00										
10:00										
11:00										
12:00										
13:00										
14:00										
15:00										
16:00										
17:00										
18:00										
19:00										
20:00										
21:00										
22:00										
23:00										

2019

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
			1407				1407	1407	1407
			1941				1941	1941	1941
			1036				1036	1036	1036
							0	0	
			614				614	614	614
			561				561	561	561
							0	0	
							0	0	
							0	0	
			743				743	743	743
			793				793	793	793
			718				718	718	718
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	
01:00	-	-	-	-	-	-	-	-	-	
02:00	-	-	-	-	-	-	-	-	-	
03:00	-	-	-	-	-	-	-	-	-	
04:00	-	-	-	-	-	-	-	-	-	
05:00	-	-	-	-	-	-	-	-	-	
06:00	-	-	-	-	-	-	-	-	-	
07:00	-	-	-	1407	-	-	-	1407	1407	1407
08:00	-	-	-	1941	-	-	-	1941	1941	1941
09:00	-	-	-	1036	-	-	-	1036	1036	1036
10:00	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	614	-	-	-	614	614	614
12:00	-	-	-	561	-	-	-	561	561	561
13:00	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
16:00	-	-	-	743	-	-	-	743	743	743
17:00	-	-	-	793	-	-	-	793	793	793
18:00	-	-	-	718	-	-	-	718	718	718
19:00	-	-	-	-	-	-	-	-	-	
20:00	-	-	-	-	-	-	-	-	-	
21:00	-	-	-	-	-	-	-	-	-	
22:00	-	-	-	-	-	-	-	-	-	
23:00	-	-	-	-	-	-	-	-	-	

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
-	-	
0.00	0.00	0.00
0.00	0.00	0.00
-	-	
-	-	
-	-	
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
-	-	
-	-	
-	-	
-	-	
-	-	

NORTH - EASTBOUND

2016 SITE 133

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	72	86	116	109	118	199	203	100	129	96
01:00	58	60	73	72	98	128	129	72	88	66
02:00	55	59	58	83	77	103	88	66	75	64
03:00	70	70	81	84	74	103	79	76	80	76
04:00	127	127	126	129	140	92	61	130	115	127
05:00	327	323	299	281	298	169	113	306	259	308
06:00	543	555	570	565	480	231	153	543	442	558
07:00	766	852	876	830	829	328	216	831	671	831
08:00	416	692	361	562	546	541	280	515	485	508
09:00	595	629	654	648	646	589	421	634	597	632
10:00	610	569	672	678	703	806	551	646	656	632
11:00	628	652	704	676	770	800	700	686	704	665
12:00	720	766	743	832	895	909	788	791	808	765
13:00	810	861	848	902	946	926	876	873	881	855
14:00	935	999	1025	1020	953	938	988	986	980	995
15:00	1061	1036	1164	1157	973	1072	1028	1078	1070	1105
16:00	1036	908	922	971	596	1056	1148	887	948	959
17:00	799	737	573	781	544	1066	980	687	783	723
18:00	829	894	497	836	888	884	623	789	779	764
19:00	677	580	677	777	812	633	463	705	660	678
20:00	417	564	490	582	603	477	387	531	503	513
21:00	316	474	392	455	454	408	304	418	400	409
22:00	316	400	347	330	410	369	400	361	367	348
23:00	166	193	172	218	300	290	148	210	212	187

2019 M1

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
			816				816	816	816
			735				735	735	735
			672				672	672	672
							0	0	
			672				672	672	672
			731				731	731	731
							0	0	
							0	0	
							0	0	
			1168				1168	1168	1168
			1026				1026	1026	1026
			854				854	854	854
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	
01:00	-	-	-	-	-	-	-	-	-	
02:00	-	-	-	-	-	-	-	-	-	
03:00	-	-	-	-	-	-	-	-	-	
04:00	-	-	-	-	-	-	-	-	-	
05:00	-	-	-	-	-	-	-	-	-	
06:00	-	-	-	-	-	-	-	-	-	
07:00	-	-	-	-14	-	-	-	-15	145	-14
08:00	-	-	-	173	-	-	-	220	250	173
09:00	-	-	-	24	-	-	-	38	75	24
10:00	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	-4	-	-	-	-14	-32	-4
12:00	-	-	-	-101	-	-	-	-60	-77	-101
13:00	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
16:00	-	-	-	197	-	-	-	281	220	197
17:00	-	-	-	245	-	-	-	339	243	245
18:00	-	-	-	18	-	-	-	65	75	18
19:00	-	-	-	-	-	-	-	-	-	
20:00	-	-	-	-	-	-	-	-	-	
21:00	-	-	-	-	-	-	-	-	-	
22:00	-	-	-	-	-	-	-	-	-	
23:00	-	-	-	-	-	-	-	-	-	

2016/2019			Two-Way 2016/2019		
5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-
1.02	0.82	1.02	1.06	0.83	1.08
0.70	0.66	0.69	0.94	0.78	0.95
0.94	0.89	0.94	1.02	0.92	1.04
-	-		-	-	-
1.02	1.05	0.99	0.99	1.05	0.98
1.08	1.11	1.05	1.00	1.05	0.99
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-
0.76	0.81	0.82	0.85	0.86	0.89
0.67	0.76	0.70	0.82	0.82	0.85
0.92	0.91	0.89	0.97	0.92	0.96
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-
-	-		-	-	-

SOUTH - WESTBOUND

2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	136	96	126	116	144	204	256	124	154	119
01:00	81	72	77	82	93	130	143	81	97	78
02:00	64	77	76	86	92	87	94	79	82	76
03:00	55	70	68	67	83	94	74	69	73	65
04:00	84	98	100	80	104	77	83	93	89	91
05:00	258	261	250	284	272	178	132	265	234	263
06:00	699	679	716	690	614	229	157	680	541	696
07:00	1615	1627	1543	1566	1390	399	260	1548	1200	1588
08:00	1498	1795	1797	1729	1513	690	346	1666	1338	1705
09:00	1293	1263	1366	1263	1106	869	540	1258	1100	1296
10:00	888	950	939	965	902	1038	1023	929	958	936
11:00	850	902	845	809	813	1115	1097	844	919	852
12:00	853	883	830	894	821	1072	1099	856	922	865
13:00	798	864	844	826	837	1092	1027	834	898	833
14:00	792	806	812	829	752	1107	872	798	853	810
15:00	719	786	871	842	883	880	783	820	823	805
16:00	871	877	957	927	864	891	722	899	873	908
17:00	1160	1109	1151	1105	982	836	706	1101	1007	1131
18:00	987	1130	1010	1080	1003	712	811	1042	962	1052
19:00	606	765	678	756	845	630	652	730	705	701
20:00	393	475	556	487	597	462	461	502	490	478
21:00	298	342	366	404	439	343	384	370	368	353
22:00	265	261	273	287	337	299	361	285	298	272
23:00	157	156	169	177	278	274	213	187	203	165

2019

Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	
			1425				1425	1425	1425
			1592				1592	1592	1592
			1180				1180	1180	1180
							0	0	
			870				870	870	870
			917				917	917	917
							0	0	
							0	0	
							0	0	
			938				938	938	938
			1146				1146	1146	1146
			1037				1037	1037	1037
							0	0	
							0	0	
							0	0	
							0	0	
							0	0	

2019-2016

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	
01:00	-	-	-	-	-	-	-	-	-	
02:00	-	-	-	-	-	-	-	-	-	
03:00	-	-	-	-	-	-	-	-	-	
04:00	-	-	-	-	-	-	-	-	-	
05:00	-	-	-	-	-	-	-	-	-	
06:00	-	-	-	-	-	-	-	-	-	
07:00	-	-	-	-141	-	-	-	-123	225	-141
08:00	-	-	-	-137	-	-	-	-74	254	-137
09:00	-	-	-	-83	-	-	-	-78	80	-83
10:00	-	-	-	-	-	-	-	-	-	
11:00	-	-	-	61	-	-	-	26	-49	61
12:00	-	-	-	23	-	-	-	61	-5	23
13:00	-	-	-	-	-	-	-	-	-	
14:00	-	-	-	-	-	-	-	-	-	
15:00	-	-	-	-	-	-	-	-	-	
16:00	-	-	-	11	-	-	-	39	65	11
17:00	-	-	-	41	-	-	-	45	139	41
18:00	-	-	-	-43	-	-	-	-5	75	-43
0.791667	-	-	-	-	-	-	-	-	-	
20:00	-	-	-	-	-	-	-	-	-	
21:00	-	-	-	-	-	-	-	-	-	
22:00	-	-	-	-	-	-	-	-	-	
23:00	-	-	-	-	-	-	-	-	-	

2016/2019

5-Day Av	7-Day Av	Mon-Thu
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
-	-	
1.09	0.84	1.11
1.05	0.84	1.07
1.07	0.93	1.10
-	-	
0.97	1.06	0.98
0.93	1.01	0.94
-	-	
-	-	
-	-	
0.96	0.93	0.97
0.96	0.88	0.99
1.00	0.93	1.01
-	-	
-	-	
-	-	
-	-	
-	-	

SUMMARY OF COMPARISON

Direction 1	2019-2016	SITE 2 AND ATC 14			SITE 200 AND ATC 15			SITE 132 AND ATC 23			SITE 35 AND ATC 13			SITE 63 AND M5			SITE 65 AND M4			SITE 90 AND M6			SITE 111 AND 2WLC 4			SITE 135 AND M2			SITE 133 AND M1			AVERAGE		
	Time Begin	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu
	00:00	1.44	1.29	1.31	1.00	0.97	0.95	0.61	0.51	0.66	1.06	0.99	0.79	-	-	-	-	-	0.00	-	-	0.00	1.37	1.26	1.50	-	-	0.00	-	-	0.00	1.10	1.00	0.58
	01:00	0.79	0.94	0.60	0.91	1.00	0.85	0.77	0.70	0.79	1.05	0.93	0.71	-	-	-	-	-	0.00	-	-	0.00	1.37	1.20	1.19	-	-	0.00	-	-	0.00	0.98	0.96	0.46
	02:00	0.57	0.60	0.34	0.71	0.75	0.67	1.40	0.97	1.51	2.29	1.39	1.33	-	-	-	-	-	0.00	-	-	0.00	2.11	1.61	1.87	-	-	0.00	-	-	0.00	1.42	1.06	0.64
	03:00	0.54	0.57	0.36	1.14	1.05	1.06	2.50	1.96	2.54	1.64	1.42	0.96	-	-	-	-	-	0.00	-	-	0.00	1.98	1.54	1.72	-	-	0.00	-	-	0.00	1.56	1.31	0.74
	04:00	0.61	0.54	0.70	0.66	0.62	0.63	4.27	3.85	4.13	1.61	1.45	1.04	-	-	-	-	-	0.00	-	-	0.00	1.36	1.42	1.11	-	-	0.00	-	-	0.00	1.70	1.58	0.84
	05:00	1.01	1.00	0.93	0.83	0.83	0.81	2.19	2.16	2.24	1.73	1.55	1.13	-	-	-	-	-	0.00	-	-	0.00	1.63	1.58	1.29	-	-	0.00	-	-	0.00	1.48	1.42	0.71
	06:00	1.04	1.02	1.04	0.93	0.91	0.93	1.94	1.87	1.93	1.39	1.25	0.92	-	-	-	-	-	0.00	-	-	0.00	1.23	1.22	0.99	-	-	0.00	-	-	0.00	1.31	1.25	0.65
	07:00	1.11	1.09	1.11	1.06	1.03	1.06	1.08	1.12	1.08	1.48	1.37	1.01	1.02	0.80	1.02	0.83	0.63	0.83	0.96	0.75	0.93	0.84	0.89	0.84	0.92	0.72	0.93	1.02	0.82	1.02	1.03	0.92	0.98
	08:00	1.15	1.12	1.15	1.18	1.14	1.21	0.80	0.90	0.78	1.35	1.28	1.29	1.19	0.94	1.19	0.89	0.68	0.89	1.01	0.80	1.01	0.97	0.98	0.95	0.85	0.69	0.84	0.70	0.66	0.69	1.01	0.92	1.00
	09:00	0.96	0.94	0.96	0.95	0.98	0.96	0.82	0.88	0.82	1.15	1.09	1.53	1.07	0.95	1.09	0.82	0.72	0.83	0.89	0.82	0.89	1.13	1.09	1.13	1.15	1.02	1.16	0.94	0.89	0.94	0.99	0.94	1.03
	10:00	0.93	0.91	0.92	0.97	0.95	0.96	1.10	1.05	1.08	1.55	1.33	1.36	-	-	-	-	-	0.00	-	-	0.00	0.95	0.97	0.93	-	-	0.00	-	-	0.00	1.10	1.04	0.58
	11:00	0.96	0.95	0.96	0.98	0.97	0.98	1.11	1.06	1.12	0.82	0.87	0.63	1.03	1.02	1.01	1.01	0.98	1.00	0.95	0.93	0.95	0.98	0.98	1.00	1.10	1.11	1.06	1.02	1.05	0.99	1.00	0.99	0.97
	12:00	0.99	0.96	1.03	1.02	1.01	1.01	1.05	1.02	1.06	0.86	0.89	0.67	1.03	1.03	1.01	0.95	0.93	0.95	1.00	0.93	0.97	1.01	1.03	1.03	1.06	1.08	1.05	1.08	1.11	1.05	1.01	1.00	0.98
	13:00	0.99	0.98	1.02	0.96	0.95	0.98	1.21	1.10	1.20	0.88	0.90	0.66	-	-	-	-	-	0.00	-	-	0.00	1.03	1.03	1.04	-	-	0.00	-	-	0.00	1.01	0.99	0.54
	14:00	0.93	0.94	0.92	1.01	1.02	1.00	1.22	1.16	1.21	0.90	0.91	0.91	-	-	-	-	-	0.00	-	-	0.00	0.91	0.93	0.89	-	-	0.00	-	-	0.00	0.99	0.99	0.55
	15:00	0.97	0.98	0.98	1.03	1.02	1.03	1.47	1.39	1.51	0.90	0.91	1.83	-	-	-	-	-	0.00	-	-	0.00	0.94	0.94	0.91	-	-	0.00	-	-	0.00	1.06	1.05	0.70
	16:00	0.84	0.89	0.84	0.94	0.96	0.95	1.08	1.07	1.08	0.90	0.91	1.67	0.97	0.84	0.96	1.10	0.95	1.07	0.91	0.78	0.89	0.78	0.82	0.76	0.59	0.60	0.56	0.76	0.81	0.82	0.89	0.86	0.96
	17:00	1.03	1.04	1.02	1.02	1.03	1.03	0.75	0.75	0.77	0.92	0.93	1.14	0.99	0.84	1.00	1.36	1.15	1.36	0.89	0.75	0.89	0.88	0.90	0.87	0.59	0.58	0.59	0.67	0.76	0.70	0.91	0.87	0.94
	18:00	1.03	1.05	1.04	0.98	1.00	0.99	0.57	0.59	0.56	0.99	0.98	0.82	1.02	0.87	1.04	1.08	0.93	1.08	1.07	0.90	1.09	1.04	1.03	1.02	0.88	0.80	0.91	0.92	0.91	0.89	0.96	0.91	0.94
	19:00	0.99	1.00	0.96	0.90	0.94	0.87	0.59	0.65	0.60	0.86	0.88	0.67	-	-	-	-	-	0.00	-	-	0.00	0.95	0.97	0.95	-	-	0.00	-	-	0.00	0.86	0.89	0.45
	20:00	0.95	0.97	0.94	0.94	0.94	0.93	0.90	0.92	0.92	1.09	1.10	0.81	-	-	-	-	-	0.00	-	-	0.00	1.32	1.27	1.41	-	-	0.00	-	-	0.00	1.04	1.04	0.56
	21:00	1.02	1.03	1.02	0.86	0.87	0.85	0.73	0.76	0.73	1.90	1.56	1.70	-	-	-	-	-	0.00	-	-	0.00	1.15	1.10	1.26	-	-	0.00	-	-	0.00	1.13	1.07	0.62
	22:00	0.96	0.97	0.97	0.92	0.90	0.91	0.40	0.43	0.36	1.18	1.07	0.99	-	-	-	-	-	0.00	-	-	0.00	1.27	1.20	1.42	-	-	0.00	-	-	0.00	0.95	0.91	0.52
	23:00	0.89	0.91	0.95	0.92	0.98	0.91	0.44	0.46	0.43	0.82	0.80	4.76	-	-	-	-	-	0.00	-	-	0.00	1.42	1.23	1.71	-	-	0.00	-	-	0.00	0.90	0.88	0.97

Direction 2	2019-2016	2016/2019			2016/2019			2016/2019			2016/2019			2016/2019			2016/2019			2016/2019			2016/2019			2016/2019			2016/2019			AVERAGE		
	Time Begin	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu	5-Day Av	7-Day Av	Mon-Thu
	00:00	1.21	1.11	1.10	1.13	1.01	1.23	0.49	0.46	0.54	0.91	0.94	0.90	-	-	0.00	-	-	0.00	-	-	0.00	1.20	1.02	1.31	-	-	0.00	-	-	0.00	0.99	0.91	0.51
	01:00	1.02	0.91	0.83	1.03	1.01	0.86	0.63	0.62	0.54	1.04	0.96	0.85	-	-	0.00	-	-	0.00	-	-	0.00	2.03	1.47	1.80	-	-	0.00	-	-	0.00	1.15	0.99	0.49
	02:00	0.80	0.97	0.89	0.81	0.97	0.79	0.94	0.81	0.92	1.25	1.19	1.00	-	-	0.00	-	-	0.00	-	-	0.00	1.91	1.49	1.56	-	-	0.00	-	-	0.00	1.14	1.08	0.52
	03:00	0.80	0.92	0.67	0.50	0.69	0.44	1.40	1.29	1.41	0.82	0.81	0.68	-	-	0.00	-	-	0.00	-	-	0.00	1.52	1.40	1.20	-	-	0.00	-	-	0.00	1.01	1.02	0.44
	04:00	0.65	0.58	0.62	0.70	0.76	0.68	4.22	3.67	4.19	1.17	1.10	0.98	-	-	0.00	-	-	0.00	-	-	0.00	1.25	1.28	0.98	-	-	0.00	-	-	0.00	1.60	1.48	0.74
	05:00	0.95	0.96	0.94	0.91	0.92	0.94	3.00	2.95	3.11	1.33	1.30	1.08	-	-	0.00	-	-	0.00	-	-	0.00	1.34	1.30	1.05	-	-	0.00	-	-	0.00	1.50	1.49	0.71
	06:00	0.98	0.99	0.99	0.90	0.93	0.91	2.31	2.26	2.27	1.09	1.08	0.90	-	-	0.00	-	-	0.00	-	-	0.00	1.15	1.12	0.94	-	-	0.00	-	-	0.00	1.29	1.28	0.60
	07:00	0.88	0.88	0.88	0.92	0.92	0.93	0.99	1.03	0.98	1.21	1.19	0.97	0.97	0.75	0.98	0.78	0.59	0.80	0.87	0.66	0.88	0.86	0.91	0.87	0.00	0.00	0.00	1.09	0.84	1.11	0.95	0.86	0.84
	08:00	1.05	1.03	1.04	1.13	1.08	1.16	0.72	0.79	0.69	1.00	1.02	0.99	1.06	0.85	1.07	0.92	0.71	0.91	1.05	0.79	1.06	1.02	1.02	0.98	0.00	0.00	0.00	1.05	0.84	1.07	1.00	0.90	0.90
	09:00	1.04	1.02	1.03	0.96	0.95	0.95	0.76	0.85	0.74	1.14	1.10	1.17	1.25	1.10	1.26	0.95	0.83	0.97	0.98	0.82	1.00	1.00	1.01	1.00	0.00	0.00	0.00	1.07	0.93	1.10	1.02	0.96	0.92
	10:00	0.96	0.95	0.97	0.99	0.98	1.00	0.94	0.99	0.92	1.06	1.05	1.07	-	-	0.00	-	-	0.00	-	-	0.00	1.02	1.01	1.04	-	-	0.00	-	-	0.00	0.99	0.99	0.50
	11:00	0.95	0.95	0.94	0.98	0.99	0.99	1.04	1.03	1.05	1.02	1.04	1.02	1.06	1.10	1.05	0.77	0.78	0.76	0.78	0.82	0.76	0.94	0.94	0.91	0.00	0.00	0.00	0.97	1.06	0.98	0.95	0.97	0.85
	12:00	0.96	0.99	0.97	0.98	1.00	0.97	1.04	1.03	1.05	1.04	1.05	1.03	1.09	1.11	1.07	0.78	0.76	0.77	0.88	0.86	0.85	1.01	0.98	1.02	0.00	0.00	0.00	0.93	1.01	0.94	0.97	0.98	0.87
	13:00	1.00	0.99	1.01	1.01	1.02	1.03	1.08	1.06	1.09	1.10	1.10	1.10	-	-	0.00	-	-	0.00	-	-	0.00	1.09	1.05	1.10	-	-	0.00	-	-	0.00	1.06	1.04	0.53
	14:00	0.94	0.96	0.95	1.00	0.99	1.01	1.08	1.01	1.08	1.01	1.04	1.01	-	-	0.00	-	-	0.00	-	-	0.00	1.09	1.07	1.09	-	-	0.00	-	-	0.00	1.02	1.02	0.51
	15:00	1.01	0.98	0.99	1.00	0.99	1.00	1.19	1.14	1.21	1.10	1.15	1.10	-	-	0.00	-	-	0.00	-	-	0.00	1.03	1.04	1.04	-	-	0.00	-	-	0.00	1.07	1.06	0.53
	16:00	1.10	1.07	1.10	1.05	1.03	1.04	1.18	1.13	1.19	1.02	1.05	1.03	1.06	0.93	1.05	0.89	0.75	0.86	0.92	0.81	0.91	1.28	1.28	1.32	0.00	0.00	0.00	0.96	0.93	0.97	1.05	1.00	0.95
	17:00	1.04	1.05	1.04	1.06	1.06	1.04	0.77	0.79	0.76	1.09	1.09	1.10	1.01	0.86	1.02	1.14	0.90	1.16	0.97	0.82	1.00	1.07	1.08	1.07	0.00	0.00	0.00	0.96	0.88	0.99	1.01	0.95	0.92
	18:00	1.06	1.07	1.03	1.03	1.04	1.02	0.65	0.70	0.64	1.09	1.08	1.10	1.12	0.96	1.11	0.90	0.76	0.89	0.95	0.83	0.95	1.11	1.10	1.09	0.00	0.00	0.00	1.00	0.93	1.01	0.99	0.94	0.89
	19:00	0.99	1.04	0.94	0.92	0.96	0.89	0.59	0.64	0.60	1.05	1.03	1.08	-	-	0.00	-	-	0.00	-	-	0.00	1.02	1.04	1.04	-	-	0.00	-	-	0.00	0.91	0.94	0.45
	20:00	1.03	1.02	1.04	0.93	0.93	0.94	0.84	0.85	0.82	1.26	1.23	1.25	-	-	0.00	-	-	0.00	-	-	0.00	1.55	1.42	1.62	-	-	0.00	-	-	0.00	1.12	1.09	0.57
	21:00	1.03	1.00	1.06	0.87	0.89	0.88	0.69	0.70	0.68	0.98	0.96	1.00	-	-	0.00	-	-	0.00	-	-	0.00	1.51	1.34	1.67	-	-	0.00	-	-	0.00	1.02	0.98	0.53
	22:00	1.06	1.07	1.10	0.86	0.88	0.88	0.46	0.50	0.41	0.92	0.86	0.91	-	-	0.00	-	-	0.00	-	-	0.00	1.89	1.70	2.10	-	-	0.00	-	-	0.00	1.04	1.00	0.54
	23:00	0.91	0.89	0.88	1.03	0.99	0.98	0.47	0.49	0.44	0.87	0.87	0.89	-	-	0.00	-	-	0.00	-	-	0.00	1.78	1.53	2.14	-	-	0.00	-	-	0.00	1.01	0.95	0.53

2WAY ANALYSIS

Time Begin	SITE 2 AND ATC 14 5-Day Av	7-Day Av	Mon-Thu	SITE 200 AND ATC 15 5-Day Av	7-Day Av	Mon-Thu	SITE 132 AND ATC 23 5-Day Av	7-Day Av	Mon-Thu	SITE 35 AND ATC 13 5-Day Av	7-Day Av	Mon-Thu
00:00	1.34	1.21	1.22	1.06	0.99	1.08	0.55	0.49	0.60	0.98	0.97	0.84
01:00	0.88	0.92	0.70	0.97	1.01	0.85	0.70	0.66	0.66	1.05	0.94	0.78
02:00	0.69	0.78	0.63	0.76	0.85	0.73	1.14	0.89	1.17	1.74	1.30	1.15
03:00	0.69	0.76	0.53	0.73	0.83	0.65	1.89	1.60	1.92	1.18	1.09	0.80
04:00	0.64	0.56	0.64	0.68	0.69	0.65	4.25	3.77	4.16	1.41	1.29	1.01
05:00	0.97	0.97	0.94	0.87	0.88	0.88	2.56	2.52	2.64	1.53	1.43	1.10
06:00	1.00	1.00	1.01	0.92	0.92	0.92	2.16	2.09	2.13	1.21	1.15	0.91
07:00	0.93	0.93	0.93	0.98	0.96	0.98	1.02	1.06	1.02	1.32	1.26	0.98
08:00	1.08	1.06	1.07	1.16	1.11	1.19	0.75	0.83	0.73	1.15	1.13	1.12
09:00	1.01	0.99	1.00	0.96	0.96	0.96	0.78	0.86	0.77	1.14	1.10	1.32
10:00	0.95	0.93	0.95	0.98	0.96	0.98	1.01	1.02	0.99	1.29	1.18	1.20
11:00	0.95	0.95	0.95	0.98	0.98	0.98	1.07	1.05	1.09	0.92	0.96	0.83
12:00	0.98	0.98	1.00	1.00	1.01	0.99	1.04	1.02	1.05	0.94	0.97	0.84
13:00	0.99	0.98	1.02	0.99	0.98	1.00	1.15	1.08	1.15	0.98	0.99	0.86
14:00	0.93	0.95	0.93	1.00	1.01	1.00	1.16	1.10	1.15	0.94	0.97	0.95
15:00	0.99	0.98	0.98	1.02	1.01	1.01	1.35	1.28	1.38	0.98	1.01	1.52
16:00	0.93	0.96	0.93	0.99	0.99	0.99	1.12	1.09	1.12	0.94	0.96	1.45
17:00	1.04	1.04	1.03	1.04	1.04	1.04	0.76	0.76	0.76	0.98	0.99	1.12
18:00	1.05	1.06	1.04	1.00	1.02	1.00	0.60	0.64	0.59	1.03	1.02	0.93
19:00	0.99	1.02	0.95	0.91	0.95	0.88	0.59	0.64	0.60	0.94	0.94	0.83
20:00	0.98	0.99	0.99	0.93	0.93	0.93	0.87	0.89	0.88	1.16	1.16	1.00
21:00	1.02	1.02	1.04	0.87	0.88	0.86	0.71	0.73	0.71	1.51	1.30	1.41
22:00	1.00	1.01	1.03	0.89	0.89	0.90	0.43	0.46	0.38	1.06	0.97	0.95
23:00	0.90	0.90	0.92	0.97	0.98	0.94	0.45	0.48	0.44	0.84	0.83	3.04

Time Begin	SITE 63 AND M5 5-Day Av	7-Day Av	Mon-Thu	SITE 65 AND M4 5-Day Av	7-Day Av	Mon-Thu	SITE 90 AND M6 5-Day Av	7-Day Av	Mon-Thu	SITE 111 AND 2WLC 4 5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	-	-	-	1.27	1.12	1.39
01:00	-	-	-	-	-	-	-	-	-	1.70	1.34	1.50
02:00	-	-	-	-	-	-	-	-	-	2.00	1.54	1.70
03:00	-	-	-	-	-	-	-	-	-	1.72	1.46	1.43
04:00	-	-	-	-	-	-	-	-	-	1.30	1.34	1.04
05:00	-	-	-	-	-	-	-	-	-	1.50	1.45	1.18
06:00	-	-	-	-	-	-	-	-	-	1.20	1.18	0.97
07:00	0.99	0.77	1.00	0.80	0.61	0.81	0.90	0.68	0.89	0.85	0.90	0.85
08:00	1.12	0.89	1.13	0.91	0.70	0.90	1.04	0.79	1.04	1.00	1.00	0.97
09:00	1.16	1.03	1.18	0.89	0.78	0.91	0.95	0.82	0.97	1.07	1.05	1.07
10:00	-	-	-	-	-	-	-	-	-	0.98	0.99	0.98
11:00	1.04	1.06	1.03	0.87	0.86	0.86	0.86	0.87	0.84	0.96	0.96	0.95
12:00	1.06	1.07	1.04	0.85	0.83	0.85	0.94	0.90	0.91	1.01	1.00	1.02
13:00	-	-	-	-	-	-	-	-	-	1.06	1.04	1.07
14:00	-	-	-	-	-	-	-	-	-	1.00	1.01	1.00
15:00	-	-	-	-	-	-	-	-	-	0.99	0.99	0.98
16:00	1.01	0.88	1.00	0.99	0.84	0.96	0.91	0.80	0.89	1.02	1.05	1.03
17:00	1.00	0.84	1.01	1.22	1.00	1.24	0.93	0.78	0.94	0.97	0.98	0.96
18:00	1.06	0.91	1.07	0.97	0.83	0.97	1.01	0.86	1.02	1.08	1.07	1.06
19:00	-	-	-	-	-	-	-	-	-	0.99	1.01	1.00
20:00	-	-	-	-	-	-	-	-	-	1.45	1.35	1.52
21:00	-	-	-	-	-	-	-	-	-	1.34	1.23	1.48
22:00	-	-	-	-	-	-	-	-	-	1.64	1.50	1.83
23:00	-	-	-	-	-	-	-	-	-	1.62	1.40	1.95

Time Begin	SITE 135 AND M2 5-Day Av	7-Day Av	Mon-Thu	SITE 133 AND M1 5-Day Av	7-Day Av	Mon-Thu	AVERAGE 5-Day Av	7-Day Av	Mon-Thu
00:00	-	-	-	-	-	-	1.041	0.954	0.855
01:00	-	-	-	-	-	-	1.060	0.974	0.749
02:00	-	-	-	-	-	-	1.266	1.072	0.897
03:00	-	-	-	-	-	-	1.240	1.149	0.887
04:00	-	-	-	-	-	-	1.655	1.530	1.250
05:00	-	-	-	-	-	-	1.487	1.451	1.124
06:00	-	-	-	-	-	-	1.298	1.268	0.989
07:00	0.34	0.27	0.35	1.06	0.83	1.08	0.978	0.874	0.947
08:00	0.26	0.21	0.26	0.94	0.78	0.95	0.999	0.898	0.993
09:00	0.37	0.33	0.38	1.02	0.92	1.04	1.014	0.953	1.038
10:00	-	-	-	-	-	-	1.043	1.016	0.850
11:00	0.48	0.48	0.46	0.99	1.05	0.98	0.975	0.984	0.958
12:00	0.53	0.54	0.53	1.00	1.05	0.99	0.988	0.989	0.973
13:00	-	-	-	-	-	-	1.033	1.015	0.850
14:00	-	-	-	-	-	-	1.008	1.005	0.839
15:00	-	-	-	-	-	-	1.065	1.053	0.980
16:00	0.39	0.40	0.37	0.85	0.86	0.89	0.936	0.904	0.982
17:00	0.39	0.38	0.39	0.82	0.82	0.85	0.935	0.885	0.954
18:00	0.50	0.45	0.52	0.97	0.92	0.96	0.966	0.912	0.956
19:00	-	-	-	-	-	-	0.884	0.911	0.710
20:00	-	-	-	-	-	-	1.079	1.064	0.886
21:00	-	-	-	-	-	-	1.091	1.032	0.915
22:00	-	-	-	-	-	-	1.004	0.966	0.848
23:00	-	-	-	-	-	-	0.957	0.918	1.213

no westbound direction, the eastbound flows (Dir 1) is used in the average

		Average 5-Day Av	7-Day Av	Mon-Thu
AM Period	07:00 - 10:00	0.997	0.908	0.993
Inter Period	11:00 - 13:00	0.981	0.987	0.966
PM period	16:00 - 19:00	0.946	0.900	0.964

MKMMM

		Average 5-Day Av	7-Day Av	Mon-Thu
AM Peak Hr	08:00 - 09:00	0.999	0.898	0.993
Avg IP hour	(10:00-16:00)	1.020	1.010	1.027
PM Peak Hr	17:00 - 18:00	0.935	0.885	0.954
				0.67%
				-2.72%
				4.59%

Only surveys that contain data for whole period used

Sites with full data only (IP 10:00 - 16:00)

Time Begin	AVERAGE 5-Day Av	7-Day Av	Mon-Thu
00:00			
01:00			
02:00			
03:00			
04:00			
05:00			
06:00			
07:00			
08:00			
09:00			
10:00	1.043	1.016	1.019
11:00	0.978	0.980	0.959
12:00	0.994	0.994	0.981
13:00	1.033	1.015	1.020
14:00	1.008	1.005	1.007
15:00	1.065	1.053	1.176
16:00			
17:00			
18:00			
19:00			
20:00			
21:00			
22:00			
23:00			

2019 Raw Survey Data

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
00:00	16	14	16	21	37	38	47	41	9	14	14	19	21	20
00:15	19	9	14	14	33	31	45	46	12	7	15	13	15	15
00:30	11	12	15	13	31	22	27	41	12	13	7	11	12	12
00:45	9	8	14	12	25	23	26	37	6	12	16	8	11	16
01:00	4	7	12	5	23	16	17	28	7	10	6	19	5	12
01:15	12	6	8	6	17	18	19	29	6	8	11	9	15	7
01:30	10	9	15	6	24	14	22	22	10	10	12	13	7	15
01:45	7	9	10	9	13	17	21	13	11	3	10	16	16	5
02:00	7	4	12	6	17	5	23	12	8	10	3	5	3	7
02:15	4	5	3	11	17	10	12	14	12	4	5	11	8	4
02:30	4	5	8	10	12	12	11	7	6	3	4	11	2	9
02:45	4	11	10	8	13	7	9	10	5	5	12	14	5	12
03:00	6	12	7	8	8	15	11	7	5	7	6	8	5	11
03:15	9	7	13	8	5	15	9	10	10	2	5	12	11	9
03:30	10	14	5	12	8	6	9	9	7	10	5	10	12	9
03:45	4	9	8	12	12	10	18	12	11	4	6	15	11	14
04:00	7	5	15	12	10	18	13	8	9	10	14	10	10	16
04:15	8	12	11	7	11	5	10	12	26	4	15	15	12	21
04:30	23	15	16	18	13	7	11	9	17	12	20	18	15	15
04:45	30	22	20	16	19	11	5	13	22	18	23	14	29	14
05:00	38	19	36	21	24	10	9	3	33	29	45	29	32	29
05:15	47	42	61	56	20	23	0	0	47	47	37	48	59	53
05:30	90	76	83	69	38	29	11	6	87	65	80	59	68	63
05:45	89	83	79	82	38	32	21	20	84	73	95	88	95	73
06:00	98	99	98	103	43	37	22	28	83	107	86	97	110	105
06:15	126	156	103	103	53	53	36	26	117	130	109	159	148	139
06:30	134	203	141	197	55	52	61	27	136	223	167	209	138	200
06:45	176	295	176	260	75	56	41	29	155	305	175	303	176	328
07:00	191	342	196	276	73	59	46	36	218	313	215	351	200	354
07:15	277	446	240	410	72	68	38	48	253	440	242	458	267	479
07:30	270	581	229	530	87	103	53	57	266	566	260	563	247	554
07:45	255	451	267	541	90	103	46	50	252	507	248	506	221	472
08:00	237	459	230	393	96	126	62	64	226	452	241	472	227	413
08:15	249	429	231	391	138	148	69	54	230	447	241	472	280	467
08:30	248	374	165	225	149	186	49	86	218	431	230	468	238	374
08:45	227	350	249	339	176	195	82	99	215	318	232	377	235	335
09:00	229	291	246	313	152	173	94	99	196	314	242	280	214	267
09:15	198	276	209	254	206	194	99	134	210	302	237	313	196	308
09:30	186	261	187	290	208	212	98	139	155	243	153	270	171	280
09:45	178	223	171	237	219	231	149	169	154	245	167	237	165	254
10:00	171	215	172	208	225	199	139	148	149	188	149	191	151	195
10:15	160	206	175	189	219	222	153	245	163	193	173	189	175	213
10:30	160	190	167	202	219	201	164	196	211	198	145	172	162	231
10:45	169	195	185	176	247	238	185	200	159	181	158	192	173	196
11:00	171	200	203	189	248	254	189	242	153	185	164	186	178	185
11:15	203	229	203	193	257	209	182	211	160	180	160	178	192	183
11:30	188	175	193	209	243	250	195	172	178	175	192	177	156	177
11:45	196	183	210	194	242	254	188	202	193	167	183	155	197	184
12:00	192	203	235	201	245	234	196	178	193	204	204	212	178	190
12:15	189	178	233	208	245	223	195	206	180	186	198	183	191	172
12:30	192	202	228	218	235	235	217	177	201	195	191	188	195	185
12:45	200	170	253	197	218	200	212	206	203	154	192	170	195	176
13:00	200	198	237	219	244	216	208	178	192	197	203	209	216	163
13:15	208	186	255	203	251	199	230	193	182	189	201	171	212	196
13:30	217	202	220	220	250	210	196	207	195	164	202	192	212	203
13:45	228	173	237	189	197	188	221	165	188	127	188	182	197	178
14:00	241	197	237	213	209	220	191	175	215	184	250	179	227	176
14:15	223	181	224	208	204	165	208	187	202	179	215	191	242	210
14:30	245	193	255	198	217	183	180	174	247	189	243	202	257	196
14:45	253	199	268	233	201	171	185	180	271	194	236	177	242	178
15:00	274	239	256	219	198	157	192	142	218	177	246	199	227	187
15:15	285	225	312	179	197	186	182	129	273	197	298	188	268	180
15:30	277	211	329	247	192	191	181	125	288	184	277	232	293	187
15:45	296	198	329	239	178	158	170	172	283	198	291	240	318	231
16:00	421	232	376	279	193	166	206	140	340	220	336	209	360	221
16:15	410	252	377	239	176	160	193	153	416	214	404	236	422	236
16:30	431	300	388	277	181	170	167	162	429	283	423	302	392	261
16:45	435	271	418	271	181	151	164	145	372	258	390	280	420	299
17:00	440	277	408	252	169	134	204	132	451	265	450	311	428	290
17:15	452	280	415	273	198	169	221	125	396	287	443	289	413	297
17:30	463	327	357	312	166	150	176	134	402	298	433	284	408	312
17:45	422	327	367	260	149	147	129	131	381	271	380	317	440	271
18:00	335	238	327	232	193	128	156	131	394	237	373	233	433	259
18:15	325	200	269	212	142	124	138	125	301	222	332	227	418	220
18:30	259	194	269	177	152	126	112	132	241	201	274	201	349	214
18:45	225	184	244	195	129	121	122	148	196	160	224	182	267	186
19:00	217	153	207	156	117	117	114	113	206	148	231	140	220	155
19:15	205	135	216	183	136	99	120	100	175	130	247	150	213	150
19:30	171	118	179	157	121	124	99	113	150	95	189	119	172	109
19:45	153	113	151	114	107	80	85	76	151	113	161	98	158	101
20:00	151	108	149	108	88	84	97	80	132	80	141	91	166	102
20:15	162	107	129	110	76	82	97	100	108	88	121	104	118	105
20:30	130	96	117	75	94	90	97	69	92	71	114	69	115	93
20:45	101	83	97	81	67	59	66	60	97	84	92	60	120	91
21:00	118	76	117	82	87	95	64	55	92	56	93	81	89	74
21:15	90	86	97	73	71	61	54	59	84	67	109	84	88	76
21:30	92	69	83	70	79	66	57	65	73	66	93	66	83	75
21:45	81	80	87	64	68	48	54	56	64	42	78	77	85	64
22:00	91	74	89	62	88	78	55	41	111	58	91	86	88	56
22:15	92	71	95	91	96	73	60	44	58	62	70	66	71	60
22:30	56	54	68	66	62	79	27	44	45	40	51	63	75	69
22:45	58	42	62	48	78	68	40	32	42	41	35	51	49	70
23:00	43	39	78	48	72	54	46	39	33	36	44	33	48	52
23:15	55	30	57	52	52	58	24	19	33	32	36	28	73	29
23:30	32	39	45	42	39	59	15	21	30	29	33	30	30	30
23:45	27	18	46	48	44	46	21	21	24	21	17	24	20	27

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
hourly	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
00:00	55	43	59	60	126	114	145	165	39	46	52	51	59	63
01:00	33	31	45	26	77	65	79	92	34	31	39	57	43	39
02:00	19	25	33	35	59	34	55	43	31	22	24	41	18	32
03:00	29	42	33	40	33	46	47	38	33	23	22	45	39	43
04:00	68	54	62	53	53	41	39	42	74	44	72	57	66	66
05:00	264	220	259	228	120	94	41	29	251	214	257	224	254	218
06:00	534	753	518	663	226	198	160	110	491	765	537	768	572	772
07:00	993	1820	932	1757	322	333	183	191	989	1826	965	1878	935	1859
08:00	961	1612	875	1348	559	655	262	303	889	1648	944	1789	980	1589
09:00	791	1051	813	1094	785	810	440	541	715	1104	799	1100	746	1109
10:00	660	806	699	775	910	860	641	789	682	760	625	744	661	835
11:00	758	787	809	785	990	967	754	827	684	707	699	696	723	729
12:00	773	753	949	824	943	892	820	767	777	739	785	753	759	723
13:00	853	759	949	831	942	813	855	743	757	677	794	754	837	740
14:00	962	770	984	852	831	739	764	716	935	746	944	749	968	760
15:00	1132	873	1226	884	765	692	725	568	1062	756	1112	859	1106	785
16:00	1697	1055	1559	1066	731	647	730	600	1557	975	1553	1027	1594	1017
17:00	1777	1211	1547	1097	682	600	730	522	1630	1121	1706	1201	1689	1170
18:00	1144	816	1109	816	616	499	528	536	1132	820	1203	843	1467	879
19:00	746	519	753	610	481	420	418	402	682	486	828	507	763	515
20:00	381	311	384	289	305	270	229	235	313	231	373	308	345	289
21:00	381	311	384	289	305	270	229	235	313	231	373	308	345	289
22:00	297	241	314	267	324	298	182	161	256	201	247	266	283	255
23:00	157	126	226	190	207	217	106	100	120	118	130	115	171	138

	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
00:00	14	14	17	22	21	25	20	10	18	28	43	38	45	27
00:15	15	6	16	18	15	22	13	7	11	12	31	24	35	46
00:30	11	10	7	10	11	10	11	14	13	7	22	17	29	31
00:45	7	10	17	8	10	16	9	8	13	8	23	18	26	33
01:00	2	9	6	12	8	11	4	8	12	3	23	22	24	28
01:15	9	6	12	11	10	7	14	4	0	0	21	16	20	23
01:30	9	9	13	12	6	13	9	12	0	0	22	18	29	24
01:45	13	6	8	13	16	6	7	7	0	0	18	11	19	16
02:00	8	7	7	6	6	6	5	6	0	0	15	7	25	12
02:15	9	9	3	8	6	3	3	3	0	0	14	9	15	14
02:30	7	2	3	12	3	7	4	5	0	0	12	12	7	7
02:45	4	3	10	10	6	9	4	4	0	0	14	5	12	11
03:00	7	7	5	9	4	8	5	7	0	0	11	13	10	6
03:15	6	1	3	6	12	10	8	10	0	0	7	13	9	12
03:30	6	11	5	15	9	10	6	13	0	0	7	8	9	8
03:45	11	7	9	15	16	14	4	9	0	0	8	9	13	5
04:00	11	6	15	15	6	11	7	5	0	0	9	12	8	6
04:15	18	3	12	14	12	18	10	9	0	0	10	7	7	7
04:30	18	10	19	18	14	15	18	12	0	0	8	8	11	12
04:45	20	15	24	11	29	15	24	24	0	0	18	12	5	15
05:00	32	30	32	25	29	31	35	22	0	0	16	11	16	11
05:15	40	42	34	50	43	53	44	38	0	0	17	20	12	7
05:30	65	58	57	55	56	53	65	65	0	0	38	23	21	14
05:45	62	72	81	83	74	65	74	78	0	0	40	30	15	18
06:00	66	89	76	91	87	85	69	77	0	0	35	34	20	25
06:15	83	110	82	118	127	119	98	129	0	0	45	49	27	21
06:30	109	185	135	171	118	174	109	167	0	0	41	48	56	22
06:45	133	252	151	239	135	255	133	239	0	0	53	53	31	32
07:00	172	254	183	271	179	283	172	262	0	0	67	44	38	26
07:15	202	338	182	336	207	328	204	327	0	0	64	57	36	36
07:30	220	346	203	358	214	365	214	358	0	0	67	87	43	62
07:45	212	341	244	344	203	338	246	337	0	0	76	95	37	50
08:00	209	301	222	330	208	311	222	341	0	0	85	105	60	54
08:15	236	319	243	320	234	344	233	321	0	0	119	115	60	59
08:30	188	321	243	316	226	314	209	299	263	275	118	161	52	73
08:45	207	302	227	320	208	298	205	294	220	270	160	184	83	81
09:00	180	235	205	270	185	260	180	241	220	244	149	144	85	81
09:15	185	250	191	225	178	250	168	216	190	220	151	176	86	113
09:30	155	202	162	200	153	230	187	193	158	240	188	195	93	121
09:45	142	189	167	218	157	224	154	184	182	181	179	208	125	137
10:00	153	176	144	161	126	169	141	187	145	186	183	191	107	122
10:15	150	170	158	163	152	178	154	180	173	172	180	181	142	180
10:30	176	167	131	158	160	195	135	149	137	192	183	175	151	166
10:45	154	156	160	166	148	169	163	169	166	149	213	216	160	164
11:00	152	171	150	169	167	190	158	176	194	181	206	207	176	209
11:15	148	164	149	165	177	153	170	178	183	161	189	169	152	159
11:30	160	150	186	175	140	151	176	155	189	199	197	206	174	164
11:45	178	159	172	157	180	154	178	151	165	178	201	222	186	164
12:00	185	181	176	192	169	180	177	179	215	198	243	202	177	154
12:15	169	157	202	173	182	166	189	163	219	199	241	199	202	181
12:30	180	186	177	170	201	168	184	167	234	177	224	213	181	161
12:45	192	152	206	166	182	182	176	167	232	175	239	205	190	162
13:00	199	190	176	162	223	131	185	183	228	192	241	188	184	155
13:15	174	168	207	162	202	153	183	172	218	189	234	189	210	168
13:30	177	157	173	173	187	165	205	184	180	174	235	185	193	150
13:45	200	159	174	156	200	149	186	138	206	168	192	169	210	152
14:00	198	159	232	161	209	181	218	169	222	193	189	192	189	136
14:15	185	146	203	180	230	193	218	146	225	180	197	149	176	153
14:30	220	168	232	181	220	180	221	171	244	188	215	151	187	153
14:45	236	163	236	161	225	180	255	171	265	225	180	153	164	136
15:00	244	169	266	186	253	182	259	186	267	190	179	155	172	129
15:15	244	166	241	187	240	190	240	215	292	210	168	142	171	114
15:30	224	170	248	203	281	189	264	202	287	235	197	170	174	2
15:45	262	167	255	197	266	169	254	165	318	219	180	128	147	1
16:00	336	183	346	208	322	189	400	171	373	232	179	166	196	1
16:15	381	172	407	190	372	201	375	198	372	210	171	140	150	88
16:30	386	228	382	230	370	215	389	233	375	232	169	147	159	124
16:45	382	232	385	229	372	234	420	215	388	220	179	131	153	130
17:00	405	211	403	250	380	227	436	217	401	205	159	124	203	101
17:15	447	243	439	235	421	240	452	243	374	247	169	133	199	102
17:30	412	256	408	220	412	240	459	229	355	258	110	164	178	109
17:45	420	228	444	243	396	195	362	250	365	216	152	115	122	120
18:00	303	201	338	192	366	204	341	190	332	203	173	117	156	109
18:15	269	212	254	178	365	172	307	174	267	175	136	107	118	106
18:30	221	177	244	179	258	175	245	183	241	168	142	110	100	120
18:45	192	135	237	158	237	175	200	141	220	160	147	98	100	106
19:00	188	135	208	115	200	138	200	158	183	147	108	87	93	97
19:15	181	115	228	116	184	140	175	132	205	168	133	85	116	90
19:30	143	96	167	123	161	104	182	116	162	132	108	111	100	81
19:45	131	121	152	88	153	87	152	96	149	132	98	83	90	72
20:00	128	86	133	96	155	101	139	104	126	101	97	72	101	68
20:15	106	71	114	87	123	91	141	103	134	114	86	65	97	88
20:30	103	76	98	79	113	81	120	92	109	98	94	79	84	66
20:45	98	78	109	61	105	87	98	69	96	52	68	65	77	55
21:00	76	58	97	67	101	63	104	63	117	74	94	72	61	54
21:15	85	61	98	76	100	77	97	82	102	78	75	60	56	47
21:30	82	53	95	58	86	73	95	62	78	65	77	42	53	53
21:45	72	49	80	81	91	64	82	73	83	70	75	65	55	48
22:00	102	52	91	85	86	68	97	56	92	53	88	73	51	40
22:15	64	49	72	64	66	53	81	66	91	75	86	69	49	37
22:30	47	41	44	61	79	54	53	48	74	66	55	53	35	46
22:45	34	35	43	39	48	54	55	34	59	44	74	78	39	39
23:00	35	34	33	34	42	33	43	38	74	50	71	61	50	25
23:15	26	29	40	26	66	33	63	34	61	47	39	52	26	24
23:30	31	23	38	28	31	26	30	40	51	44	45	49	19	17
23:45	14	20	16	22	26	19	36	19	46	43	46	44	20	20

	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
hourly	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
00:00	47	40	57	58	57	73	53	39	55	55	119	97	135	137
01:00	33	30	39	48	40	37	34	31	12	3	84	67	92	91
02:00	28	21	23	36	21	25	16	18	0	0	55	33	59	44
03:00	30	26	22	45	41	42	23	39	0	0	33	43	41	31
04:00	67	34	70	58	61	59	59	50	0	0	45	39	31	40
05:00	199	202	204	213	202	202	218	203	0	0	111	84	64	50
06:00	391	636	444	619	467	633	409	612	0	0	174	184	134	100
07:00	806	1279	812	1309	803	1314	836	1284	0	0	274	283	154	174
08:00	840	1243	935	1286	876	1267	869	1255	483	545	482	565	255	267
09:00	662	876	725	913	673	964	689	834	750	885	667	723	389	452
10:00	633	669	593	648	586	711	593	685	621	699	759	763	560	632
11:00	638	644	657	666	664	648	682	660	731	719	793	804	688	696
12:00	726	676	761	701	734	696	726	676	900	749	947	819	750	658
13:00	750	674	730	653	812	598	759	677	832	723	902	731	797	625
14:00	839	636	903	683	884	734	912	657	956	786	781	645	716	578
15:00	974	672	1010	773	1040	730	1017	768	1164	854	724	595	664	246
16:00	1485	815	1520	857	1436	839	1584	817	1508	894	698	584	658	343
17:00	1684	938	1694	948	1609	902	1709	939	1495	926	590	536	702	432
18:00	985	725	1073	707	1226	726	1093	688	1060	706	598	432	474	441
19:00	643	467	755	442	698	469	709	502	699	579	447	366	399	340
20:00	315	221	370	282	378	277	378	280	380	287	321	239	225	202
21:00	315	221	370	282	378	277	378	280	380	287	321	239	225	202
22:00	247	177	250	249	279	229	286	204	316	238	303	273	174	162
23:00	106	106	127	110	165	111	172	131	232	184	201	206	115	86

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
	EB (Arm B exit)	WB (Arm B approach)	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	187	295												
07:15	196	338												
07:30	228	384												
07:45	205	408												
08:00	196	387												
08:15	189	395												
08:30	164	405												
08:45	186	405												
09:00	163	318												
09:15	172	288												
09:30	165	270												
09:45	172	304												
11:00	177	216												
11:15	161	221												
11:30	167	220												
11:45	167	213												
12:00	175	198												
12:15	185	228												
12:30	178	239												
12:45	193	252												
16:00	300	220												
16:15	275	229												
16:30	301	233												
16:45	292	256												
17:00	298	291												
17:15	267	283												
17:30	272	271												
17:45	189	301												
18:00	204	256												
18:15	231	262												
18:30	218	258												
18:45	201	261												

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
hourly	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	816	1425	0	0	0	0	0	0	0	0	0	0	0	0
08:00	735	1592	0	0	0	0	0	0	0	0	0	0	0	0
09:00	672	1180	0	0	0	0	0	0	0	0	0	0	0	0
11:00	672	870	0	0	0	0	0	0	0	0	0	0	0	0
12:00	731	917	0	0	0	0	0	0	0	0	0	0	0	0
16:00	1168	938	0	0	0	0	0	0	0	0	0	0	0	0
17:00	1026	1146	0	0	0	0	0	0	0	0	0	0	0	0
18:00	854	1037	0	0	0	0	0	0	0	0	0	0	0	0

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
	EB (B exit)	WB (B Approach	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	148	193												
07:15	184	226												
07:30	240	315												
07:45	248	406												
08:00	235	439												
08:15	205	473												
08:30	178	472												
08:45	169	451												
09:00	121	298												
09:15	149	274												
09:30	128	219												
09:45	98	198												
	0	0												
11:00	96	132												
11:15	100	162												
11:30	131	177												
11:45	134	147												
12:00	143	131												
12:15	153	155												
12:30	135	147												
12:45	144	137												
	0	0												
16:00	0	0												
16:15	0	0												
16:30	0	0												
16:45	0	0												
17:00	0	0												
17:15	0	0												
17:30	0	0												
17:45	0	0												
18:00	0	0												
18:15	0	0												
18:30	0	0												
18:45	0	0												

RESURVEY TUESDAY 08.10.2019

	EB (B exit)	WB (B Approach	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	121	218												
07:15	193	310												
07:30	245	407												
07:45	275	472												
08:00	256	476												
08:15	231	464												
08:30	210	524												
08:45	173	477												
09:00	147	340												
09:15	133	273												
09:30	110	221												
09:45	108	202												
11:00	114	160												
11:15	109	143												
11:30	115	163												
11:45	131	148												
12:00	137	141												
12:15	125	140												
12:30	149	144												
12:45	155	136												
16:00	346	173												
16:15	333	200												
16:30	376	195												
16:45	360	175												
17:00	394	201												
17:15	432	208												
17:30	345	186												
17:45	340	198												
18:00	299	206												
18:15	297	214												
18:30	199	165												
18:45	146	133												

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
hourly	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	820	1140	0	0	0	0	0	0	0	0	0	0	0	0
08:00	787	1835	0	0	0	0	0	0	0	0	0	0	0	0
09:00	496	989	0	0	0	0	0	0	0	0	0	0	0	0
11:00	461	618	0	0	0	0	0	0	0	0	0	0	0	0
12:00	575	570	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0

hourly	EB	WB
07:00	834	1407
08:00	870	1941
09:00	498	1036
11:00	469	614
12:00	566	561
16:00	1415	743
17:00	1511	793
18:00	941	718

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
	EB (B exit)	WB (B Approach)	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	54	129												
07:15	98	172												
07:30	134	216												
07:45	203	223												
08:00	172	239												
08:15	207	255												
08:30	196	257												
08:45	191	264												
09:00	128	158												
09:15	97	148												
09:30	94	135												
09:45	91	134												
11:00	73	115												
11:15	84	109												
11:30	89	128												
11:45	88	120												
12:00	97	160												
12:15	104	148												
12:30	108	124												
12:45	111	160												
16:00	123	179												
16:15	165	173												
16:30	153	191												
16:45	141	160												
17:00	130	231												
17:15	134	188												
17:30	132	198												
17:45	122	194												
18:00	120	172												
18:15	109	166												
18:30	111	129												
18:45	98	131												

hourly	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	489	740	0	0	0	0	0	0	0	0	0	0	0	0
08:00	766	1015	0	0	0	0	0	0	0	0	0	0	0	0
09:00	410	575	0	0	0	0	0	0	0	0	0	0	0	0
11:00	334	472	0	0	0	0	0	0	0	0	0	0	0	0
12:00	420	592	0	0	0	0	0	0	0	0	0	0	0	0
16:00	582	703	0	0	0	0	0	0	0	0	0	0	0	0
17:00	518	811	0	0	0	0	0	0	0	0	0	0	0	0
18:00	438	598	0	0	0	0	0	0	0	0	0	0	0	0

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
	EB (D approacl	WB (D Exit)	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	206	307												
07:15	273	367												
07:30	320	436												
07:45	384	429												
08:00	370	413												
08:15	354	428												
08:30	375	357												
08:45	339	381												
09:00	294	301												
09:15	236	272												
09:30	235	223												
09:45	190	235												
11:00	198	206												
11:15	214	216												
11:30	215	206												
11:45	204	196												
12:00	233	224												
12:15	259	213												
12:30	204	215												
12:45	250	222												
16:00	460	279												
16:15	442	262												
16:30	478	319												
16:45	473	334												
17:00	501	328												
17:15	522	350												
17:30	502	355												
17:45	429	346												
18:00	419	291												
18:15	378	249												
18:30	317	228												
18:45	265	208												

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
hourly	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	1183	1539	0	0	0	0	0	0	0	0	0	0	0	0
08:00	1438	1579	0	0	0	0	0	0	0	0	0	0	0	0
09:00	955	1031	0	0	0	0	0	0	0	0	0	0	0	0
11:00	831	824	0	0	0	0	0	0	0	0	0	0	0	0
12:00	946	874	0	0	0	0	0	0	0	0	0	0	0	0
16:00	1853	1194	0	0	0	0	0	0	0	0	0	0	0	0
17:00	1954	1379	0	0	0	0	0	0	0	0	0	0	0	0
18:00	1379	976	0	0	0	0	0	0	0	0	0	0	0	0

	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
	EB (E approach)	WB (C Exit)	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	50	139												
07:15	84	200												
07:30	100	269												
07:45	133	318												
08:00	103	346												
08:15	120	365												
08:30	97	367												
08:45	112	349												
09:00	92	200												
09:15	82	159												
09:30	73	135												
09:45	63	141												
11:00	69	87												
11:15	80	107												
11:30	102	123												
11:45	81	108												
12:00	117	115												
12:15	118	113												
12:30	103	108												
12:45	96	131												
16:00	183	123												
16:15	188	138												
16:30	191	142												
16:45	165	125												
17:00	185	161												
17:15	163	142												
17:30	156	154												
17:45	146	160												
18:00	139	125												
18:15	116	131												
18:30	116	110												
18:45	89	89												

hourly	THURSDAY 27TH JUNE		FRIDAY 28TH JUNE		SATURDAY 29TH JUNE		SUNDAY 30TH JUNE		MONDAY 1ST JULY		TUESDAY 2ND JULY		WEDNESDAY 3RD JULY	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
07:00	367	926	0	0	0	0	0	0	0	0	0	0	0	0
08:00	432	1427	0	0	0	0	0	0	0	0	0	0	0	0
09:00	310	635	0	0	0	0	0	0	0	0	0	0	0	0
11:00	332	425	0	0	0	0	0	0	0	0	0	0	0	0
12:00	434	467	0	0	0	0	0	0	0	0	0	0	0	0
16:00	727	528	0	0	0	0	0	0	0	0	0	0	0	0
17:00	650	617	0	0	0	0	0	0	0	0	0	0	0	0
18:00	460	455	0	0	0	0	0	0	0	0	0	0	0	0

	MONDAY 1ST		TUESDAY 2ND		WEDNESDAY 3RD		THURSDAY 27TH		FRIDAY 28TH		SATURDAY 29TH		SUNDAY 30TH	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
00:00	6	8	6	16	8	6	7	8	11	8	14	14	12	21
00:15	7	7	8	7	3	2	4	3	8	9	10	17	8	18
00:30	1	6	5	11	1	9	4	11	4	5	8	9	10	9
00:45	2	12	5	5	5	1	4	4	3	8	8	12	6	14
01:00	5	4	5	7	9	7	6	6	7	6	4	5	5	10
01:15	2	6	2	5	1	5	3	7	2	2	9	6	4	11
01:30	5	1	2	7	8	2	1	2	0	0	8	4	7	6
01:45	0	1	6	1	3	2	6	3	0	0	5	7	7	6
02:00	1	4	0	3	3	6	3	4	0	0	1	8	5	6
02:15	4	3	4	4	3	1	3	1	0	0	3	1	3	4
02:30	5	1	4	1	3	5	4	4	0	0	4	3	2	7
02:45	2	4	1	7	4	4	1	3	0	0	5	4	6	6
03:00	1	1	4	2	2	3	0	2	0	0	2	3	1	3
03:15	1	3	1	4	7	7	3	5	0	0	9	4	4	3
03:30	2	4	9	5	6	2	5	9	0	0	5	1	3	3
03:45	4	3	3	9	2	6	3	4	0	0	2	6	3	3
04:00	5	4	9	3	5	7	3	3	0	0	1	5	1	8
04:15	2	5	8	7	11	12	3	9	0	0	2	4	2	4
04:30	8	5	6	13	9	6	11	5	0	0	5	4	2	1
04:45	10	24	13	20	6	14	9	11	0	0	7	5	5	1
05:00	12	5	9	6	15	11	13	10	0	0	6	7	3	7
05:15	17	7	28	15	19	15	25	15	0	0	10	7	13	5
05:30	30	20	35	20	36	12	42	26	0	0	21	9	9	5
05:45	34	41	28	40	33	48	31	42	0	0	18	14	10	17
06:00	24	27	35	30	37	29	33	36	0	0	14	16	2	14
06:15	42	26	52	29	57	33	44	26	0	0	13	11	10	6
06:30	65	33	75	25	60	37	59	36	0	0	28	14	20	4
06:45	78	49	80	52	74	57	84	48	0	0	24	28	13	9
07:00	110	75	117	71	110	62	94	60	0	0	30	18	15	9
07:15	154	81	162	90	140	109	144	101	152	94	35	16	17	16
07:30	204	146	223	150	204	125	201	124	174	136	48	37	18	7
07:45	202	175	227	225	242	214	208	199	204	200	49	30	25	18
08:00	228	200	250	206	233	201	210	219	200	192	53	39	13	12
08:15	203	251	245	267	206	277	215	271	177	254	66	38	21	16
08:30	193	276	220	271	187	270	191	275	139	223	73	45	20	19
08:45	184	248	198	273	181	249	182	249	143	124	68	53	28	19
09:00	119	140	117	176	161	155	106	149	82	104	84	43	30	23
09:15	100	99	114	100	116	99	103	101	85	99	82	51	48	18
09:30	92	81	110	79	96	84	102	80	92	82	82	64	52	38
09:45	93	74	88	87	101	76	96	80	99	76	89	82	76	42
10:00	81	66	75	78	90	59	74	66	66	67	87	58	57	36
10:15	74	65	82	35	92	80	91	61	74	86	95	65	53	56
10:30	80	62	64	65	57	65	42	37	95	63	92	87	74	45
10:45	82	82	70	67	91	87	93	81	93	72	98	80	62	46
11:00	90	67	75	79	59	73	66	71	88	77	86	66	72	55
11:15	48	63	62	63	85	80	82	79	70	65	78	82	76	72
11:30	87	87	74	60	77	100	69	105	90	73	98	90	61	70
11:45	64	70	91	91	84	93	72	75	87	98	82	103	75	61
12:00	90	88	109	77	78	87	110	80	129	98	95	104	62	73
12:15	89	79	91	94	99	95	103	90	89	88	98	98	75	61
12:30	88	79	103	87	109	96	103	107	109	95	89	87	76	87
12:45	85	107	93	100	94	123	94	95	100	129	74	126	67	63
13:00	109	91	122	83	108	104	109	97	103	124	80	99	50	99
13:15	69	106	84	103	84	104	75	106	85	121	76	104	63	72
13:30	49	55	99	118	85	90	98	98	92	124	81	78	82	87
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14:00	105	80	96	111	96	111	110	114	107	113	86	88	84	73
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14:45	94	104	92	93	89	109	79	111	86	131	57	103	75	82
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16:00	146	127	138	139	155	110	139	138	135	140	63	79	54	83
16:15	120	128	110	119	128	135	132	130	157	145	66	67	38	69
16:30	165	133	173	150	143	171	171	140	147	135	58	63	46	56
16:45	121	129	147	148	145	113	127	134	159	136	70	74	40	53
17:00	213	170	233	181	245	168	206	158	204	153	60	81	48	45
17:15	167	164	206	162	198	168	181	146	146	116	70	63	37	59
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17:45	172	140	168	148	151	202	167	141	115	125	60	68	48	53
18:00	144	120	142	132	141	202	142	118	93	138	47	70	55	56
18:15	102	103	117	135	120	216	105	123	91	109	51	65	47	43
18:30	100	86	89	95	84	126	112	116	82	83	55	59	59	53
18:45	75	95	66	91	80	103	80	76	69	97	47	51	38	41
19:00	65	66	84	94	86	101	85	86	86	89	50	42	41	49
19:15	60	75	74	81	71	76	66	81	57	83	30	56	41	50
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21:45	27	31	20	29	25	33	25	44	28	31	29	32	9	34
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22:30	15	22	19	31	13	28	13	45	30	36	18	26	14	21
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23:15	9	18	8	20	12	21	14	17	22	24	16	19	7	9
23:30	12	12	12	14	8	7	5	5	17	21	17	15	8	9
23:45	8	12	4	5	12	14	8	6	12	23	18	18	7	9

	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
hourly	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
00:00	16	33	24	39	17	18	19	26	26	30	40	52	36	62
01:00	12	12	15	20	21	16	16	18	9	8	26	22	23	33
02:00	12	12	9	15	13	16	11	12	0	0	13	16	16	23
03:00	8	11	17	20	17	18	11	20	0	0	18	14	11	12
04:00	25	38	36	43	31	39	26	28	0	0	15	18	10	14
05:00	93	73	100	81	103	86	111	93	0	0	55	37	35	34
06:00	209	135	242	136	228	156	220	146	0	0	79	69	45	33
07:00	670	477	729	536	696	510	647	484	530	430	162	101	75	50
08:00	808	975	913	1017	807	997	798	1014	659	793	260	175	82	66
09:00	404	394	429	442	474	414	407	410	358	361	337	240	206	121
10:00	317	275	291	245	330	291	300	245	328	288	372	290	246	183
11:00	289	287	302	293	305	346	289	330	335	313	344	341	284	258
12:00	352	353	396	358	380	401	410	372	427	410	356	415	280	284
13:00	315	366	377	395	345	407	365	410	379	474	301	360	276	334
14:00	378	397	387	396	362	433	347	465	375	462	277	361	298	316
15:00	381	451	388	484	393	475	455	476	401	534	255	290	234	290
16:00	552	517	568	556	571	529	569	542	598	556	257	283	178	261
17:00	761	636	835	652	823	684	754	602	625	547	254	288	177	209
18:00	421	404	414	453	425	647	439	433	335	427	200	245	199	193
19:00	244	268	268	308	262	322	266	314	254	315	145	179	144	172
20:00	122	138	115	121	135	166	139	177	147	165	103	145	62	99
21:00	122	138	115	121	135	166	139	177	147	165	103	145	62	99
22:00	78	124	104	136	89	124	89	158	115	139	84	112	52	79
23:00	51	58	30	52	48	59	46	53	71	87	63	82	39	43

Appendix A.3

TTN3 – TRIP GENERATION

Berkeley St James

MILTON KEYNES EAST

Transport Technical Note 3 (TTN3): Trip Generation

TN3: TRIP GEN
JUNE 2020

INTERNAL

Berkeley St James

MILTON KEYNES EAST

Transport Technical Note 3 (TTN3): Trip Generation

TYPE OF DOCUMENT (VERSION) INTERNAL

PROJECT NO. 70057521

OUR REF. NO. TN3: TRIP GEN

DATE: JUNE 2020

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
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Signature				
Checked by	Alex Smith			
Signature				
Authorised by	Allan Norcutt			
Signature				
Project number	70057521			
Report number				
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1 INTRODUCTION

1.1 INTRODUCTION

1.1.1. 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 which is under their control to the northeast of Milton Keynes (‘Milton Keynes East Sustainable Urban Extension’ or MKE).

1.1.2. To assess the impact of MKE and the associated infrastructure sought to be delivered as part of the recent Housing Infrastructure Funding (HIF) bid, the Milton Keynes Multi-Modal Model (MKMMM) was used. The MKMMM is held by MKC and managed by AECOM (Milton Keynes Council’s consultants) on MKC’s behalf.

1.1.3. As part of the modelling required to support the forthcoming planning application now, updates to the MKMMM have been discussed with MKC and Highways England (HE) to assess the impact of the development on the surrounding highway network. A separate Technical Note: (TN1) Modelling Approach Note v2, set out the intentions to assess the scheme, alongside the likely modelling years and scenarios. The Modelling approach TN v2 was issued to MKC and HE in March 2019 (with minor updates re-issued in May 2019).

1.1.4. 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.

1.1.5. 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.”*

1.1.6. 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.

1.2 MILTON KEYNES EAST SUSTAINABLE URBAN EXTENSION

1.2.1. 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] *Please note: this a different team to MKCs incumbent modelling consultants AECOM*

1.2.2. 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.

1.2.3. MKE is strategically well 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.

1.2.4. 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.

1.2.5. The MKE site includes parcels which will be delivered by other parties (i.e. not Berkeley), including Bloor, Segro (Roxhill) and MKC. As discussed below, recent discussions with MKC officers and planners have highlighted the need to assess the wider allocation and extract the relative impacts from each land holding. This note sets out an approach proposed by Berkeley to test the wider allocation, 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.

1.3 MODELLING COMPLETED TO DATE

1.3.1. The MKMMM was used to assess the future growth aspirations for MKC – through their Plan:MK scheme. Additionally, the MKMMM was agreed by MKC to be suitable to assess other planned developments in the area, including that in the 'East of M1' area, also known as MKE. The proposed MKE development was assessed using the model as part of the Housing Infrastructure Fund (HIF) application process. This assessment focussed on the Local Plan horizon year of 2031 for the AM, PM and Inter-peak periods.

1.3.2. Several discussions between WSP and MKC took place in regard to the modelling scenarios supporting the HIF application and subsequently, any future planning application.

1.3.3. During the discussions, it was identified that the MKMMM strategic model utilises a set of trip rates that have been derived on a zone by zone basis. Whilst these trip rates are appropriate for a strategic assessment, it is considered beneficial to set out the alternative assumptions that can then be included in future sensitivity tests.

1.4 TECHNICAL NOTE PURPOSE

1.4.1. Whilst it was agreed between MKC and WSP for the HIF that the MKMMM would be used as a consistent basis for the HIF specific modelling runs, it was acknowledged that this would need to be refined for the purposes of a planning application(s) using bespoke trip rates, refined zoning and an additional future year to reflect full build-out of the development to ensure that the proposed infrastructure is adequate to accommodate the forecast demand associated with the proposals.

1.4.2. We are aware that the Milton Keynes South East (MKSE) site had similar discussions regarding alternative trip rates to be run within the MKMMM model. It is our understanding that the MKSE site were seeking to apply reductions for internalisation in the range of 20-30%. WSP have reviewed the information provided previously on the MKSE trip rates, albeit acknowledging that discussions between MKSE and MKC were on-going at the time. Even at a high level, a comparison of trip rates applied is considered useful within this note..

1.4.3. To explore the trip making potential of the proposed development two trip generation scenarios have been considered:

- The **'Traditional'** scenario which provides the resultant multi-modal trip generation based upon typical methodologies and standard sustainable transport initiatives both on and off-site to discourage private car usage. This includes accounting for trip internalisation based on the land uses proposed within the site.
- The **'Future Mobility'** scenario which takes the Traditional scenario and makes a series of assumptions about how the way people travel will change in the future based on trends and a series of interventions to provide a future mode share and trip generation.
  - This approach has been informed by a future mobility tool that includes evidenced trends that could be more representative of the future year scenarios than the 'traditional' approach. Importantly it provides a guide to what could be achievable with a subsequent task of bottom-up planning of mobility interventions to determine a practical target mode shift.

1.4.4. For the residential elements, the base trip rates used as the starting point in the trip generation assessment have been sourced from the TRICS trip generation database, an industry standard tool used to define trip making patterns based upon other similar sites across the UK. Journeys by purpose have been calculated using National Travel Survey data, and the resulting all mode trip generation has then been split down by mode using Census Travel to Work mode shares and NTS mode share data for education purposes.

1.4.5. The employment trips adopt a similar methodology, utilising TRICS multi-modal rates and modal shares to ascertain the likely trip generation for those elements. These are discussed in more detail within Section 3 of this TN.

1.4.6. The gross trip generation has then been supplemented by a series of assumptions to allow for consideration of modal shift anticipated as part of the wider strategies to encourage sustainable transport and internalisation associated with providing a mix of land uses on site.

1.4.7. The resulting trip generation has then been presented for the two scenarios identified. The 'Traditional' scenario results in the highest number of vehicular trips and reflects a proposal with some sustainable transport interventions, however does not apply a forward thinking approach. The 'Future Mobility' scenario establishes a series of ambitious targets to achieve travel by sustainable modes evidenced from research undertaken to inform strategic transport studies at national government level.

1.4.8. The 'Future Mobility' Scenario uses the 'Traditional' scenario as a baseline and applies WSP's bespoke Future Mobility tool to suggest likely changes in travel behaviour as a result of technology and emerging trends.

1.4.9. The application of these trends provides an indication of the potential uptake in alternative modes and strategies applied by new mobility providers across different future years. The numbers in this note and appendices are therefore indicative and will be taken further with the design of the site and inclusion of mobility measures for all modes of transport from the outset.

1.4.10. Therefore, in parallel to discussing the approach outlined in this note, WSP has approached mobility providers to understand the potential interest, uptake and applicability of certain measures specific to the MKE site. These discussions will provide confidence in the location-specific evidence-base for the uptake of the future mobility trends.

1.4.11. It is the intention that the MKE site will be assessed against an agreed single set of measures and resulting trip rates / generation for the application based on the work set out above rather than undertaking various iterations and scenarios of what may materialise.

1.4.12. Couple with this, is an intention that a high level of monitoring of the early phases of the development will then be undertaken through the Travel Plan process to monitor the effectiveness of those proposed measures. This will allow the first phases to adapt to trends at the time of occupation / completion and also allow MKC to review the measures being implemented. This can then also be used to feed back into preparation of material to support each Reserved Matters Application (RMA) as it comes forward which can be reflective of what has been delivered and realised on the ground and / or what further measures may need to be introduced in order to achieve the mode share.

1.4.13. Considering the above, this Technical Note (TN) is primarily focused on the assumptions derived by WSP for use on the MKE site. The TN covers the following:

- Current status and assumptions of the MKMMM;
- Future years, development assumptions and build out;
- MKE trip generation – Traditional methodology;
- MKE trip generation – Alternative methodology (Future Mobility); and
- Summary

1.5 PROGRAMME

1.5.1. It is important to set out the programme in the context of the proposed work set out in this note and the separate Technical Note 1: Modelling Approach Note v2. Following a successful application to receive HIF funding to deliver the strategic infrastructure required to unlock development at MKE, both Berkeley and MKC will be working collaboratively to pursue a planning application, carry out the detailed design of the strategic infrastructure works and deliver them on site prior to the HIF spend deadline of March 2024.

1.5.2. In order to meet this programme, the intention of both Berkeley and MKC is to submit a planning application as early as is practically deliverable. The assessment of the transport impacts of the development is key to meeting the planning programme as the outputs required from the modelling process feed into other studies which will need to be undertaken as part of the Environmental Impact Assessment, including noise and air quality.

1.5.3. As a result, we have suggested the below programme, shown in Table 1.1, associated with the transport modelling work required which we will seek both MKC and Highways England's support to ensure that an application can be submitted on an agreed basis:

Table 1-1 – Indicative Programme

Item	Responsible Party for Producing the Information	Authorising Party	Start Date	Date for Completion	Date for Approval (allows a max. 6-weeks from date of completion)	Comment
Completion of updated base year model following additional surveys undertaken and associated Technical Note	AECOM via instruction from MKC and following receipt of survey data from WSP	MKC and Highways England	November 2019	April 2020	May 2020	MKC signed off base model
Trip Generation Methodology and Trip Rates	WSP	MKC and Highways England	December 2019	June 2020	Mid July 2020	
Future Full Build out year growth assumptions	WSP and MKC	MKC and Highways England	January 2020	May / June 2020	July 2020	Draft note issued and largely agreed with MKC
Revised Future 2031 and Full Build out Base Year Models	AECOM via instruction from MKC	MKC and Highways England	June 2020	July 2020	July / August 2020	
Revised Future 2031 Base Year + MKE Model	AECOM via instruction from MKC	MKC and Highways England	July / August 2020	September 2020	September / Early October 2020	
Revised Future Full Build Out Base Year + MKE Model	AECOM via instruction from MKC	MKC and Highways England	July / August 2020	September 2020	September / Early October 2020	

1.5.4. The above assumes that once detailed junction modelling is undertaken using the traffic flows extracted from the strategic traffic model that any mitigation measures identified at an individual junction level do not need to be then incorporated back into the strategic model on the premise that they are unlikely to materially affect the way in which traffic is routed around the highway network.

2 CURRENT MKMMM MODEL AND UPDATES NEEDED FOR A PLANNING APPLICATION

2.1 INTRODUCTION

2.1.1. The modelling for the HIF application was based on a set of common assumptions and, as such, it is considered that the current MKMMM trip rates and assumptions provide a reasonable basis to undertake analysis at the strategic level and indeed the model was found fit for purpose as an evidence base supporting the Local Plan.

2.1.2. However, further review of these assumptions with regards to the trip generation characteristics applicable to MKE and the way in which the MKE site is represented in the model has been explored in greater detail to assess its suitability for a planning application. This chapter presents the existing modelling assumptions and the potential methodology that could be adopted in determining the site's trip generation.

2.2 MKMMM BASELINE TRAFFIC MODEL

2.2.1. During 2016 and 2017, MKC updated the MKMMM in preparation for its use as a tool to test alternative planning options within Plan:MK. The primary purpose of the model updates was to provide a robust means of assessing alternative land-use options and development phasing while withstanding scrutiny at the same time. The initial goal was to develop a Reference Case to enable testing of plan options with the horizon year of 2031 to reflect the Local Plan (LP) period.

2.2.2. The above required the model to be sufficiently updated, re-validated and recalibrated to 2016 by incorporating additional data sources into the previous 2009 model. As a result, the model used to assess the schemes considered in Plan:MK is less than five years old.

2.2.3. Highway trips were modelled using SATURN modelling software package and, as it is not possible to model public transport in SATURN, Emme software to model the public transport trips. Emme was also used to run demand modelling. A customised version of the Department for Transport's (DfT) trip end model, CTripEnd, was used to produce forecast 2031 trips.

2.2.4. In addition to updating the model using new traffic survey data, the simulation network area was extended to better model the impacts of the Plan:MK expansion areas. On the demand side, a variable demand model was developed to estimate the effects of changes in transport infrastructure, except trip assignment, which was forecast by the highway and public transport assignment models.

2.2.5. As outline above in Section 1, an updated base year model has been developed for testing of the MKE site, based on traffic surveys undertaken in 2019 in the surrounding areas adjacent to the MKE allocation. This base model update has been signed off by MKC for use in the assessment of the development future year scenarios. The Transport Assessment (TA) which will accompany the application will discuss the update in more detail.

2.3 ASSUMPTIONS OF MKMMM USED IN HIF

2.3.1. The original 2017 HIF pre-submission assessed the MKE development site for the following:

- 5,000 homes (tested as 5,005)
- 6,330 jobs (employment)

Indicative employment land uses and sizes as follows;

- B1c – 175,000 sqft – approximately 350 jobs
- B2 – 745,000 sqft – approximately 1,900 jobs
- B8 – 3,345,000 sqft – approximately 3,850 jobs
- Education facilities – approximately 230 jobs

2.3.2. The number of units and jobs (employment) tested in the modelling remained the same throughout the HIF modelling process to ensure consistency and to allow a like for like comparison with previous results.

2.3.3. Appropriate employment densities were applied based on the specific employment type areas to ascertain the number of jobs. The MKMMM utilises the forecast number of jobs to determine the anticipated vehicular trip generation.

2.4 ASSESSMENT YEARS FOR MKE

2.4.1. The MKMMM future year is set to 2031 to coincide with the LP period, and it is understood that the Inspector determined that the future year is fit and sound for use in the HIF Application.

2.4.2. As discussed in Chapter 3 further below, and as agreed with MKC and HE the assessments will utilise the future year of 2031, as an interim year for the scheme given that the full build out of the development will extend beyond this.

2.4.3. In addition, a further future year test will be completed, assuming a full build out scenario (including a residential uplift to account for flexibility as discussed below). The development build out trajectory has been reviewed to ensure that build out rates are realistic, robust and where possible reflect current residential build out rates observed in MK. As such, a revised build out year of 2048 has been calculated. Previous meetings and discussions suggested that 2039 could be used as the final year, however, it was considered that this could be unachievable in terms of delivery rates.

2.4.4. By ensuring that the full build out year is as accurately forecast as possible ensures that background growth is accounted for within the analysis. The end year does not change the development quantum assessed, and the principles / methodologies as set out in this note remain the same as previously discussued.

2.5 SMART MOTORWAY

2.5.1. Highways England (HE) issued the designs they intend to implement as part of the SMART motorway project, including different assumptions applied previously. For reference, the HE plans are as follows:

- HA549348-AMAR-HGN-SWI-DR-CH-400017
- HA549348-AMAR-HGN-SWI-DR-CH-400018
- HA549348-AMAR-HGN-SWI-DR-CH-400019
- HA549348-AMAR-HGN-SWI-DR-CH-400020

2.5.2. WSP reviewed and agreed with MKC that the HE designs should be taken forward as the basis for all future year modelling runs (including the Reference Case). Therefore, the future year assessments will include the SMART motorway information.

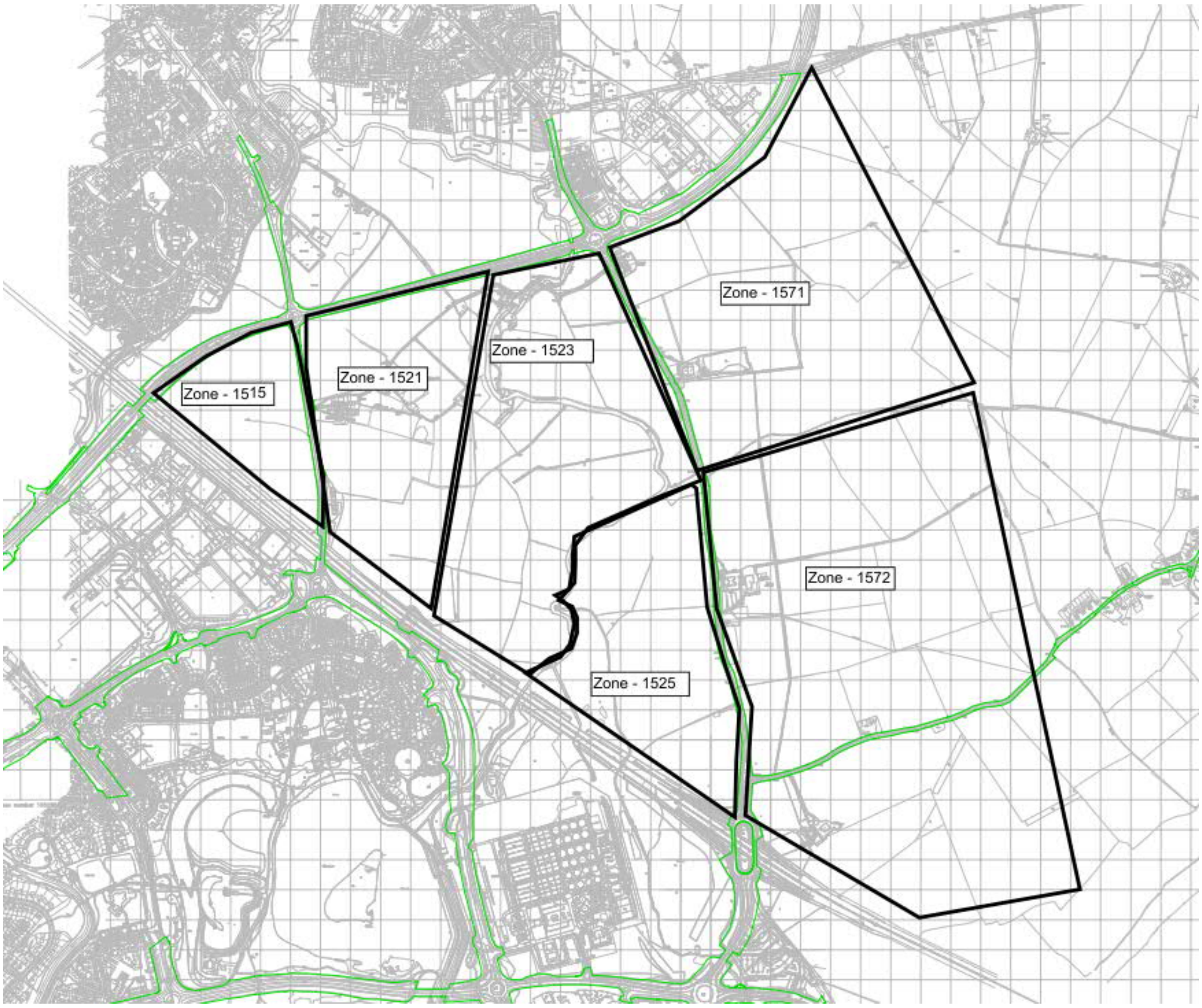
2.6 MKE TRIPS AND TRIP RATES

MKMMM RESIDENTIAL TRIPS

2.6.1. The 2016 MKMMM Local Model Validation Report (LMVR) prepared by AECOM outlines that the residential AM Peak hour vehicular trip-rates of around 0.20 to 0.25 are applied per household (the variability in rates is dependent on the % of households already in that zone). However, it was noted that the trip rates produced for MKE were different from those in zones with existing development due to the fact that the MKE site is currently classified as a greenfield site with only limited number of existing households.

2.6.2. Following discussions with MKC and AECOM, information on the MKE trips by zones was provided by the modelling team. The zones are indicatively shown in Figure 2-1 below.

Figure 2-1 - MKMMM model zones in MKE Area



2.6.3. The modelled trips used in the HIF analysis and corresponding trip rates provided are summarised in Table 2-1 and Table 2-2 below.

Table 2-1 - MKE MKMMM (HIF) trips by development zones

Dev Zone MK East (Total Trips)	No, of Dwellings	Jobs	AM		IP		PM	
			Origin	Dest	Origin	Dest	Origin	Dest
1515	0	603	14	83	19	16	68	16
1521	1294	43	556	59	95	92	163	181
1523	807	0	176	39	62	68	72	160
1571	1683	0	701	57	110	107	183	221
1525	182	1394	75	219	61	56	182	78
1572	1039	4290	578	600	234	205	856	238
Total	**5005**	**6330**	**2100**	**1058**	**581**	**545**	**1524**	**894**

Table 2-2 - MKE MKMMM (HIF) trip rates by development zones

Dev Zone MK East (Total Trips)	Dwellings	Jobs	AM		IP		PM	
			Origin Trip Rate	Dest Trip Rate	Origin Trip Rate	Dest Trip Rate	Origin Trip Rate	Dest Trip Rate
1515	0	603	0.02	0.14	0.03	0.03	0.11	0.03
1521	1294	43	0.43	0.05	0.07	0.07	0.13	0.14
1523	807	0	0.22	0.05	0.08	0.08	0.09	0.2
1571	1683	0	0.42	0.03	0.07	0.06	0.11	0.13
1525	182	1394	n/a	n/a	n/a	n/a	n/a	n/a
1572	1039	4290	n/a	n/a	n/a	n/a	n/a	n/a
Total	**5005**	**6330**	**1**	**0**	**0**	**0**	**0**	**0**

MKMMM EMPLOYMENT TRIPS

2.6.4. As shown in Table 2-1 and Table 2-2, employment trips were derived based on the number of additional jobs that would be created as part of MKE.

2.6.5. AECOM explained that a customised version of DfT's CTripEnd model was used to calculate the employment densities (and correspondingly the number of jobs generated) by applying a blanket job density by classification.

WSP CALCULATION OF CURRENT MKMMM GENERAL RESIDENTIAL AND EMPLOYMENT TRIP RATES

2.6.6. The trip rates currently used in the MKMMM are linked with the various zones associated with MKE. As such, the strategic model applies different trip rate profiles based on the composition of each zone. To enable a review of the existing rates, it is considered useful to calculate general trip rates for residential and employment trips, subsequently allowing comparison with other methodologies.

2.6.7. Using zones 1523/1515 (purely residential), it is possible to review the generated trips and calculate a residential vehicular trip rate. By analysing the trip generation for the purely residential zones, and deducting it from the total product, an origin trip rate can be produced for the zones which also include employment uses. Table 2-3 below provides a summary of the calculated trip rates based on the current MKMMM assumptions.

Table 2-3 - Current MKMMM - WSP calculated vehicular trip rates and trip generation

Land Use		AM		IP		PM	
		Origin	Dest.	Origin	Dest.	Origin	Dest.
Residential (5,005 dwellings)	Trip Rate	0.352	0.039	0.069	0.070	0.102	0.153
	Trip Generation	1763	193	346	352	513	766
Employment (6,330 jobs)	Trip Rate	0.05	0.14	0.04	0.03	0.16	0.02
	Trip Generation	337	865	235	193	1011	128
TOTAL		**2100**	**1058**	**581**	**545**	**1524**	**894**

2.6.8. The trip rates shown in Table 2-3 above provide an approximate rate for a site wide development with a residential and employment split. The residential trip rate in the PM peak is considerably lower than the AM peak and results in significantly fewer trips. Additionally, the employment trips appear to reflect more traditional commuter employment travel patterns and may not reflect the high proportion of proposed industrial and warehouse land uses.

2.6.9. While the exact trip rates may differ slightly, the above provides a good starting point against which to compare alternative methodologies.

2.7 RATIONALE FOR REVIEWING TRIP RATES

2.7.1. It is acknowledged that the MKMMM is a strategic model, and as such, it was created for a different purpose than to specifically assess a single development or developable area.

2.7.2. As agreed with MKC and HE, the MKMMM is considered to be the appropriate basis to assess the scheme for the majority of the runs. However, it is considered the current trip rates used within the MKMMM model may require adjustment to reflect the characteristics of the proposed development. This includes the ability of the site to capture trips, also referred to as “internalisation” as residents/staff may not need to travel further afield due to the range of services and land uses available.

2.7.3. There is a potential that the use of standardised trip rates may be open to challenge if those trip rates are deemed too low, which could under-estimate impact, or equally too high which would result in over-engineering and development that does not align with the sustainability measures outlined in Plan:MK, the LTP4 Mobility Strategy for Milton Keynes and the MK2050 aspirations.

2.7.4. This TN focuses on the residential and employment vehicular trip rates used within the development tests, and it is important to acknowledge, that for any planning application (including the MKE application), accurate trip rates should be adopted to assess the scheme.

2.7.5. To reflect the sustainable aspirations of the development and to ensure that consideration has been made of potential changes in travel demand anticipated in the coming decades, the trip generation has been presented in two scenarios:

- The 'Traditional' scenario which provides the resultant multi-modal trip generation based upon typical methodologies and standard sustainable transport initiatives both on and off-site to discourage private car usage. This includes accounting for trip internalisation based on the land uses proposed within the site.
- The 'Future Mobility' scenario which takes the Traditional scenario and makes a series of assumptions about how the way people travel will change in the future based on trends and a series of interventions to provide a future mode share and trip generation.
  - This approach has been informed by a future mobility tool that includes evidenced trends that could be more representative of the future year scenarios than the 'traditional' approach. Importantly it provides a guide to what could be achievable with a subsequent task of bottom-up planning of mobility interventions to determine a practical target mode shift.

2.7.6. A Future Mobility TN3a has been attached to this note within Appendix A. To assist with understanding the process that has been followed to derive the trip generation a series of flow diagrams have been developed which are shown in Figure 2-2 (Residential) and Figure 2-3 (Employment).

Figure 2-2 - Trip Generation Scenarios - Flow Diagrams (Residential)

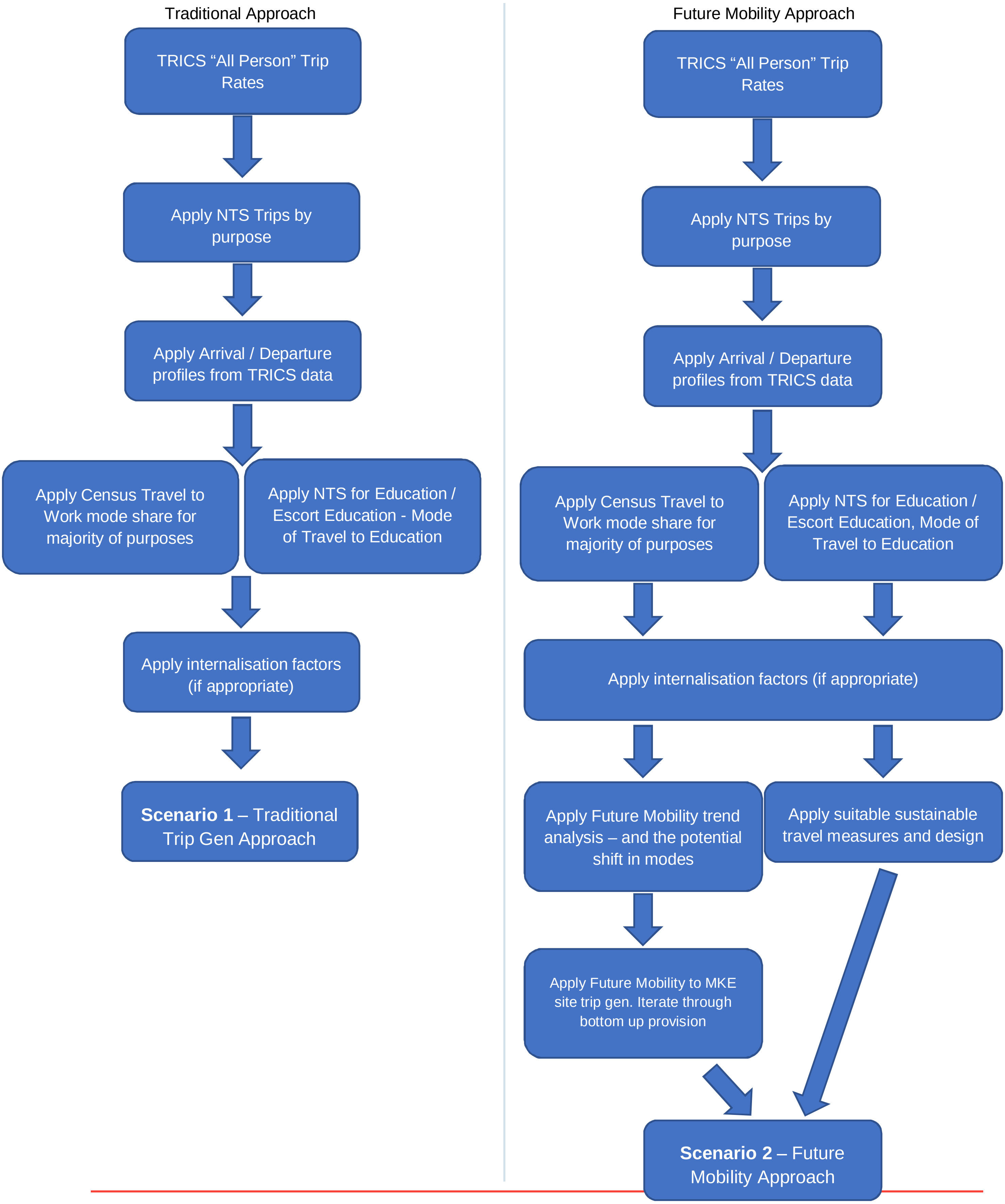
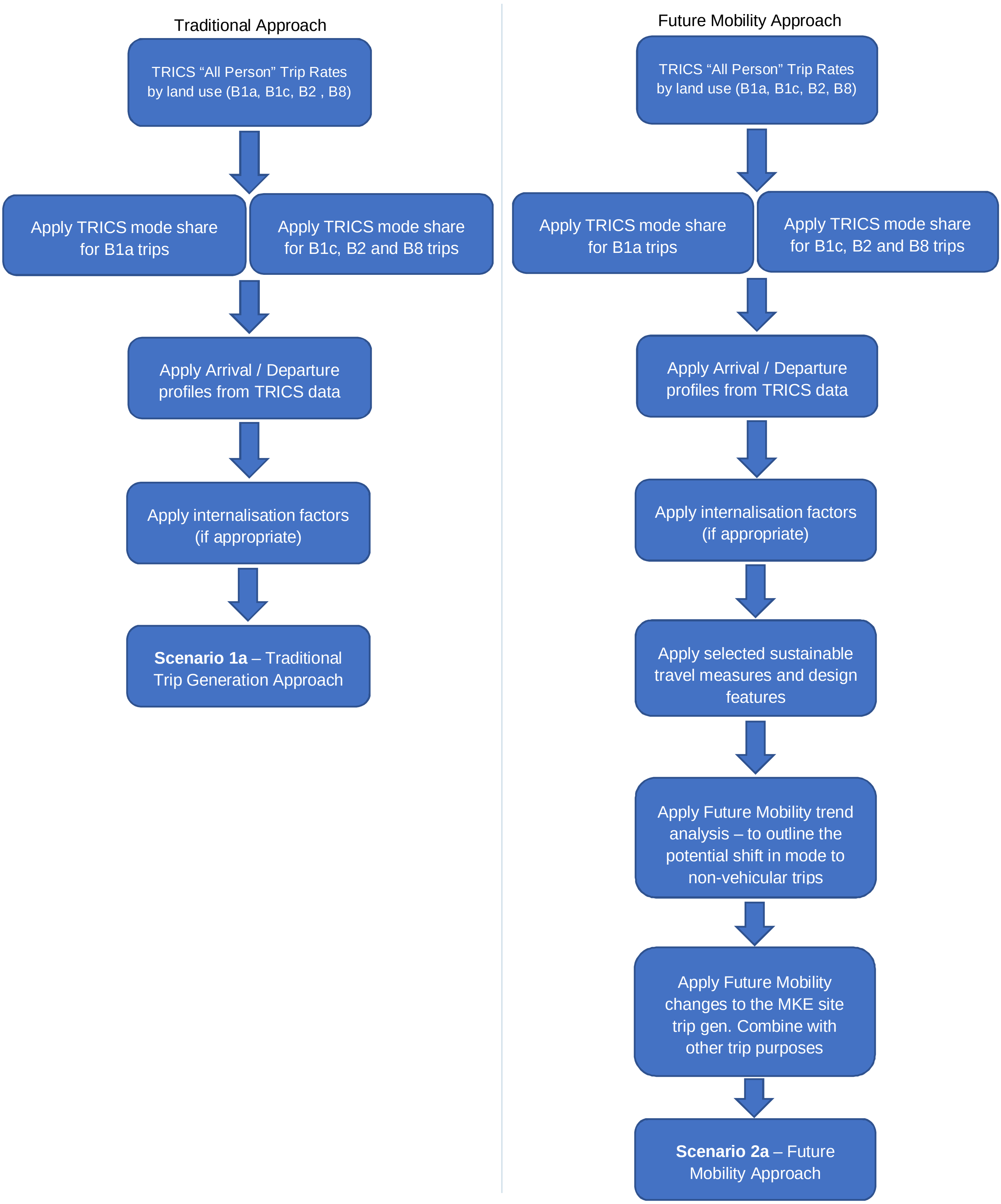


Figure 2-3 - Trip Generation Scenarios - Flow Diagrams (Employment)



2.7.7. With regards to the Future Mobility approach, as discussed further below, we have in parallel, been approaching mobility providers to get bespoke information and where possible forecasts or letters of support. This information will be useful in providing a verification check against the forecasts set out in this TN at a later date.

2.7.8. Internalisation factors are applied within the analysis to cater for the mix of uses on site. This is set out further in Chapter 3 below, but it should be noted that we are applying it to the residential origin trips only to ensure that the process does not discount trips twice; i.e. reducing the origin of the internalised employment trip purpose (i.e. from residential) as opposed to the source itself (i.e. the employment destination).

2.7.9. For employment trips, the base data is from TRICS, which may already adopt shift patterns to minimise traffic impacts at their respective locations. There is an intention to reduce peak hour trips as far as feasible for the employment, such as by introducing triple shift patterns. It is not intended to include this within these assessments, but should be noted that this approach could be useful as one of the tools needed if there are any mitigation strategies required.

2.8 MK FUTURES 2050

2.8.1. 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. The 2050 Strategy for Milton Keynes is being 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.

2.8.2. 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.

2.8.3. 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.

2.8.4. 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.

2.8.5. 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.

2.9 PUBLIC TRANSPORT

MASS RAPID TRANSIT (MRT)

2.9.1. 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.

2.9.2. 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.

2.9.3. 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.

2.9.4. 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. A boarding point will also be provided serving the development area to the west of the linear park. 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.

2.9.5. A transport technical note, TTN6 – MRT Review has been completed, and attached to this report in Appendix B. TN6, provides a brief overview of existing MRT and Park and Ride facilities within England, alongside the work undertaken by MKC on the possible introduction of an MRT to inform the grounding for how the future introduction of an MRT system by MKC could influence travel behaviours within the MKE development and encourage a shift away from the use of the private car, in particular sole occupancy trips.

2.9.6. The data set out in TTN6 provides an evidence base on the adjustments / factors applied to the MKE trip generation to account for Future Mobility and MRT at the MKE site. This will ensure that the positive mode shift benefits that arise from MRT and park and ride sites are captured within the development.

2.9.7. As outlined in TTN6, and discussed in Section 5 of this report, the future mobility changes to the trip generation account for MRT to some degree. In reality, the mode shift, including accounting for trip extraction off the network at the Park and Ride site could be higher than that outlined in TN6.

2.9.8. 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 further potential mode shift / impact from the MRT proposals.

2.9.9. This is considered to be a robust assumption given the early nature of the MRT initiative and that the Future Mobility approach has already taken into account some increases and uplift in Public Transport. It may be possible that later phases of the site incorporate MRT use as part of any RMA.

PARK AND RIDE

2.9.10. 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.

2.9.11. 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.

2.9.12. Similar to the MRT, and as discussed in TTN6 (Appendix B) it is proposed that the future year assessments do not take into account any further adjustments to cover the potential positive impacts of the P&R within the modelling at this stage. It is considered that the future mobility approach, discussed in Section 5, takes into account some of the modal shift that would occur at the development.

2.9.13. The P&R will be a great opportunity to transfer vehicular trips away from the A509 (and other strategic links) and therefore could remove further vehicular trips from the network after they reach the site. It is robust, at this stage, not to assume this transference in the modelling, but the impacts of the P&R could be assessed during later Phases of the site.

3 DEVELOPMENT PROPOSALS

3.1 DEVELOPMENT QUANTUM

3.1.1. At this stage, the development quantum is indicative and may be subject to change. However, a broad understanding of the likely residential numbers and employment areas is given below.

3.1.2. It should be noted that the planning application will cover the land under control or ownership of Berkeley St James. Berkeley is the majority land holder of the MKE site and represent approximately 80% of the residential area. The HIF application included land under others control including Bloor, Segro (Roxhill) and MKC.

3.1.3. 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.

3.1.4. 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.

3.1.5. Through discussions with MKC in April 2020, it has been suggested that a higher number of residential units is tested to account for this variability. The meeting notes from that discussion are attached to this TN within Appendix C. 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.

3.1.6. Therefore, it is likely that Berkeley will seek to deliver approximately 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).Table 3-1 below shows the development quantum that would be subject to the forthcoming Transport Assessment compared to the allocated site in its entirety:

Table 3-1 – Development Quantum – Berkeley Land and MKE Allocation

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

3.1.7. As discussed in April 2020, it was suggested that strategic modelling outputs will be reviewed by each respective zone. As the various land holdings broadly align with the new zone structure, it is possible to allocated trips proportionally to those respective zones. As such, it will be possible to assess the whole allocation, whilst extracting trips / impacts specifically linked with the Berkeley application.

3.1.8. This note focuses on the potential total allocation trip generation to be tested within the MKMMM.

RESIDENTIAL

3.1.9. The tenure type for the residential land use has been assumed to be as shown in Table 3-1.

Table 3-2 – Residential dwellings and tenure type (Full allocation)

Dwelling Type	MKE (full allocation plus uplift)
Mixed Houses / Apartments – private	3,795
Mixed Houses / Apartments – affordable (31%)	1,705
Total	5,500

3.1.10. It is not possible to understand the level of apartments within the residential land use at this stage. It is acknowledged that apartments have different trip generation characteristics and often lower levels of car ownership. However, as the quantum is not fixed at this stage, a mixed houses / apartments trip rate will be used for both private and affordable dwellings.

3.1.11. Also as shown above, it is assumed that the site will deliver a policy compliant 31% of affordable homes. Similar to the above, the mix of these houses is unknown at this stage, and so a mixed category has been selected in the TRICS exercise, which is discussed further below.

EMPLOYMENT

Table 3-3 - Land Use for Employment Development Area and number of Jobs (Full Allocation)

	Employment land Use	Development Floor Area (sqft)	Development Floor Area (sqm)	HCA Densities (jobs per m²)	Resulting Jobs
Berkeley Land	Office - B1a	400,000	37,161	13	2,859
	Hub – B1c / B2*	1,000,000	92,903	30	3,097
	Warehouse - B8	2,945,000	273,599	81	3,378
Segro	Warehouse - B8	875,000	81,290	81	1,004
	Total	5,220,000	484,954	-	10,337

**Assumed as B2 based on indicative information at this stage*

3.1.12. As with the residential uses, the employment area is not fixed at this time. Table 3-3 above provides an indicative quantum split by the respective likely employment types. For reference, the HCA job densities guide has also been used to calculate the potential number of jobs that the site may deliver.

3.1.13. The number of jobs forecast using the HCA density is beyond that considered in the original HIF modelling. Therefore, it is suggested that the trip generation for the employment is calculated using TRICs and added into the model as bespoke trip generation volumes.

3.1.14. As shown above, the employment area seeks to develop primarily warehousing / B8 uses at this moment. The development forecast jobs are lower than what is currently included in the MKMMM. However, it is likely that the MKMMM outputs also included other land within the HIF assessments, including the Segro employment site west of Willen Road which is within the overall MKE allocation.

3.1.15. The Segro site has been included as a warehouse element only (B8) and will be included with the B8 identified for the Berkeley land to ensure a consistent assessment approach.

OTHER USES

3.1.16. The development would also create jobs associated with the retail and education facilities on site. These have been excluded at this stage of the analysis as it is assumed that the vast majority of these jobs would be captured within the internal trips and residential trip analysis.

3.1.17. The allocation / development intends to deliver a number of primary schools, secondary school and a local / district centre. It should be noted that the proposed Secondary school and local / district centre are planned for delivery prior to 2031.

3.1.18. As discussed in Section 2.9 above, a Park and Ride (P&R) facility is proposed as part of the infrastructure included in the HIF application. It is understood that the MKMMM, is not able to explicitly model P&R elements. As such, an alternative method to determine the likely impacts has been reviewed, and is discussed further in Section 5 of this TN.

3.2 DEVELOPMENT AND FUTURE YEAR ASSESSMENTS

3.2.1. The current MKMMM has a future year of 2031 to align with the local plan period. As discussed in the TN: Modelling Approach v2, it was agreed that a 2031 year and a 2048 full build out year test would be adopted (n.b. the future year of 2039 was discussed initially). The full build out year test would also include a 10% residential uplift as discussed above.

3.2.2. 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 (discussed further below)
- **C – 2048 Full build out 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 the forecast full build out year (2048) applied. This will include, where possible[2], strategic sites relevant from other boroughs
- **D – 2048 Full build out year reference case - with Development**
  - The above scenario, with the full built out development

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

3.2.3. This TN therefore sets outs the trip generation inputs into Scenarios B and D only. The scenarios therefore being considered within this note are:

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 Full build out year with Development Scenario – traditional methodology** (similar to 2031, but with a bespoke future year + committed development; and
4. **2048 Full build out year with Development Scenario – Future Mobility Scenario** – 2048 with Development Scenario forecasts applied to relevant Mobility Masterplanning scenario to represent total buildout scenario.

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

3.2.5. Therefore, the modelling scenarios tests in the TA will be:

- 2016 Base year
- A – 2031 Future year reference case - without Development
- B – 2031 Future year with Development – Future Mobility test
- C – 2048 Full build out year Future year reference case - without Development
- D – 2048 Full build out year Future year with Development – Future Mobility test

ASSUMED DEVELOPMENT BUILD OUT

3.2.6. To ascertain the level of development at the interim year (2031), Berkeley's and MKC have reviewed the residential build out rates to ensure that any schedule is defendable.

3.2.7. Using the agreed trajectory, the split of houses at 2031 and 2048 are shown in Table 3-4 below. A similar exercise for the employment uses has also been undertaken and the assumptions are also in the Table below.

Table 3-4 – MKE Development 2031 and 2048 Assumptions

Land Use	Type	MKE - 2031	MKE - 2048
Residential	Mixed Houses / Apartments – private	1,035	3,795
	Mixed Houses / Apartments – affordable	465	1,705
	TOTAL	*1,500*	*5,500*
Employment	B1a	16,387 m²	37,161 m²
	B1c / B2*	40,967 m²	92,903 m²
	B8**	201,938 m²	354,889 m²
	TOTAL	*259,292 m²*	*484,954 m²*

**Assumed as B2 **Combined Segro and Berkeley (full allocation)*

4 MKE TRIP GENERATION – SCENARIO 1 - TRADITIONAL APPROACH

4.1 MKMMM RESIDENTIAL AND EMPLOYMENT TRIP RATES

4.1.1. WSP have undertaken a review of the potential adjustments and traditional (but alternative to the MKMMM) methodology that could be adopted to reflect the developments proposals

4.1.2. Other refinements include an internalisation factor, which would be applied to the residential trip rates in order to account for the proportion of trips internal to the site and therefore, not contributing to impacts on the external networks albeit these trips would need to be distributed on to the MKE local highway network where appropriate

4.2 MKE TRIP RATES – TRADITIONAL METHODOLOGY

4.2.1. The traditional trip rate methodology which has been established is set out below and includes a worked example setting out the process which has been developed including the application of various datasets. This builds upon a spreadsheet model used to calculate the potential trips. The worked example is attached to this TN as **Appendix D** and should be viewed in conjunction with the information set out below.

RESIDENTIAL TRIP RATES

4.2.2. To provide a basis for a calculation of residential trip generation, the TRICS database was interrogated to obtain a total person residential trip rate. It is understood that MKC will seek a percentage of affordable units on the site, so both Private Housing vehicular trip rates and Affordable Housing vehicular trip rates were extracted. National Travel Survey (NTS) results were then utilised to supplement the data further and to determine trips based on journey purpose by time of day.

4.2.3. Due to the nature of the development, with the provision of employment, leisure, education and retail facilities on-site, it can be assumed that a proportion of journeys would not leave the development and would therefore not impact the wider road networks. Suitable adjustments were therefore applied to the journey purposes to reflect this internalisation of trips.

Initial Person Trip Rate and Demand

4.2.4. An outline of the methodology is presented below with a worked example provided in **Appendix D**.

- 5,500 dwellings in total. It is understood that MKC would seek 31% of units to be affordable;
- TRICS multi-modal trip rate extracted for Private dwellings to determine the likely trip rate for the private homes within the development (Total Person)
- TRICS multi-modal trip rate was extracted for Affordable dwellings to determine the likely trip rate for the affordable home within the development (Total Person)
- As the development unit type schedule is not fixed; a 'mixed' trip rate was used (sites comprising houses and flats – for both private and affordable)

4.2.5. Trip rates for the proposed development land uses have been derived from TRICS. The TRICS database is an industry standard tool which is used to predict trip rates for future development based upon similar existing sites in the UK and Ireland. 'All person' trip rates for each proposed land use have been extracted from the TRICS database.

4.2.6. Table 4-1 below provides the total person trip rates used in the analysis. The TRICS outputs are also included within **Appendix E** of this TN.

Table 4-1 - TRICS 'Total Person' trip rates (Two-way) for private and affordable dwellings

TRICS Category	Tenure	AM Peak 0800-0900	PM Peak 1700-1800
Mixed House / Apartments	Trip Rate (Two-way) – Private	0.878	0.783
	Trip Rate (Two-way) – Affordable	0.984	0.900

Trip Purpose and Internalisation

4.2.7. The below has subsequently been applied to both the affordable and private dwellings separately;

- The Total person trips have then been disaggregated by Trips by purpose, using National Travel Survey information (NTS0502 - Start time of trips by purpose);
- The Arrival/Departure percentage splits have been applied (taken from the respective TRICS information) for a greater understanding of the movement of vehicles and the tidality of the movements generated by the site;
- 2011 Census information, specifically data from *QS703EW - Method of Travel to* Work *(2001 specification)* was used to determine the mode with which these journeys are being taken for the employment and business trip purposes, with a specific focus on Car/Van journeys;
- A review of the relevant trips by purpose was undertaken to check if this modal split is accurate considering the development proposals. This was particularly prevalent for education trips where it is documented that these purposes are likely to adopt different modes:
- Education and Escort Education trips were broken down by Primary/Secondary/Higher Education to meet the Milton Keynes Local Authority split.
- NTS0614 was used to get modal split by education type (for primary and secondary).
- TRICS was used to get modal split for Higher Education.
- Indicative Internal/External trip assumptions were applied with further refinement applied to ensure that internalisation factors were included,
- Final trip rates were calculated for internal and external trips on the network based on the above.

4.2.8. Table 4-2 shows the trip rates with the NTS - Trip Rates by purpose using NTS0502 data applied, for both the private and affordable tenures.

Table 4-2 - NTS - Trip Rates by purpose using NTS0502 Applied to Total person trip rates

Purpose of Journey	Private		Affordable	
	AM Peak 0800-0900	PM Peak 1700-1800	AM Peak 0800-0900	PM Peak 1700-1800
Commuting	0.183	0.260	0.205	0.299
Business	0.029	0.029	0.033	0.033
Education	0.256	0.022	0.287	0.025
Escort Education	0.194	0.015	0.217	0.017
Shopping	0.035	0.095	0.039	0.109
Other work, other escort and personal business	0.122	0.157	0.137	0.181
Visiting friends, entertainment	0.029	0.151	0.033	0.174
Holiday, day-trip	0.030	0.054	0.034	0.062
All Purposes	0.878	0.783	0.984	0.900

Mode Share – Non-Educational trips

4.2.9. The mode share adopted by users is dependent on several factors, including proximity to land uses and journey purpose.

4.2.10. The 2011 Census data was used to determine the method of travel from residential locations for commuting and business trips (i.e. journey to work, JTW). The 2011 Census data contained in QS703EW – Method of Travel to Work (2001 specification) informed the JTW mode share summarised below. An average of the following MSOA's was used to determine the final Census modal share observed in Table 4-3 below;

- E02003461 : Milton Keynes 003
- E02003462 : Milton Keynes 004
- E02003463 : Milton Keynes 005
- E02003464 : Milton Keynes 006
- E02003465 : Milton Keynes 007
- E02003475 : Milton Keynes 017

Table 4-3 - Census Modal Share (Main Mode) – non education

Mode	Percentage
Work mainly at or from home	10.0%
Underground, metro, light rail, tram	0.2%
Train	3.1%
Bus, minibus or coach	4.1%
Taxi	0.6%
Motorcycle, scooter or moped	0.6%
Driving a car or van	65.8%
Passenger in a car or van	6.0%
Bicycle	3.1%
On foot	6.0%
Other method of travel to work	0.3%

Mode Share – Education Trips

4.2.11. Due to the provision of education facilities on site, it can be assumed that a significant proportion of residential users would utilise the new facilities instead of travelling further afield. Not only would this affect the internalisation of trips but would also affect the mode share. Data from NTSA19020b was used to produce an estimate on the mode of travel likely to be adopted based on the type of school and distance travelled to it. Data in NTSA19020b only provides information for primary and secondary schools, and therefore the mode share information for Higher Education data was obtained from TRICS.

4.2.12. For this analysis, information from the under 1 mile and 1 to under 2 miles distance was used for the secondary school, on account of where that education type is expected to be situated in relation to the majority of the proposed development. A high proportion of the development will be within 1 mile of primary education facilities and as such will benefit from close proximity to primary school.

4.2.13. Table 4-4 below shows the percentage split of individuals' travel mode for journeys to primary school for under 1 mile and secondary schools located a distance of between 1 and 2 miles.

Table 4-4 – NTSA19020b School mode by age

NTSA19020b	Percentage	
Main Mode	Age 5-10 years - (Under 1 mile)	Age 11-16 years - (1 to under 2 miles)
Walk	82%	51%
Bicycle	1%	6%
Car / Van	16%	30%
Bus	1%	12%
Other Transport	0%	-
All Modes	100%	100%

4.2.14. The information in Table 4-4 above, along with TRICS mode-share data for higher education, produces a modal split of total trips for both Education and Escort Education purposes. The worked example in Appendix D provides a further breakdown.

4.2.15. The application of the mode shares for each journey purpose provides a greater degree of granularity in the analysis and therefore, a better reflection of the proposed development and its potential trip generation.

Internalisation Factors

4.2.16. The final stage of the residential trip rate analysis is to apply an internalisation factor. The nature of the development's land use mix means that some of the trips calculated above would not leave the development and, as a result, would not impact the external road network. Table 4-5 below outlines the reductions applied to each of the selected trip purposes.

Table 4-5 - Internalisation Reductions applied to Journey Purpose Trip Rates

Purpose	Internalisation Reduction	Further Notes
Commuting	15%	Reviewing the JTW data for nearby MSOAs in MK's presents data that suggests work internalisation ranges between 8% and 18%
Business	15%	See above
Education	73%*	The indicative proposals across the wider MKE site include the provision of three primary schools and a secondary school. Any external trips limited to staff and/or a small percentage of parent choice
Escort education	73%*	Escort education forms both primary purpose trips but also secondary trips – however assumed the same percentages as the main education trips.
Shopping	33%	There will be a local / district centre and other retail proposed within the site where some shopping needs will be satisfied internally
Other work, other escort and personal business	25%	Alongside retail, there will be other services within the proposed development
Visiting friends/entertainment/sport	20%	The development proposes leisure facilities within the site, including green walks and routes.
Holiday/Day trip/Other	0%	Assumed that this captures ad hoc trips within the development. Although for robustness, no adjustment made,

**This is calculated using the MK LA school data, assuming all of primary school trips and 50% of secondary school trips are internal, with the remaining 50% of secondary school trips and all of the higher educational trips being external.*

4.2.17. It should be noted that internalisation factors are applied to the residential origin trips only to ensure that the process does not discount trips twice; i.e. reducing the origin of the internalised employment trip purpose (i.e. from residential) as opposed to the source itself (i.e. the employment destination).

4.3 RESULTING INTERNAL TRIPS

4.3.1. Applying the various tables and assumptions on mode share and internalisation set out above and in Appendix A, the final number of internal trips can be calculated as well as the associated trip rate value. Table 4-6 below shows the total internal trips associated with the development for 2031. Table 4-7 below provides the same data for the full build out year (currently assumed as 2048).

Table 4-6 – Internal Vehicular Trips by Mode (private and affordable dwellings only) – 2031

INTERNAL – 2031 Year 1,500 Dwellings		AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	3.9%	3	10	12	15	8	23
Underground, metro, light rail, tram	0.1%	0	0	0	0	0	0
Train	1.2%	1	3	4	4	3	7
Bus, minibus or coach	3.6%	5	17	22	7	4	11
Taxi	0.3%	0	1	1	1	1	1
Motorcycle, scooter or moped	0.3%	0	1	1	1	1	1
Driving a car or van	37.4%	40	140	180	101	56	157
Passenger in a car or van	2.3%	2	6	7	9	5	14
Bicycle	2.5%	3	11	14	5	3	8
On foot	48.3%	87	302	389	29	16	45
Other method of travel to work	0.1%	0	0	1	0	0	1
TOTAL		**141**	**490**	**631**	**172**	**96**	**268**

Table 4-7 – Internal Vehicular Trips by Mode (private and affordable dwellings only) – 2048

INTERNAL – 2048 Year 5,500 Dwellings		AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	3.9%	10	35	46	53	30	83
Underground, metro, light rail, tram	0.1%	0	1	1	1	1	2
Train	1.2%	3	11	14	16	9	26
Bus, minibus or coach	3.6%	18	63	81	25	14	39
Taxi	0.3%	1	2	3	3	2	5
Motorcycle, scooter or moped	0.3%	1	2	3	3	2	5
Driving a car or van	37.4%	147	512	659	370	206	576
Passenger in a car or van	2.3%	6	21	27	32	18	50
Bicycle	2.5%	12	41	52	18	10	29
On foot	48.3%	319	1108	1427	106	59	165
Other method of travel to work	0.1%	0	2	2	2	1	3
TOTAL		**517**	**1798**	**2315**	**631**	**352**	**983**

4.3.2. As noted in the two tables above, the same assumptions for 2031 and 2048 have been applied for consistency, but with varying development quanta. The resulting internal trips and rates for both years, focusing on Driving a Car / Van only are shown in Table 4-8 below.

Table 4-8 – Internal Vehicular Trips – Driving a Car or Van (Residential – Private and Affordable – 2031 and 2048)

Trip Rates	Year	AM Peak			PM Peak		
		0800-0900			1700-1800		
		Arr	Dep	Total	Arr	Dep	Total
TOTAL (Car and Van)	2031	40	140	180	101	56	157
Trip Rate (per total dwelling)	1500 dwellings	0.027	0.093	0.120	0.067	0.038	0.105
TOTAL (Car and Van)	2048	147	512	659	370	206	576
Trip Rate (per total dwelling)	5500 dwellings	0.027	0.093	0.120	0.067	0.038	0.105

4.3.3. It should be noted that these trips will therefore be loaded into the model as inter-zone to inter-zone trips. The trips will therefore be distributed onto the MKE highway network only, with the MKE zoning having schools, the local / district centre allocated to them accordingly to enable this to be implemented. This will ensure that the vehicular trips associated with the development, regardless of being internal to the site are captured within the analysis and at internal site junctions.

4.4 RESIDENTIAL - EXTERNAL TRIPS AND RATES

4.4.1. The corresponding final number of external trips can be calculated as well as the associated trip rate value by calculating the converse of the internal site trip generation identified in Table 4-8 above. Table 4-9 below shows the total external trips associated with the development for 2031. Table 4-10 below provides the same data for 2048.

Table 4-9 - External Vehicular Trips by Mode (private and affordable dwellings only) – 2031

EXTERNAL – 2031 Year 1,500 Dwellings		AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	8.8%	12	42	54	61	34	95
Underground, metro, light rail, tram	0.2%	0	1	1	1	1	2
Train	2.7%	4	14	17	19	10	29
Bus, minibus or coach	7.5%	19	65	84	28	16	44
Taxi	0.6%	1	3	4	4	2	6
Motorcycle, scooter or moped	0.6%	1	3	4	4	2	6
Driving a car or van	62.8%	98	340	437	403	225	628
Passenger in a car or van	6.4%	11	38	49	38	21	59
Bicycle	3.3%	6	20	26	19	11	30
On foot	6.4%	11	39	50	37	21	58
Other method of travel to work	0.7%	2	6	8	2	1	3
TOTAL		**164**	**571**	**735**	**617**	**344**	**961**

Table 4-10 – External Vehicular Trips by Mode (private and affordable dwellings only) – 2048

EXTERNAL – 2048 Year 5,500 Dwellings		AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	8.8%	45	155	200	223	125	348
Underground, metro, light rail, tram	0.2%	1	3	4	5	3	7
Train	2.7%	14	50	64	69	38	107
Bus, minibus or coach	7.5%	69	240	308	103	58	161
Taxi	0.6%	3	11	14	14	8	22
Motorcycle, scooter or moped	0.6%	3	10	13	14	8	22
Driving a car or van	62.8%	358	1245	1603	1479	826	2304
Passenger in a car or van	6.4%	40	140	180	139	77	216
Bicycle	3.3%	21	74	96	70	39	109
On foot	6.4%	41	142	183	137	76	213
Other method of travel to work	0.7%	7	23	30	8	5	13
TOTAL		**602**	**2093**	**2695**	**2261**	**1262**	**3523**

4.4.2. Table 4-11 below provides the resulting vehicular trip generation and trip rates for external trips to the site for both the private and affordable residential land use (for the 2031 and 2048 future years).

Table 4-11 - External Vehicular Trips – Driving a Car or Van (Residential – Private and Affordable – 2031 and 2048)

Trip Rates	Year	AM Peak			PM Peak		
		0800-0900			1700-1800		
		Arr	Dep	Total	Arr	Dep	Total
TOTAL (Car and Van)	2031	98	340	437	403	225	628
Trip Rate (per total dwelling)	1,500 dwellings	0.065	0.226	0.291	0.269	0.150	0.419
TOTAL (Car and Van)	2048	358	1245	1603	1479	826	2304
Trip Rate (per total dwelling)	5500 dwellings	0.065	0.226	0.291	0.269	0.150	0.419

4.5 RESIDENTIAL – COMBINED INTERNAL AND EXTERNAL TRIPS (TOTAL SITE) AND RATES

4.5.1. Applying the various tables set out above, the final number of internal and external trips can be calculated as well as the associated final trip rate value. Tables 4-12 and 4-13 provide the 2031 and 2048 values.

Table 4-12 - Internal and External Vehicular Trips by Mode (private and affordable dwellings only) – 2031

INTERNAL AND EXTERNAL – 2031 Year 2,250 Dwellings		AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	7.1%	15	52	67	75	42	118
Underground, metro, light rail, tram	0.2%	0	1	1	2	1	3
Train	2.2%	5	16	21	23	13	36
Bus, minibus or coach	6.2%	24	82	106	35	20	54
Taxi	0.5%	1	4	5	5	3	8
Motorcycle, scooter or moped	0.5%	1	3	4	5	3	8
Driving a car or van	54.0%	138	479	617	504	281	786
Passenger in a car or van	5.0%	13	44	57	47	26	72
Bicycle	3.0%	9	31	40	24	13	38
On foot	20.9%	98	341	439	66	37	103
Other method of travel to work	0.5%	2	7	9	3	2	4
TOTAL TRIPS		**305**	**1061**	**1366**	**789**	**440**	**1229**

Table 4-13 - Internal and External Vehicular Trips by Mode (private and affordable dwellings only) – 2048

INTERNAL AND EXTERNAL – 2048 Year 5,500 Dwellings		AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	7.1%	55	190	245	277	154	431
Underground, metro, light rail, tram	0.2%	1	4	5	6	3	9
Train	2.2%	17	60	78	85	48	133
Bus, minibus or coach	6.2%	87	302	389	128	72	200
Taxi	0.5%	4	13	17	18	10	28
Motorcycle, scooter or moped	0.5%	4	12	16	18	10	28
Driving a car or van	54.0%	505	1756	2262	1848	1032	2880
Passenger in a car or van	5.0%	46	161	208	171	95	266
Bicycle	3.0%	33	115	148	89	49	138
On foot	20.9%	360	1250	1610	243	135	378
Other method of travel to work	0.5%	7	25	32	10	6	15
TOTAL TRIPS		**1119**	**3891**	**5010**	**2892**	**1614**	**4506**

4.5.2. Table 4-14 below shows the total internal and external car borne trips associated with the development. The total residential elements are considered further below.

Table 4-14 - Internal and External Vehicular Trips – Driving a Car or Van (Residential – Private and Affordable – 2031 and 2048)

Trips rates	**Year**	**AM Peak**			**PM Peak**		
		0800-0900			**1700-1800**		
		Arr	**Dep**	**Total**	**Arr**	**Dep**	**Total**
TOTAL (Car and Van)	2031	138	479	617	504	281	786
Trip Rate (per total dwelling)	1,500 Dwellings	0.092	0.319	0.411	0.336	0.188	0.524
TOTAL (Car and Van)	2048	505	1756	2262	1848	1032	2880
Trip Rate (per total dwelling)	5,500 Dwellings	0.092	0.319	0.411	0.336	0.188	0.524

4.6 COMPARISON AGAINST MKMMM AND MKSE (RESIDENTIAL ONLY)

4.6.1. MKC have provided the indicative trip rates that were being discussed for the MKSE site being promoted by Gallagher's. It is understood that these rates had not been agreed with MKC at the time of writing. WSP did not have sight of any further background calculations and have applied assumptions on the MKSE data provided.

4.6.2. Table 4-15 below provides a comparison between the three elements (MKMMM, MKSE and the MKE calculations).

Table 4-15 - Comparison of Residential Trip Rates (MKMMM, MKSE and MKE)

Source	AM PEAK			PM PEAK		
	Arrival	Departure	Total	Arrival	Departure	Total
MKMMM*	0.039	0.352	0.391	0.153	0.102	0.255
MKSE**	0.098	0.291	0.389	0.256	0.119	0.375
MKE (internal and external)	0.092	0.319	0.411	0.336	0.188	0.524
MKE (External only)	0.065	0.226	0.291	0.269	0.150	0.419

**Based on our assumptions of trips from the MKMMM model for the MKE site*

***Assumed with a 20% reduction for internalisation (understood to be indicative and not agreed between Gallagher's and MKC at this stage)*

4.6.3. The external AM peak hour trips rates for MKE are lower than the other sources. This is largely due to the high levels of education trips being internalised within the site. However, when considering the combined internal and external trips, both of which will be modelled on the network – the resulting trip rates are higher than the other sources. This would suggest a robust methodology is adopted.

4.6.4. In the PM peak hour, the residential trip rates for MKE are higher than the others tested, considering either external only trips or the combined internal and external movements.

4.6.5. On balance, it appears that the methodology outlined above for MKE results in trip rates that are similar to MKSE's current assumptions. It is acknowledged that the MKSE rates are indicative, however, they provide a useful comparison.

4.7 EMPLOYMENT TRIPS – TRADITIONAL APPROACH

4.7.1. WSP have also undertaken an exercise similar to that outlined above for residential trips to review the potential employment trips from the development. This was primarily based on researching appropriate sites within the TRICS database based on the likely number of jobs generated by the bulk of the employment on-site (B1a, B1c, B2 and B8 land use).

4.7.2. The methodology adopted is based on the following:

The TRICS multi-modal trip rates extracted for the following employment types:

- B1a – Office
- B1c / B2 – Business for industrial purposes / General Industrial
- B8 – Storage and Distribution

4.7.3. The expected employment floor area of the proposed development was applied to each employment type trip rate to determine the number of trips that will be produced by each employment area type;

4.7.4. The number of jobs related to each employment area type is estimated and trip rates calculated to allow comparison with AECOM data.

TRICS

4.7.5. A trip rate was extracted for each respective employment land use from TRICS using employment sites with similar characteristics and land uses to the development proposals where possible. The multi-modal TRICS outputs are provided in **Appendix B**. For ease of review Table 4-16 below summarises the assumed vehicular trip rates adopted for each of the land uses.

Table 4-16 – Vehicular Trip Rates for B1c, B2 and B8 Land Uses (per m²)

Employment	AM PEAK			PM PEAK		
Trips per m²	**Arrival**	**Departure**	**Total**	**Arrival**	**Departure**	**Total**
B1a	0.748	0.067	0.815	0.061	0.724	0.785
B1c / B2*	0.230	0.029	0.259	0.041	0.320	0.361
B8*	0.201	0.028	0.229	0.055	0.203	0.258

**combination of OGVs, Cars, LGVs trip rates*

4.7.6. To ascertain the number of jobs that each employment type could create, the relevant employment density, taken from the HCA Employment Densities guide, was applied to the floor area for each proposed employment type. Table 4-17 below provides a summary of the floor spaces, densities adopted and the resulting level of jobs.

Table 4-17 - Land Use for Employment Development Area and number of Jobs

Employment land Use	Proposed Development Floor Area - 2031	Proposed Development Floor Area - 2048	HCA Densities Guide (jobs per m²)	Resulting Jobs - 2031	Resulting Jobs - 2048
B1a	16,387 m^2	37,161 m^2	13	1,261	2,859
B1c / B2	40,967 m^2	92,903 m^2	30	1,366	3,097
B8	201,938 m^2	354,889 m^2	81	2,503	4,399
Total	259,292 m^2	448,636 m^2	-	5,129	10,355

4.7.7. The development would also create jobs associated with the retail, education, etc. facilities on site. These have been excluded at this stage of the analysis as it is assumed that these jobs would be captured within the residential trip analysis on the premise that many of the employees to such uses would be generated from the residential properties within the site or from localised areas to the site.

4.7.8. The mode shares for the employment uses have been taken from the respective TRICS outputs. These have been categorised into the same headings as the Census data categories to allow comparison. For ease of review, the B1a office trips have been separated out, as this land use typically adopts a higher variety of modes of travel. The B1c / B2 and B8 trips have been combined as these typically have higher percentages of private vehicular use.

4.7.9. Tables 4-18 and 4-19 show the trips for 2031 for the Office and Warehousing elements respectively. Tables 4-20 and 4-21 underneath show the same data for 2048.

Table 4-18 - Employment – B1a Office Trips – 2031

Employment – B1a Office Trips	2031	AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	0.0%	0	0	0	0	0	0
Underground, metro, light rail, tram	0.0%	0	0	0	0	0	0
Train	26.7%	68	1	70	1	71	71
Bus, minibus or coach	7.0%	18	0	18	1	19	20
Taxi	1.9%	3	3	6	1	2	4
Motorcycle, scooter or moped	0.0%	0	0	0	0	0	0
Driving a car or van	49.6%	123	11	134	10	119	129
Passenger in a car or van	0.0%	0	0	0	0	0	0
Bicycle	4.3%	12	0	12	0	11	11
On foot	10.4%	24	2	26	4	25	29
Other method of travel to work	0.0%	0	0	0	0	0	0

Table 4-19 - Employment – B1c / B2 / B8 Office Trips – 2031

Employment – B1c / B2 / B8 Trips	2031	AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	0.0%	0	0	0	0	0	0
Underground, metro, light rail, tram	0.4%	6	0	6	0	0	0
Train	1.1%	8	0	8	6	2	8
Bus, minibus or coach	7.4%	52	3	55	12	43	55
Taxi	0.5%	2	2	4	2	2	3
Motorcycle, scooter or moped	1.0%	2	0	2	2	10	12
Driving a car or van	82.8%	500	68	569	128	541	669
Passenger in a car or van	0.0%	0	0	0	0	0	0
Bicycle	2.8%	13	2	15	8	19	26
On foot	4.1%	26	3	29	2	30	32
Other method of travel to work	0.0%	0	0	0	0	0	0

Table 4-20 - Employment – B1a Office Trips – 2048

Employment – B1a Office Trips	2048	AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	0.0%	0	0	0	0	0	0
Underground, metro, light rail, tram	0.0%	0	0	0	0	0	0
Train	26.7%	155	3	158	1	161	162
Bus, minibus or coach	7.0%	40	0	40	2	42	44
Taxi	1.9%	7	6	14	3	5	9
Motorcycle, scooter or moped	0.0%	0	0	0	0	0	0
Driving a car or van	49.6%	278	25	303	23	269	292
Passenger in a car or van	0.0%	0	0	0	0	0	0
Bicycle	4.3%	27	0	27	0	25	25
On foot	10.4%	55	5	59	9	57	65
Other method of travel to work	0.0%	0	0	0	0	0	0

Table 4-21 - Employment – B1c / B2 / B8 Office Trips – 2048

Employment – B1c / B2 / B8 Office Trips	2048	AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	0.0%	0	0	0	0	0	0
Underground, metro, light rail, tram	0.4%	11	0	11	0	0	0
Train	1.0%	14	0	14	11	4	14
Bus, minibus or coach	7.2%	94	7	100	21	77	99
Taxi	0.5%	4	4	7	4	4	7
Motorcycle, scooter or moped	0.9%	4	0	4	4	18	21
Driving a car or van	83.1%	927	126	1053	233	1018	1251
Passenger in a car or van	0.0%	0	0	0	0	0	0
Bicycle	2.7%	24	4	28	14	34	48
On foot	4.2%	48	6	55	4	58	61
Other method of travel to work	0.0%	0	0	0	0	0	0

4.7.10. As the development seeks to develop a significant proportion of B8 land uses, the trip generation reflects those characteristics. Typically, B8 use would adopt a shift pattern that results in fewer vehicles during the traditional commuter peak periods. Double shift and triple shift patterns (12hr and 8hr) are typical and are often scheduled around the peak periods to avoid trip interaction.

4.7.11. By calculating the trips using TRICS, these patterns are picked up to a degree better than applying a blanket trip rate per job.

4.8 TOTAL MASTERPLAN TRIPS

4.8.1. Reviewing the internal and external residential trips, plus the employment trips, the full trip generation profile for the development can be assessed. Table 4-22 outlines the total development trips and modal split for the future year 2031.

Table 4-22 - Total Trips (Internal and External Residential plus Employment) – 2031

WHOLE DEVELOPMENT - 2031		AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	4.0%	15	52	67	75	42	118
Underground, metro, light rail, tram	0.2%	6	1	7	2	1	3
Train	4.7%	81	18	99	30	86	116
Bus, minibus or coach	6.7%	93	85	178	48	81	129
Taxi	0.6%	6	8	15	8	7	15
Motorcycle, scooter or moped	0.6%	3	3	7	7	13	20
Driving a car or van	62.8%	760	558	1319	642	941	1583
Passenger in a car or van	2.8%	13	44	57	47	26	72
Bicycle	3.1%	34	33	68	32	43	75
On foot	14.3%	148	346	494	72	92	164
Other method of travel to work	0.3%	2	7	9	3	2	4
TOTAL		***1163***	***1157***	***2320***	***965***	***1333***	***2299***

4.8.2. Table 4-23 outlines the same information for the 2048 future year.

Table 4-23 - Total Trips (Internal and External Residential plus Employment) – 2048

WHOLE DEVELOPMENT - 2048		AM Peak			PM Peak		
Mode of Travel	**Modal Split**	**Arr**	**Dep**	**2way**	**Arr**	**Dep**	**2way**
Work mainly at or from home	5.0%	55	190	245	277	154	431
Underground, metro, light rail, tram	0.2%	12	4	16	6	3	9
Train	4.1%	187	64	250	97	212	309
Bus, minibus or coach	6.5%	220	309	529	152	191	343
Taxi	0.6%	15	23	38	25	19	44
Motorcycle, scooter or moped	0.5%	8	12	20	21	28	49
Driving a car or van	59.6%	1710	1908	3618	2104	2319	4423
Passenger in a car or van	3.5%	46	161	208	171	95	266
Bicycle	3.1%	84	119	203	103	108	211
On foot	16.5%	463	1262	1724	255	250	505
Other method of travel to work	0.4%	7	25	32	10	6	15
TOTAL		***2807***	***4077***	***6884***	***3221***	***3384***	***6605***

5 MKE TRIP GENERATION – SCENARIO 2 - FUTURE MOBILITY

5.1 INTRODUCTION

5.1.1. The increasing digitisation of society, with connected and autonomous technologies, zero emission vehicles, shared service models and new forms of electronic payment, are already causing disruption and blurring the boundaries of traditional transport modes.

5.1.2. As it is envisaged that full build out of the Proposed Development is not likely to be completed until some time, currently assumed as 2048, it is essential to consider the evolving transportation landscape and how this may affect the future vehicular and parking infrastructure requirements across the site. This is a key consideration to ensure proposals are future facing.

5.1.3. With that in mind, this note explores the emerging megatrends related to new mobility which impacts our society and highlights user's future needs for travel. These trends are key considerations when designing for the future. This is explored further through the use of WSP's Mobility Masterplanning Tool to forecast future mode share and fleet composition, allowing us to build a picture of what this might mean for future levels of trip making and parking provision.

5.1.4. For example, emerging trends away from diesel and petrol propulsion, as seen through policy initiatives in places like Paris and London, the consideration of Low and Ultra Low Emission Zones, the phasing out of diesel rail vehicles and increasing levels of research into greener fuels and technologies for ships, coupled with commercially viable environmentally alternatives, could see reductions start to occur as the vehicle fleet changes. This uptake is especially observed in Milton Keynes[3] for instance.]

5.1.5. **Appendix A** of this report contains a Future Mobility TN that sets out the application of this approach and background details further.

5.2 FUTURE MOBILITY AND THE MOBILITY MASTERPLANNING TOOL

5.2.1. The following alternative trip generation approach – Scenario 2 – Future Mobility, is designed to ensure that assertions for design including the provision for public transport, mobility services and layout (such as increased car sharing / opportunities for taxi and shared mobility) result in the MKE scheme being Future Ready i.e. a scheme design that is resilient and can accommodate likely potential future mobility scenarios through to 2048. The resultant outcome being incrementally realised throughout the build period as new technologies and mobility services are introduced and adopted and as emerging technologies and mobility services come forwards over time.

5.2.2. The exercise should not be considered a fixed forecast to inform a design representative of a future operational year. However, the ranges presented below outline the potential trip generation and modes which could be adopted (which will then be validated through a bottom-up planning task

[3] DfT Veh1031 Data indicates 6,719 Plug-in cars and light goods vehicles licensed at the end of quarter 2019 Q3 in Milton Keynes UA

informed by supplier engagement) and realised given the period associated with the overall build out and rapidly evolving changes in mobility choice and technologies.

5.2.3. Flexibility is key within the final design, particularly to recognise a number of probable mobility futures. There are significant changes in the short-medium term from electrification and from new mobility business models which will influence how people access private or shared mobility. A very different set of impacts will subsequently arrive from the likely penetration of autonomous vehicles within the vehicle fleet.

5.2.4. To determine the baseline mode share for journeys to and from the development site, the mode shares from the Traditional trip generation scenario has been used.

5.2.5. The mode shares represent the main mode of travel and do not therefore reflect first or last mile journeys. The tables above outline the baseline modal share for MKE derived from a combination of 2011 census data, NTS data and TRICS surveys for the residential and employment land uses.

5.3 FORECASTS

5.3.1. The forecast mode shares shown in the traditional methodology do not include adjustments for sustainable initiatives such as the application of travel plans. As such, they allow a baseline for the Future Mobility approach to utilise and apply future trends and forecasts.

5.3.2. The tool is currently designed for scenarios up to the year 2035, which is still deemed a more useful representation of 2048 than other traditional techniques. It is considered overly robust using the trends up to 2035 as a proxy for the 2048 forecast year, as it is likely alternative mobility strategies will come forward in this period. It is acknowledged however that forecasting far in advance also creates a level of uncertainty, and as such, it is considered appropriate to keep 2048 at the same levels.

5.3.3. Figure 5-1 showcases the Transport Planning approach to trip generation forecasting, resulting in the traditional ‘unadjusted’ future scenarios; whilst Figure 5-2 illustrates how these feed into the Future Mobility ‘adjusted’ future scenarios.

Figure 5-1 - Traditional Transport Planning Approach

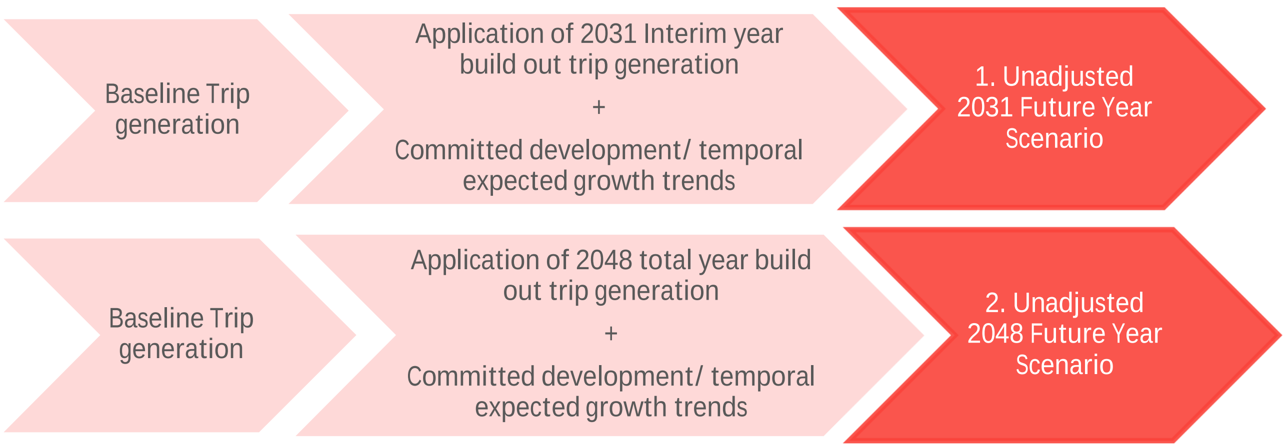
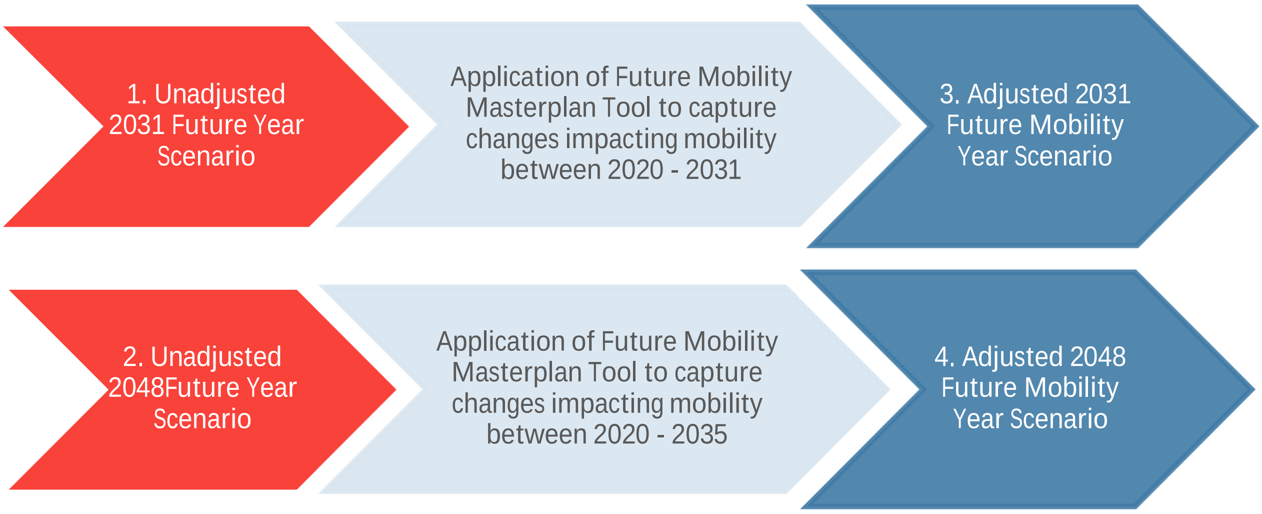


Figure 5-2 - Future Mobility Masterplanning Tool



5.3.4. The scenarios considered in this study are:

1. **Unadjusted 2031 Future Year Scenario –** 2031 traditional methodology scenario (i.e. the scheme forecast derived under traditional trip generation analysis comprising scheme vehicular trip generation + 2031 committed development)
2. **Unadjusted 2048 Future Year Scenario –** 2048 traditional methodology scenario (i.e. the scheme forecast derived under traditional trip generation analysis comprising scheme vehicular trip generation + 2048 committed development)
3. **Adjusted 2031 Future Year Scenario –** Scenario 1 vehicular forecasts applied to 2031 Mobility Masterplanning scenario to form interim occupancy year; and
4. **Adjusted 2048 Future Year Scenario –** Scenario 2 vehicular forecasts applied to 2035 Mobility Masterplanning scenario to represent total buildout scenario.

5.3.5. The forecasts within the Mobility Masterplanning Tool are a result of an extensive literature review, analysis on the implications and adoption of mobility business models and new vehicle technologies, and a projection of a number of existing and forecast DfT datasets.

5.3.6. For the purpose of capturing the full extent of trends and analysis built into the Future Mobility Tool (particularly prior to 2031), the Unadjusted Future Year Scenarios (Scenarios 1 and 2) have been applied to the tool as the 2020 scenario.

5.3.7. The development proposals include both primary and secondary school elements. As such, the traditional methodology already account for the likely change in mode for the uses, based largely on proximity to the residential areas which will use them most.

5.3.8. As a result, whilst mobility services and technologies will change it is considered unlikely that there would be a significant impact on the way in which those education journeys are made given that many of them are on foot or by cycle.

5.3.9. The employment elements of the proposals include office based and other industrial / warehouse based sites. The office based trips are likely to adopt a varying range of modes to reflect the different choices of its staff. The other industrial based trips typically adopt car based trips, and as such the likely trends / mobility measures available to those users are likely to be different.

5.3.10. As a result, it is considered appropriate to apply the Future Mobility approach to the following elements only for robustness;

- Residential Trips (Internal & External combined) – but excluding education trips;
- Employment – B1a Office; and
- Employment – B1c, B2 and B8 uses

5.3.11. Using provisional mode share data shown in Table 5-1, the tool can provide approximate forecasts of mode share between privately owned vehicles and shared mobility (comprising taxi/private hire/bus).

Table 5-1 – Milton Keynes East – Indicative Base year Mode Shares

Mode	Residential (non-education)	Employment (B1a)	Employment (B1c, B2, B8)
Work mainly at or from home	10.0%	0.0%	0.0%
Underground, metro, light rail, tram	0.2%	0.0%	0.4%
Train	3.1%	26.7%	1.1%
Bus, minibus or coach	4.1%	7.0%	7.4%
Taxi	0.6%	1.9%	0.5%
Motorcycle, scooter or moped	0.6%	0.0%	1.0%
Driving a car or van	65.8%	49.6%	82.8%
Passenger in a car or van	6.0%	0.0%	0.0%
Bicycle	3.1%	4.3%	2.8%
On foot	6.0%	10.4%	4.1%
Other method of travel to work	0.3%	0.0%	0.0%

5.3.12. Tables 5-2, 5-3 and 5-4 below represent the percentage change by privately owned or shared mobility mode split in Future Mobility Scenarios for Residential trips (excluding education and escort education trips), Office Employment trips (B1a uses) and other Employment trips (B1c, B2 and B8 uses), respectively.

5.3.13. As shown, the tool focuses sole on vehicle trips and combines similar vehicle modes outlined in Table 5-1 (i.e. 'Driving a car or van' and 'Passenger in car or van' are grouped). 'Shared Mobility' encompasses 'taxi', 'private hire vehicle' and 'bus' trips, as well as any future shared mobility vehicular services to be introduced to the development.

5.3.14. The 2031 Base scenario in tables 5-2, 5-3 and 5-4 represent the traditional Transport Planning approach to future trip generation, i.e. Unadjusted Future with Development Scenario; and have been applied to the Tool as the 2020 Scenario to capture the full extent of trends and analysis built into the tool. It is worth noting that for each scenario, the model illustrates the proportion of privately own vehicles or shared mobility as a total of all vehicle trips, not as a proportion of total trips.

5.3.15. As shown, the tool focuses sole on vehicle trips and combines similar vehicle modes outlined in Table 5-1 (i.e. 'Driving a car or van' and 'Motorcycle, scooter and moped' are grouped to form the privately owned vehicle category). 'Shared Mobility' encompasses 'passenger in a car or van', 'taxi' and 'bus, minibus or coach' trips, as well as any future shared mobility vehicular services to be introduced to the development. An example is detailed below for clarity:

- Table 5-1: Residential (excluding education) – Privately Owned Vehicle;
  - Driving a car or van = 66%
  - Motorcycle, scooter or moped = 1%
  - 67%
- Table 5-1: Residential (excluding education) – Shared mobility;
  - Passenger in a car or van = 6%
  - Taxi = 1%
  - Bus, minibus or coach = 4%
  - 11%
- Table 5-2: Privately owned vehicles (i.e. share of Privately Owned Vehicle / Shared Mobility) = 67% / 78% = 86% of vehicle trips

5.3.16. The 'percentage change in mode' is relative to each mode i.e. a small change to a mode with low levels of initial users results in a higher % change as highlighted by shared mobility.

Table 5-2 – Future Mobility Scenario – Residential (excluding education trips)

Mode	2020*	2031	2035 (representing 2048)	Percentage Change in Mode		
	Base / Traditional	Occupation	Future	% Change in Mode; base to 2031	% Change in Mode; 2031 to 2035	% Change in Mode; base to 2035
Privately owned vehicle	86%	54%	40%	-37%	-26%	-53%
Shared Mobility	14%	46%	60%	345%	-7%	502%

Note: Table illustrates proportion of vehicle trips (car passenger included in Taxi / Private Hire / Shared Mobility)

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

Table 5-3 – Future Mobility Scenario – Employment Trips (B1a use)

Mode	2020	2031	2035 (representing 2048)	Percentage Change in Mode		
	Base / Traditional	Occupation	Future	% Change in Mode; base to 2031	% Change in Mode; 2031 to 2035	% Change in Mode; base to 2035
Privately owned vehicle	85%	72%	62%	-15%	-14%	-27%
Shared Mobility	15%	28%	38%	540%	23%	903%

Note: Table illustrates proportion of vehicle trips (car passenger included in Taxi / Private Hire / Shared Mobility)

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

Table 5-4 – Future Mobility Scenario – Employment Trips (B1c, B2 and B8 uses)

Mode	2020	2031	2035	Percentage Change in Mode		
	Base / Traditional	Occupation	Future	% Change in Mode traditional to 2031	% Change in Mode 2031 to 2035	% Change in Mode traditional to 2035
Privately owned vehicle	92%	91%	89%	0%	-3%	-3%
Shared Mobility	8%	9%	11%	662%	53%	1257%

Note: Table illustrates proportion of vehicle trips (car passenger included in Taxi / Private Hire / Shared Mobility)

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

5.3.17. To note, the percentage change above is relative to each mode i.e. a small change to a mode with low levels of initial users results in a higher % change as highlighted by shared mobility.

5.3.18. The above forecasts indicate that overall reductions are likely to be seen in the proportion of trips to/from the site undertaken in 'Privately owned vehicles' whilst 'Shared mobility' trips are seen to increase.

5.3.19. These forecasts can be attributed to:

1. Initially, the continued evolution of new mobility business models will increase the breadth of mobility services available and offer a viable alternative to personal vehicle ownership. These mobility business models capitalise on the ability to match customers and trips in real-time, to offer customers a more personalised form of mobility:

   - **Ride Sharing** – Schemes/digital platforms that match drivers and passengers who share similar destinations. These operate at both individual and corporation levels. E.g. ViaVan's operations in Milton Keynes since launch in 2018, which include a new ride-sharing trial where concessionary bus passes can be used as payment for ViaVan trips (for old age pensioners and disabled people).
   - **Ride Sourcing** – Real-time, dynamic allocation of customers to drivers based on origin and destination and payment services using pre-approved accounts. Usually rides are in private hire vehicles however increasing offering of micro-transit vehicles to use operating model. E.g. Uber is operational in the Milton Keynes area.
   - **Car Sharing** – On-demand short-term car rentals with the vehicle owned and managed by a fleet operator or private individual.[1] E.g. Enterprise Car Club, as available in locations across Milton Keynes including Newport Pagnell, Pineham and Bletchley.

[1] https://dspace.mit.edu/bitstream/handle/1721.1/104994/960048423-MIT.pdf?sequence=1

2. Emergence of Mobility as a Service (MaaS) schemes, which unlock the use and adoption of both shared and public transport through seamless and personalised information, reservation, booking and payments integration. e.g. Initially Whim (in Birmingham) and more recently CityMapper (in London).
3. Lastly, the adoption of increasingly automated connected and autonomous vehicles which enable travellers to migrate to shared potentially cheaper to operate / use assets; they also provide door-to-door transport whilst providing access on a personal or shared basis. These advances are expected to be commercially deployed at scale within private hire and city taxi fleets from 2025-2030.

5.3.20. Recent changes in government policy support an increased ridership in buses, which will be complemented by a number of different forms of Shared Mobility options. An example is micro-transit services, such as those already being offered by Uber Pool services, which are classified as Light Duty Vehicles (having fewer than 16 seats) and offer a more 'on-demand' and personalised mobility by comparison with conventional bus services. As already mentioned, in Milton Keynes, the ViaVan trial allows concessionary bus pass holders free access, and such services are particularly useful in servicing more vulnerable transport users with sustainable travel options [2]

5.4 RESULTING FUTURE YEAR TRIPS AND COMPARISON AGAINST SCENARIO 1

5.4.1. The application of the Future Mobility trends within the data should be seen as a potential range that could occur in the future years, but will ultimately depend on the designs applied in the site and the uptake of these modes. Given current world events we may find that the choice to work from home becomes more prevalent as people become more engaged with the opportunity to do so and it is seen as a viable option. No allowance is made for this here but as Reserved Matters Applications come forwards for the site and statistical data, including the next Census, becomes available due consideration will be given to any radical changes in travel habits which may occur.

5.4.2. There will be a greater need for monitoring of the development from the first phases onwards to ensure that the site can meet the mobility trends set out. If not, then MKC will be able to liaise with the developers to review measures and adapt / or provide alternatives to ensure that the mode shares set out are achieved.

2031

5.4.3. Tables 5-5, 5-6, 5-7 and 5-8 set out the potential trips that could occur at the site in the 2031 future year. Within the tables are the corresponding numbers from the unadjusted – traditional approach. Note, that the residential - educational trips are unadjusted.

[2] https://www.miltonkeynes.co.uk/news/traffic-and-travel/oaps-and-disabled-people-get-free-travel-electric-vehicles-instead-taking-bus-milton-keynes-1381022

Table 5-5 – Potential - Residential (Non Education) Trips, applying FM Trends - 2031

Scenario	Residential (Non Education) / Mode	AM Peak			PM Peak		
		Arr	Dep	2way	Arr	Dep	2way
2031 - Unadjusted	Privately Owned Vehicle	99	344	443	500	279	779
	Shared Mobility	16	56	72	81	45	126
	Total	**115**	**400**	**515**	**581**	**324**	**905**
2031 - Adjusted FM Scenario	Privately Owned Vehicle	62	217	279	314	176	490
	Shared Mobility	53	183	236	266	149	415
	Total	**115**	**400**	**515**	**581**	**324**	**905**
Adjustment Margin	Privately Owned Vehicle	-37	-128	-164	-185	-103	-289
	Shared Mobility	37	128	164	185	103	289
	Total NET CHANGE	**0**	**0**	**0**	**0**	**0**	**0**

Table 5-6 - Potential - Residential (Education) – no adjustments - 2031

Scenario	Residential (Education) / Mode	AM Peak			PM Peak		
		Arr	Dep	2way	Arr	Dep	2way
2031 - Unadjusted	Privately Owned Vehicle	40	138	178	9	5	14
	Shared Mobility	21	74	96	6	3	9
	Total	**61**	**213**	**274**	**15**	**8**	**23**
2031 - Adjusted FM Scenario	Privately Owned Vehicle	40	138	178	9	5	14
	Shared Mobility	21	74	96	6	3	9
	Total	**61**	**213**	**274**	**15**	**8**	**23**
Adjustment Margin	Privately Owned Vehicle	0	0	0	0	0	0
	Shared Mobility	0	0	0	0	0	0
	Total NET CHANGE	**0**	**0**	**0**	**0**	**0**	**0**

Table 5-7 - Potential Employment – B1a Office Trips – 2031

Scenario	B1a) – Based on 2031 Future Year Scenario / Mode	AM Peak			PM Peak		
		Arr	Dep	2way	Arr	Dep	2way
2031 - Unadjusted	Privately Owned Vehicle	123	11	134	10	119	129
	Shared Mobility	21	3	24	2	21	23
	Total	**143**	**14**	**157**	**12**	**139**	**152**
2031 - Adjusted FM Scenario	Privately Owned Vehicle	105	9	114	9	101	110
	Shared Mobility	31	19	50	11	24	35
	Total	**135**	**29**	**164**	**19**	**126**	**145**
Adjustment Margin	Privately Owned Vehicle	-18	-2	-19	-1	-17	-19
	Shared Mobility	10	16	26	8	4	12
	Total NET CHANGE	**-8**	**15**	**7**	**7**	**-14**	**-7**

Table 5-8 - Potential Employment – B1c / B2 / B8 Trips – 2031

Scenario	(B1C, B2 AND B8) – Based on 2031 Future Year Scenario / Mode	AM Peak			PM Peak		
		Arr	Dep	2way	Arr	Dep	2way
2031 - Unadjusted	Privately Owned Vehicle	503	68	571	130	551	681
	Shared Mobility	54	5	59	14	45	59
	Total	**556**	**73**	**630**	**144**	**596**	**740**
2031 - Adjusted FM Scenario	Privately Owned Vehicle	502	68	571	130	551	681
	Shared Mobility	44	18	62	20	36	56
	Total	**546**	**86**	**633**	**150**	**587**	**737**
Adjustment Margin	Privately Owned Vehicle	0	0	0	0	0	0
	Shared Mobility	-10	13	3	6	-8	-2
	Total NET CHANGE	**-10**	**13**	**3**	**6**	**-9**	**-3**

5.4.4. The resulting 2031 trips demonstrate the potential positive effects from the application of Future Mobility measures at the site.

TOTAL MASTERPLAN – 2031

5.4.5. The Table 5-9 presents the traditional methodology trips, using the future mobility mode classifications, with Table 5-10 showing the total masterplan trips if a Future Mobility approach were to be adopted. Table 5-11 outlines the total difference between the approaches in the 2031 year.

Table 5-9 – 2031 – Total Masterplan, Traditional Methodology Trips

Masterplan - unadjusted	AM Peak			PM Peak		
	Arr	Dep	2way	Arr	Dep	2way
Work mainly at or from home	*15*	*52*	*67*	*75*	*42*	*118*
Underground, metro, light rail, tram	*6*	*1*	*7*	*2*	*1*	*3*
Train	*81*	*18*	*99*	*30*	*86*	*116*
Privately Owned Vehicle	**764**	**562**	**1326**	**649**	**954**	**1603**
Shared Mobility	**112**	**138**	**250**	**103**	**114**	**216**
Bicycle	*34*	*33*	*68*	*32*	*43*	*75*
On foot	*148*	*346*	*494*	*72*	*92*	*164*
Other method of travel to work	*2*	*7*	*9*	*3*	*2*	*4*
Total	**1163**	**1157**	**2320**	**965**	**1333**	**2299**

Table 5-10 – 2031 – Total Masterplan, Future Mobility Trips

Masterplan – adjusted / FM Scenario	AM Peak			PM Peak		
	Arr	Dep	2way	Arr	Dep	2way
Work mainly at or from home	*15*	*52*	*67*	*75*	*42*	*118*
Underground, metro, light rail, tram	*6*	*1*	*7*	*2*	*1*	*3*
Train	*81*	*18*	*99*	*30*	*86*	*116*
Privately Owned Vehicle	**709**	**433**	**1141**	**462**	**833**	**1295**
Shared Mobility	**149**	**295**	**444**	**302**	**212**	**515**
Bicycle	*34*	*33*	*68*	*32*	*43*	*75*
On foot	*148*	*346*	*494*	*72*	*92*	*164*
Other method of travel to work	*2*	*7*	*9*	*3*	*2*	*4*
Total	**1145**	**1185**	**2330**	**978**	**1311**	**2289**

Table 5-11 – 2031 – Total Masterplan - Difference

Difference – Traditional versus FM scenario	AM Peak			PM Peak		
	Arr	Dep	2way	Arr	Dep	2way
Work mainly at or from home	*0*	*0*	*0*	*0*	*0*	*0*
Underground, metro, light rail, tram	*0*	*0*	*0*	*0*	*0*	*0*
Train	*0*	*0*	*0*	*0*	*0*	*0*
Privately Owned Vehicle	**-55**	**-129**	**-184**	**-187**	**-121**	**-308**
Shared Mobility*	**37**	**157**	**194**	**200**	**99**	**298**
Bicycle	*0*	*0*	*0*	*0*	*0*	*0*
On foot	*0*	*0*	*0*	*0*	*0*	*0*
Other method of travel to work	*0*	*0*	*0*	*0*	*0*	*0*
Total Difference	**-18**	**28**	**10**	**13**	**-23**	**-10**

5.4.6. Adopting a Future Mobility based approach shifts approximately 185 and 310 two way private vehicle trips onto shared mobility modes.

TOTAL MASTERPLAN – 2048

5.4.7. Tables 5-12, 5-13, 5-14 and 5-15 set out the potential trips that could occur at the site in the 2048 future year. Note, that the residential - educational trips are unadjusted.

Table 5-12 - Potential Residential (Non Education), applying FM trends - 2048

Scenario	Residential (Non Education) / Mode	AM Peak			PM Peak		
		Arr	Dep	2way	Arr	Dep	2way
2048 - Unadjusted	Privately Owned Vehicle	363	1262	1625	1832	1023	2855
	Shared Mobility	59	204	263	296	165	462
	Total	**422**	**1466**	**1887**	**2129**	**1188**	**3317**
2048 - Adjusted FM Scenario	Privately Owned Vehicle	169	589	758	855	477	1332
	Shared Mobility	252	877	1129	1274	711	1985
	Total	**422**	**1466**	**1887**	**2129**	**1188**	**3317**
Adjustment Margin	Privately Owned Vehicle	-194	-673	-867	-978	-546	-1523
	Shared Mobility	194	673	867	978	546	1523
	Total NET CHANGE	**0**	**0**	**0**	**0**	**0**	**0**

Table 5-13 - Residential (Education) – no adjustments - 2048

Scenario	Residential (Education) / Mode	AM Peak			PM Peak		
		Arr	Dep	2way	Arr	Dep	2way
2048 - Unadjusted	Privately Owned Vehicle	146	507	653	34	19	53
	Shared Mobility	78	273	351	20	11	32
	Total	**224**	**780**	**1004**	**54**	**30**	**84**
2048 - Adjusted FM Scenario	Privately Owned Vehicle	146	507	653	34	19	53
	Shared Mobility	78	273	351	20	11	32
	Total	**224**	**780**	**1004**	**54**	**30**	**84**
Adjustment Margin	Privately Owned Vehicle	0	0	0	0	0	0
	Shared Mobility	0	0	0	0	0	0
	Total NET CHANGE	**0**	**0**	**0**	**0**	**0**	**0**

Table 5-14 - Employment – B1a Office Trips – 2048

Scenario	Employment – B1a Office Trips / Mode	AM Peak			PM Peak		
		Arr	Dep	2way	Arr	Dep	2way
2048 - Unadjusted	Privately Owned Vehicle	278	25	303	23	269	292
	Shared Mobility	47	7	54	6	47	53
	Total	**325**	**32**	**357**	**28**	**316**	**344**
2048 - Adjusted FM Scenario	Privately Owned Vehicle	204	18	222	17	197	214
	Shared Mobility	92	68	160	37	69	106
	Total	**296**	**86**	**382**	**53**	**266**	**319**
Adjustment Margin	Privately Owned Vehicle	-74	-7	-81	-6	-72	-78
	Shared Mobility	45	61	106	31	22	53
	Total NET CHANGE	**-29**	**54**	**25**	**25**	**-50**	**-25**

Table 5-15 - Employment – B1c / B2 / B8 Trips – 2048

Scenario	Employment – B1c / B2 / B8 Trips / Mode	AM Peak			PM Peak		
		Arr	Dep	2way	Arr	Dep	2way
2048 - Unadjusted	Privately Owned Vehicle	931	126	1058	237	1035	1272
	Shared Mobility	97	10	107	25	81	106
	Total	**1029**	**136**	**1165**	**262**	**1117**	**1378**
2048 - Adjusted FM Scenario	Privately Owned Vehicle	902	122	1024	229	1002	1231
	Shared Mobility	89	53	142	61	85	146
	Total	**991**	**175**	**1166**	**291**	**1087**	**1378**
Adjustment Margin	Privately Owned Vehicle	-30	-4	-34	-8	-33	-41
	Shared Mobility	-8	43	35	36	4	40
	Total NET CHANGE	**-38**	**39**	**1**	**29**	**-30**	**-1**

5.4.8. Similar to 2031, the resulting 2048 trips demonstrate the changing trends in Future Mobility measures and how they could be applied at the site. As shown in the Future Mobility Technical Note in Appendix A, there is a forecast increase in mobility trends in 2035 (representing 2048) and as such the level of expected shift becomes greater.

TOTAL MASTERPLAN – 2048

5.4.9. The Table 5-16 presents the traditional methodology trips, using the future mobility mode classifications for the full build out 2048 year, with Table 5-17 showing the total masterplan trips if a Future Mobility approach were to be adopted. Table 5-18 outlines the total difference between the approaches in the 2031 year.

Table 5-16 - 2048 – Total Masterplan, Traditional Methodology Trips

Masterplan (unadjusted)- 2048	AM Peak			PM Peak		
	Arr	Dep	2way	Arr	Dep	2way
Work mainly at or from home	*55*	*190*	*245*	*277*	*154*	*431*
Underground, metro, light rail, tram	*12*	*4*	*16*	*6*	*3*	*9*
Train	*187*	*64*	*250*	*97*	*212*	*309*
Privately Owned Vehicle	**1718**	**1920**	**3638**	**2126**	**2346**	**4472**
Shared Mobility*	**282**	**494**	**775**	**347**	**305**	**652**
Bicycle	*84*	*119*	*203*	*103*	*108*	*211*
On foot	*463*	*1262*	*1724*	*255*	*250*	*505*
Other method of travel to work	*7*	*25*	*32*	*10*	*6*	*15*
Total	**2807**	**4077**	**6884**	**3221**	**3384**	**6605**

Table 5-17 - 2048 – Total Masterplan, Future Mobility Trips

Masterplan (FM Scenario)- 2048	AM Peak			PM Peak		
	Arr	Dep	2way	Arr	Dep	2way
Work mainly at or from home	*55*	*190*	*245*	*277*	*154*	*431*
Underground, metro, light rail, tram	*12*	*4*	*16*	*6*	*3*	*9*
Train	*187*	*64*	*250*	*97*	*212*	*309*
Privately Owned Vehicle	**1420**	**1236**	**2656**	**1135**	**1696**	**2830**
Shared Mobility*	**512**	**1271**	**1783**	**1392**	**876**	**2268**
Bicycle	*84*	*119*	*203*	*103*	*108*	*211*
On foot	*463*	*1262*	*1724*	*255*	*250*	*505*
Other method of travel to work	*7*	*25*	*32*	*10*	*6*	*15*
Total	**2740**	**4170**	**6910**	**3274**	**3305**	**6579**

Table 5-18 - 2048 – Total Masterplan, Difference

Difference 2048 – Unadjusted versus FM scenario	AM Peak			PM Peak		
	Arr	Dep	2way	Arr	Dep	2way
Work mainly at or from home	*0*	*0*	*0*	*0*	*0*	*0*
Underground, metro, light rail, tram	*0*	*0*	*0*	*0*	*0*	*0*
Train	*0*	*0*	*0*	*0*	*0*	*0*
Privately Owned Vehicle	**-298**	**-684**	**-982**	**-991**	**-651**	**-1642**
Shared Mobility*	**231**	**777**	**1008**	**1045**	**571**	**1616**
Bicycle	*0*	*0*	*0*	*0*	*0*	*0*
On foot	*0*	*0*	*0*	*0*	*0*	*0*
Other method of travel to work	*0*	*0*	*0*	*0*	*0*	*0*
Total Difference	**-67**	**93**	**26**	**54**	**-80**	**-26**

5.5 FM SCENARIO COMPARISON AGAINGST MKMMM

5.5.1. Table 5-19 below provides a comparison between the three elements (MKMMM, MKSE and the MKE calculations) including the Future Mobility Scenario.

Table 5-19 - Comparison of Residential Trip Rates (MKMMM, MKSE and MKE)

Source / Site	AM PEAK			PM PEAK		
	Arr	Dep	2way	Arr	Dep	2way
MKMMM*	0.039	0.352	0.391	0.153	0.102	0.255
MKSE**	0.098	0.291	0.389	0.256	0.119	0.375
MKE (internal and external)	0.092	0.319	0.411	0.336	0.188	0.524
MKE (External only)	0.065	0.226	0.291	0.269	0.150	0.419
MKE – FM Scenario – 2031 *1,500 Units – (internal and external)*	0.068	0.237	0.305	0.216	0.120	0.336
MKE – FM Scenario – 2048 *5,500 Units – (internal and external)*	0.057	0.199	0.256	0.162	0.090	0.252

**Based on our assumptions of trips from the MKMMM model for the MKE site*

***Assumed with a 20% reduction for internalisation (understood to be indicative and not agreed between Gallagher's and MKC at this stage)*

5.5.2. Adopting Future Mobility strategies indicates that the residential elements could result in a trip rates which are lower than the standard MKMMM defaults rates in the AM and PM peaks. It should be noted that the PM results are only slightly lower than the MKMMM rates, but are based on future trend analysis and will be the result of design led initiatives that promote sustainable trips throughout the MKE site.

5.5.3. Table 5-20 below shows the total trips (residential and employment) for the site. For comparison, the originally tested HIF flows are included in the table, however it should be noted that these were based on a different quanta of dwellings and employment.

Table 5-20 – MKE – Total Vehicle trips compared to MKMMM HIF assumptions

Total Trips	AM Peak			PM Peak		
	0800-0900			1700-1800		
	Arr	Dep	2way	Arr	Dep	2way
MKMMM - HIF *	1058	2100	3158	894	1524	2418
MKE – 2048 Traditional Approach**	1718	1920	3638	2126	2346	4472
MKE - 2048 Future Mobility**	1420	1236	2656	1135	1696	2830

*5,000 units, plus all employment (including other land holders)

**5,500 units, plus employment (Berkeley and Segro)

5.5.4. The analysis indicates that the Future Mobility approach will seek to shift private vehicles onto other modes. So, whilst the total vehicle trips (compared to the previous HIF modelling) have changed, the number of trips from the development have been accurately forecast to account for the potential uptake in shared mobility. This approach is coupled with the ongoing bottom up masterplan design process, which seeks to account for other modes and their respective design considerations and not solely focused on highway infrastructure.

5.5.1. As discussed further in TN6 – MRT, which is in Appendix B, whilst not explicitly linked with MRT trips, it can be argued that the future mobility adjustments made to trip generation outlined above would also include the changes as a result of a combined MRT / P&R proposal at the site. The change in mode shift from Privately owned vehicle to shared mobility in our analysis is shown in Table 5-21 below;

Table 5-21 - MKE Proposals and shift in mode share to account for Future Mobility

		Change in mode shift		
Year	Type	AM (two way)	PM (two way	Average Change
Interim build out (assumed end of plan period 2031)	Privately Owned Vehicle	-8%	-13%	-11%
	Shared Mobility	8%	13%	11%
2048 Full build out year scenario	Privately Owned Vehicle	-14%	-25%	-20%
	Shared Mobility	15%	25%	20%

5.5.2. It is therefore considered appropriate that the future mobility changes to the trip generation account for MRT to some degree. In reality, the mode shift, including accounting for trip extraction off the network at the Park and Ride site could be higher than that included above, and as such, making no further adjustments to the trip generation (other than the Future Mobility adjustments) is considered robust.

5.5.3. Any adjustments to the trips (applied through a corresponding reduction in the vehicular trips) will be applied to those generated by the site only at this stage and not applied to wider background traffic. Whilst a MRT will clearly benefit a wider catchment than just the MKE site, applying a factor to that traffic could over-estimate the level of trips from elsewhere in the network.

5.5.4. This approach is considered robust and gives a further supporting evidence based approach to applying the adjustments to the trip rates to account for Future Mobility trends. It should be noted that the level of MRT use will therefore be higher (as those outside of the development will also use it) and as such, greater shift away from private vehicle use can be expected.

5.6 NEXT STEPS

5.6.1. In parallel to ongoing discussions with MKC and Highways England over the trip generation characteristics of the site, WSP is also approaching mobility providers with regards to the MKE site in order to understand their business models, plans, appetite for serving the site, etc.

5.6.2. It is intended to review the potential mobility providers further and adopt similar strategies within MKE. This will ensure that the site not only provides infrastructure in line with expected trends, but also ensures that supporting schemes and designs are in place from the beginning of the project.

5.6.3. This will provide further supporting evidence and bespoke information applicable to the site from existing suppliers to underpin the methodology set out above.

5.6.4. This may therefore lead to a slight adjustment in the mode shares applied in the above analysis, but the above Future Mobility trends approach should be seen as a solid foundation from which to assess the impacts from the development which can be refined as and when Reserved Matters Applications come forwards and monitoring of the mode share being realised is undertaken and understood.

6 SUMMARY AND CONCLUSIONS

6.1 CONCLUSIONS

6.1.1. This Technical Note has been prepared to summarise the provisional trip generation associated with the MKE site.

6.1.2. To explore the trip making potential of the proposed development two scenarios for the trip generation have been considered:

- The **'Traditional'** scenario which provides the resultant multi-modal trip generation based upon typical methodologies and a series of sustainable transport initiatives both on and off-site to discourage private car usage. This includes trip internalisation.
- The **'Future Mobility'** scenario which takes the Traditional scenario and makes a series of assumptions about how the way people travel will change in the future based on trends and a series of interventions to provide a future mode share and trip generation.

6.1.3. This approach has been informed by a future mobility tool that includes evidenced trends that could be more representative of the future year scenarios than the 'traditional' approach.

6.1.4. It is proposed to use the Future Mobility scenario to test the development scheme within the MKMMM model.

Appendix A

TN3A - FUTURE MOBILITY APPROACH

TTN3A - MKE – FUTURE MOBILITY TECHNICAL NOTE

DATE	26 June 2020	CONFIDENTIALITY	Restricted
SUBJECT	Milton Keynes East		

1. Introduction

The increasing digitisation of society, and the emergence of connected and autonomous technologies, zero emission vehicles, shared service models and new forms of electronic payment, are already causing disruption and blurring the boundaries of traditional transport modes. How these changes are reflected within the planning of new development is paramount, particularly as the build-out timeline will be realised as these changes come to fruition.

Given the unique nature of Milton Keynes it may lend itself to new modes of transport and associated services which may struggle to integrate as easily in other places. As has been seen already with interventions such as the autonomous pod trials and the ongoing robot delivery services, Milton Keynes is at the cutting edge of new technology implementation. Last years' Milton Keynes Infrastructure Plan considered the role of new and emerging technologies and how these could help realise future ambitions.

Flexibility is key within the scheme design, particularly to recognise a number of possible mobility futures. One guide to the potential futures is through the application of the WSP's Mobility Masterplanning Tool, which relates these trends to traditional trip generation analysis, helping to forecast changes to private vehicle ownership and fleet composition. This can help guide scheme design for future levels of trip making and parking requirements. The tool draws upon a wide range of current research and forecasts for car ownership trends, mode share changes and patterns in trip making characteristics that fit within a series of megatrends for the way in which people access private or shared mobility.

As such, this technical note seeks to explore an alternative mobility future to that within the traditional trip generation analysis prepared for the Milton Keynes East development site (*TN: Milton Keynes East – Trip Generation and Future Mobility*). The exercise is intended to ensure that assumptions for design, including parking spaces, are robust and that wider thinking on possible futures has been considered. Ultimately, the exercise seeks to ensure that the Milton Keynes East scheme is Future Ready – i.e. a scheme design that is resilient and can accommodate likely potential future mobility scenarios through to 2035. In this sense, 2035 has been used as reference to the proposed 2048 full build out scenario.

For clarity, the exercise should not be considered a forecast to inform a fixed design representative of a future operational year (as is expected within the traditional development trip generation methodology), instead it can help guide the bottom-up planning of shared mobility interventions to help realise a future of reduced private car ownership.

2. Future Trip Generation Study

Error! Reference source not found. outlines the baseline modal share for Milton Keynes derived from 2011 census data for the residential uses and TRICS data for the employment land uses.

Table 1-1 – Milton Keynes East – Base Mode Share by land uses

Mode	Residential	Employment (B1a)	Employment (B1c, B2, B8)
Work mainly at or from home	10.0%	0.0%	0.0%
Underground, metro, light rail, tram	0.2%	0.0%	0.4%
Train	3.1%	26.7%	1.1%
Bus, minibus or coach	4.1%	7.0%	7.4%
Taxi	0.6%	1.9%	0.5%
Motorcycle, scooter or moped	0.6%	0.0%	1.0%
Driving a car or van	65.8%	49.6%	82.8%
Passenger in a car or van	6.0%	0.0%	0.0%
Bicycle	3.1%	4.3%	2.8%
On foot	6.0%	10.4%	4.1%
Other method of travel to work	0.3%	0.0%	0.0%

Using provisional mode share data (**Error! Reference source not found.**), WSP's Mobility Masterplanning Tool can provide approximate forecasts of mode share between privately owned vehicles (comprising 'driving a car or van' and 'motorcycle, scooter or moped') and shared mobility (comprising 'passenger in a car or van', 'taxi' and 'bus, minibus or coach'). It is understood that the changes outlined above are not usually considered in traditional Transport Planning approach for Future Baseline Scenarios, which instead focuses on predicting development traffic based on existing trends in combination with committed developments in the vicinity of the site and/or temporal expected growth trends.

The Mobility Masterplan Tool therefore is used to consider the introduction and adoption of new business models and emerging technologies, as well as the social, political, environmental and demographic trends described above to any future baseline as an indication of potential future scenarios. 2031 is recognised as year of interim occupation of the development, with 1,500 residential units build out and approximately 53% employment land use build out; and 2048 is recognised as final total build out of the development quantum. The tool is currently designed for scenarios up to the year 2035, which is still deemed a more useful representation of 2048 than other traditional techniques.

The use of The Mobility Masterplan Tool for 2048 is considered robust, as it is likely that the continuing trends of digitisation and mobility as a service will produce travel options beyond private vehicle use between 2035 and 2048. As such, it is considered appropriate to use the tools 2035 year forecast to represent 2048, however it is acknowledged that in reality, the mode shift is likely to be greater than suggested.

Figure 1-1 showcases the Transport Planning approach to trip generation forecasting, resulting in the *traditional* 'unadjusted' future scenarios; whilst Figure 1-2 illustrates how these feed into the *Future Mobility* 'adjusted' future scenarios.

Figure 1-1 – Traditional Transport Planning Approach

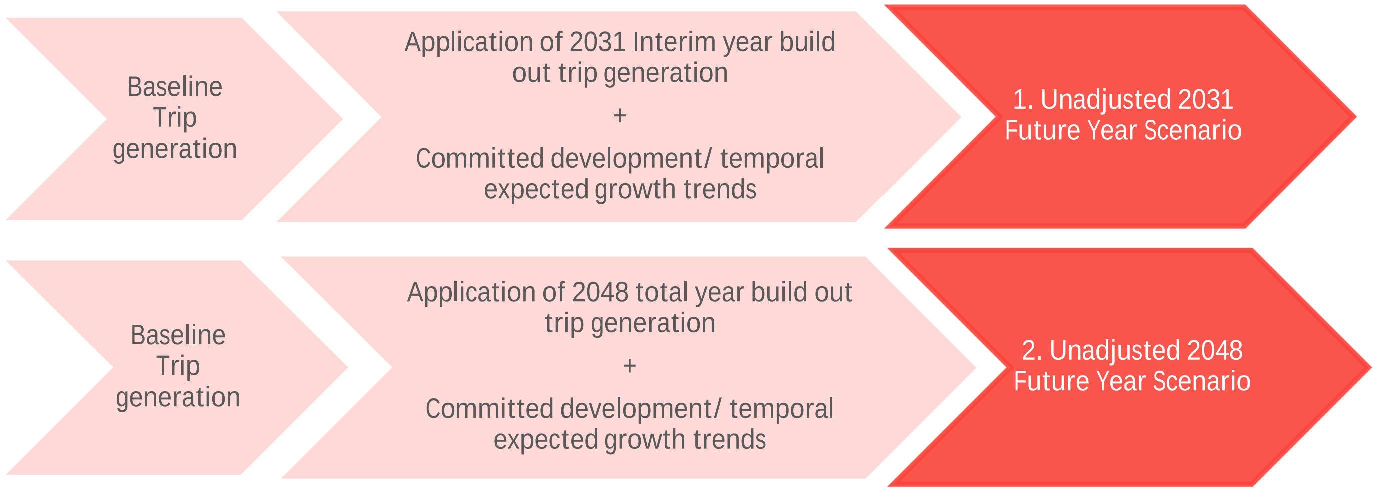
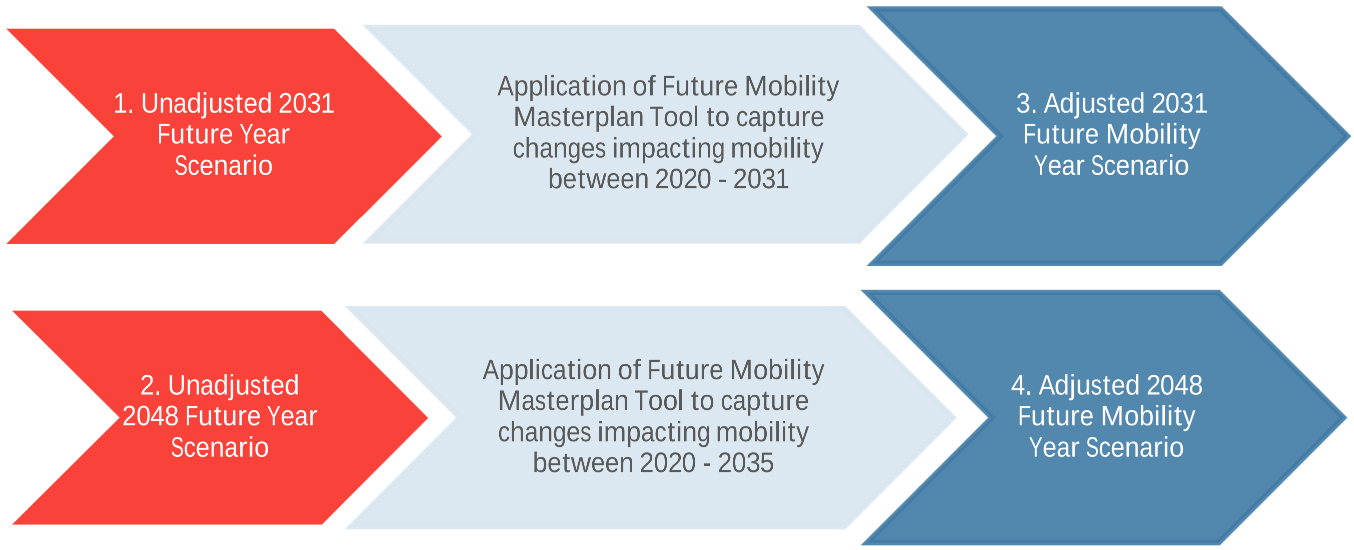


Figure 1-2 – Future Mobility Masterplanning Tool



The scenarios considered in the study are hereafter referred to as:

1. **Unadjusted 2031 Future Year Scenario –** 2031 *traditional methodology* scenario (i.e. the scheme forecast derived under traditional trip generation analysis comprising scheme vehicular trip generation + 2031 committed development)

2. **Unadjusted 2048 Future Year Scenario –** 2048 *traditional methodology* scenario (i.e. the scheme forecast derived under traditional trip generation analysis comprising scheme vehicular trip generation + 2048 committed development)

3. **Adjusted 2031 Future Year Scenario –** Scenario 1 vehicular forecasts applied to 2031 Mobility Masterplanning scenario to form interim occupancy year; and

4. **Adjusted 2048 Future Year Scenario –** Scenario 2 vehicular forecasts applied to 2035 Mobility Masterplanning scenario to represent total buildout scenario.

Tables 1-2, 1-3 and 1-4 below represent the percentage change by privately owned or shared mobility mode split in Future Mobility Scenarios for Residential trips (excluding education and escort education trips), Office Employment trips (B1a uses) and other Employment trips (B1c, B2 and B8 uses), respectively.

For the purpose of capturing the full extent of trends and analysis built into the Future Mobility Tool (particularly prior to 2031), the Unadjusted Future Year Scenarios (Scenarios 1 and 2) have been applied to the tool as the 2020 scenario. As shown, the tool focuses sole on vehicle trips and combines similar vehicle modes outlined in Table 1-1 (i.e. 'Driving a car or van' and 'Motorcycle, scooter and moped' are grouped to form the privately owned vehicle category). 'Shared Mobility' encompasses 'passenger in a car or van', 'taxi' and 'bus, minibus or coach' trips, as well as any future shared mobility vehicular services to be introduced to the development.

Table 1-2 – Future Mobility Trajectory – Residential (excluding education trips)

Mode	2031*	2031	2035	Percentage Change in Mode		
	Base / Traditional	Interim Occupation	Future	% Change in Mode traditional to 2031	% Change in Mode 2031 to 2035	% Change in Mode traditional to 2035
Privately owned vehicle	86%	54%	40%	-37%	-26%	-53%
Shared Mobility	14%	46%	60%	345%	-7%	502%

*Note: Table illustrates proportion of vehicle trips (car/van passenger included in Shared Mobility) * 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

Table 1-3 – Future Mobility Trajectory – Employment Trips (B1a use)

Mode	2031*	2031	2035	Percentage Change in Mode		
	Base / Traditional	Occupation	Future	% Change in Mode traditional to 2031	% Change in Mode 2031 to 2035	% Change in Mode traditional to 2035
Privately owned vehicle	85%	72%	62%	-15%	-14%	-27%
Shared Mobility	15%	27%	38%	540%	23%	903%

*Note: Table illustrates proportion of vehicle trips (car/van passenger included in Shared Mobility) * 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

Table 1-4 – Future Mobility Trajectory – Employment Trips (B1c, B2 and B8 uses)

Mode	2031*	2031	2035	Percentage Change in Mode		
	Base / Traditional	Occupation	Future	% Change in Mode traditional to 2031	% Change in Mode 2031 to 2035	% Change in Mode traditional to 2035
Privately owned vehicle	92%	91%	89%	0%	-3%	-3%
Shared Mobility	8%	9%	11%	662%	53%	1257%

*Note: Table illustrates proportion of vehicle trips (car/van passenger included Shared Mobility) * 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

To note, the percentage change above is relative to each mode i.e. a small change to a mode with low levels of initial users results in a higher % change as highlighted by shared mobility.

The above forecasts indicate that overall reductions are likely to be seen in the proportion of trips to/from the site undertaken in 'Privately owned vehicles' whilst 'Shared mobility' trips are seen to increase.

These forecasts can be attributed to:

1. Initially, the continued evolution of new mobility business models will increase the breadth of mobility services available and offer a viable alternative to personal vehicle ownership. These mobility business models capitalise on the ability to match customers and trips in real-time, to offer customers a more personalised form of mobility:
    - **Ride Sharing** – Schemes/digital platforms that match drivers and passengers who share similar destinations. These operate at both individual and corporation levels. E.g. ViaVan's operations in Milton Keynes since launch in 2018, which include a new ride-sharing trial where concessionary bus passes can be used as payment for ViaVan trips (for old age pensioners and disabled people).
    - **Ride Sourcing** – Real-time, dynamic allocation of customers to drivers based on origin and destination and payment services using pre-approved accounts. Usually rides are in private hire vehicles however increasing offering of micro-transit vehicles to use operating model. E.g. Uber is operational in the Milton Keynes area.
    - **Car Sharing** – On-demand short-term car rentals with the vehicle owned and managed by a fleet operator or private individual.[1] E.g. Enterprise Car Club, as available in locations across Milton Keynes including Newport Pagnell, Pineham and Bletchley.

2. Emergence of Mobility as a Service (MaaS) schemes, which unlock the use and adoption of both shared and public transport through seamless and personalised information, reservation, booking and payments integration. e.g. Initially Whim (in Birmingham) and more recently CityMapper (in London).

3. Lastly, the adoption of increasingly automated connected and autonomous vehicles which enable travellers to migrate to shared potentially cheaper to operate / use assets; they also provide door-to-door transport whilst providing access on a personal or shared basis. These advances are expected to be commercially deployed at scale within private hire and city taxi fleets from 2025-2030.

Recent changes in government policy support an increased ridership in buses, which will be complemented by a number of different forms of Shared Mobility options. An example is micro-transit services, such as those already being offered by Uber Pool services, which are classified as Light Duty Vehicles (having fewer than 16 seats) and offer a more 'on-demand' and personalised mobility by comparison with conventional bus services. As already mentioned, in Milton Keynes, the ViaVan trial allows concessionary bus pass holders free access, and such services are particularly useful in servicing more vulnerable transport users with sustainable travel options. [2]

The continued growth and evolution of these new forms of mobility is very dependent on future external levers, such as the regulatory environment, the affordability and acceptability of technology, and the

[1] https://dspace.mit.edu/bitstream/handle/1721.1/104994/960048423-MIT.pdf?sequence=1
[2] https://www.miltonkeynes.co.uk/news/traffic-and-travel/oaps-and-disabled-people-get-free-travel-electric-vehicles-instead-taking-bus-milton-keynes-1381022

customers' willingness to share. Wider automotive sector trends already indicate how transport offerings are influencing customer behaviours:

- **Driving licencing** amongst young people has been falling since a peak of 48% (17-20 year olds) and 75% (21-29year olds) in 1993, to 29% and 63% respectively in 2014; with research suggesting that changing behaviours are more than just a postponement of driving. [3]

- **Traditional car manufacturers**, concerned about losing customer ownership, are actively planning and investing in integrated mobility services. VW Group, for example, has developed the MOIA demand responsive transit (DRT) service, offering a fully electric luxury passenger experience which users can order, book and pay for on an app. MOIA is operational in Hamburg and Hanover.. [4] [5]

- Rates of **urbanisation** are increasing and city residents are being pressed to reassess the benefits of personal vehicle ownership as the breadth of mobility services available increases.[6]

- Increasing prevalence of **telecommuting** to allow working from home, hub or remote working on the move.

Consumers may be hesitant to go completely car-free despite potential future cost savings and personalised on-demand service offerings, however 'urbanisation trends and rider habits suggest that new vehicle sales will continue to decline for the foreseeable future'.[7]

To note, the future trends above are representative of the wider network and the vision for Milton Keynes East would be expected to push the boundary for shifts in sustainable travel modes. The existing baseline mode share used within the assessment focusses on Milton Keynes (**Error! Reference source not found.**) and we would expect residents and workers at Milton Keynes East to select greater levels of sustainable travel options from the outset.

2. Fleet Composition

The Mobility Masterplanning Tool has also been used to indicate the forecast fleet composition for an increasingly automated (proportion with Level 4 or 5 automated capabilities as defined by Society of Automotive Engineers (SAE) standard J3016-2018) and electrified fleet (proportion of Ultra Low Emission Vehicles (ULEVs) versus Internal Combustion Engine (ICE). The forecast can provide an indication of the variation in electric vehicle charging infrastructure needs across the different vehicle access modes.

To date, the relative uptake of ULEV has been significant for taxi and private hire services, as fleets have been the earliest to be electrified. This effect will be accelerated with the introduction of Level 4 or 5 vehicles, as an increased utilisation of vehicle fleets leads to quicker fleet replacement rates (replaced by further ULEVs). The introduction of highly automated vehicles is also fastest in taxi/ private hire/ shared mobility fleets, which will most likely represent the urban taxi fleet in 2035. Trends show a slower uptake observed for privately owned vehicles.

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[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/673176/young-peoples-travel-whats-changed.pdf
[4] https://www.moia.io/en/
[5] https://www.moia.io/en/blog/We-are-lacking-imagination/London-here-we-come-
[6] https://www.bbc.co.uk/news/uk-44482291
[7] https://ww2.frost.com/frost-perspectives/reassessing-vehicle-ownership-era-shared-mobility/

3. APPENDIX

Scenario Summary

Figure 3-1 – Traditional Transport Planning Approach

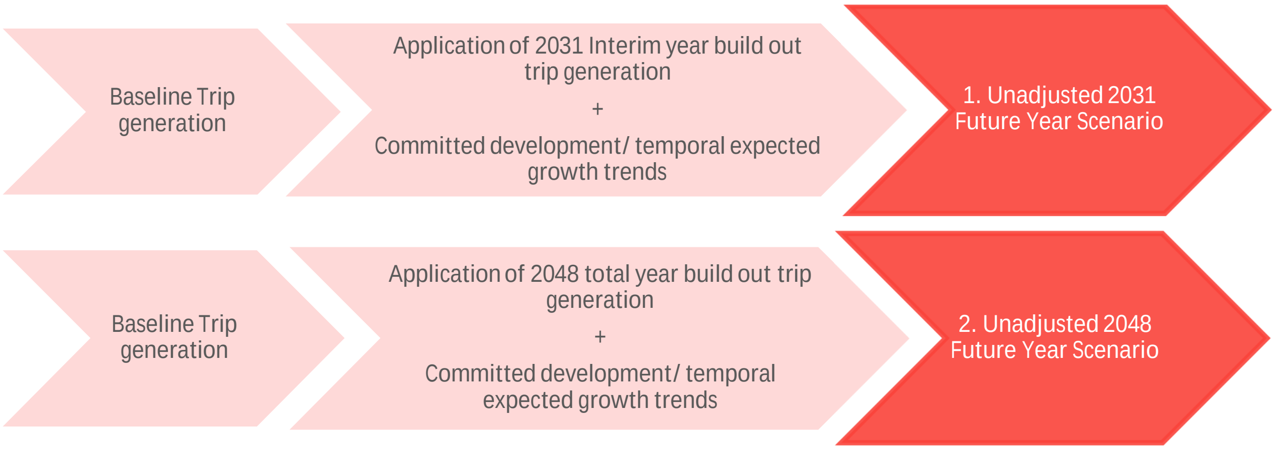
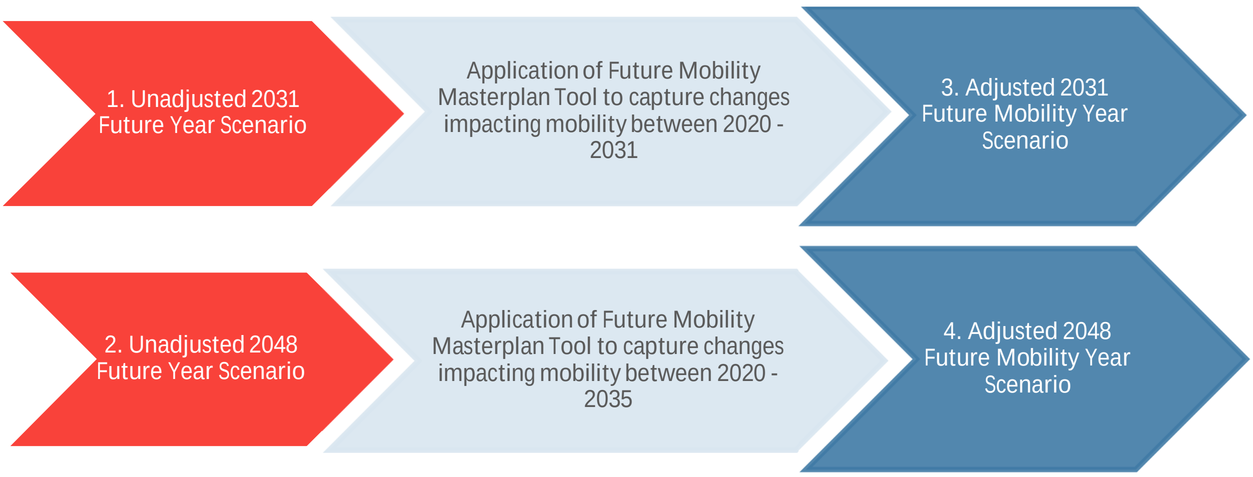


Figure 3-2 – Future Mobility Masterplanning Tool



The scenarios considered in the study are hereafter referred to as:

1. **Unadjusted 2031 Future Year Scenario –** 2031 *traditional methodology* scenario (i.e. the scheme forecast derived under traditional trip generation analysis comprising scheme vehicular trip generation + 2031 committed development)
2. **Unadjusted 2048 Future Year Scenario –** 2048 *traditional methodology* scenario (i.e. the scheme forecast derived under traditional trip generation analysis comprising scheme vehicular trip generation + 2048 committed development)
3. **Adjusted 2031 Future Year Scenario –** Scenario 1 vehicular forecasts applied to 2031 Mobility Masterplanning scenario to form interim occupancy year; and
4. **Adjusted 2048 Future Year Scenario –** Scenario 2 vehicular forecasts applied to 2035 Mobility Masterplanning scenario to represent total buildout scenario.

As alluded to, the Tool incorporates the introduction and adoption of new business models and emerging technologies, as well as the social, political, environmental and demographic trends, which are not considered in the traditional transport planning approach. Therefore, for the purpose of capturing the full extent of trends and analysis built into the Future Mobility Tool (particularly prior to 2031), the Unadjusted Future Year Scenarios (Scenarios 1 and 2) have been applied to the tool as the 2020 scenario.

An interim year is included in the tables below, to showcase the trajectory of mobility trends from the base year to the Future Scenario year (2031 or 2048); i.e. the relative pace of change in mode composition (privately owned vehicle/ shared mobility) over time. In the Adjusted 2031 Future Scenario, the interim year showcases mobility trends up to the year 2025, whilst for the Adjusted 2048 Future Scenario, the interim year showcases mobility trends up to the year 2031.

The Tool is currently designed for scenarios up to the year 2035. Whilst the total build-out year is understood to be 2048, the 2035 Future Mobility Scenario is deemed a useful representation of mobility trends at the total build-out year.

Mode Share and Percentage Change Derived from New Mobility Masterplanning Tool

Table 3-1 – 2031 Future Mobility Scenario – Residential Trips (non-education)

Mode	2031*	2025	2031	Percentage Change in Mode		
	Base / unadjusted	Occupation	Future	Percentage Change in Mode 2020 to 2025	Percentage Change in Mode 2025 to 2031	Percentage Change in Mode 2020 to 2031
Privately owned vehicle	86%	75%	54%	-13%	-28%	-37%
Shared Mobility	14%	25%	46%	109%	64%	345%
Total	100%	100%	100%	97%	36%	308%

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

Table 3-2 – 2031 Future Mobility Scenario – Employment B1a

Mode	2031*	2025	2031	Percentage Change in Mode		
	Base / Traditional	Occupation	Future	Percentage Change in Mode 2020 to 2025	Percentage Change in Mode 2025 to 2031	Percentage Change in Mode 2020 to 2031
Privately owned vehicle	85%	84%	72%	-1%	-14%	-15%
Shared Mobility	15%	16%	28%	151%	116%	540%
Total	100%	100%	100%	150%	103%	525%

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

Table 3-3 – 2031 Future Mobility Scenario – Employment B1c, B2 and B8

Mode	2031*	2025	2031	Percentage Change in Mode		
	Base/ Traditional	Occupation	Future	Percentage Change in Mode 2020 to 2025	Percentage Change in Mode 2025 to 2031	Percentage Change in Mode 2020 to 2031
Privately owned vehicle	91%	94%	91%	2%	-2%	0%
Shared Mobility	9%	6%	9%	164%	157%	665%
Total	100%	100%	100%	166%	155%	665%

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

Table 3-4 – 2048 Future Mobility Scenario – Residential Trips (non-education)

Mode	2031*	2031	2035**	Percentage Change in Mode		
	Base/ Traditional	Occupation	Future	Percentage Change in Mode 2020 to 2031	Percentage Change in Mode 2031 to 2035	Percentage Change in Mode 2020 to 2035
Privately owned vehicle	86%	54%	40%	-37%	-26%	-53%
Shared Mobility	14%	46%	60%	345%	-7%	502%
Total	100%	100%	100%	308%	-33%	449%

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

*** 2035 Future represents the 2048 Future Mobility scenario*

Table 3-5 – 2048 Future Mobility Scenario – Employment B1a

Mode	2031*	2031	2035**	Percentage Change in Mode		
	Base/ Traditional	Occupation	Future	Percentage Change in Mode 2020 to 2031	Percentage Change in Mode 2031 to 2035	Percentage Change in Mode 2031 to 2035
Privately owned vehicle	85%	72%	62%	-15%	-14%	-27%
Shared Mobility	15%	28%	38%	540%	23%	903%
Total	100%	100%	100%	525%	9%	876%

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

*** 2035 Future represents the 2048 Future Mobility scenario*

Table 3-6 – 2048 Future Mobility Scenario – Employment B1c, B2 and B8

Mode	2031*	2031	2035**	Percentage Change in Mode		
	Base/ Traditional	Occupation	Future	Percentage Change in Mode 2020 to 2031	Percentage Change in Mode 2031 to 2035	Percentage Change in Mode 2020 to 2035
Privately owned vehicle	92%	91%	89%	0%	-3%	-3%
Shared Mobility	8%	9%	11%	662%	53%	1257%
Total	100%	100%	100%	662%	50%	1254%

** 2031 Base represents the traditional Transport Planning approach to future trip generation, i.e. Future with Development Scenario; and has been applied to the Tool as the 2020 Scenario*

*** 2035 Future represents the 2048 Future Mobility scenario*

Trip Generation Net Change

RESIDENTIAL TRIPS (NON-EDUCATION) – BASED ON 2031 FUTURE YEAR SCENARIO

Table 3-7 – Unadjusted 2031 Future Year Scenario (representing 2020 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	99	344	443	500	279	779
Shared Mobility	16	56	72	81	45	126
Total	**115**	**400**	**515**	**581**	**324**	**905**

Note: Values are subject to rounding errors

Table 3-8 – Adjusted 2031 Future Year Scenario

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	62	217	279	314	176	490
Shared Mobility	53	183	236	266	149	415
Total	**115**	**400**	**515**	**581**	**324**	**905**

Note: Values are subject to rounding errors

Table 3-9 – Adjustment margin (representing Net Change 2020 - 2031)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	-37	-128	-164	-185	-103	-289
Shared Mobility	37	128	164	185	103	289
Total Net Change	**0**	**0**	**0**	**0**	**0**	**0**

Note: Values are subject to rounding errors

EMPLOYMENT TRIPS (B1A) – BASED ON 2031 FUTURE YEAR SCENARIO

Table 3-10 – Unadjusted 2031 Future Year Scenario (representing 2020 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	123	11	134	10	119	129
Shared Mobility	21	3	24	2	21	23
Total	**143**	**14**	**157**	**12**	**139**	**152**

Note: Values are subject to rounding errors

Table 3-11 – Adjusted 2031 Future Year Scenario

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	105	9	114	9	101	110
Shared Mobility	31	19	50	11	24	35
Total	**135**	**29**	**164**	**19**	**126**	**145**

Note: Values are subject to rounding errors

Table 3-12 – Adjustment margin (representing Net Change 2020 - 2031)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	-18	-2	-19	-1	-17	-19
Shared Mobility	10	16	26	8	4	12
Total Net Change	**-8**	**15**	**7**	**7**	**-14**	**-7**

Note: Values are subject to rounding errors

EMPLOYMENT TRIPS (B1C, B2 AND B8) – 2031 BASE/ TRADITIONAL TRAJECTORY

Table 3-13 – Unadjusted 2031 Future Year Scenario (representing 2020 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	503	68	571	130	551	681
Shared Mobility	54	5	59	14	45	59
Total	**556**	**73**	**630**	**144**	**596**	**740**

Note: Values are subject to rounding errors

Table 3-14 – Adjusted 2031 Future Year Scenario

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	502	68	571	130	551	681
Shared Mobility	44	18	62	20	36	56
Total	**546**	**86**	**633**	**150**	**587**	**737**

Note: Values are subject to rounding errors

Table 3-15 – Adjustment margin (representing Net Change 2020 - 2031)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	0	0	0	0	0	0
Shared Mobility	-10	13	3	6	-8	-2
Total	**-10**	**13**	**3**	**6**	**-9**	**-3**

Note: Values are subject to rounding errors

RESIDENTIAL TRIPS (NON-EDUCATION) – BASED ON 2048 FUTURE YEAR SCENARIO

Table 3-16 – Unadjusted 2048 Future Year Scenario (representing 2020 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	363	1262	1625	1832	1023	2855
Shared Mobility	59	204	263	296	165	462
Total	**422**	**1466**	**1887**	**2129**	**1188**	**3317**

Note: Values are subject to rounding errors

Table 3-17 – Adjusted 2031 Future Year Scenario

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	228	794	1022	1153	644	1797
Shared Mobility	193	672	865	976	545	1520
Total	**422**	**1466**	**1887**	**2129**	**1188**	**3317**

Note: Values are subject to rounding errors

Table 3-18 – Adjusted 2035 Future Year Scenario (representing 2048 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	169	589	758	855	477	1332
Shared Mobility	252	877	1129	1274	711	1985
Total	**422**	**1466**	**1887**	**2129**	**1188**	**3317**

Note: Values are subject to rounding errors

Table 3-19 – Adjustment margin (representing Net Change 2020 - 2048)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	-194	-673	-867	-978	-546	-1523
Shared Mobility	194	673	867	978	546	1523
Total	**0**	**0**	**0**	**0**	**0**	**0**

Note: Values are subject to rounding errors

EMPLOYMENT (B1A) – BASED ON 2048 FUTURE YEAR SCENARIO

Table 3-20 – Unadjusted 2048 Future Year Scenario (representing 2020 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	278	25	303	23	269	292
Shared Mobility	47	7	54	6	47	53
Total	**325**	**32**	**357**	**28**	**316**	**344**

Note: Values are subject to rounding errors

Table 3-21 – Adjusted 2031 Future Year Scenario

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	237	21	259	19	230	249
Shared Mobility	70	44	114	24	55	80
Total	**307**	**65**	**373**	**44**	**285**	**329**

Note: Values are subject to rounding errors

Table 3-22 – Adjusted 2035 Future Year Scenario (representing 2048 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	204	18	222	17	197	214
Shared Mobility	92	68	160	37	69	106
Total	**296**	**86**	**382**	**53**	**266**	**319**

Note: Values are subject to rounding errors

Table 3-23 – Adjustment margin (representing Net Change 2020 - 2048)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	-74	-7	-81	-6	-72	-78
Shared Mobility	45	61	106	31	22	53
Total	**-29**	**54**	**25**	**25**	**-50**	**-25**

Note: Values are subject to rounding errors

EMPLOYMENT (B1C, B2 AND B8) – BASED ON 2048 FUTURE YEAR SCENARIO

Table 3-24 – Unadjusted 2048 Future Year Scenario (representing 2020 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	931	126	1058	237	1035	1272
Shared Mobility	97	10	107	25	81	106
Total	**1029**	**136**	**1165**	**262**	**1117**	**1378**

Note: Values are subject to rounding errors

Table 3-25 – Adjusted 2031 Future Year Scenario

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	927	126	1053	236	1031	1267
Shared Mobility	79	32	111	41	71	113
Total	**1006**	**158**	**1164**	**277**	**1102**	**1380**

Note: Values are subject to rounding errors

Table 3-26 – Adjusted 2035 Future Year Scenario (representing 2048 Scenario)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	902	122	1024	229	1002	1231
Shared Mobility	89	53	142	61	85	146
Total	**991**	**175**	**1166**	**291**	**1087**	**1378**

Note: Values are subject to rounding errors

Table 3-27 – Adjustment margin (representing Net Change 2020 - 2048)

Mode	AM			PM		
	In	Out	Total	In	Out	Total
Privately Owned Vehicle	-30	-4	-34	-8	-33	-41
Shared Mobility	-8	43	35	36	4	40
Total	**-38**	**39**	**1**	**29**	**-30**	**-1**

Note: Values are subject to rounding errors

Appendix B

TN6 - MRT REVIEW NOTE

PROVIDED IN FULL WITHIN APPENDIX A.6

Appendix C

30 APRIL 2020 - MEETING NOTES

Internal

MEETING NOTES
MILTON KEYNES EAST

MEETING DATE	30 April 2020	**MEETING TIME**	15:00 – 17:00
MEETING SUBJECT	Milton Keynes East – Highways and Planning	**VENUE**	ONLINE CON CALL
ATTENDEES	**MKC** Steve Hayes (SH) Andrew Turner (AT), Phil Caves (PC), Nigel Weeks (NW) – *SMT on behalf of MKC*, (could not attend call) James Povey (JP), Martin Tate (MT) **Berkeley** Ashley Spearing (AS), Ryan James (RJ)	**WSP** Allan Norcutt (AN), Ana Gonzalez (AG), Alex Smith (ASm), Filip Imramovsky (FI) **Lichfields** Martin Taylor (MTa)	
CONFIDENTIALITY	**Confidential**		

ITEM	SUBJECT	ACTION
1	**Introductions and Purpose of Meeting** ASm outlined that the purpose of the call was to progress the modelling aspects of the MKE application, largely focusing on the strategic MKMMM model inputs and agreed approaches. Linked with this, as it influences both modelling and design, decisions were also needed on some of the highway infrastructure. Prior to the call, the following draft documents were issued; - Transport Assessment Scoping Note (Draft) - TTN4 – 2039 Growth and Future Year (Draft) - TTN5 – Link Flow Capacity review (Draft)	
2	**Update on MKE and Programme** The MKE site is currently developing proving layouts for the residential and employment elements. A number of internal workshops have been	

ITEM	SUBJECT	ACTION
	progressed to further the design aspects, including highways and access consideration. There have been separate highways focused meetings with MKC over corridor widths and consideration of the MKC Design Guide within the scheme. WSP are progressing supporting documentation to support both the application and the development specific model tests, e.g. Trip Generation notes. Before these can be finalised an agreement on the modelling approach is required (Item 3 below). The intention is to agree items that will allow MKC and their consultants AECOM to progress the reference case model whilst development specific inputs are agreed. WSP and Berkeley are developing a programme that will be shared with everyone that seeks to agree deliverables and key decision points. As part of this programme, there is a need to agree the review periods required by MKC (and other parties, such as Highways England for example) before receiving comments back. It would be appreciated if MKC are happy to commit to timescales.	
3	**General modelling approach (allocation vs accounting for site specific details)** It was explained that typically an application would assess its own red line. The added complexity of being part of a wider allocation has resulted in the need to agree the best way to assess the scheme whilst ensuring that the cumulative effects of other land holdings are taken into account. It was discussed that the Berkeley land covers the majority of the developable area within the allocated site, but it was 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. 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. It was suggested that a higher number of residential units is tested to account for this variability. It was suggested that 10% uplift on the allocation number (residential units) could be suitable.	

ITEM	SUBJECT	ACTION
	This approach was agreed as being sensible to ensure that the level of infrastructure is adequate for the site and that any off-site mitigation is reviewed appropriately. It was agreed that the full development allocation (including uplift) would be tested. A review of the zone impacts would be undertaken to then allow a review of which land holder site was causing impacts (akin to select link analysis). This would allow MKC to assess each of the land holdings included in the allocation under a consistent modelled approach. MKC also outlined that in terms of mitigation, the tariff approach may be used to proportion any off-site costs based on the number of units per land holder / application. In terms of policy, testing the full allocation would be acceptable to MKC. **NB**. This is dependent on the modelling allowing this process to happen. MT and AECOM will review whether it is possible to extract zone / development specific trips / impacts should a full allocation be tested. It was considered that this would be likely feasible, however this needs to be reviewed. A fall back position will be to review development red line specific tests against a wider allocation scenario. This would require additional model runs and associated costs / delays to the programme. It is understood that Bloor have begun discussions with MKC over the TA scoping etc. Although no details on those discussions were available, there was a risk that alternative methods / assessments may be suggested that do not align with the wider site. We are aware that Segro have also submitted an application for the employment on the western edge of the allocation. It is unclear if the material submitted as part of the application accounts for the wider allocation. It was suggested that all the sites attached to the allocation would be required to undertake modelling in a consistent and similar manner.	**MKC** – to review model
4	**Review of highway infrastructure; which links could potentially be single lane or dualled,** TTN5 was submitted prior to the meeting to enable further discussions whilst on the call over whether certain links need to be dual carriageway or if single lane carriageways were sufficient.	

ITEM	SUBJECT	ACTION
	The note used outputs from a previous version of a MKMMM scenario and reviewed a number of highway links. It was explained that the site should be delivering an exemplar location that is not dependent on highway infrastructure. This would step back from predict and provide modelling approaches and instead focus on sustainable travel and design. MKC agreed that if the modelling supported the decision base that single lane would be adequate then this would be acceptable. The modelling outputs indicate that the eastern perimeter road could be single lane carriageway and still provide sufficient capacity. It is noted that MKC raised concern over this, however it was agreed that as the data supports this assertion then this would be agreeable. As part of general highways discussions, WSP are producing plans that will outline details of the infrastructure recommendations. WSP will provide this to MKC and will set out the lane configurations throughout the site. It was noted that the recent base model updates had provided new flows on the A059 in the MKW area (discussed further in Item 7). These flows were lower than the previous version of the MKMMM and as such, gave confidence that the forecast flows on the A509 (and such justification for single lane carriageway) would remain similar to as previously tested. MKC agreed that the available data and base model updates supported to the use of single carriageway along the Eastern Perimeter Road and the A509 .	**WSP –** to provide highways drawings **MKC** – to review highways drawings once received
5	**Transport Assessment Scoping** A draft TA scoping note was submitted prior to the call. This Scoping note outlines that the MKMMM strategic outputs will be used to inform detailed testing within the Transport Assessment (using software such as Junctions9 or LinSig). In addition, a micro-simulation model of Junction 14 and Northfields Roundabout, in Paramics will be undertaken. *NB. A separate Paramics LMVR has been issued to MKC and Highways England for review and sign off* It is understood that MKC have reviewed initially and are in agreement in principle to the approach set out. It would be appreciated if a formal response / agreement / comments could be received on the Scoping note.	**MKC** – review and comment on TA Scoping note. Acceptance of approach.

ITEM	SUBJECT	ACTION
	As part of the discussions, it was raised whether the modelling had tested removal of the link between Tongwell Street and the new M1 bridge. It was set out that as part of the HIF assessment, a model run was completed that removed this link and tested the likely changes in traffic flows. The removal of Tongwell Street connecting to the new M1 bridge would assist in reducing the complexity of the junction at the new bridge. It would also allow for less delay on the new bridge, which in turn would be a positive in reducing traffic at M1 J14. MKC requested further information on the previous model tests. MKC could then review whether the assessments could be undertaken without this link. It would be useful to get MKC's views on the assessments and whether they are happy to proceed with or without the link in place. It is acknowledged that it is not only a highways decision in terms of inclusion / exclusion of the link.	**WSP** – Send out information on the w/out Tongwell Street tests (*note Allan Norcutt issued this via email on Friday 01/05/2020)* **MKC** – review the information and confirm whether happy to include Tongwell Street connection or not.
6	**2039 Future growth and adjusted reference case** TTN4 was submitted to MKC prior to the meeting. The note set out a review of the planned growth between 2031 and 2039 in the areas outside of the MK Borough. It is understood the MK Planning officers are undertaking their own review of growth within CMK, for both residential and employment uses. This would allow an updated reference case to be used in the future year model testing. It is appreciated that TTN4 is still under review, however MKC confirmed that it appeared to be agreed in principle.	**MKC** – planning to review growth in CMK for inclusion in reference case models **MKC** – review the information in TTN4 and confirm acceptance.

ITEM	SUBJECT	ACTION
7	**Updates to the MKMMM Base Model and validation status** MKC explained that the base model for the bespoke MKMMM has been completed. AECOM have issued a calibration and validation note that sets out the performance of the model. In general, MKC are happy that model has been updated and improves the granularity and accuracy in the MKE area, which was the primary purpose of the exercise. Some links are shown to result in lower flows compared to previous versions of the MKMMM. However, it is considered that the approach set out in the TA (including use of detailed testing) would mitigate any differences. WSP have reviewed the note and concur with MKC over the acceptability of the base model. It is understood that the AECOM note has been sent to Highways England for their comment as well. It would be appreciated if MKC could confirm that they are happy that the base model is now signed off.	**MKC** – confirm base model is signed off.
8	**Liaison with other bodies (Highways England etc)** As outlined in Item 7 above, some liaison with HE has already been undertaken. MKC confirmed that they would be happy to proceed with the reference case in advance of HE's response to Item 7. It was agreed that the initial discussions with MKC have now reached a point where enough agreement was in place to then start discussions with HE. Although it is acknowledged that the majority of items are focused for MKC's review as the LPA and determining body. WSP confirmed that the Paramics LMVR has also been issued to HE and further technical notes will be issued to HE and MKC in due course.	
9	**Next Steps, Future Meetings and AOB** MKC questioned over the influence of the MRT / P&R in the modelling approach.	**WSP**– to review and provide a note on MRT and P&R from other projects

ITEM	SUBJECT	ACTION
	MKC asked that further information and examples on the use of MRT and P&R would be beneficial in provide an evidence base should adjustments be made to trip rates. This would provide the necessary realism to the future year tests based on experience at projects elsewhere. It was agreed that further specific meetings may be required (such as those discussing highways matters) moving forwards.	to understand potential trip / mode change.

Appendix D

TRIP GENERATION - TRADITIONAL APPROACH WORKED EXAMPLE

TRIP GENERATION – Worked Example (residential)

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Trip Generation worked example		
PROJECT:	Milton Keynes East	**AUTHOR:**	F Imramovsky / A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1 INTRODUCTION

1.1.1. 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).

1.1.2. To assess the impact of MKE and the associated infrastructure sought to be delivered as part of the recent Housing Infrastructure Funding (HIF) bid, the Milton Keynes Multi-Modal Model (MKMMM) was used. The MKMMM is held by MKC and managed by AECOM (Milton Keynes Council's consultants) on MKC's behalf.

1.1.3. As part of the modelling required to support the planning application now, updates to the MKMMM have been set out to assess the impact of the development on the surrounding highway network.

1.1.4. The below worked example identifies the traditional trip generation methodology approach, for the full build out future year. This consists of the following residential profile;

Table 1-1 – MKE residential development – Full build out

Land Use	Type	MKE - 2048
Residential	Mixed Houses / Apartments – private	3,795
	Mixed Houses / Apartments – affordable	1,705

1.1.5. The worked example focuses on the private dwellings only, however the same methodology has been applied to the affordable units as discussed below.

2 RESIDENTIAL TRIP RATE WORKED EXAMPLE

2.1 TRICS Selection

2.1.1. The TRICS database was interrogated to produce a rate for the AM, PM as per the MKMMM periods. For ease of review, the AM and PM peak hours are shown below. Data for Mixed Private housing was extracted to obtain trip rates for sites with characteristics similar to those anticipated for the MKE development, and are shown in Table 2-1 below. The full TRICS dataset is provided in the spreadsheet contained in **Appendix E** of TTN3.

TRIP GENERATION – Worked Example (residential)

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Trip Generation worked example		
PROJECT:	Milton Keynes East	**AUTHOR:**	F Imramovsky / A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

Table 2-1 - TRICS Total Person trip rates (Two-way) for private dwellings

Time Period	AM Peak 0800-0900	PM Peak 1700-1800
Trip Rate (Two-way) - Private	0.878	0.783
Trip Rate (Two-way) – Affordable	0.984	0.900

2.1.2. To calculate the trip rates by journey purpose, the NTS data in table NTS0502 was used. The full NTS0502 results can also be found in the spreadsheet included in Appendix A.

2.1.3. Table 2-2 below demonstrates the trip rate split by journey purpose. It can be seen that in the AM peak, most of the travel is for educational or escort educational purposes, whilst in the PM it is predominantly commuting.

Table 2-2- Trip Rates by purpose using NTS0502

	Private		Affordable	
Purpose of Journey	**AM Peak 0800-0900**	**PM Peak 1700-1800**	**AM Peak 0800-0900**	**PM Peak 1700-1800**
Commuting	0.183	0.260	0.205	0.299
Business	0.029	0.029	0.033	0.033
Education	0.256	0.022	0.287	0.025
Escort Education	0.194	0.015	0.217	0.017
Shopping	0.035	0.095	0.039	0.109
Other work, other escort and personal business	0.122	0.157	0.137	0.181
Visiting friends, entertainment	0.029	0.151	0.033	0.174
Holiday, day-trip	0.030	0.054	0.034	0.062
All Purposes	0.878	0.783	0.984	0.900

2.1.4. Trip rates shown in Table 2-2 above were then applied to the proposed private residential dwellings. Table 2-3 below shows the number of proposed trips for all of the journey purposes generated by the 3,795 private dwellings.

Table 2-3 – Person trips by purpose using NTS0502 for 3,795 Private dwellings

Purpose of Journey	AM Peak 0800-0900	PM Peak 1700-1800
Commuting	696	988
Business	110	110
Education	972	82
Escort Education	735	57
Shopping	132	360
Other work, other escort and personal business	463	598
Visiting friends, entertainment	111	574
Holiday, day-trip	114	203
All Purposes	3,332	2,971

2.1.5. Subsequently, an arrival and departure split was determined for the AM and PM peak hours and then divided by the method of travel to get to their destination. This makes the data comparable to the existing trip rate data divided by Origin Trip Rate and Destination Trip Rate provided by AECOM as part of the MKMMM.

2.1.6. The arrival/departure split as provided in the initial mixed private TRICS trip rate data is shown in Table 2-4 below for the AM and PM peak trip rates.

Table 2-4 - Arrival and departure split

	AM Peak	PM Peak
Arrival	21.3%	66.2%
Departure	78.7%	33.8%
Total	100%	100%

2.1.7. The data in Table 2-4 above were applied to the trips in Table 2-3 to determine the assumed quantity of journeys coming in to, and leaving the development, as shown for the AM and PM peaks in Table 2-5 below.

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CHECKED:	A Smith	**APPROVED:**	A Norcutt

Table 2-5 – Person trips by purpose with arrival and departure split applied

TRIPS / PURPOSE	AM Peak			PM Peak		
	0800-0900			1700-1800		
	Arrival	Departure	Total	Arrival	Departure	Total
Commuting	148	548	*696*	654	334	*988*
Business	23	87	*110*	73	37	*110*
Education	207	765	*972*	54	28	*82*
Escort education	156	578	*735*	38	19	*57*
Shopping	28	104	*132*	238	122	*360*
Other work, other escort and personal business	99	364	*463*	395	202	*598*
Visiting friends / entertainment / sport	24	87	*111*	380	194	*574*
Holiday / Day trip / Other	24	90	*114*	135	69	*203*
All purposes	710	2,622	*3,332*	1,966	1,006	*2,971*

2.1.8. The proposed development includes both primary and secondary schools. It is therefore essential to understand what the likely percentage of education-related trips would be associated with each type of education facility. This is particularly important during the determination of the likely modal share.

2.1.9. The 2011 Census provides data on the existing split of Primary, Secondary and Higher Education children for The Milton Keynes Local Authority, which was used for the analysis. The split is shown below in Table 2-6:

Table 2-6 - Milton Keynes Local Authority Education Split

School Type	Number of Pupils	Percentage
State Funded Primary	27,420	55.6%
State Funded Secondary	16,694	33.8%
Higher Education	5,219	10.6%
Total	49,333	100%

2.1.10. These splits were used along with the aforementioned NTS0502 'Trips by Purpose' (Table 5) to produce an assumption for the proportion of Education and Escort Education trips. Table 2-7 and Table 2-8 below shows the Arrival and Departure split for these respectively.

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CHECKED:	A Smith	**APPROVED:**	A Norcutt

Table 2-7 - Education Person trips in Milton Keynes by Level of Education

School Type	AM Peak			PM Peak		
	Arr	**Dep**	**Total**	**Arr**	**Dep**	**Total**
Primary	115	425	540	30	15	45
Secondary	70	259	329	18	9	28
Higher Education	22	81	103	6	3	9
Total	207	765	972	54	28	82

Table 2-8 - Education Escort Person trips in Milton Keynes by Level of Education

School Type	AM Peak			PM Peak		
	Arr	**Dep**	**Total**	**Arr**	**Dep**	**Total**
Primary	87	321	408	21	11	32
Secondary	53	196	249	13	6	19
Higher Education	17	61	78	4	2	6
Total	**156**	**578**	**735**	**38**	**19**	**57**

2.2 Mode Share

2.2.1. The mode share adopted by users is dependent on several factors, including proximity to land uses and journey purpose.

2.2.2. The 2011 Census data was used to determine the method of travel from residential locations for commuting and business trips (i.e. journey to work, JTW). The 2011 Census data contained in *QS703EW – Method of Travel to Work (2001 specification)* informed the JTW mode share summarised in Table 2-9 below. An average of the following MSOA's was used to determine the final Census modal share;

- E02003461 : Milton Keynes 003
- E02003462 : Milton Keynes 004
- E02003463 : Milton Keynes 005
- E02003464 : Milton Keynes 006
- E02003465 : Milton Keynes 007
- E02003475 : Milton Keynes 017

Table 2-9 - Census Modal Share

Mode	Percentage
Work mainly at or from home	10.0%
Underground, metro, light rail, tram	0.2%
Train	3.1%
Bus, minibus or coach	4.1%
Taxi	0.6%
Motorcycle, scooter or moped	0.6%
Driving a car or van	65.8%
Passenger in a car or van	6.0%
Bicycle	3.1%
On foot	6.0%
Other method of travel to work	0.3%

2.2.3. Due to the provision of education facilities on site, it can be assumed that a proportion of residential users would utilise the new facilities instead of travelling further afield. Not only would this affect the internalisation of trips but would also affect the mode share. Data from NTS0614 was used to produce an estimate on the mode adopted based on the distance travelled to school. The data outlines the expected method of travel to education, based on the distance being travelled and the level of education. Data in NTSA19020b only provides information for primary and secondary, and therefore the mode share information for Higher Education data was obtained from TRICS.

2.2.4. For the secondary school analysis, information from the 1 to under 2 miles distance was used, on account of where the school is expected to be situated in relation to the majority of the proposed development. For the primary schools, a high proportion of the development will be under 1 mile to education facilities and as such will benefit from the close proximity to those services.

2.2.5. Table 2-10 below shows the percentage split of individuals' travel mode for journeys to primary and secondary schools located in a distance of between 1 and 2 miles. A high proportion of journeys is made by car, but this reduces with age, being replaced in favour of walking and cycle use.

TRIP GENERATION – Worked Example (residential)

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Table 2-10 – NTSA19020b

	Percentage	
Main Mode	Age 5-10 years Under 1 mile	Age 11-16 years 1 to under 2 miles
Walk	82%	51%
Bicycle	1%	6%
Car / Van	16%	30%
Bus	1%	12%
Other Transport	0%	-
All Modes	100%	100%

2.2.6. The information in Table 2-10 above, along with TRICS mode-share data for higher education, produces a modal split of total trips for both Education and Escort Education purposes.

2.2.7. The application of the mode shares for each journey purpose allows for greater control in the analysis and therefore, a better reflection of the proposed development and its potential vehicular trip generation.

2.2.8. For ease of review, the vehicular trips have been summarised by journey purpose, with Table 2-11 showing the current assumptions.

Table 2-11 - Total Vehicle Trips by Journey Purpose – Private Dwellings

TRIPS / PURPOSE	**AM Peak**			**PM Peak**		
	0800-0900			1700-1800		
	Arrival	Dep	Total	Arrival	Dep	Total
Commuting	98	360	458	430	220	650
Business	15	57	72	48	24	72
Education	53	195	247	14	7	21
Escort education	40	147	187	9	5	14
Shopping	19	68	87	157	80	237
Other work, other escort and personal business	65	240	305	260	133	393
Visiting friends / entertainment / sport	16	57	73	250	128	378
Holiday / Day trip / Other	16	59	75	89	45	134
All purposes	320	1,184	1,504	1,257	643	1,900

2.3 Internalisation

2.3.1. The final stage of the residential trip rate analysis is to apply an internalisation factor. The nature of the development's land use mix means that some of the trips calculated above would not leave the development and, as a result, would not impact the external road network. Table 2-12 below outlines the reductions applied to each of the selected purpose trips.

Table 2-12 - Internalisation Reductions applied to Journey Purpose Trip Rates

Purpose	Internalisation Reduction	Further Notes
Commuting	15%	Reviewing the JTW data for nearby MSOAs in MK's presents data that suggests work internalisation ranges between 8% and 18%
Business	15%	See above
Education	73%*	The proposals include 4 primary schools and a secondary school. Any external trips limited to staff and/or a small percentage of parent choice
Escort education	73%*	Escort education forms both primary purpose trips but also secondary trips – however assumed the same percentages as the main education trips.
Shopping	33%	There will be a district centre and other retail proposed within the site where some shopping needs will be satisfied internally
Other work, other escort and personal business	25%	Alongside retail, there will be other services within the proposed development
Visiting friends/entertainment/sport	20%	The development proposes leisure facilities within the site, including green walks and routes.
Holiday/Day trip/Other	0%	Assumed that this captures ad hoc trips within the development. Although for robustness, no adjustment made,

*This is calculated using the MK LA school data, assuming all of primary school trips and 50% of secondary school trips are internal, with the remaining 50% of secondary school trips and all of the higher educational trips being external.

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3 INTERNAL TRIPS

3.1.1. Applying the various tables and assumptions on mode share and internalisation, the final number of external trips can be calculated as well as the associated final trip rate value. Table 3-1 below shows the total external trips associated with the development. It should be noted that Table 3-1 below shows only trips related to private dwellings of the site. The total residential elements are considered further below.

Table 3-1 – Internal Vehicular Trips by Trip Purpose (private dwellings only)

	AM Peak			PM Peak		
	0800-0900			1700-1800		
	Arrival	**Departure**	**Total**	**Arrival**	**Departure**	**Total**
Commuting	15	54	69	65	33	98
Business	2	9	11	7	4	11
Education	29	107	136	8	4	11
Escort education	22	81	103	5	3	8
Shopping	6	23	29	52	26	78
Other work, other escort and personal business	16	60	76	65	33	98
Visiting friends/entertainment/sport	3	11	15	50	26	76
Holiday/Day trip/Other	0	0	0	0	0	0
TOTAL	**93**	**345**	**438**	**251**	**129**	**380**

3.1.2. The same trip generation process, as outlined above, was undertaken for the affordable dwellings. The same modal split and internalisation assumptions were applied to affordable dwellings

TRIP GENERATION – Worked Example (residential)

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Trip Generation worked example		
PROJECT:	Milton Keynes East	**AUTHOR:**	F Imramovsky / A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

4 EXTERNAL TRIPS AND FINAL RATES

4.1.1. Applying the various tables and assumptions on mode share and internalisation, the final number of external trips can be calculated as well as the associated final trip rate value. Table 4-1 below shows the total external trips associated with the development. It should be noted that Table 4-1 below shows only trips related to private dwellings of the site. The total residential elements are considered further below.

Table 4-1 - External Vehicular Trips by Trip Purpose (private dwellings only)

	AM Peak			**PM Peak**		
Mode	**0800-0900**			**1700-1800**		
	Arrival	**Departure**	**Total**	**Arrival**	**Departure**	**Total**
Commuting	83	306	389	366	187	553
Business	13	48	62	41	21	61
Education	24	87	111	6	3	9
Escort education	18	66	84	4	2	6
Shopping	12	46	58	105	54	159
Other work, other escort and personal business	49	180	229	195	100	295
Visiting friends/entertainment/sport	12	46	58	200	102	302
Holiday/Day trip/Other	16	59	75	89	45	134
TOTAL	**227**	**839**	**1,066**	**1,005**	**514**	**1,520**

4.1.2. The same trip generation process, as outlined above, was undertaken for the affordable dwellings. The same modal split and internalisation assumptions were applied to affordable dwellings

Table 4-2 - External Vehicular Trips – Driving a Car or Van (Residential – Private 2048)

Trip Rates	**Year**	**AM Peak**			**PM Peak**		
		0800-0900			**1700-1800**		
		Arr	**Dep**	**Total**	**Arr**	**Dep**	**Total**
TOTAL (Car and Van)	2048	227	839	1,066	1,005	514	1,520
Trip Rate (per total dwelling)	3795 dwellings	0.060	0.221	0.281	0.265	0.136	0.400

Appendix E

TRICS OUTPUTS

TRICS 7.5.1
Trip Rate Parameter: Number of dwellings

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use	03 - RESIDENTIAL	
Category	K - MIXED PRIV HOUS (FLATS AND HOUSES)	
MULTI-MODAL TOTAL PEOPLE		

Selected regions and areas:

2	SOUTH EAST		
	ES	EAST SUSSE	1 days
	HC	HAMPSHIR	1 days
	WS	WEST SUSS	1 days
4	EAST ANGLIA		
	CA	CAMBRIDG	1 days
5	EAST MIDLANDS		
	NT	NOTTINGH	1 days
7	YORKSHIRE & NORTH LINCOLNSHIRE		
	NE	NORTH EA	1 days
9	NORTH		
	CB	CUMBRIA	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of dwellings
Actual Range:	64 to 132 (units:)
Range Selected by User:	50 to 211 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 20/09/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	1 days
Thursday	4 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	7 days
Directional ATC Count	0 days

This data displays the number of manual classified the total a whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	0
Edge of Town Centre	0
Suburban Area (PPS6 Out of Centre)	3
Edge of Town	4
Neighbourhood Centre (PPS6 Local Centre)	0
Free Standing (PPS6 Out of Town)	0
Not Known	0

This data displays the number of surveys per mair Edge of To Suburban / Neighbour Edge of To Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	1
Commercial Zone	0
Development Zone	0
Residential Zone	5
Retail Zone	0
Built-Up Zone	0
Village	0
Out of Town	0
High Street	0
No Sub Category	1

This data displays the number of surveys per locat Industrial Z Developm Residentia Retail Zone Built-Up Zo Village Out of Tov High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3	7 days

This data displays the number of surveys per Use which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	3 days
20,001 to 25,000	2 days
25,001 to 50,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	3 days
75,001 to 100,000	1 days
125,001 to 250,000	2 days
250,001 to 500,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	4 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	6 days

This data displays the number of surveys within th and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	7 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 CA-03-K-01 MIXED HOU CAMBRIDGESHIRE
WEASANHAM LANE
FENLAND
WISBECH
Edge of Town
Residential Zone
Total Number of dwell 100
Survey date MONDAY ######## Survey Typ MANUAL

2 CB-03-K-01 FLATS & TE CUMBRIA
BRIDGE LANE

CARLISLE
Edge of Town
Industrial Zone
Total Number of dwell 66
Survey date THURSDAY ######## Survey Typ MANUAL

3 ES-03-K-01 MIXED HOU EAST SUSSEX
LEWES ROAD
RIDGEWOOD
UCKFIELD
Edge of Town
Residential Zone
Total Number of dwell 64
Survey date THURSDAY ######## Survey Typ MANUAL

4 HC-03-K-06 HOUSES & HAMPSHIRE
ROMSEY ROAD
MAYBUSH
SOUTHAMPTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwell 91
Survey date THURSDAY ######## Survey Typ MANUAL

5 NE-03-K-01 BLOCK OF F NORTH EAST LINCOLNSHIRE
LADYSMITH ROAD

CLEETHORPES
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwell 67
Survey date TUESDAY ######## Survey Typ MANUAL

6 NT-03-K-02 MIXED HOU NOTTINGHAMSHIRE
CASTLE BRIDGE ROAD

NOTTINGHAM
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwell 132
Survey date MONDAY ######## Survey Typ MANUAL

7 WS-03-K-0: MIXED HOU WEST SUSSEX
LITTLEHAMPTON ROAD
WEST DURRINGTON
WORTHING
Edge of Town
Residential Zone
Total Number of dwell 115
Survey date THURSDAY ######## Survey Typ MANUAL

This section provides a list of all survey sites and c it displays the selecte the day of and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: VEHICLES

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									

03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0.082	7	91	0.255	7	91	0.337
08:00-09:00	7	91	0.117	7	91	0.315	7	91	0.432
09:00-10:00	7	91	0.12	7	91	0.115	7	91	0.235
10:00-11:00	7	91	0.126	7	91	0.173	7	91	0.299
11:00-12:00	7	91	0.115	7	91	0.113	7	91	0.228
12:00-13:00	7	91	0.148	7	91	0.135	7	91	0.283
13:00-14:00	7	91	0.15	7	91	0.126	7	91	0.276
14:00-15:00	7	91	0.115	7	91	0.17	7	91	0.285
15:00-16:00	7	91	0.209	7	91	0.142	7	91	0.351
16:00-17:00	7	91	0.198	7	91	0.145	7	91	0.343
17:00-18:00	7	91	0.285	7	91	0.154	7	91	0.439
18:00-19:00	7	91	0.23	7	91	0.137	7	91	0.367
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			1.895			1.98			3.875

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: TAXIS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0	7	91	0	7	91	0
08:00-09:00	7	91	0.005	7	91	0.006	7	91	0.011
09:00-10:00	7	91	0.008	7	91	0.008	7	91	0.016
10:00-11:00	7	91	0.003	7	91	0.003	7	91	0.006
11:00-12:00	7	91	0.003	7	91	0.005	7	91	0.008
12:00-13:00	7	91	0.003	7	91	0.002	7	91	0.005
13:00-14:00	7	91	0.005	7	91	0.006	7	91	0.011
14:00-15:00	7	91	0.005	7	91	0.005	7	91	0.01
15:00-16:00	7	91	0.003	7	91	0.002	7	91	0.005
16:00-17:00	7	91	0.005	7	91	0.005	7	91	0.01
17:00-18:00	7	91	0.002	7	91	0.003	7	91	0.005
18:00-19:00	7	91	0.005	7	91	0.005	7	91	0.01
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.047			0.05			0.097

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: OGVS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0.002	7	91	0.002	7	91	0.004
08:00-09:00	7	91	0.003	7	91	0	7	91	0.003
09:00-10:00	7	91	0	7	91	0.005	7	91	0.005
10:00-11:00	7	91	0.008	7	91	0.006	7	91	0.014
11:00-12:00	7	91	0	7	91	0.002	7	91	0.002
12:00-13:00	7	91	0.002	7	91	0	7	91	0.002
13:00-14:00	7	91	0.003	7	91	0.002	7	91	0.005
14:00-15:00	7	91	0.003	7	91	0.005	7	91	0.008
15:00-16:00	7	91	0	7	91	0	7	91	0
16:00-17:00	7	91	0	7	91	0	7	91	0
17:00-18:00	7	91	0	7	91	0	7	91	0
18:00-19:00	7	91	0	7	91	0	7	91	0
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.021			0.022			0.043

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: PSVS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0	7	91	0	7	91	0
08:00-09:00	7	91	0.002	7	91	0.002	7	91	0.004
09:00-10:00	7	91	0	7	91	0	7	91	0
10:00-11:00	7	91	0	7	91	0	7	91	0
11:00-12:00	7	91	0	7	91	0	7	91	0
12:00-13:00	7	91	0	7	91	0	7	91	0
13:00-14:00	7	91	0	7	91	0	7	91	0
14:00-15:00	7	91	0.002	7	91	0.002	7	91	0.004
15:00-16:00	7	91	0.002	7	91	0.002	7	91	0.004
16:00-17:00	7	91	0	7	91	0	7	91	0
17:00-18:00	7	91	0	7	91	0	7	91	0
18:00-19:00	7	91	0	7	91	0	7	91	0
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.006			0.006			0.012

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: CYCLISTS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0.006	7	91	0.024	7	91	0.03
08:00-09:00	7	91	0.008	7	91	0.031	7	91	0.039
09:00-10:00	7	91	0.002	7	91	0.008	7	91	0.01
10:00-11:00	7	91	0	7	91	0.008	7	91	0.008
11:00-12:00	7	91	0.003	7	91	0.002	7	91	0.005
12:00-13:00	7	91	0.006	7	91	0.005	7	91	0.011
13:00-14:00	7	91	0.006	7	91	0.003	7	91	0.009
14:00-15:00	7	91	0.005	7	91	0.002	7	91	0.007
15:00-16:00	7	91	0.009	7	91	0.006	7	91	0.015
16:00-17:00	7	91	0.009	7	91	0.008	7	91	0.017
17:00-18:00	7	91	0.009	7	91	0.005	7	91	0.014
18:00-19:00	7	91	0.019	7	91	0.003	7	91	0.022
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.082			0.105			0.187

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: VEHICLE OCCUPANTS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0.099	7	91	0.301	7	91	0.4
08:00-09:00	7	91	0.137	7	91	0.498	7	91	0.635
09:00-10:00	7	91	0.159	7	91	0.162	7	91	0.321
10:00-11:00	7	91	0.176	7	91	0.233	7	91	0.409
11:00-12:00	7	91	0.156	7	91	0.161	7	91	0.317
12:00-13:00	7	91	0.2	7	91	0.186	7	91	0.386
13:00-14:00	7	91	0.195	7	91	0.17	7	91	0.365
14:00-15:00	7	91	0.151	7	91	0.219	7	91	0.37
15:00-16:00	7	91	0.372	7	91	0.203	7	91	0.575

16:00-17:00	7	91	0.296	7	91	0.217	7	91	0.513
17:00-18:00	7	91	0.411	7	91	0.217	7	91	0.628
18:00-19:00	7	91	0.323	7	91	0.191	7	91	0.514
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			2.675			2.758			5.433

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: PEDESTRIANS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0.019	7	91	0.074	7	91	0.093
08:00-09:00	7	91	0.028	7	91	0.129	7	91	0.157
09:00-10:00	7	91	0.033	7	91	0.049	7	91	0.082
10:00-11:00	7	91	0.014	7	91	0.038	7	91	0.052
11:00-12:00	7	91	0.017	7	91	0.033	7	91	0.05
12:00-13:00	7	91	0.03	7	91	0.033	7	91	0.063
13:00-14:00	7	91	0.058	7	91	0.047	7	91	0.105
14:00-15:00	7	91	0.049	7	91	0.072	7	91	0.121
15:00-16:00	7	91	0.139	7	91	0.049	7	91	0.188
16:00-17:00	7	91	0.079	7	91	0.03	7	91	0.109
17:00-18:00	7	91	0.087	7	91	0.039	7	91	0.126
18:00-19:00	7	91	0.057	7	91	0.03	7	91	0.087
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.61			0.623			1.233

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: BUS/TRAM PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0	7	91	0.017	7	91	0.017
08:00-09:00	7	91	0.014	7	91	0.024	7	91	0.038
09:00-10:00	7	91	0	7	91	0.006	7	91	0.006
10:00-11:00	7	91	0.002	7	91	0.009	7	91	0.011
11:00-12:00	7	91	0.002	7	91	0.003	7	91	0.005
12:00-13:00	7	91	0.005	7	91	0.002	7	91	0.007
13:00-14:00	7	91	0.006	7	91	0	7	91	0.006
14:00-15:00	7	91	0.008	7	91	0.005	7	91	0.013
15:00-16:00	7	91	0.031	7	91	0.019	7	91	0.05
16:00-17:00	7	91	0.003	7	91	0.002	7	91	0.005
17:00-18:00	7	91	0.009	7	91	0.003	7	91	0.012
18:00-19:00	7	91	0.009	7	91	0.003	7	91	0.012
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.089			0.093			0.182

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: TOTAL RAIL PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									

06:00-07:00									
07:00-08:00	7	91	0	7	91	0.008	7	91	0.008
08:00-09:00	7	91	0	7	91	0.009	7	91	0.009
09:00-10:00	7	91	0	7	91	0.003	7	91	0.003
10:00-11:00	7	91	0	7	91	0	7	91	0
11:00-12:00	7	91	0	7	91	0	7	91	0
12:00-13:00	7	91	0	7	91	0	7	91	0
13:00-14:00	7	91	0	7	91	0.003	7	91	0.003
14:00-15:00	7	91	0.002	7	91	0	7	91	0.002
15:00-16:00	7	91	0.002	7	91	0	7	91	0.002
16:00-17:00	7	91	0	7	91	0	7	91	0
17:00-18:00	7	91	0.002	7	91	0	7	91	0.002
18:00-19:00	7	91	0	7	91	0	7	91	0
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.006			0.023			0.029

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: COACH PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0	7	91	0	7	91	0
08:00-09:00	7	91	0	7	91	0	7	91	0
09:00-10:00	7	91	0	7	91	0	7	91	0
10:00-11:00	7	91	0	7	91	0	7	91	0
11:00-12:00	7	91	0	7	91	0	7	91	0
12:00-13:00	7	91	0	7	91	0	7	91	0
13:00-14:00	7	91	0	7	91	0	7	91	0
14:00-15:00	7	91	0	7	91	0	7	91	0
15:00-16:00	7	91	0	7	91	0	7	91	0
16:00-17:00	7	91	0	7	91	0	7	91	0
17:00-18:00	7	91	0	7	91	0	7	91	0
18:00-19:00	7	91	0	7	91	0	7	91	0
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0			0			0

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: PUBLIC TRANSPORT USERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0	7	91	0.025	7	91	0.025
08:00-09:00	7	91	0.014	7	91	0.033	7	91	0.047
09:00-10:00	7	91	0	7	91	0.009	7	91	0.009
10:00-11:00	7	91	0.002	7	91	0.009	7	91	0.011
11:00-12:00	7	91	0.002	7	91	0.003	7	91	0.005
12:00-13:00	7	91	0.005	7	91	0.002	7	91	0.007
13:00-14:00	7	91	0.006	7	91	0.003	7	91	0.009
14:00-15:00	7	91	0.009	7	91	0.005	7	91	0.014
15:00-16:00	7	91	0.033	7	91	0.019	7	91	0.052
16:00-17:00	7	91	0.003	7	91	0.002	7	91	0.005
17:00-18:00	7	91	0.011	7	91	0.003	7	91	0.014
18:00-19:00	7	91	0.009	7	91	0.003	7	91	0.012
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.094			0.116			0.21

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: TOTAL PEOPLE

Time Range	ARRIVALS No. Days	Ave. DWELLS	Trip Rate	DEPARTURES No. Days	Ave. DWELLS	Trip Rate	TOTALS No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0.124	7	91	0.424	7	91	0.548
08:00-09:00	7	91	0.187	7	91	0.691	7	91	0.878
09:00-10:00	7	91	0.194	7	91	0.228	7	91	0.422
10:00-11:00	7	91	0.192	7	91	0.288	7	91	0.48
11:00-12:00	7	91	0.178	7	91	0.198	7	91	0.376
12:00-13:00	7	91	0.241	7	91	0.225	7	91	0.466
13:00-14:00	7	91	0.266	7	91	0.224	7	91	0.49
14:00-15:00	7	91	0.214	7	91	0.298	7	91	0.512
15:00-16:00	7	91	0.553	7	91	0.277	7	91	0.83
16:00-17:00	7	91	0.387	7	91	0.257	7	91	0.644
17:00-18:00	7	91	0.518	7	91	0.265	7	91	0.783
18:00-19:00	7	91	0.408	7	91	0.227	7	91	0.635
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			3.462			3.602			7.064

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: CARS

Time Range	ARRIVALS No. Days	Ave. DWELLS	Trip Rate	DEPARTURES No. Days	Ave. DWELLS	Trip Rate	TOTALS No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0.054	7	91	0.205	7	91	0.259
08:00-09:00	7	91	0.074	7	91	0.243	7	91	0.317
09:00-10:00	7	91	0.079	7	91	0.077	7	91	0.156
10:00-11:00	7	91	0.076	7	91	0.115	7	91	0.191
11:00-12:00	7	91	0.072	7	91	0.061	7	91	0.133
12:00-13:00	7	91	0.106	7	91	0.093	7	91	0.199
13:00-14:00	7	91	0.088	7	91	0.079	7	91	0.167
14:00-15:00	7	91	0.069	7	91	0.121	7	91	0.19
15:00-16:00	7	91	0.148	7	91	0.096	7	91	0.244
16:00-17:00	7	91	0.135	7	91	0.087	7	91	0.222
17:00-18:00	7	91	0.202	7	91	0.104	7	91	0.306
18:00-19:00	7	91	0.172	7	91	0.096	7	91	0.268
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			1.275			1.377			2.652

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: LGVS

Time Range	ARRIVALS No. Days	Ave. DWELLS	Trip Rate	DEPARTURES No. Days	Ave. DWELLS	Trip Rate	TOTALS No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0.022	7	91	0.014	7	91	0.036
08:00-09:00	7	91	0.013	7	91	0.013	7	91	0.026
09:00-10:00	7	91	0.019	7	91	0.008	7	91	0.027
10:00-11:00	7	91	0.027	7	91	0.035	7	91	0.062
11:00-12:00	7	91	0.016	7	91	0.017	7	91	0.033
12:00-13:00	7	91	0.017	7	91	0.017	7	91	0.034
13:00-14:00	7	91	0.022	7	91	0.014	7	91	0.036
14:00-15:00	7	91	0.017	7	91	0.016	7	91	0.033
15:00-16:00	7	91	0.019	7	91	0.024	7	91	0.043
16:00-17:00	7	91	0.014	7	91	0.025	7	91	0.039
17:00-18:00	7	91	0.022	7	91	0.013	7	91	0.035
18:00-19:00	7	91	0.011	7	91	0.006	7	91	0.017

19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.219			0.202			0.421

TRIP RATE for Land Use 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: MOTOR CYCLES

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:00	7	91	0	7	91	0	7	91	0
08:00-09:00	7	91	0	7	91	0	7	91	0
09:00-10:00	7	91	0	7	91	0	7	91	0
10:00-11:00	7	91	0	7	91	0	7	91	0
11:00-12:00	7	91	0.002	7	91	0.002	7	91	0.004
12:00-13:00	7	91	0	7	91	0	7	91	0
13:00-14:00	7	91	0	7	91	0.002	7	91	0.002
14:00-15:00	7	91	0	7	91	0	7	91	0
15:00-16:00	7	91	0	7	91	0	7	91	0
16:00-17:00	7	91	0	7	91	0	7	91	0
17:00-18:00	7	91	0.003	7	91	0	7	91	0.003
18:00-19:00	7	91	0	7	91	0	7	91	0
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.005			0.004			0.009

Parameter summary

Trip rate parameter range selected:	64 - 132 (units:)
Survey date date range:	01/01/10 - 20/09/17
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of followed b the total n the number of survey days that have been manually removed from the selected set outside of the standard filterin

TRICS 7.5.3
Trip Rate P Number of dwellings

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use 03 - RESIDENTIAL
Category L - MIXED AFFORD HOUS (FLATS AND HOUSES)
MULTI-MODAL TOTAL PEOPLE

Selected regions and areas:

2	SOUTH EAST		
	ES	EAST SUSS	1 days
	HC	HAMPSHIR	1 days
9	NORTH		
	TW	TYNE & WE	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculatio
Parameter Number of dwellings
Actual Ran 19 to 59 (units:)
Range Sele 19 to 59 (units:)

Public Transport Provision:
Selection b Include all surveys

Date Range 01/01/10 to 17/11/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.
Selected survey days:
Tuesday 2 days
Thursday 1 days
This data displays the number of selected surveys by day of the week.

Selected survey types:
Manual co 3 days
Directional 0 days
This data d the total a whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Cent	0
Edge of To	0
Suburban /	2
Edge of To	1
Neighbour	0
Free Stand	0
Not Known	0

This data d Edge of Tc Suburban Neighbour Edge of Tc Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Z	0
Commercia	0
Developme	0
Residential	3
Retail Zone	0
Built-Up Zc	0
Village	0
Out of Tow	0
High Street	0
No Sub Cat	0

This data d Industrial Z Developm Residentia Retail Zone Built-Up Zc Village Out of Tov High Street and No Sub Category.

Secondary Filtering selection:

Use Class:
C3 3 days
This data d which can be found within the Library module of TRICS®.

Population within 1 mile:
5,001 to 1(1 days
25,001 to 5 2 days
This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:
75,001 to : 1 days
100,001 to 1 days
250,001 to 1 days
This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:
0.6 to 1.0 2 days
1.1 to 1.5 1 days
This data d within a radius of 5-miles of selected survey sites.

Travel Plan:
Yes 2 days
No 1 days
This data d and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:
No PTAL Pr 3 days
This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 ES-03-L-01 HOUSES & EAST SUSSEX
HUGHENDEN ROAD
ORE VALLEY
HASTINGS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwel 51
Survey dat TUESDAY ######## Survey Typ MANUAL

2 HC-03-L-02 HOUSES/FI HAMPSHIRE
HUNTS POND ROAD
TITCHFIELD
NEAR FAREHAM
Edge of Town
Residential Zone
Total Number of dwel 59
Survey dat TUESDAY ######## Survey Typ MANUAL

3 TW-03-L-0: SEMI-DET/ TYNE & WEAR
JOHNSON STREET

GATESHEAD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwel 19
Survey dat THURSDAY ######## Survey Typ MANUAL

This sectio it displays the select the day of and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: VEHICLES

	ARRIVALS			DEPARTURES			TOTALS		
Time Rang	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0.101	3	43	0.326	3	43	0.427
08:00-09:0	3	43	0.155	3	43	0.287	3	43	0.442
09:00-10:0	3	43	0.186	3	43	0.209	3	43	0.395
10:00-11:0	3	43	0.171	3	43	0.147	3	43	0.318
11:00-12:0	3	43	0.209	3	43	0.209	3	43	0.418
12:00-13:0	3	43	0.178	3	43	0.109	3	43	0.287
13:00-14:0	3	43	0.163	3	43	0.202	3	43	0.365
14:00-15:0	3	43	0.171	3	43	0.264	3	43	0.435
15:00-16:0	3	43	0.38	3	43	0.256	3	43	0.636
16:00-17:0	3	43	0.473	3	43	0.287	3	43	0.76

17:00-18:0	3	43	0.333	3	43	0.248	3	43	0.581
18:00-19:0	3	43	0.264	3	43	0.155	3	43	0.419
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			2.784			2.699			5.483

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: TAXIS

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0	3	43	0	3	43	0
08:00-09:0	3	43	0	3	43	0	3	43	0
09:00-10:0	3	43	0	3	43	0	3	43	0
10:00-11:0	3	43	0	3	43	0	3	43	0
11:00-12:0	3	43	0	3	43	0	3	43	0
12:00-13:0	3	43	0.008	3	43	0.008	3	43	0.016
13:00-14:0	3	43	0	3	43	0	3	43	0
14:00-15:0	3	43	0	3	43	0	3	43	0
15:00-16:0	3	43	0	3	43	0	3	43	0
16:00-17:0	3	43	0.008	3	43	0.008	3	43	0.016
17:00-18:0	3	43	0.008	3	43	0	3	43	0.008
18:00-19:0	3	43	0	3	43	0.008	3	43	0.008
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.024			0.024			0.048

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: OGVS

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0	3	43	0	3	43	0
08:00-09:0	3	43	0	3	43	0	3	43	0
09:00-10:0	3	43	0	3	43	0	3	43	0
10:00-11:0	3	43	0	3	43	0	3	43	0
11:00-12:0	3	43	0.008	3	43	0	3	43	0.008
12:00-13:0	3	43	0	3	43	0	3	43	0
13:00-14:0	3	43	0	3	43	0.008	3	43	0.008
14:00-15:0	3	43	0	3	43	0	3	43	0
15:00-16:0	3	43	0	3	43	0	3	43	0
16:00-17:0	3	43	0	3	43	0	3	43	0
17:00-18:0	3	43	0	3	43	0	3	43	0
18:00-19:0	3	43	0	3	43	0	3	43	0
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.008			0.008			0.016

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: CYCLISTS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0	3	43	0.008	3	43	0.008
08:00-09:0	3	43	0	3	43	0.031	3	43	0.031
09:00-10:0	3	43	0.008	3	43	0.031	3	43	0.039
10:00-11:0	3	43	0.008	3	43	0.016	3	43	0.024
11:00-12:0	3	43	0.008	3	43	0	3	43	0.008
12:00-13:0	3	43	0.008	3	43	0.008	3	43	0.016
13:00-14:0	3	43	0	3	43	0	3	43	0
14:00-15:0	3	43	0	3	43	0	3	43	0
15:00-16:0	3	43	0.016	3	43	0.008	3	43	0.024
16:00-17:0	3	43	0.016	3	43	0	3	43	0.016
17:00-18:0	3	43	0.031	3	43	0	3	43	0.031
18:00-19:0	3	43	0.023	3	43	0	3	43	0.023
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.118			0.102			0.22

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: VEHICLE OCCUPANTS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0.124	3	43	0.473	3	43	0.597
08:00-09:0	3	43	0.202	3	43	0.473	3	43	0.675
09:00-10:0	3	43	0.24	3	43	0.256	3	43	0.496
10:00-11:0	3	43	0.178	3	43	0.178	3	43	0.356
11:00-12:0	3	43	0.248	3	43	0.24	3	43	0.488
12:00-13:0	3	43	0.209	3	43	0.14	3	43	0.349
13:00-14:0	3	43	0.194	3	43	0.202	3	43	0.396
14:00-15:0	3	43	0.186	3	43	0.271	3	43	0.457
15:00-16:0	3	43	0.527	3	43	0.287	3	43	0.814
16:00-17:0	3	43	0.636	3	43	0.333	3	43	0.969
17:00-18:0	3	43	0.442	3	43	0.295	3	43	0.737
18:00-19:0	3	43	0.302	3	43	0.233	3	43	0.535
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			3.488			3.381			6.869

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: PEDESTRIANS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate

00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0.008	3	43	0.016	3	43	0.024
08:00-09:0	3	43	0.039	3	43	0.178	3	43	0.217
09:00-10:0	3	43	0.093	3	43	0.093	3	43	0.186
10:00-11:0	3	43	0.023	3	43	0.047	3	43	0.07
11:00-12:0	3	43	0.039	3	43	0.031	3	43	0.07
12:00-13:0	3	43	0.031	3	43	0.008	3	43	0.039
13:00-14:0	3	43	0.031	3	43	0.054	3	43	0.085
14:00-15:0	3	43	0.023	3	43	0.016	3	43	0.039
15:00-16:0	3	43	0.132	3	43	0.116	3	43	0.248
16:00-17:0	3	43	0.178	3	43	0.078	3	43	0.256
17:00-18:0	3	43	0.054	3	43	0.062	3	43	0.116
18:00-19:0	3	43	0.023	3	43	0.023	3	43	0.046
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.674			0.722			1.396

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: BUS/TRAM PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0.016	3	43	0.008	3	43	0.024
08:00-09:0	3	43	0	3	43	0.039	3	43	0.039
09:00-10:0	3	43	0	3	43	0.023	3	43	0.023
10:00-11:0	3	43	0	3	43	0.016	3	43	0.016
11:00-12:0	3	43	0.008	3	43	0	3	43	0.008
12:00-13:0	3	43	0.023	3	43	0.016	3	43	0.039
13:00-14:0	3	43	0.016	3	43	0.023	3	43	0.039
14:00-15:0	3	43	0.023	3	43	0.023	3	43	0.046
15:00-16:0	3	43	0.023	3	43	0	3	43	0.023
16:00-17:0	3	43	0	3	43	0	3	43	0
17:00-18:0	3	43	0.008	3	43	0	3	43	0.008
18:00-19:0	3	43	0.016	3	43	0.008	3	43	0.024
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.133			0.156			0.289

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: TOTAL RAIL PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0	3	43	0.016	3	43	0.016

08:00-09:0	3	43	0	3	43	0.023	3	43	0.023
09:00-10:0	3	43	0	3	43	0.023	3	43	0.023
10:00-11:0	3	43	0	3	43	0	3	43	0
11:00-12:0	3	43	0	3	43	0	3	43	0
12:00-13:0	3	43	0	3	43	0	3	43	0
13:00-14:0	3	43	0	3	43	0	3	43	0
14:00-15:0	3	43	0	3	43	0	3	43	0
15:00-16:0	3	43	0.008	3	43	0	3	43	0.008
16:00-17:0	3	43	0.008	3	43	0	3	43	0.008
17:00-18:0	3	43	0.008	3	43	0	3	43	0.008
18:00-19:0	3	43	0.023	3	43	0	3	43	0.023
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.047			0.062			0.109

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: PUBLIC TRANSPORT USERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0.016	3	43	0.023	3	43	0.039
08:00-09:0	3	43	0	3	43	0.062	3	43	0.062
09:00-10:0	3	43	0	3	43	0.047	3	43	0.047
10:00-11:0	3	43	0	3	43	0.016	3	43	0.016
11:00-12:0	3	43	0.008	3	43	0	3	43	0.008
12:00-13:0	3	43	0.023	3	43	0.016	3	43	0.039
13:00-14:0	3	43	0.016	3	43	0.023	3	43	0.039
14:00-15:0	3	43	0.023	3	43	0.023	3	43	0.046
15:00-16:0	3	43	0.031	3	43	0	3	43	0.031
16:00-17:0	3	43	0.008	3	43	0	3	43	0.008
17:00-18:0	3	43	0.016	3	43	0	3	43	0.016
18:00-19:0	3	43	0.039	3	43	0.008	3	43	0.047
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.18			0.218			0.398

TRIP RATE for Land Use 03 - RESIDENTIAL/L - MIXED AFFORD HOUS (FLATS AND HOUSES)
Calculation Factor: 1 DWELLS
Count Type: TOTAL PEOPLE

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	DWELLS	Rate	Days	DWELLS	Rate	Days	DWELLS	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00									
07:00-08:0	3	43	0.147	3	43	0.519	3	43	0.666
08:00-09:0	3	43	0.240	3	43	0.744	3	43	0.984
09:00-10:0	3	43	0.341	3	43	0.426	3	43	0.767
10:00-11:0	3	43	0.209	3	43	0.256	3	43	0.465
11:00-12:0	3	43	0.302	3	43	0.271	3	43	0.573
12:00-13:0	3	43	0.271	3	43	0.171	3	43	0.442
13:00-14:0	3	43	0.240	3	43	0.279	3	43	0.519
14:00-15:0	3	43	0.233	3	43	0.310	3	43	0.543
15:00-16:0	3	43	0.705	3	43	0.411	3	43	1.116

Average of interpeak

Arr	Dep	Total
0.326667	0.283	0.609667

16:00-17:0	3	43	0.837	3	43	0.411	3	43	1.248
17:00-18:0	3	43	0.543	3	43	0.357	3	43	0.9
18:00-19:0	3	43	0.388	3	43	0.264	3	43	0.652
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			4.456			4.419			8.875

TRICS 7.6.4
Trip Rate P Gross floor area

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use 02 - EMPLOYMENT
Category A - OFFICE
MULTI-MODAL VEHICLES

Selected regions and areas:

1	GREATER LONDON		
	BT	BRENT	2 days
	HO	HOUNSLO\	1 days
2	SOUTH EAST		
	ES	EAST SUSSI	3 days
	HF	HERTFORD	2 days
	KC	KENT	2 days
	SC	SURREY	2 days
4	EAST ANGLIA		
	NF	NORFOLK	1 days
7	YORKSHIRE & NORTH LINCOLNSHIRE		
	NY	NORTH YO	2 days
	WY	WEST YORI	1 days
8	NORTH WEST		
	LC	LANCASHIF	1 days
	MS	MERSEYSIE	1 days
9	NORTH		
	DH	DURHAM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.
Parameter: Gross floor area
Actual Ran 178 to 114000 (units: sqm)
Range Sele 178 to 114000 (units: sqm)

Public Transport Provision:
Selection b Include all surveys

Date Rang 01/01/11 to 17/06/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.
Selected survey days:
Tuesday 8 days
Wednesda 6 days
Thursday 5 days
This data displays the number of selected surveys by day of the week.

Selected survey types:
Manual co 19 days
Directional 0 days
This data d the total a whilst ATC surveys are undertaking using machines.

Selected Locations:
Town Cent 0
Edge of To 9
Suburban / 6
Edge of To 4
Neighbour 0
Free Stand 0
Not Know 0
This data d Edge of To Suburban Neighbour Edge of To Town Centre and Not Known.

Selected Location Sub Categories:
Industrial 2 1
Commercia 2
Developm 2
Residentia 4
Retail Zone 0
Built-Up Zc 7
Village 0
Out of Tow 0
High Stree 0
No Sub Cat 3
This data d Industrial Developm Residentia Retail Zon Built-Up Z Village Out of Tov High Street and No Sub Category.

Secondary Filtering selection:

Use Class:
B1 19 days
This data d which can be found within the Library module of TRICS®.

Population within 1 mile:
1,001 to 5, 1 days
5,001 to 1(4 days
10,001 to 1 1 days
15,001 to 2 2 days
25,001 to 5 9 days
50,001 to 1 2 days
This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:
25,001 to ! 2 days
75,001 to : 3 days
100,001 to 2 days
125,001 to 6 days
250,001 to 2 days

500,001 or 4 days
This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:
0.6 to 1.0 9 days
1.1 to 1.5 9 days
1.6 to 2.0 1 days
This data d within a radius of 5-miles of selected survey sites.

Travel Plan:
Yes 9 days
No 10 days
This data d and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:
No PTAL Pr 16 days
1b Very po 1 days
5 Very Goo 1 days
6a Exceller 1 days
This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 BT-02-A-03 OFFICES BRENT
EMPIRE WAY

WEMBLEY
Suburban Area (PPS6 Out of Centre)
Development Zone
Total Gross floor area: 920 sqm
Survey dat WEDNESD/ ######## Survey Typ MANUAL

2 BT-02-A-04 OFFICES BRENT
EMPIRE WAY

WEMBLEY
Suburban Area (PPS6 Out of Centre)
Development Zone
Total Gross floor area: 10625 sqm
Survey dat THURSDAY ######## Survey Typ MANUAL

3 DH-02-A-0: CONSTRUC DURHAM
DURHAM ROAD
BOWBURN
NEAR DURHAM
Edge of Town
Industrial Zone
Total Gross floor area: 2000 sqm
Survey dat TUESDAY ######## Survey Typ MANUAL

4 ES-02-A-11 HOUSING (EAST SUSSEX
THE SIDINGS
ORE VALLEY
HASTINGS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 186 sqm
Survey dat TUESDAY ######## Survey Typ MANUAL

5 ES-02-A-12 COUNCIL C EAST SUSSEX
VICARAGE LANE

HAILSHAM
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 3640 sqm
Survey dat THURSDAY ######## Survey Typ MANUAL

6 ES-02-A-13 OFFICES EAST SUSSEX
ROMAN ROAD

HOVE
Edge of Town Centre
Residential Zone
Total Gross floor area: 280 sqm
Survey dat WEDNESD/ ######## Survey Typ MANUAL

7 HF-02-A-03 OFFICE HERTFORDSHIRE
60 VICTORIA STREET

ST ALBANS
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 610 sqm
Survey dat WEDNESD/ ######## Survey Typ MANUAL

8 HF-02-A-04 OFFICES HERTFORDSHIRE
STATION WAY

ST ALBANS
Edge of Town Centre
Residential Zone
Total Gross floor area: 5000 sqm
Survey dat THURSDAY ######## Survey Typ MANUAL

9 HO-02-A-0: SKY HEADQ HOUNSLOW
SYON LANE

ISLEWORTH
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Gross floor area: 120000 sqm
Survey dat WEDNESD/ ######## Survey Typ MANUAL

10 KC-02-A-09 COUNCIL C KENT
SANDLING ROAD

MAIDSTONE
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 1500 sqm
Survey dat WEDNESD/ ######## Survey Typ MANUAL
11 KC-02-A-10 COUNCIL C KENT
SANDLING ROAD

MAIDSTONE
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 2900 sqm
Survey dat WEDNESD/ ######## Survey Typ MANUAL
12 LC-02-A-09 OFFICES LANCASHIRE
FURTHERGATE

BLACKBURN
Suburban Area (PPS6 Out of Centre)
Built-Up Zone
Total Gross floor area: 2600 sqm
Survey dat TUESDAY ######## Survey Typ MANUAL
13 MS-02-A-0: SCIENCE P/ MERSEYSIDE
MOUNT PLEASANT

LIVERPOOL
Edge of Town
Built-Up Zone
Total Gross floor area: 11250 sqm
Survey dat TUESDAY ######## Survey Typ MANUAL
14 NF-02-A-03 OFFICES NORFOLK
NORTH QUAY

GREAT YARMOUTH
Edge of Town Centre
Commercial Zone
Total Gross floor area: 5500 sqm
Survey dat TUESDAY ######## Survey Typ MANUAL
15 NY-02-A-01 SOLICITOR: NORTH YORKSHIRE
NORTH PARK ROAD

HARROGATE
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 178 sqm
Survey dat THURSDAY ######## Survey Typ MANUAL
16 NY-02-A-02 DISTRICT C NORTH YORKSHIRE
STATION ROAD

RICHMOND
Edge of Town Centre
No Sub Category
Total Gross floor area: 1930 sqm
Survey dat THURSDAY ######## Survey Typ MANUAL
17 SC-02-A-16 BANK OF A SURREY
STANHOPE ROAD

CAMBERLEY
Edge of Town
Commercial Zone
Total Gross floor area: 39230 sqm
Survey dat TUESDAY ######## Survey Typ MANUAL
18 SC-02-A-17 PHARMACI SURREY
ST GEORGE'S AVENUE
THE HEATH
WEYBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 10293 sqm
Survey dat TUESDAY ######## Survey Typ MANUAL
19 WY-02-A-0 OFFICES WEST YORKSHIRE
PIONEER WAY
WHITWOOD
CASTLEFORD
Edge of Town
No Sub Category
Total Gross floor area: 1230 sqm
Survey dat TUESDAY ######## Survey Typ MANUAL

This sectio it displays the selecte the day of and whether the survey was a manual classified count or an ATC count.

Manually Deselected Sites

Site Ref	Reason for Deselection
HD-02-A-0	data centre
HD-02-A-0(	data centre
HD-02-A-0!	data centre

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: VEHICLES

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									

Count Type: VEHICLES

	Arr	Dep	Total
AM	0.78	0.094	0.874
PM	0.081	0.749	0.83

03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.361	1	114000	0.055	1	114000	0.416
07:00-08:0	18	11353	0.429	18	11353	0.059	18	11353	0.488
08:00-09:0	19	10765	0.78	19	10765	0.094	19	10765	0.874
09:00-10:0	19	10765	0.534	19	10765	0.132	19	10765	0.666
10:00-11:0	19	10765	0.187	19	10765	0.111	19	10765	0.298
11:00-12:0	19	10765	0.118	19	10765	0.097	19	10765	0.215
12:00-13:0	19	10765	0.158	19	10765	0.178	19	10765	0.336
13:00-14:0	19	10765	0.155	19	10765	0.144	19	10765	0.299
14:00-15:0	19	10765	0.108	19	10765	0.143	19	10765	0.251
15:00-16:0	19	10765	0.085	19	10765	0.215	19	10765	0.3
16:00-17:0	19	10765	0.096	19	10765	0.503	19	10765	0.599
17:00-18:0	19	10765	0.081	19	10765	0.749	19	10765	0.83
18:00-19:0	17	11949	0.059	17	11949	0.333	17	11949	0.392
19:00-20:0	1	114000	0.049	1	114000	0.239	1	114000	0.288
20:00-21:0	1	114000	0.038	1	114000	0.094	1	114000	0.132
21:00-22:0	1	114000	0.05	1	114000	0.075	1	114000	0.125
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			3.288			3.221			6.509

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: TAXIS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.002	1	114000	0.002	1	114000	0.004
07:00-08:0	18	11353	0.005	18	11353	0.005	18	11353	0.01
08:00-09:0	19	10765	0.02	19	10765	0.017	19	10765	0.037
09:00-10:0	19	10765	0.023	19	10765	0.023	19	10765	0.046
10:00-11:0	19	10765	0.009	19	10765	0.01	19	10765	0.019
11:00-12:0	19	10765	0.007	19	10765	0.003	19	10765	0.01
12:00-13:0	19	10765	0.007	19	10765	0.009	19	10765	0.016
13:00-14:0	19	10765	0.007	19	10765	0.009	19	10765	0.016
14:00-15:0	19	10765	0.005	19	10765	0.003	19	10765	0.008
15:00-16:0	19	10765	0.008	19	10765	0.005	19	10765	0.013
16:00-17:0	19	10765	0.012	19	10765	0.012	19	10765	0.024
17:00-18:0	19	10765	0.009	19	10765	0.014	19	10765	0.023
18:00-19:0	17	11949	0.006	17	11949	0.006	17	11949	0.012
19:00-20:0	1	114000	0.011	1	114000	0.012	1	114000	0.023
20:00-21:0	1	114000	0.007	1	114000	0.007	1	114000	0.014
21:00-22:0	1	114000	0.007	1	114000	0.004	1	114000	0.011
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.145			0.141			0.286

Count Type: TAXIS

	Arr	Dep	Total
AM	0.02	0.017	0.037
PM	0.009	0.014	0.023

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: OGVS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.001	1	114000	0	1	114000	0.001
07:00-08:0	18	11353	0.002	18	11353	0.002	18	11353	0.004
08:00-09:0	19	10765	0.002	19	10765	0.001	19	10765	0.003
09:00-10:0	19	10765	0.002	19	10765	0.003	19	10765	0.005
10:00-11:0	19	10765	0.002	19	10765	0.001	19	10765	0.003
11:00-12:0	19	10765	0	19	10765	0.001	19	10765	0.001
12:00-13:0	19	10765	0	19	10765	0	19	10765	0
13:00-14:0	19	10765	0	19	10765	0	19	10765	0
14:00-15:0	19	10765	0.001	19	10765	0.001	19	10765	0.002
15:00-16:0	19	10765	0.001	19	10765	0.001	19	10765	0.002
16:00-17:0	19	10765	0	19	10765	0	19	10765	0
17:00-18:0	19	10765	0.001	19	10765	0.001	19	10765	0.002
18:00-19:0	17	11949	0	17	11949	0	17	11949	0
19:00-20:0	1	114000	0	1	114000	0	1	114000	0
20:00-21:0	1	114000	0	1	114000	0	1	114000	0
21:00-22:0	1	114000	0	1	114000	0	1	114000	0
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.012			0.011			0.023

Count Type: OGVS

	Arr	Dep	Total
AM	0.002	0.001	0.003
PM	0.001	0.001	0.002

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: PSVS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									

Count Type: PSVS

	Arr	Dep	Total
AM	0.01	0.009	0.019
PM	0.01	0.01	0.02

02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.003	1	114000	0.004	1	114000	0.007
07:00-08:0	18	11353	0.005	18	11353	0.009	18	11353	0.014
08:00-09:0	19	10765	0.01	19	10765	0.009	19	10765	0.019
09:00-10:0	19	10765	0.01	19	10765	0.01	19	10765	0.02
10:00-11:0	19	10765	0.007	19	10765	0.007	19	10765	0.014
11:00-12:0	19	10765	0.003	19	10765	0.002	19	10765	0.005
12:00-13:0	19	10765	0.002	19	10765	0.002	19	10765	0.004
13:00-14:0	19	10765	0.002	19	10765	0.002	19	10765	0.004
14:00-15:0	19	10765	0.003	19	10765	0.002	19	10765	0.005
15:00-16:0	19	10765	0.003	19	10765	0.003	19	10765	0.006
16:00-17:0	19	10765	0.007	19	10765	0.008	19	10765	0.015
17:00-18:0	19	10765	0.01	19	10765	0.01	19	10765	0.02
18:00-19:0	17	11949	0.009	17	11949	0.009	17	11949	0.018
19:00-20:0	1	114000	0.012	1	114000	0.01	1	114000	0.022
20:00-21:0	1	114000	0.008	1	114000	0.004	1	114000	0.012
21:00-22:0	1	114000	0.004	1	114000	0.004	1	114000	0.008
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.098			0.095			0.193

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: CYCLISTS

		ARRIVALS			DEPARTURES			TOTALS	
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.023	1	114000	0.002	1	114000	0.025
07:00-08:0	18	11353	0.038	18	11353	0.001	18	11353	0.039
08:00-09:0	19	10765	0.073	19	10765	0	19	10765	0.073
09:00-10:0	19	10765	0.044	19	10765	0	19	10765	0.044
10:00-11:0	19	10765	0.006	19	10765	0.001	19	10765	0.007
11:00-12:0	19	10765	0.003	19	10765	0.001	19	10765	0.004
12:00-13:0	19	10765	0.002	19	10765	0.003	19	10765	0.005
13:00-14:0	19	10765	0.002	19	10765	0.004	19	10765	0.006
14:00-15:0	19	10765	0.002	19	10765	0.005	19	10765	0.007
15:00-16:0	19	10765	0.001	19	10765	0.01	19	10765	0.011
16:00-17:0	19	10765	0.002	19	10765	0.03	19	10765	0.032
17:00-18:0	19	10765	0.001	19	10765	0.066	19	10765	0.067
18:00-19:0	17	11949	0.002	17	11949	0.043	17	11949	0.045
19:00-20:0	1	114000	0	1	114000	0.027	1	114000	0.027
20:00-21:0	1	114000	0	1	114000	0.011	1	114000	0.011
21:00-22:0	1	114000	0.002	1	114000	0.004	1	114000	0.006
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.201			0.208			0.409

Count Type: CYCLISTS

	Arr	Dep	Total
AM	0.073	0	0.073
PM	0.001	0.066	0.067

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: VEHICLE OCCUPANTS

		ARRIVALS			DEPARTURES			TOTALS	
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.368	1	114000	0.049	1	114000	0.417
07:00-08:0	18	11353	0.449	18	11353	0.049	18	11353	0.498
08:00-09:0	19	10765	0.863	19	10765	0.066	19	10765	0.929
09:00-10:0	19	10765	0.567	19	10765	0.105	19	10765	0.672
10:00-11:0	19	10765	0.191	19	10765	0.103	19	10765	0.294
11:00-12:0	19	10765	0.124	19	10765	0.102	19	10765	0.226
12:00-13:0	19	10765	0.169	19	10765	0.198	19	10765	0.367
13:00-14:0	19	10765	0.175	19	10765	0.15	19	10765	0.325
14:00-15:0	19	10765	0.117	19	10765	0.155	19	10765	0.272
15:00-16:0	19	10765	0.083	19	10765	0.238	19	10765	0.321
16:00-17:0	19	10765	0.09	19	10765	0.536	19	10765	0.626
17:00-18:0	19	10765	0.075	19	10765	0.841	19	10765	0.916
18:00-19:0	17	11949	0.051	17	11949	0.369	17	11949	0.42
19:00-20:0	1	114000	0.034	1	114000	0.246	1	114000	0.28
20:00-21:0	1	114000	0.029	1	114000	0.094	1	114000	0.123
21:00-22:0	1	114000	0.043	1	114000	0.075	1	114000	0.118
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			3.428			3.376			6.804

Count Type: VEHICLE OCCUPANTS

	Arr	Dep	Total
AM	0.863	0.066	0.929
PM	0.075	0.841	0.916

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: PEDESTRIANS

		ARRIVALS			DEPARTURES			TOTALS	
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									

Count Type: PEDESTRIANS

	Arr	Dep	Total
AM	0.147	0.013	0.16
PM	0.023	0.153	0.176

01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.025	1	114000	0.005	1	114000	0.03
07:00-08:0	18	11353	0.045	18	11353	0.011	18	11353	0.056
08:00-09:0	19	10765	0.147	19	10765	0.013	19	10765	0.16
09:00-10:0	19	10765	0.114	19	10765	0.029	19	10765	0.143
10:00-11:0	19	10765	0.047	19	10765	0.052	19	10765	0.099
11:00-12:0	19	10765	0.063	19	10765	0.065	19	10765	0.128
12:00-13:0	19	10765	0.204	19	10765	0.339	19	10765	0.543
13:00-14:0	19	10765	0.292	19	10765	0.23	19	10765	0.522
14:00-15:0	19	10765	0.15	19	10765	0.083	19	10765	0.233
15:00-16:0	19	10765	0.055	19	10765	0.065	19	10765	0.12
16:00-17:0	19	10765	0.029	19	10765	0.078	19	10765	0.107
17:00-18:0	19	10765	0.023	19	10765	0.153	19	10765	0.176
18:00-19:0	17	11949	0.011	17	11949	0.048	17	11949	0.059
19:00-20:0	1	114000	0.005	1	114000	0.036	1	114000	0.041
20:00-21:0	1	114000	0.008	1	114000	0.022	1	114000	0.03
21:00-22:0	1	114000	0.004	1	114000	0.013	1	114000	0.017
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			1.222			1.242			2.464

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: BUS/TRAM PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.032	1	114000	0.004	1	114000	0.036
07:00-08:0	18	11353	0.03	18	11353	0.013	18	11353	0.043
08:00-09:0	19	10765	0.085	19	10765	0.001	19	10765	0.086
09:00-10:0	19	10765	0.059	19	10765	0.004	19	10765	0.063
10:00-11:0	19	10765	0.023	19	10765	0.007	19	10765	0.03
11:00-12:0	19	10765	0.02	19	10765	0.01	19	10765	0.03
12:00-13:0	19	10765	0.018	19	10765	0.027	19	10765	0.045
13:00-14:0	19	10765	0.024	19	10765	0.018	19	10765	0.042
14:00-15:0	19	10765	0.007	19	10765	0.012	19	10765	0.019
15:00-16:0	19	10765	0.007	19	10765	0.021	19	10765	0.028
16:00-17:0	19	10765	0.006	19	10765	0.054	19	10765	0.06
17:00-18:0	19	10765	0.006	19	10765	0.082	19	10765	0.088
18:00-19:0	17	11949	0.004	17	11949	0.026	17	11949	0.03
19:00-20:0	1	114000	0.007	1	114000	0.023	1	114000	0.03
20:00-21:0	1	114000	0.007	1	114000	0.008	1	114000	0.015
21:00-22:0	1	114000	0.01	1	114000	0.005	1	114000	0.015
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.345			0.315			0.66

Count Type: BUS/TRAM PASSENGERS

	Arr	Dep	Total
AM	0.085	0.001	0.086
PM	0.006	0.082	0.088

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: TOTAL RAIL PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:0	1	114000	0.028	1	114000	0.006	1	114000	0.034
07:00-08:0	18	11353	0.092	18	11353	0.01	18	11353	0.102
08:00-09:0	19	10765	0.417	19	10765	0.009	19	10765	0.426
09:00-10:0	19	10765	0.327	19	10765	0.005	19	10765	0.332
10:00-11:0	19	10765	0.087	19	10765	0.008	19	10765	0.095
11:00-12:0	19	10765	0.027	19	10765	0.014	19	10765	0.041
12:00-13:0	19	10765	0.036	19	10765	0.022	19	10765	0.058
13:00-14:0	19	10765	0.033	19	10765	0.018	19	10765	0.051
14:00-15:0	19	10765	0.013	19	10765	0.019	19	10765	0.032
15:00-16:0	19	10765	0.01	19	10765	0.048	19	10765	0.058
16:00-17:0	19	10765	0.004	19	10765	0.202	19	10765	0.206
17:00-18:0	19	10765	0.004	19	10765	0.432	19	10765	0.436
18:00-19:0	17	11949	0.005	17	11949	0.204	17	11949	0.209
19:00-20:0	1	114000	0.005	1	114000	0.139	1	114000	0.144
20:00-21:0	1	114000	0.007	1	114000	0.055	1	114000	0.062
21:00-22:0	1	114000	0.002	1	114000	0.015	1	114000	0.017
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			1.097			1.206			2.303

Count Type: TOTAL RAIL PASSENGERS

	Arr	Dep	Total
AM	0.417	0.009	0.426
PM	0.004	0.432	0.436

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: COACH PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate

Count Type: COACH PASSENGERS

	Arr	Dep	Total
AM	0.022	0	0.022

00:00-01:00								
01:00-02:00								
02:00-03:00								
03:00-04:00								
04:00-05:00								
05:00-06:00								
06:00-07:0 1	114000	0	1	114000	0	1	114000	0
07:00-08:0 18	11353	0.014	18	11353	0	18	11353	0.014
08:00-09:0 19	10765	0.022	19	10765	0	19	10765	0.022
09:00-10:0 19	10765	0.016	19	10765	0	19	10765	0.016
10:00-11:0 19	10765	0.001	19	10765	0	19	10765	0.001
11:00-12:0 19	10765	0	19	10765	0	19	10765	0
12:00-13:0 19	10765	0	19	10765	0	19	10765	0
13:00-14:0 19	10765	0	19	10765	0	19	10765	0
14:00-15:0 19	10765	0	19	10765	0.001	19	10765	0.001
15:00-16:0 19	10765	0	19	10765	0.002	19	10765	0.002
16:00-17:0 19	10765	0	19	10765	0.009	19	10765	0.009
17:00-18:0 19	10765	0	19	10765	0.031	19	10765	0.031
18:00-19:0 17	11949	0	17	11949	0.015	17	11949	0.015
19:00-20:0 1	114000	0	1	114000	0.034	1	114000	0.034
20:00-21:0 1	114000	0	1	114000	0.003	1	114000	0.003
21:00-22:0 1	114000	0	1	114000	0	1	114000	0
22:00-23:00								
23:00-24:00								
Daily Trip Rates:		0.053			0.095			0.148

PM	0	0.031	0.031

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: PUBLIC TRANSPORT USERS

		ARRIVALS			DEPARTURES			TOTALS
No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00								
01:00-02:00								
02:00-03:00								
03:00-04:00								
04:00-05:00								
05:00-06:00								
06:00-07:0 1	114000	0.06	1	114000	0.01	1	114000	0.07
07:00-08:0 18	11353	0.136	18	11353	0.023	18	11353	0.159
08:00-09:0 19	10765	0.524	19	10765	0.01	19	10765	0.534
09:00-10:0 19	10765	0.401	19	10765	0.01	19	10765	0.411
10:00-11:0 19	10765	0.112	19	10765	0.015	19	10765	0.127
11:00-12:0 19	10765	0.046	19	10765	0.023	19	10765	0.069
12:00-13:0 19	10765	0.054	19	10765	0.049	19	10765	0.103
13:00-14:0 19	10765	0.057	19	10765	0.036	19	10765	0.093
14:00-15:0 19	10765	0.021	19	10765	0.031	19	10765	0.052
15:00-16:0 19	10765	0.017	19	10765	0.071	19	10765	0.088
16:00-17:0 19	10765	0.01	19	10765	0.265	19	10765	0.275
17:00-18:0 19	10765	0.01	19	10765	0.545	19	10765	0.555
18:00-19:0 17	11949	0.01	17	11949	0.245	17	11949	0.255
19:00-20:0 1	114000	0.012	1	114000	0.196	1	114000	0.208
20:00-21:0 1	114000	0.014	1	114000	0.066	1	114000	0.08
21:00-22:0 1	114000	0.011	1	114000	0.02	1	114000	0.031
22:00-23:00								
23:00-24:00								
Daily Trip Rates:		1.495			1.615			3.11

Count Type: PUBLIC TRANSPORT USERS

	Arr	Dep	Total
AM	0.524	0.01	0.534
PM	0.01	0.545	0.555

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
Calculation Factor: 100 sqm
Count Type: TOTAL PEOPLE

		ARRIVALS			DEPARTURES			TOTALS
No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00								
01:00-02:00								
02:00-03:00								
03:00-04:00								
04:00-05:00								
05:00-06:00								
06:00-07:0 1	114000	0.475	1	114000	0.066	1	114000	0.541
07:00-08:0 18	11353	0.667	18	11353	0.084	18	11353	0.751
08:00-09:0 19	10765	1.608	19	10765	0.089	19	10765	1.697
09:00-10:0 19	10765	1.126	19	10765	0.144	19	10765	1.27
10:00-11:0 19	10765	0.356	19	10765	0.172	19	10765	0.528
11:00-12:0 19	10765	0.237	19	10765	0.192	19	10765	0.429
12:00-13:0 19	10765	0.428	19	10765	0.589	19	10765	1.017
13:00-14:0 19	10765	0.526	19	10765	0.421	19	10765	0.947
14:00-15:0 19	10765	0.289	19	10765	0.275	19	10765	0.564
15:00-16:0 19	10765	0.156	19	10765	0.384	19	10765	0.54
16:00-17:0 19	10765	0.131	19	10765	0.908	19	10765	1.039
17:00-18:0 19	10765	0.11	19	10765	1.604	19	10765	1.714
18:00-19:0 17	11949	0.074	17	11949	0.704	17	11949	0.778
19:00-20:0 1	114000	0.052	1	114000	0.505	1	114000	0.557
20:00-21:0 1	114000	0.051	1	114000	0.192	1	114000	0.243
21:00-22:0 1	114000	0.061	1	114000	0.111	1	114000	0.172
22:00-23:00								
23:00-24:00								
Daily Trip Rates:		6.347			6.44			12.787

Count Type: TOTAL PEOPLE

	Arr	Dep	Total
AM	1.608	0.089	1.697
PM	0.11	1.604	1.714

TRICS 7.6.4
Trip Rate P: Gross floor area

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use 02 - EMPLOYMENT
Category C - INDUSTRIAL UNIT
MULTI-MODAL VEHICLES

Selected regions and areas:
2 SOUTH EAST
WS WEST SUSS 1 days
6 WEST MIDLANDS
HE HEREFORD: 1 days
This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.
Parameter: Gross floor area
Actual Rang 1880 to 67459 (units: sqm)
Range Selec 620 to 80000 (units: sqm)

Public Transport Provision:
Selection by Include all surveys

Date Range 01/01/11 to 24/09/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.
Selected survey days:
Tuesday 2 days
This data displays the number of selected surveys by day of the week.

Selected survey types:
Manual cou 2 days
Directional 0 days
This data di the total ac whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centr	0
Edge of Tov	0
Suburban A	0
Edge of Tov	1
Neighbourh	1
Free Standi	0
Not Known	0

This data di Edge of To Suburban A Neighbour Edge of To Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Z	0
Commercia	1
Developme	0
Residential	0
Retail Zone	0
Built-Up Zo	0
Village	1
Out of Tow	0
High Street	0
No Sub Cate	0

This data di Industrial Z Developme Residentia Retail Zone Built-Up Zc Village Out of Tow High Street and No Sub Category.

Secondary Filtering selection:

Use Class:
B2 2 days
This data di which can be found within the Library module of TRICS®.

Population within 1 mile:
1,001 to 5, 1 days
10,001 to 1 1 days
This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:
50,001 to 7 1 days
75,001 to 1 1 days
This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:
1.1 to 1.5 2 days
This data di within a radius of 5-miles of selected survey sites.

Travel Plan:
Yes 1 days
No 1 days
This data di and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:
No PTAL Pr 2 days
This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 HE-02-C-02 THERMAL F HEREFORDSHIRE
COLLEGE ROAD
BURCOTT
HEREFORD
Edge of Town
Commercial Zone
Total Gross floor area: 1880 sqm
Survey date TUESDAY ######### Survey Type MANUAL
2 WS-02-C-0: ROLLS ROY WEST SUSSEX
STANE STREET
WESTHAMPNETT
NEAR CHICHESTER
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Gross floor area: 67459 sqm
Survey date TUESDAY ######### Survey Type MANUAL

This sectior it displays the selecte the day of and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: VEHICLES

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.532	1	67459	0.006	1	67459	0.538
06:00-07:0	1	67459	0.345	1	67459	0.076	1	67459	0.421
07:00-08:0	2	34670	0.374	2	34670	0.046	2	34670	0.42
08:00-09:0	2	34670	0.235	2	34670	0.035	2	34670	0.27
09:00-10:0	2	34670	0.105	2	34670	0.056	2	34670	0.161
10:00-11:0	2	34670	0.074	2	34670	0.052	2	34670	0.126
11:00-12:0	2	34670	0.053	2	34670	0.046	2	34670	0.099
12:00-13:0	2	34670	0.075	2	34670	0.05	2	34670	0.125
13:00-14:0	2	34670	0.232	2	34670	0.076	2	34670	0.308
14:00-15:0	2	34670	0.441	2	34670	0.512	2	34670	0.953
15:00-16:0	2	34670	0.059	2	34670	0.329	2	34670	0.388
16:00-17:0	2	34670	0.052	2	34670	0.296	2	34670	0.348
17:00-18:0	2	34670	0.048	2	34670	0.327	2	34670	0.375
18:00-19:0	2	34670	0.032	2	34670	0.173	2	34670	0.205
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			2.657			2.08			4.737

Count Type: VEHICLES

	Arr	Dep	Total
AM	0.235	0.035	0.27
PM	0.048	0.327	0.375

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: TAXIS

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.001	1	67459	0.001	1	67459	0.002
06:00-07:0	1	67459	0	1	67459	0	1	67459	0
07:00-08:0	2	34670	0	2	34670	0	2	34670	0
08:00-09:0	2	34670	0	2	34670	0	2	34670	0
09:00-10:0	2	34670	0	2	34670	0	2	34670	0
10:00-11:0	2	34670	0	2	34670	0	2	34670	0
11:00-12:0	2	34670	0	2	34670	0	2	34670	0
12:00-13:0	2	34670	0	2	34670	0	2	34670	0
13:00-14:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
14:00-15:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
15:00-16:0	2	34670	0	2	34670	0	2	34670	0
16:00-17:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
17:00-18:0	2	34670	0.004	2	34670	0.004	2	34670	0.008
18:00-19:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.009			0.009			0.018

Count Type: TAXIS

	Arr	Dep	Total
AM	0	0	0
PM	0.004	0.004	0.008

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: OGVS

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip

Count Type: OGVS

	Arr	Dep	Total

Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.007	1	67459	0.001	1	67459	0.008
06:00-07:0	1	67459	0.009	1	67459	0.007	1	67459	0.016
07:00-08:0	2	34670	0.009	2	34670	0.01	2	34670	0.019
08:00-09:0	2	34670	0.01	2	34670	0.01	2	34670	0.02
09:00-10:0	2	34670	0.014	2	34670	0.016	2	34670	0.03
10:00-11:0	2	34670	0.012	2	34670	0.01	2	34670	0.022
11:00-12:0	2	34670	0.012	2	34670	0.012	2	34670	0.024
12:00-13:0	2	34670	0.01	2	34670	0.012	2	34670	0.022
13:00-14:0	2	34670	0.007	2	34670	0.007	2	34670	0.014
14:00-15:0	2	34670	0.004	2	34670	0.006	2	34670	0.01
15:00-16:0	2	34670	0.012	2	34670	0.007	2	34670	0.019
16:00-17:0	2	34670	0.007	2	34670	0.009	2	34670	0.016
17:00-18:0	2	34670	0.013	2	34670	0.01	2	34670	0.023
18:00-19:0	2	34670	0.007	2	34670	0.013	2	34670	0.02
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.133			0.13			0.263

AM	0.01	0.01	0.02
PM	0.013	0.01	0.023

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: PSVS

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.003	1	67459	0.003	1	67459	0.006
06:00-07:0	1	67459	0.003	1	67459	0.003	1	67459	0.006
07:00-08:0	2	34670	0.003	2	34670	0.003	2	34670	0.006
08:00-09:0	2	34670	0.003	2	34670	0.003	2	34670	0.006
09:00-10:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
10:00-11:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
11:00-12:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
12:00-13:0	2	34670	0.003	2	34670	0.003	2	34670	0.006
13:00-14:0	2	34670	0.003	2	34670	0.001	2	34670	0.004
14:00-15:0	2	34670	0.003	2	34670	0.004	2	34670	0.007
15:00-16:0	2	34670	0.003	2	34670	0.003	2	34670	0.006
16:00-17:0	2	34670	0.004	2	34670	0.004	2	34670	0.008
17:00-18:0	2	34670	0.003	2	34670	0.003	2	34670	0.006
18:00-19:0	2	34670	0.003	2	34670	0.003	2	34670	0.006
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.037			0.036			0.073

Count Type: PSVS

	Arr	Dep	Total
AM	0.003	0.003	0.006
PM	0.003	0.003	0.006

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: CYCLISTS

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.018	1	67459	0	1	67459	0.018
06:00-07:0	1	67459	0.022	1	67459	0.004	1	67459	0.026
07:00-08:0	2	34670	0.017	2	34670	0	2	34670	0.017
08:00-09:0	2	34670	0.003	2	34670	0	2	34670	0.003
09:00-10:0	2	34670	0.003	2	34670	0	2	34670	0.003
10:00-11:0	2	34670	0.001	2	34670	0	2	34670	0.001
11:00-12:0	2	34670	0	2	34670	0	2	34670	0
12:00-13:0	2	34670	0.001	2	34670	0	2	34670	0.001
13:00-14:0	2	34670	0.006	2	34670	0	2	34670	0.006
14:00-15:0	2	34670	0.026	2	34670	0.017	2	34670	0.043
15:00-16:0	2	34670	0	2	34670	0.006	2	34670	0.006
16:00-17:0	2	34670	0	2	34670	0.017	2	34670	0.017
17:00-18:0	2	34670	0.004	2	34670	0.006	2	34670	0.01
18:00-19:0	2	34670	0.001	2	34670	0.007	2	34670	0.008
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.102			0.057			0.159

Count Type: CYCLISTS

	Arr	Dep	Total
AM	0.003	0	0.003
PM	0.004	0.006	0.01

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: VEHICLE OCCUPANTS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.631	1	67459	0.001	1	67459	0.632
06:00-07:0	1	67459	0.369	1	67459	0.086	1	67459	0.455
07:00-08:0	2	34670	0.415	2	34670	0.048	2	34670	0.463
08:00-09:0	2	34670	0.251	2	34670	0.032	2	34670	0.283
09:00-10:0	2	34670	0.108	2	34670	0.063	2	34670	0.171
10:00-11:0	2	34670	0.087	2	34670	0.063	2	34670	0.15
11:00-12:0	2	34670	0.058	2	34670	0.049	2	34670	0.107
12:00-13:0	2	34670	0.087	2	34670	0.056	2	34670	0.143
13:00-14:0	2	34670	0.245	2	34670	0.087	2	34670	0.332
14:00-15:0	2	34670	0.57	2	34670	0.661	2	34670	1.231
15:00-16:0	2	34670	0.066	2	34670	0.378	2	34670	0.444
16:00-17:0	2	34670	0.061	2	34670	0.337	2	34670	0.398
17:00-18:0	2	34670	0.056	2	34670	0.368	2	34670	0.424
18:00-19:0	2	34670	0.033	2	34670	0.187	2	34670	0.22
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			3.037			2.416			5.453

Count Type: VEHICLE OCCUPANTS

	Arr	Dep	Total
AM	0.251	0.032	0.283
PM	0.056	0.368	0.424

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: PEDESTRIANS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.03	1	67459	0	1	67459	0.03
06:00-07:0	1	67459	0.003	1	67459	0	1	67459	0.003
07:00-08:0	2	34670	0.016	2	34670	0	2	34670	0.016
08:00-09:0	2	34670	0.014	2	34670	0.003	2	34670	0.017
09:00-10:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
10:00-11:0	2	34670	0.006	2	34670	0.003	2	34670	0.009
11:00-12:0	2	34670	0	2	34670	0.001	2	34670	0.001
12:00-13:0	2	34670	0.006	2	34670	0.016	2	34670	0.022
13:00-14:0	2	34670	0.01	2	34670	0	2	34670	0.01
14:00-15:0	2	34670	0.04	2	34670	0.039	2	34670	0.079
15:00-16:0	2	34670	0	2	34670	0.004	2	34670	0.004
16:00-17:0	2	34670	0	2	34670	0.007	2	34670	0.007
17:00-18:0	2	34670	0	2	34670	0.02	2	34670	0.02
18:00-19:0	2	34670	0.001	2	34670	0.003	2	34670	0.004
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.127			0.097			0.224

Count Type: PEDESTRIANS

	Arr	Dep	Total
AM	0.014	0.003	0.017
PM	0	0.02	0.02

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: BUS/TRAM PASSENGERS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0	1	67459	0	1	67459	0
06:00-07:0	1	67459	0.001	1	67459	0.007	1	67459	0.008
07:00-08:0	2	34670	0.01	2	34670	0	2	34670	0.01
08:00-09:0	2	34670	0.007	2	34670	0	2	34670	0.007
09:00-10:0	2	34670	0.001	2	34670	0	2	34670	0.001
10:00-11:0	2	34670	0.001	2	34670	0	2	34670	0.001
11:00-12:0	2	34670	0.001	2	34670	0	2	34670	0.001
12:00-13:0	2	34670	0.001	2	34670	0	2	34670	0.001
13:00-14:0	2	34670	0	2	34670	0	2	34670	0
14:00-15:0	2	34670	0	2	34670	0.001	2	34670	0.001
15:00-16:0	2	34670	0	2	34670	0.007	2	34670	0.007
16:00-17:0	2	34670	0	2	34670	0.007	2	34670	0.007
17:00-18:0	2	34670	0	2	34670	0.006	2	34670	0.006

Count Type: BUS/TRAM PASSENGERS

	Arr	Dep	Total
AM	0.007	0	0.007
PM	0	0.006	0.006

18:00-19:0	2	34670	0	2	34670	0	2	34670	0
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.022			0.028			0.05

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: TOTAL RAIL PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.001	1	67459	0	1	67459	0.001
06:00-07:0	1	67459	0	1	67459	0	1	67459	0
07:00-08:0	2	34670	0.003	2	34670	0	2	34670	0.003
08:00-09:0	2	34670	0	2	34670	0	2	34670	0
09:00-10:0	2	34670	0	2	34670	0	2	34670	0
10:00-11:0	2	34670	0	2	34670	0	2	34670	0
11:00-12:0	2	34670	0	2	34670	0	2	34670	0
12:00-13:0	2	34670	0	2	34670	0	2	34670	0
13:00-14:0	2	34670	0	2	34670	0	2	34670	0
14:00-15:0	2	34670	0	2	34670	0	2	34670	0
15:00-16:0	2	34670	0	2	34670	0	2	34670	0
16:00-17:0	2	34670	0	2	34670	0	2	34670	0
17:00-18:0	2	34670	0	2	34670	0	2	34670	0
18:00-19:0	2	34670	0	2	34670	0	2	34670	0
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.004			0			0.004

Count Type: TOTAL RAIL PASSENGERS

	Arr	Dep	Total
AM	0	0	0
PM	0	0	0

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: COACH PASSENGERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.095	1	67459	0	1	67459	0.095
06:00-07:0	1	67459	0.018	1	67459	0.001	1	67459	0.019
07:00-08:0	2	34670	0.012	2	34670	0	2	34670	0.012
08:00-09:0	2	34670	0.006	2	34670	0.007	2	34670	0.013
09:00-10:0	2	34670	0.001	2	34670	0	2	34670	0.001
10:00-11:0	2	34670	0	2	34670	0	2	34670	0
11:00-12:0	2	34670	0.004	2	34670	0	2	34670	0.004
12:00-13:0	2	34670	0.003	2	34670	0.001	2	34670	0.004
13:00-14:0	2	34670	0.004	2	34670	0	2	34670	0.004
14:00-15:0	2	34670	0	2	34670	0.082	2	34670	0.082
15:00-16:0	2	34670	0	2	34670	0.017	2	34670	0.017
16:00-17:0	2	34670	0.001	2	34670	0.014	2	34670	0.015
17:00-18:0	2	34670	0	2	34670	0.001	2	34670	0.001
18:00-19:0	2	34670	0	2	34670	0.001	2	34670	0.001
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.144			0.124			0.268

Count Type: COACH PASSENGERS

	Arr	Dep	Total
AM	0.006	0.007	0.013
PM	0	0.001	0.001

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: PUBLIC TRANSPORT USERS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.096	1	67459	0	1	67459	0.096
06:00-07:0	1	67459	0.019	1	67459	0.009	1	67459	0.028
07:00-08:0	2	34670	0.025	2	34670	0	2	34670	0.025
08:00-09:0	2	34670	0.013	2	34670	0.007	2	34670	0.02
09:00-10:0	2	34670	0.003	2	34670	0	2	34670	0.003
10:00-11:0	2	34670	0.001	2	34670	0	2	34670	0.001

Count Type: PUBLIC TRANSPORT USERS

	Arr	Dep	Total
AM	0.013	0.007	0.02
PM	0	0.007	0.007

11:00-12:0	2	34670	0.006	2	34670	0	2	34670	0.006
12:00-13:0	2	34670	0.004	2	34670	0.001	2	34670	0.005
13:00-14:0	2	34670	0.004	2	34670	0	2	34670	0.004
14:00-15:0	2	34670	0	2	34670	0.084	2	34670	0.084
15:00-16:0	2	34670	0	2	34670	0.025	2	34670	0.025
16:00-17:0	2	34670	0.001	2	34670	0.022	2	34670	0.023
17:00-18:0	2	34670	0	2	34670	0.007	2	34670	0.007
18:00-19:0	2	34670	0	2	34670	0.001	2	34670	0.001
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.172			0.156			0.328

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: TOTAL PEOPLE

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.775	1	67459	0.001	1	67459	0.776
06:00-07:0	1	67459	0.414	1	67459	0.099	1	67459	0.513
07:00-08:0	2	34670	0.473	2	34670	0.048	2	34670	0.521
08:00-09:0	2	34670	0.281	2	34670	0.042	2	34670	0.323
09:00-10:0	2	34670	0.115	2	34670	0.065	2	34670	0.18
10:00-11:0	2	34670	0.095	2	34670	0.066	2	34670	0.161
11:00-12:0	2	34670	0.063	2	34670	0.05	2	34670	0.113
12:00-13:0	2	34670	0.098	2	34670	0.074	2	34670	0.172
13:00-14:0	2	34670	0.265	2	34670	0.087	2	34670	0.352
14:00-15:0	2	34670	0.636	2	34670	0.8	2	34670	1.436
15:00-16:0	2	34670	0.066	2	34670	0.412	2	34670	0.478
16:00-17:0	2	34670	0.062	2	34670	0.384	2	34670	0.446
17:00-18:0	2	34670	0.061	2	34670	0.401	2	34670	0.462
18:00-19:0	2	34670	0.036	2	34670	0.199	2	34670	0.235
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			3.44			2.728			6.168

Count Type: TOTAL PEOPLE

	Arr	Dep	Total
AM	0.281	0.042	0.323
PM	0.061	0.401	0.462

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: CARS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.483	1	67459	0	1	67459	0.483
06:00-07:0	1	67459	0.322	1	67459	0.062	1	67459	0.384
07:00-08:0	2	34670	0.349	2	34670	0.03	2	34670	0.379
08:00-09:0	2	34670	0.211	2	34670	0.013	2	34670	0.224
09:00-10:0	2	34670	0.069	2	34670	0.022	2	34670	0.091
10:00-11:0	2	34670	0.04	2	34670	0.027	2	34670	0.067
11:00-12:0	2	34670	0.023	2	34670	0.016	2	34670	0.039
12:00-13:0	2	34670	0.053	2	34670	0.027	2	34670	0.08
13:00-14:0	2	34670	0.198	2	34670	0.049	2	34670	0.247
14:00-15:0	2	34670	0.404	2	34670	0.46	2	34670	0.864
15:00-16:0	2	34670	0.026	2	34670	0.293	2	34670	0.319
16:00-17:0	2	34670	0.035	2	34670	0.265	2	34670	0.3
17:00-18:0	2	34670	0.022	2	34670	0.303	2	34670	0.325
18:00-19:0	2	34670	0.014	2	34670	0.144	2	34670	0.158
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			2.249			1.711			3.96

Count Type: CARS

	Arr	Dep	Total
AM	0.211	0.013	0.224
PM	0.022	0.303	0.325

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: LGVS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									

Count Type: LGVS

	Arr	Dep	Total
AM	0.009	0.006	0.015
PM	0.006	0.007	0.013

04:00-05:00									
05:00-06:0	1	67459	0.021	1	67459	0	1	67459	0.021
06:00-07:0	1	67459	0.007	1	67459	0.003	1	67459	0.01
07:00-08:0	2	34670	0.009	2	34670	0.001	2	34670	0.01
08:00-09:0	2	34670	0.009	2	34670	0.006	2	34670	0.015
09:00-10:0	2	34670	0.019	2	34670	0.017	2	34670	0.036
10:00-11:0	2	34670	0.019	2	34670	0.012	2	34670	0.031
11:00-12:0	2	34670	0.016	2	34670	0.016	2	34670	0.032
12:00-13:0	2	34670	0.006	2	34670	0.007	2	34670	0.013
13:00-14:0	2	34670	0.017	2	34670	0.016	2	34670	0.033
14:00-15:0	2	34670	0.014	2	34670	0.023	2	34670	0.037
15:00-16:0	2	34670	0.014	2	34670	0.02	2	34670	0.034
16:00-17:0	2	34670	0.004	2	34670	0.01	2	34670	0.014
17:00-18:0	2	34670	0.006	2	34670	0.007	2	34670	0.013
18:00-19:0	2	34670	0	2	34670	0.004	2	34670	0.004
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.161			0.142			0.303

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
Calculation Factor: 100 sqm
Count Type: MOTOR CYCLES

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Range	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	67459	0.016	1	67459	0	1	67459	0.016
06:00-07:0	1	67459	0.004	1	67459	0	1	67459	0.004
07:00-08:0	2	34670	0.001	2	34670	0	2	34670	0.001
08:00-09:0	2	34670	0.001	2	34670	0	2	34670	0.001
09:00-10:0	2	34670	0	2	34670	0	2	34670	0
10:00-11:0	2	34670	0	2	34670	0	2	34670	0
11:00-12:0	2	34670	0	2	34670	0	2	34670	0
12:00-13:0	2	34670	0.001	2	34670	0	2	34670	0.001
13:00-14:0	2	34670	0.006	2	34670	0.001	2	34670	0.007
14:00-15:0	2	34670	0.014	2	34670	0.017	2	34670	0.031
15:00-16:0	2	34670	0.001	2	34670	0.001	2	34670	0.002
16:00-17:0	2	34670	0	2	34670	0.003	2	34670	0.003
17:00-18:0	2	34670	0	2	34670	0	2	34670	0
18:00-19:0	2	34670	0	2	34670	0.004	2	34670	0.004
19:00-20:00									
20:00-21:00									
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.044			0.026			0.07

Count Type: MOTOR CYCLES

	Arr	Dep	Total
AM	0.001	0	0.001
PM	0	0	0

TRICS 7.6.4
Trip Rate P Gross floor area

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use 02 - EMPLOYMENT
Category F - WAREHOUSING (COMMERCIAL)
MULTI-MODAL VEHICLES

Selected regions and areas:

1	GREATER LONDON		
	HD	HILLINGDO	1 days
	HO	HOUNSLOV	1 days
2	SOUTH EAST		
	EX	ESSEX	1 days
3	SOUTH WEST		
	DV	DEVON	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.
Parameter Gross floor area
Actual Ran 6560 to 50000 (units: sqm)
Range Sele 1976 to 80066 (units: sqm)

Public Transport Provision:
Selection b Include all surveys

Date Range 01/01/11 to 03/04/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.
Selected survey days:
Wednesda 2 days
Thursday 1 days
Friday 1 days
This data displays the number of selected surveys by day of the week.

Selected survey types:
Manual co 4 days
Directional 0 days
This data d the total a whilst ATC surveys are undertaking using machines.

Selected Locations:
Town Cent 0
Edge of To 0
Suburban / 1
Edge of To 2
Neighbour 0
Free Stand 1
Not Known 0
This data d Edge of To Suburban Neighbour Edge of To Town Centre and Not Known.

Selected Location Sub Categories:
Industrial Z 3
Commercia 0
Developme 0
Residential 0
Retail Zone 0
Built-Up Zc 0
Village 0
Out of Tow 1
High Street 0
No Sub Cat 0
This data d Industrial Z Developm Residentia Retail Zone Built-Up Zc Village Out of Tov High Street and No Sub Category.

Secondary Filtering selection:

Use Class:
B8 4 days
This data d which can be found within the Library module of TRICS®.

Population within 1 mile:
1,000 or Le 1 days
10,001 to 1 1 days
20,001 to 2 1 days
25,001 to 5 1 days
This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:
125,001 to 2 days
500,001 or 2 days
This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:
0.6 to 1.0 2 days
1.1 to 1.5 2 days
This data d within a radius of 5-miles of selected survey sites.

Travel Plan:
Yes 2 days
No 2 days
This data d and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:
No PTAL Pr 2 days
1b Very po 1 days
2 Poor 1 days
This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters
1 DV-02-F-02 LIDL DISTRI DEVON

CHILLPARK BRAKE
CLYST HONITON
NEAR EXETER
Free Standing (PPS6 Out of Town)
Out of Town
Total Gross floor area: 50000 sqm
Survey dat WEDNESD/ ######## Survey Typ MANUAL

2 EX-02-F-01 SPORTS SU ESSEX
BRUNEL WAY
SEVERALLS INDUSTRIAL PK
COLCHESTER
Edge of Town
Industrial Zone
Total Gross floor area: 6560 sqm
Survey dat FRIDAY ######## Survey Typ MANUAL

3 HD-02-F-01 FOOD DIST HILLINGDON
NINE ACRES CLOSE

HAYES
Edge of Town
Industrial Zone
Total Gross floor area: 8673 sqm
Survey dat THURSDAY ######## Survey Typ MANUAL

4 HO-02-F-0: LOGISTICS HOUNSLOW
ASCOT ROAD

FELTHAM
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 13500 sqm
Survey dat WEDNESD/ ######## Survey Typ MANUAL

This sectio it displays the select the day of and whether the survey was a manual classified count or an ATC count.

Manually Deselected Sites
Site Ref Reason for Deselection
CB-02-F-01 b2

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: VEHICLES

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0.024	1	50000	0.02	1	50000	0.044
06:00-07:0	1	50000	0.046	1	50000	0.03	1	50000	0.076
07:00-08:0	4	19683	0.166	4	19683	0.053	4	19683	0.219
08:00-09:0	4	19683	0.255	4	19683	0.071	4	19683	0.326
09:00-10:0	4	19683	0.192	4	19683	0.1	4	19683	0.292
10:00-11:0	4	19683	0.091	4	19683	0.094	4	19683	0.185
11:00-12:0	4	19683	0.124	4	19683	0.138	4	19683	0.262
12:00-13:0	4	19683	0.127	4	19683	0.173	4	19683	0.3
13:00-14:0	4	19683	0.173	4	19683	0.144	4	19683	0.317
14:00-15:0	4	19683	0.077	4	19683	0.118	4	19683	0.195
15:00-16:0	4	19683	0.086	4	19683	0.111	4	19683	0.197
16:00-17:0	4	19683	0.102	4	19683	0.142	4	19683	0.244
17:00-18:0	4	19683	0.076	4	19683	0.23	4	19683	0.306
18:00-19:0	4	19683	0.056	4	19683	0.171	4	19683	0.227
19:00-20:0	1	50000	0.014	1	50000	0.014	1	50000	0.028
20:00-21:0	1	50000	0.028	1	50000	0.022	1	50000	0.05
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			1.637			1.631			3.268

Count Type: VEHICLES

	Arr	Dep	Total
AM	0.255	0.071	0.326
PM	0.076	0.23	0.306

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: TAXIS

	ARRIVALS			DEPARTURES			TOTALS		
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0	4	19683	0	4	19683	0
08:00-09:0	4	19683	0.001	4	19683	0.001	4	19683	0.002
09:00-10:0	4	19683	0	4	19683	0	4	19683	0
10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0	4	19683	0	4	19683	0
12:00-13:0	4	19683	0	4	19683	0	4	19683	0
13:00-14:0	4	19683	0	4	19683	0	4	19683	0
14:00-15:0	4	19683	0	4	19683	0	4	19683	0
15:00-16:0	4	19683	0	4	19683	0	4	19683	0
16:00-17:0	4	19683	0.001	4	19683	0.001	4	19683	0.002
17:00-18:0	4	19683	0	4	19683	0	4	19683	0
18:00-19:0	4	19683	0	4	19683	0	4	19683	0
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									

Count Type: TAXIS

	Arr	Dep	Total
AM	0.001	0.001	0.002
PM	0	0	0

23:00-24:00								
Daily Trip Rates:		0.002			0.002			0.004

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: OGVS

		ARRIVALS			DEPARTURES			TOTALS
No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00								
01:00-02:00								
02:00-03:00								
03:00-04:00								
04:00-05:00								
05:00-06:0 1	50000	0.016	1	50000	0.014	1	50000	0.03
06:00-07:0 1	50000	0.034	1	50000	0.018	1	50000	0.052
07:00-08:0 4	19683	0.044	4	19683	0.034	4	19683	0.078
08:00-09:0 4	19683	0.052	4	19683	0.042	4	19683	0.094
09:00-10:0 4	19683	0.066	4	19683	0.042	4	19683	0.108
10:00-11:0 4	19683	0.037	4	19683	0.037	4	19683	0.074
11:00-12:0 4	19683	0.03	4	19683	0.048	4	19683	0.078
12:00-13:0 4	19683	0.034	4	19683	0.052	4	19683	0.086
13:00-14:0 4	19683	0.025	4	19683	0.039	4	19683	0.064
14:00-15:0 4	19683	0.019	4	19683	0.022	4	19683	0.041
15:00-16:0 4	19683	0.028	4	19683	0.018	4	19683	0.046
16:00-17:0 4	19683	0.027	4	19683	0.019	4	19683	0.046
17:00-18:0 4	19683	0.017	4	19683	0.019	4	19683	0.036
18:00-19:0 4	19683	0.011	4	19683	0.02	4	19683	0.031
19:00-20:0 1	50000	0.008	1	50000	0.01	1	50000	0.018
20:00-21:0 1	50000	0.012	1	50000	0.008	1	50000	0.02
21:00-22:00								
22:00-23:00								
23:00-24:00								
Daily Trip Rates:		0.46			0.442			0.902

Count Type: OGVS

	Arr	Dep	Total
AM	0.052	0.042	0.094
PM	0.017	0.019	0.036

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: PSVS

		ARRIVALS			DEPARTURES			TOTALS
No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00								
01:00-02:00								
02:00-03:00								
03:00-04:00								
04:00-05:00								
05:00-06:0 1	50000	0	1	50000	0	1	50000	0
06:00-07:0 1	50000	0	1	50000	0	1	50000	0
07:00-08:0 4	19683	0	4	19683	0	4	19683	0
08:00-09:0 4	19683	0	4	19683	0	4	19683	0
09:00-10:0 4	19683	0	4	19683	0	4	19683	0
10:00-11:0 4	19683	0	4	19683	0	4	19683	0
11:00-12:0 4	19683	0	4	19683	0	4	19683	0
12:00-13:0 4	19683	0.003	4	19683	0.003	4	19683	0.006
13:00-14:0 4	19683	0	4	19683	0	4	19683	0
14:00-15:0 4	19683	0.001	4	19683	0.001	4	19683	0.002
15:00-16:0 4	19683	0.001	4	19683	0.001	4	19683	0.002
16:00-17:0 4	19683	0	4	19683	0	4	19683	0
17:00-18:0 4	19683	0.004	4	19683	0.003	4	19683	0.007
18:00-19:0 4	19683	0	4	19683	0.001	4	19683	0.001
19:00-20:0 1	50000	0	1	50000	0	1	50000	0
20:00-21:0 1	50000	0	1	50000	0	1	50000	0
21:00-22:00								
22:00-23:00								
23:00-24:00								
Daily Trip Rates:		0.009			0.009			0.018

Count Type: PSVS

	Arr	Dep	Total
AM	0	0	0
PM	0.004	0.003	0.007

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: CYCLISTS

		ARRIVALS			DEPARTURES			TOTALS
No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00								
01:00-02:00								
02:00-03:00								
03:00-04:00								
04:00-05:00								
05:00-06:0 1	50000	0	1	50000	0	1	50000	0
06:00-07:0 1	50000	0.002	1	50000	0.002	1	50000	0.004
07:00-08:0 4	19683	0.004	4	19683	0	4	19683	0.004
08:00-09:0 4	19683	0.006	4	19683	0.001	4	19683	0.007
09:00-10:0 4	19683	0	4	19683	0	4	19683	0
10:00-11:0 4	19683	0	4	19683	0	4	19683	0
11:00-12:0 4	19683	0.003	4	19683	0	4	19683	0.003
12:00-13:0 4	19683	0.003	4	19683	0	4	19683	0.003
13:00-14:0 4	19683	0.008	4	19683	0.006	4	19683	0.014
14:00-15:0 4	19683	0.005	4	19683	0.001	4	19683	0.006
15:00-16:0 4	19683	0	4	19683	0.004	4	19683	0.004
16:00-17:0 4	19683	0.008	4	19683	0.014	4	19683	0.022
17:00-18:0 4	19683	0.003	4	19683	0.008	4	19683	0.011
18:00-19:0 4	19683	0.001	4	19683	0.004	4	19683	0.005
19:00-20:0 1	50000	0	1	50000	0	1	50000	0
20:00-21:0 1	50000	0	1	50000	0	1	50000	0
21:00-22:00								
22:00-23:00								
23:00-24:00								
Daily Trip Rates:		0.043			0.04			0.083

Count Type: CYCLISTS

	Arr	Dep	Total
AM	0.006	0.001	0.007
PM	0.003	0.008	0.011

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)

Calculation Factor: 100 sqm
Count Type: VEHICLE OCCUPANTS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0.032	1	50000	0.024	1	50000	0.056
06:00-07:0	1	50000	0.078	1	50000	0.036	1	50000	0.114
07:00-08:0	4	19683	0.213	4	19683	0.065	4	19683	0.278
08:00-09:0	4	19683	0.326	4	19683	0.085	4	19683	0.411
09:00-10:0	4	19683	0.248	4	19683	0.135	4	19683	0.383
10:00-11:0	4	19683	0.117	4	19683	0.109	4	19683	0.226
11:00-12:0	4	19683	0.149	4	19683	0.173	4	19683	0.322
12:00-13:0	4	19683	0.156	4	19683	0.226	4	19683	0.382
13:00-14:0	4	19683	0.236	4	19683	0.199	4	19683	0.435
14:00-15:0	4	19683	0.097	4	19683	0.144	4	19683	0.241
15:00-16:0	4	19683	0.099	4	19683	0.137	4	19683	0.236
16:00-17:0	4	19683	0.124	4	19683	0.187	4	19683	0.311
17:00-18:0	4	19683	0.09	4	19683	0.291	4	19683	0.381
18:00-19:0	4	19683	0.062	4	19683	0.216	4	19683	0.278
19:00-20:0	1	50000	0.014	1	50000	0.02	1	50000	0.034
20:00-21:0	1	50000	0.036	1	50000	0.032	1	50000	0.068
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			2.077			2.079			4.156

Count Type: VEHICLE OCCUPANTS

	Arr	Dep	Total
AM	0.326	0.085	0.411
PM	0.09	0.291	0.381

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: PEDESTRIANS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0.009	4	19683	0	4	19683	0.009
08:00-09:0	4	19683	0.01	4	19683	0.001	4	19683	0.011
09:00-10:0	4	19683	0.005	4	19683	0	4	19683	0.005
10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0.001	4	19683	0.001	4	19683	0.002
12:00-13:0	4	19683	0.011	4	19683	0.017	4	19683	0.028
13:00-14:0	4	19683	0.014	4	19683	0.004	4	19683	0.018
14:00-15:0	4	19683	0	4	19683	0	4	19683	0
15:00-16:0	4	19683	0	4	19683	0	4	19683	0
16:00-17:0	4	19683	0.006	4	19683	0.009	4	19683	0.015
17:00-18:0	4	19683	0.001	4	19683	0.011	4	19683	0.012
18:00-19:0	4	19683	0	4	19683	0.004	4	19683	0.004
19:00-20:0	1	50000	0	1	50000	0.002	1	50000	0.002
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.057			0.049			0.106

Count Type: PEDESTRIANS

	Arr	Dep	Total
AM	0.01	0.001	0.011
PM	0.001	0.011	0.012

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: BUS/TRAM PASSENGERS

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0.002	1	50000	0	1	50000	0.002
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0.009	4	19683	0	4	19683	0.009
08:00-09:0	4	19683	0.023	4	19683	0	4	19683	0.023
09:00-10:0	4	19683	0.001	4	19683	0	4	19683	0.001
10:00-11:0	4	19683	0.001	4	19683	0.001	4	19683	0.002
11:00-12:0	4	19683	0.003	4	19683	0	4	19683	0.003
12:00-13:0	4	19683	0.015	4	19683	0.006	4	19683	0.021
13:00-14:0	4	19683	0.009	4	19683	0.006	4	19683	0.015
14:00-15:0	4	19683	0.001	4	19683	0.006	4	19683	0.007
15:00-16:0	4	19683	0.001	4	19683	0.005	4	19683	0.006
16:00-17:0	4	19683	0.013	4	19683	0.023	4	19683	0.036
17:00-18:0	4	19683	0.006	4	19683	0.02	4	19683	0.026
18:00-19:0	4	19683	0.003	4	19683	0.006	4	19683	0.009
19:00-20:0	1	50000	0.004	1	50000	0.002	1	50000	0.006
20:00-21:0	1	50000	0.004	1	50000	0	1	50000	0.004
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.095			0.075			0.17

Count Type: BUS/TRAM PASSENGERS

	Arr	Dep	Total
AM	0.023	0	0.023
PM	0.006	0.02	0.026

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: TOTAL RAIL PASSENGERS

ARRIVALS	DEPARTURES	TOTALS

Count Type: TOTAL RAIL PASSENGERS

Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0	4	19683	0	4	19683	0
08:00-09:0	4	19683	0.006	4	19683	0	4	19683	0.006
09:00-10:0	4	19683	0	4	19683	0	4	19683	0
10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0.004	4	19683	0	4	19683	0.004
12:00-13:0	4	19683	0.001	4	19683	0.003	4	19683	0.004
13:00-14:0	4	19683	0	4	19683	0	4	19683	0
14:00-15:0	4	19683	0	4	19683	0.004	4	19683	0.004
15:00-16:0	4	19683	0	4	19683	0.001	4	19683	0.001
16:00-17:0	4	19683	0	4	19683	0.004	4	19683	0.004
17:00-18:0	4	19683	0.003	4	19683	0.001	4	19683	0.004
18:00-19:0	4	19683	0	4	19683	0	4	19683	0
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.014			0.013			0.027

	Arr	Dep	Total
AM	0.006	0	0.006
PM	0.003	0.001	0.004

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: COACH PASSENGERS

		ARRIVALS			DEPARTURES			TOTALS	
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0	4	19683	0	4	19683	0
08:00-09:0	4	19683	0	4	19683	0	4	19683	0
09:00-10:0	4	19683	0	4	19683	0	4	19683	0
10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0	4	19683	0	4	19683	0
12:00-13:0	4	19683	0.018	4	19683	0.019	4	19683	0.037
13:00-14:0	4	19683	0	4	19683	0	4	19683	0
14:00-15:0	4	19683	0.006	4	19683	0.013	4	19683	0.019
15:00-16:0	4	19683	0.005	4	19683	0.006	4	19683	0.011
16:00-17:0	4	19683	0	4	19683	0	4	19683	0
17:00-18:0	4	19683	0.014	4	19683	0.006	4	19683	0.02
18:00-19:0	4	19683	0	4	19683	0	4	19683	0
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.043			0.044			0.087

Count Type: COACH PASSENGERS

	Arr	Dep	Total
AM	0	0	0
PM	0.014	0.006	0.02

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: PUBLIC TRANSPORT USERS

		ARRIVALS			DEPARTURES			TOTALS	
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0.002	1	50000	0	1	50000	0.002
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0.009	4	19683	0	4	19683	0.009
08:00-09:0	4	19683	0.029	4	19683	0	4	19683	0.029
09:00-10:0	4	19683	0.001	4	19683	0	4	19683	0.001
10:00-11:0	4	19683	0.001	4	19683	0.001	4	19683	0.002
11:00-12:0	4	19683	0.006	4	19683	0	4	19683	0.006
12:00-13:0	4	19683	0.034	4	19683	0.028	4	19683	0.062
13:00-14:0	4	19683	0.009	4	19683	0.006	4	19683	0.015
14:00-15:0	4	19683	0.008	4	19683	0.023	4	19683	0.031
15:00-16:0	4	19683	0.006	4	19683	0.013	4	19683	0.019
16:00-17:0	4	19683	0.013	4	19683	0.027	4	19683	0.04
17:00-18:0	4	19683	0.023	4	19683	0.028	4	19683	0.051
18:00-19:0	4	19683	0.003	4	19683	0.006	4	19683	0.009
19:00-20:0	1	50000	0.004	1	50000	0.002	1	50000	0.006
20:00-21:0	1	50000	0.004	1	50000	0	1	50000	0.004
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.152			0.134			0.286

Count Type: PUBLIC TRANSPORT USERS

	Arr	Dep	Total
AM	0.029	0	0.029
PM	0.023	0.028	0.051

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: TOTAL PEOPLE

		ARRIVALS			DEPARTURES			TOTALS	
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									

Count Type: TOTAL PEOPLE

	Arr	Dep	Total
AM	0.372	0.088	0.46
PM	0.117	0.338	0.455

02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0.034	1	50000	0.024	1	50000	0.058
06:00-07:0	1	50000	0.08	1	50000	0.038	1	50000	0.118
07:00-08:0	4	19683	0.235	4	19683	0.065	4	19683	0.3
08:00-09:0	4	19683	0.372	4	19683	0.088	4	19683	0.46
09:00-10:0	4	19683	0.254	4	19683	0.135	4	19683	0.389
10:00-11:0	4	19683	0.118	4	19683	0.111	4	19683	0.229
11:00-12:0	4	19683	0.159	4	19683	0.174	4	19683	0.333
12:00-13:0	4	19683	0.204	4	19683	0.271	4	19683	0.475
13:00-14:0	4	19683	0.267	4	19683	0.216	4	19683	0.483
14:00-15:0	4	19683	0.109	4	19683	0.168	4	19683	0.277
15:00-16:0	4	19683	0.105	4	19683	0.154	4	19683	0.259
16:00-17:0	4	19683	0.151	4	19683	0.236	4	19683	0.387
17:00-18:0	4	19683	0.117	4	19683	0.338	4	19683	0.455
18:00-19:0	4	19683	0.066	4	19683	0.23	4	19683	0.296
19:00-20:0	1	50000	0.018	1	50000	0.024	1	50000	0.042
20:00-21:0	1	50000	0.04	1	50000	0.032	1	50000	0.072
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			2.329			2.304			4.633

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: CARS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0.006	1	50000	0.004	1	50000	0.01
06:00-07:0	1	50000	0.01	1	50000	0.01	1	50000	0.02
07:00-08:0	4	19683	0.109	4	19683	0.014	4	19683	0.123
08:00-09:0	4	19683	0.177	4	19683	0.015	4	19683	0.192
09:00-10:0	4	19683	0.085	4	19683	0.03	4	19683	0.115
10:00-11:0	4	19683	0.02	4	19683	0.027	4	19683	0.047
11:00-12:0	4	19683	0.048	4	19683	0.051	4	19683	0.099
12:00-13:0	4	19683	0.052	4	19683	0.086	4	19683	0.138
13:00-14:0	4	19683	0.124	4	19683	0.081	4	19683	0.205
14:00-15:0	4	19683	0.043	4	19683	0.066	4	19683	0.109
15:00-16:0	4	19683	0.024	4	19683	0.061	4	19683	0.085
16:00-17:0	4	19683	0.047	4	19683	0.097	4	19683	0.144
17:00-18:0	4	19683	0.042	4	19683	0.184	4	19683	0.226
18:00-19:0	4	19683	0.029	4	19683	0.123	4	19683	0.152
19:00-20:0	1	50000	0.006	1	50000	0.004	1	50000	0.01
20:00-21:0	1	50000	0.014	1	50000	0.012	1	50000	0.026
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.836			0.865			1.701

Count Type: CARS

	Arr	Dep	Total
AM	0.177	0.015	0.192
PM	0.042	0.184	0.226

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: LGVS

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0.002	1	50000	0.002	1	50000	0.004
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0.011	4	19683	0.005	4	19683	0.016
08:00-09:0	4	19683	0.024	4	19683	0.013	4	19683	0.037
09:00-10:0	4	19683	0.041	4	19683	0.028	4	19683	0.069
10:00-11:0	4	19683	0.034	4	19683	0.03	4	19683	0.064
11:00-12:0	4	19683	0.044	4	19683	0.038	4	19683	0.082
12:00-13:0	4	19683	0.033	4	19683	0.032	4	19683	0.065
13:00-14:0	4	19683	0.018	4	19683	0.02	4	19683	0.038
14:00-15:0	4	19683	0.014	4	19683	0.024	4	19683	0.038
15:00-16:0	4	19683	0.027	4	19683	0.027	4	19683	0.054
16:00-17:0	4	19683	0.022	4	19683	0.023	4	19683	0.045
17:00-18:0	4	19683	0.013	4	19683	0.019	4	19683	0.032
18:00-19:0	4	19683	0.015	4	19683	0.025	4	19683	0.04
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0.002	1	50000	0.002	1	50000	0.004
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.3			0.288			0.588

Count Type: LGVS

	Arr	Dep	Total
AM	0.024	0.013	0.037
PM	0.013	0.019	0.032

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: MOTOR CYCLES

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0

Count Type: MOTOR CYCLES

	Arr	Dep	Total
AM	0.001	0	0.001
PM	0.001	0.005	0.006

06:00-07:0	1	50000	0.002	1	50000	0.002	1	50000	0.004
07:00-08:0	4	19683	0.001	4	19683	0	4	19683	0.001
08:00-09:0	4	19683	0.001	4	19683	0	4	19683	0.001
09:00-10:0	4	19683	0	4	19683	0	4	19683	0
10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0.001	4	19683	0.001	4	19683	0.002
12:00-13:0	4	19683	0.005	4	19683	0	4	19683	0.005
13:00-14:0	4	19683	0.005	4	19683	0.003	4	19683	0.008
14:00-15:0	4	19683	0	4	19683	0.005	4	19683	0.005
15:00-16:0	4	19683	0.006	4	19683	0.004	4	19683	0.01
16:00-17:0	4	19683	0.005	4	19683	0.003	4	19683	0.008
17:00-18:0	4	19683	0.001	4	19683	0.005	4	19683	0.006
18:00-19:0	4	19683	0	4	19683	0.001	4	19683	0.001
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.027			0.024			0.051

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: Underground Passengers

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0	4	19683	0	4	19683	0
08:00-09:0	4	19683	0.003	4	19683	0	4	19683	0.003
09:00-10:0	4	19683	0	4	19683	0	4	19683	0
10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0	4	19683	0	4	19683	0
12:00-13:0	4	19683	0	4	19683	0	4	19683	0
13:00-14:0	4	19683	0	4	19683	0	4	19683	0
14:00-15:0	4	19683	0	4	19683	0	4	19683	0
15:00-16:0	4	19683	0	4	19683	0	4	19683	0
16:00-17:0	4	19683	0	4	19683	0	4	19683	0
17:00-18:0	4	19683	0	4	19683	0	4	19683	0
18:00-19:0	4	19683	0	4	19683	0	4	19683	0
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.003			0			0.003

Count Type: Underground Passengers

	Arr	Dep	Total
AM	0.003	0	0.003
PM	0	0	0

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: Overground Passengers

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0	4	19683	0	4	19683	0
08:00-09:0	4	19683	0	4	19683	0	4	19683	0
09:00-10:0	4	19683	0	4	19683	0	4	19683	0
10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0	4	19683	0	4	19683	0
12:00-13:0	4	19683	0.001	4	19683	0	4	19683	0.001
13:00-14:0	4	19683	0	4	19683	0	4	19683	0
14:00-15:0	4	19683	0	4	19683	0	4	19683	0
15:00-16:0	4	19683	0	4	19683	0.001	4	19683	0.001
16:00-17:0	4	19683	0	4	19683	0	4	19683	0
17:00-18:0	4	19683	0	4	19683	0	4	19683	0
18:00-19:0	4	19683	0	4	19683	0	4	19683	0
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.001			0.001			0.002

Count Type: Overground Passengers

	Arr	Dep	Total
AM	0	0	0
PM	0	0	0

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: National Rail Passengers

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0	4	19683	0	4	19683	0
08:00-09:0	4	19683	0.004	4	19683	0	4	19683	0.004
09:00-10:0	4	19683	0	4	19683	0	4	19683	0

Count Type: National Rail Passengers

	Arr	Dep	Total
AM	0.004	0	0.004
PM	0.003	0.001	0.004

10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0.004	4	19683	0	4	19683	0.004
12:00-13:0	4	19683	0	4	19683	0.003	4	19683	0.003
13:00-14:0	4	19683	0	4	19683	0	4	19683	0
14:00-15:0	4	19683	0	4	19683	0.004	4	19683	0.004
15:00-16:0	4	19683	0	4	19683	0	4	19683	0
16:00-17:0	4	19683	0	4	19683	0.004	4	19683	0.004
17:00-18:0	4	19683	0.003	4	19683	0.001	4	19683	0.004
18:00-19:0	4	19683	0	4	19683	0	4	19683	0
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.011			0.012			0.023

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: Bus Passengers

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0	1	50000	0	1	50000	0
06:00-07:0	1	50000	0	1	50000	0	1	50000	0
07:00-08:0	4	19683	0.008	4	19683	0	4	19683	0.008
08:00-09:0	4	19683	0.017	4	19683	0	4	19683	0.017
09:00-10:0	4	19683	0	4	19683	0	4	19683	0
10:00-11:0	4	19683	0	4	19683	0	4	19683	0
11:00-12:0	4	19683	0	4	19683	0	4	19683	0
12:00-13:0	4	19683	0.01	4	19683	0.003	4	19683	0.013
13:00-14:0	4	19683	0.005	4	19683	0.001	4	19683	0.006
14:00-15:0	4	19683	0.001	4	19683	0.005	4	19683	0.006
15:00-16:0	4	19683	0	4	19683	0.004	4	19683	0.004
16:00-17:0	4	19683	0.013	4	19683	0.023	4	19683	0.036
17:00-18:0	4	19683	0.006	4	19683	0.013	4	19683	0.019
18:00-19:0	4	19683	0.001	4	19683	0.005	4	19683	0.006
19:00-20:0	1	50000	0	1	50000	0	1	50000	0
20:00-21:0	1	50000	0	1	50000	0	1	50000	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.061			0.054			0.115

Count Type: Bus Passengers

	Arr	Dep	Total
AM	0.017	0	0.017
PM	0.006	0.013	0.019

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
Calculation Factor: 100 sqm
Count Type: Servicing Vehicles

			ARRIVALS			DEPARTURES			TOTALS
	No.	Ave.	Trip	No.	Ave.	Trip	No.	Ave.	Trip
Time Rang	Days	GFA	Rate	Days	GFA	Rate	Days	GFA	Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:0	1	50000	0.016	1	50000	0.014	1	50000	0.03
06:00-07:0	1	50000	0.034	1	50000	0.018	1	50000	0.052
07:00-08:0	4	19683	0.055	4	19683	0.041	4	19683	0.096
08:00-09:0	4	19683	0.064	4	19683	0.05	4	19683	0.114
09:00-10:0	4	19683	0.09	4	19683	0.062	4	19683	0.152
10:00-11:0	4	19683	0.061	4	19683	0.066	4	19683	0.127
11:00-12:0	4	19683	0.062	4	19683	0.077	4	19683	0.139
12:00-13:0	4	19683	0.056	4	19683	0.076	4	19683	0.132
13:00-14:0	4	19683	0.039	4	19683	0.055	4	19683	0.094
14:00-15:0	4	19683	0.027	4	19683	0.036	4	19683	0.063
15:00-16:0	4	19683	0.05	4	19683	0.037	4	19683	0.087
16:00-17:0	4	19683	0.042	4	19683	0.034	4	19683	0.076
17:00-18:0	4	19683	0.028	4	19683	0.028	4	19683	0.056
18:00-19:0	4	19683	0.023	4	19683	0.041	4	19683	0.064
19:00-20:0	1	50000	0.008	1	50000	0.01	1	50000	0.018
20:00-21:0	1	50000	0.012	1	50000	0.008	1	50000	0.02
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			0.667			0.653			1.32

Count Type: Servicing Vehicles

	Arr	Dep	Total
AM	0.064	0.05	0.114
PM	0.028	0.028	0.056

Mountbatten House
Basing View
Basingstoke, Hampshire
RG21 4HJ

wsp.com

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PROJECT:	Milton Keynes East	**AUTHOR:**	A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1 INTRODUCTION

1.1.1. 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).

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

1.1.3. WSP issued a Transport Assessment Scoping Report and accompanying Transport Technical Note 3 (TTN3) in June 2020 to stakeholders for comment. TTN3 set out the proposed Trip Generation for the MKE development which was developed using a 'traditional' methodology of forecasting flows alongside a 'Future Mobility' based approach, which built upon the flows and applied forecast trends to account for shifts away from private vehicle use.

1.1.4. It should be noted that Milton Keynes Council Highways Officers have accepted the use of the trip generation as set out in TTN3 and this is being used in the supporting traffic modelling.

1.1.5. Highways England (HE), and their consultants AECOM, issued a response to the Scoping Report and TTN3 in a combined note 'TN7' issued by HE on 11 September 2020.

1.1.6. The comments raised in AECOM's TN7 regarding the Scoping Note have been reviewed and these will be addressed in the TA accordingly. This note, TTN3.1, therefore provides further information on the Trip Generation elements only, and takes the queries raised by AECOM and provides further responses and information where necessary.

2 RESPONSE TO AECOM / HE COMMENTS

2.1.1. As set out in HE's / AECOMs response note, TTN3 outlines the two trip generation methodologies that have been presented. The first trip generation method is based on a 'Traditional' approach which follows a standard trip generation methodology and accounts for internalisation of trips based on the development providing services and trip attractors for residents. The second uses a 'Future Mobility' methodology which makes a series of additional assumptions about how the way people travel will change in the future based on new mobility opportunities and revised travel trends.

2.1.2. As set out in section 7.8 of HEs / AECOMs response with reference to the Traditional Trip generation - *Overall, AECOM considers the methodology to be robust*.

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2.1.3. AECOM have set out further recommendations or requests for further information within their note. In summary these cover the following, all of which are discussed in further detail below;

- Use of Traditional Trip Generation within the tests set out in the TA
- TRICS trip rate output files
- Justification for the use of vehicle trip rates for the B1 and B2 use classes.
- External trip rate for employment uses as these trips are likely to utilise the SRN.
- Evidence that the mode share percentages from the surrounding MSOAs are appropriate to the SUE development.
- Explanation of how the final 'internalisation' factors per trip purpose have been derived
- Details of the trip generation for education uses and how this will change during the build out of the site.
- 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.

2.2 Use of Traditional Trip Generation within the tests set out in the TA

2.2.1. One of the comments / recommendations made in the HE / AECOM note (paragraph 6.6) was to show the Traditional Trip Generation assessments alongside the Future Mobility tests in the TA.

2.2.2. The TA will demonstrate the differences in terms of trip generation between the two methodologies (also shown in TTN3). On recent calls discussing the strategic modelling process with HE, WSP have outlined that they do not consider that it is appropriate to run a full set of capacity and modelling tests using the two methodologies. WSP believes that this would 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.

2.2.3. A development such as MKE should be leading the way in enabling sustainably based travel throughout the site as well as connections to the wider Milton Keynes area. The development proposes to do this by adopting mobility services alongside permeable and accessible masterplan design. This will be further underpinned by public transport provision, which can be further strengthened once the Mass Rapid Transit (MRT) proposals from MKC are delivered at a later date.

2.2.4. It is acknowledged that assurance on the deliverability of the supporting sustainable infrastructure is required, however the TA and supporting documentation (including Public Transport Strategy and Travel Plans) outline how these measures will enable the site to move away from prioritising private vehicular based travel. The TA and Travel Plans will also set out how the site will be monitored moving forwards as each phase develops, ensuring that the development reacts to the latest emerging trends and technologies.

2.2.5. WSP have engaged with a number of mobility providers and operators and have received letters of support from these companies. These letters were issued to MKC and HE on 30 July 2020 and will be attached to the TA as an appendix. The letters set out that those providers believe that the inclusion of their technology or measures will lead to a positive shift away from private vehicle use.

2.2.6. As the Future Mobility trip generation builds upon the Traditional methodology, it is prudent to comment and respond on certain items now to provide assurance that the Future Mobility scenario is appropriate for use in the assessment.

2.2.7. It is useful to note that in Paragraph 7.15 HE / AECOM acknowledge that the Future Mobility adjustments are akin to those seen if a Travel Plan were to be adopted;

This represents an average 11% peak period mode shift to future mobility modes by 2031 and a 20% shift by 2048. This is considered a reasonable target given that Travel Plan mode shift targets typically seek to achieve a 20% reduction in single occupancy peak hour vehicle trips within the first five years post occupation. It is important however that the TA provides evidence that this percentage reduction is achievable through the provision of notable sustainable transport initiatives.

2.2.8. As outlined above, the MKE site is developing a Travel Plan for both residents and staff. The trip generation presented has not made any adjustments for 'standard' Travel Plan measures, and arguably, reductions in the region of 20%, using the statement above, could be equally applied to the forecasts. The Future Mobility adjustments not only take into account development led design and initiatives, but also general trends in the uptake of other modes away from private vehicle.

2.2.9. HE / AECOM acknowledge that further adjustments, to account for MRT and P&R would not be robust, in Section 7.16;

The TASR notes that MRT and, to some extent, P&R will also influence the future mobility changes and could result in trip extraction over and above the figures set out in TTN3. However, no further adjustments to the trip generation are proposed and the future mobility adjustments have only been applied to trips generated by MKE. This approach is considered by AECOM to be reasonable.

2.2.10. Further information is provided below on the other points, however, considering the above – the adjustments set out in the Future Mobility trip generation are not considered unreasonable or unjustifiable. Travel Plans are known to have a positive impact on travel behaviour both at a resident and employee level. It is therefore likely that the Travel Plans being developed will have a further positive benefit on the reduction in private vehicle use. This has not been reflected in the analysis presented. The Future Mobility analysis sets out, based on an evidence backed approach, the potential shift away from private vehicle. The proposed development will then provide the physical and community based infrastructure to ensure that these figures are matched or bettered.

2.2.11. The Travel Plan strategy for MKE is in discussion with MKC officers, but the currently includes a monitoring strategy and use of a Travel Plan Steering Group, which could be made up of key stakeholders, such as Milton Keynes Council, Berkeley's and Highways England.

2.2.12. The Travel Plan strategy, alongside the promotion of future mobility at the site, results in our opinion that it is therefore appropriate that the Future Mobility are used in the assessments, without any further adjustments (either for Travel Plans or MRT & PR).

2.3 TRICS trip rate output files

2.3.1. Appendix E of TTN3 provided the TRICS outputs in excel format, which also contained the relevant Trip rates and the relevant selection criteria.

2.3.2. For ease of review, these will be included in the TA as well in the TRICS pdf format.

2.4 Justification for the use of vehicle trip rates for the B1 and B2 use classes.

2.4.1. Multi-modal trip rates for B1 and B2 uses were extracted and vehicular trip rates extracted from those 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.

2.4.2. As the development seeks to develop a significant proportion of B8 land uses, the trip generation reflects those characteristics. Typically, B8 use would adopt a shift pattern that results in fewer vehicles during the traditional commuter peak periods. Double shift and triple shift patterns (12hr and 8hr) are typical and are often scheduled around the peak periods to avoid trip interaction.

2.4.3. By calculating the trips using TRICS, these patterns are picked up to a degree better than applying a blanket trip rate per job.

2.4.4. 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 below, Census Journey to Work data has also been used to review potential mode shares for employees.

2.5 External trip rate for employment uses as these trips are likely to utilise the SRN.

2.5.1. The Employment trips as set out in TTN3 are added in to the model as external trips.

2.5.2. Internalisation factors are applied within the analysis to cater for the mix of uses on site. This is set out further in Chapter 3 of TTN3, but it should be noted that the application of internalisation has only been applied to the residential origin trips only. This is to ensure that the process does not discount trips twice; i.e. reducing the origin of the internalised employment trip purpose (i.e. from residential) as opposed to the source itself (i.e. the employment destination).

2.5.3. Therefore, other than the Future Mobility adjustments, as set out in TTN3, the employment uses trips are set out in the Tables with no further reduction.

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2.6 Evidence that the mode share percentages from the surrounding MSOAs are appropriate to the SUE development.

2.6.1. The 2011 Census data was used to determine the method of travel from residential locations for commuting and business trips (i.e. journey to work, JTW). The 2011 Census data contained in QS703EW – Method of Travel to Work (2001 specification) informed the JTW mode share summarised in Section 4.2 of TTN3.

2.6.2. As part of the review process a larger number of MSOA's were selected as shown in Table 2.1 and Figure 2.1 below;

Table 2.1 – Selected Milton Keynes MSOA's and respective JTW data

Method of Travel to Work	*Milton Keynes 002*	*Milton Keynes 003*	*Milton Keynes 004*	*Milton Keynes 005*	*Milton Keynes 006*	*Milton Keynes 007*	*Milton Keynes 009*	*Milton Keynes 017*
All categories:	**6,807**	**5,404**	**5,849**	**5,113**	**4,815**	**4,663**	**4,500**	**10,741**
Work mainly at or from home	805	345	445	365	215	370	256	831
Underground, metro, light rail, tram	10	9	5	4	6	14	3	17
Train	216	68	106	111	80	127	80	368
Bus, minibus or coach	69	143	157	155	289	144	212	386
Taxi	9	15	24	26	60	31	66	54
Motorcycle, scooter or moped	22	27	35	19	27	26	18	37
Driving a car or van	3,272	2,681	2,918	2,315	1,871	2,126	1,661	5,509
Passenger in a car or van	221	234	218	258	267	226	224	427
Bicycle	72	121	130	108	115	118	108	238
On foot	141	257	352	186	194	149	294	503
Other method of travel to work	14	15	13	6	14	13	19	27
Not in employment	1,956	1,489	1,446	1,560	1,677	1,319	1,559	2,344

2.6.3. A review process was undertaken to ensure that the MSOA's selected were reflective of the likely development.

2.6.4. For example, MK 002, where the development is located, and as shown on Figure 2-1 covers a large area which does not have a large amount of residential or employment development currently on it. As such, it was considered that MK 002 is not reflective of the development and shouldn't be used in the final analysis.

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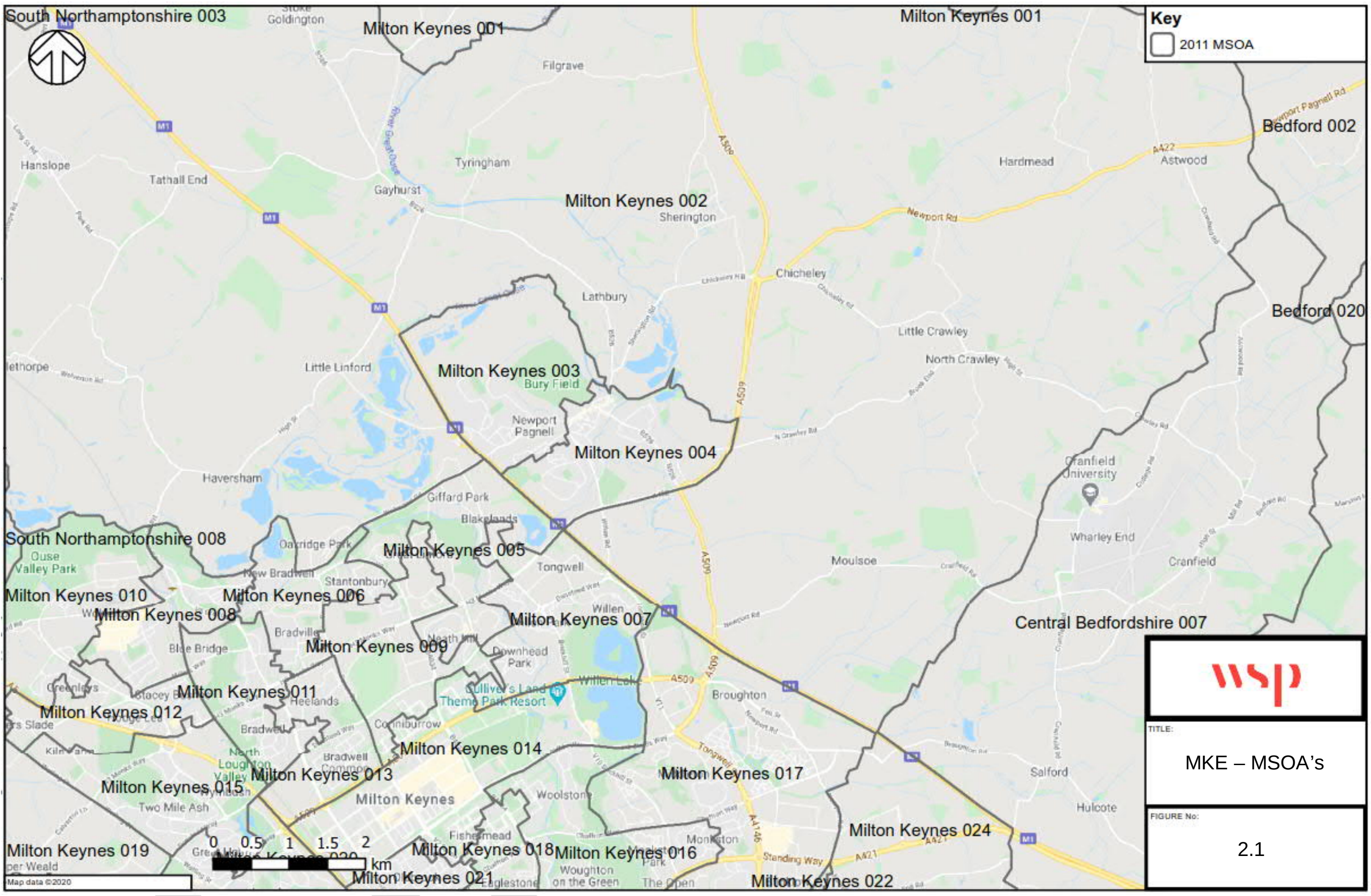
Figure 2.1 – MSOA's Reviewed around MKE Site



2.6.5. Each MSOA was reviewed in turn to ascertain the likely composition of the zone and a judgement made whether it was comparable to the land uses and geographic context of Milton Keynes East.

2.6.6. MSOA's 006[1] and 009, are located closer to Central Milton Keynes are shown in the Table above, but are not used in the final average mode share. It could be argued that these MSOA's share similar characteristics to the proposed development, however result in lower car mode shares if used. Therefore, for robustness – these were not included albeit the nature and sustainability of the development may lead to lower car mode shares more akin to these MSOAs.

[1] It should be noted that in TTN3 – reference to MK MSOA 006 was included, however this was not correct. MSOA 006 was not used in the averaging process.

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2.6.7. The final MSOA site selection, with explanation on those MSOA's is set out below;

- E02003461 : Milton Keynes 003
  - This MSOA covers a residential area at Newport Pagnell
  - The MSOA contains residential parcels and a primary school which is considered reflective of the proposed site
- E02003462 : Milton Keynes 004
  - This MSOA is also located at Newport Pagnell
  - It has a mix of residential and high street shops plus Employment opportunities (Interchange Park)
  - The MSOA also includes medical centres and multiple primary schools
- E02003463 : Milton Keynes 005
  - This MSOA contains a good balance of residential and employment sites.
  - It also contains Blakelands Hospital, Primary Schools and leisure / green areas
- E02003465 : Milton Keynes 007
  - This MSOA contain both employment and residential areas which is reflective of the development proposals.
  - The area also has supporting land uses, such as Primary Schools and religious centres.
- E02003475 : Milton Keynes 017
  - This MSOA contain both employment and residential areas. The employment within the MSOA is reflective of the emerging development masterplan.
  - Other land uses within the MSOA include primary and secondary education

Table 2.1 – Selected Milton Keynes MSOA's

Method of Travel to Work	*Milton Keynes 003*	*Milton Keynes 004*	*Milton Keynes 005*	*Milton Keynes 007*	*Milton Keynes 017*	*AVERAGE (%age)**
All categories:	**5,404**	**5,849**	**5,113**	**4,663**	**10,741**	
Work mainly at or from home	345	445	365	370	831	10.0%
Underground, metro, light rail, tram	9	5	4	14	17	0.2%
Train	68	106	111	127	368	3.1%
Bus, minibus or coach	143	157	155	144	386	4.1%
Taxi	15	24	26	31	54	0.6%
Motorcycle, scooter or moped	27	35	19	26	37	0.6%
Driving a car or van	2,681	2,918	2,315	2,126	5,509	65.8%
Passenger in a car or van	234	218	258	226	427	6.0%
Bicycle	121	130	108	118	238	3.1%
On foot	257	352	186	149	503	6.0%
Other method of travel to work	15	13	6	13	27	0.3%
Not in employment	1,489	1,446	1,560	1,319	2,344	n/a

**removing those not in employment*

2.6.8. It could be argued that Milton Keynes 004 is the most reflective of the proposed development as it includes similar land uses, including schools and employment areas. The mode share for 004 is similar to the average used. The average mode share removes outliers that would result in lower car mode shares – and is considered appropriate for use.

2.7 Explanation of how the final 'internalisation' factors per trip purpose have been derived

2.7.1. Table 4-5 within TTN3 provides a summary of the internalisation factors and notes how these were calculated. For ease of review the table is replicated below;

Table 2-2 - Internalisation Reductions applied to Journey Purpose Trip Rates (Table 4-5 of TTN3)

Purpose	*Internalisation Reduction*	*Further Notes*
Commuting	15%	Reviewing the JTW data for nearby MSOAs in MK's presents data that suggests work internalisation ranges between 8% and 18%
Business	15%	See above
Education	73%	The indicative proposals across the wider MKE site include the provision of three primary schools and a secondary school. Any external trips limited to staff and/or a small percentage of parent choice
Escort education	73%	Escort education forms both primary purpose trips but also secondary trips – however assumed the same percentages as the main education trips.
Shopping	33%	There will be a local / district centre and other retail proposed within the site where some shopping needs will be satisfied internally
Other work, other escort and personal business	25%	Alongside retail, there will be other services within the proposed development
Visiting friends/entertainment/sport	20%	The development proposes leisure facilities within the site, including green walks and routes.
Holiday/Day trip/Other	0%	Assumed that this captures ad hoc trips within the development. Although for robustness, no adjustment made,

2.7.2. Further detail has been provided below on each of the journey purposes;

Commuting and Business

2.7.3. As outlined in the Table above, a review of internal trips from the JTW origin and destination datasets was completed.

2.7.4. Table 2-3 below shows a summary of the selected MSOA's in the area and their respective internalisation percentages;

Table 2-3 – JTW WU03EW Data Summary – Selected MSOA's internal trips

All categories: Method of travel to work (2001 specification)

	Internal (to same MSOA)	TOTAL Trips	%
E02003460 : Milton Keynes 002	285	3696	7.7%
E02003461 : Milton Keynes 003	151	3269	4.6%
E02003462 : Milton Keynes 004	496	3632	13.7%
E02003463 : Milton Keynes 005	149	2914	5.1%
E02003465 : Milton Keynes 007	167	2765	6.0%
E02003475 : Milton Keynes 017	1244	7020	17.7%

2.7.5. As noted above, MSOA 004 is considered a close match to the development proposals. Therefore, the use of 15% is considered appropriate given the proposals and opportunities for promoting work and living in the same area.

Education and Escort Education

2.7.6. Appendix D of TTN3.1 provided a worked example of the calculations. Within that appendix, there was information on the Local Authority Split breakdown. This has been replicated in Table 2-4 below.

Table 2-4 - Milton Keynes Local Authority Education Split

School Type	*Number of Pupils*	*Percentage*
State Funded Primary	27,420	55.6%
State Funded Secondary	16,694	33.8%
Higher Education	5,219	10.6%
Total	49,333	100%

2.7.7. Considering that the MKE site proposes primary and secondary schools, the above data has been used in calculating the internalisation factor for education and escort education.

2.7.8. The broad splits have been applied to the education and escort education trip purposes to allow a dissemination between the various education types.

2.7.9. As outlined in TTN3.1 the internalisation factor has been based on the following;

- 100% Primary school internal
- 50% of Secondary School trips are internal
- 0% of Higher Education trips are internal

2.7.10. Using the split above, this results in a 73% internalisation factor. This is considered appropriate given the development quantum and mix of education uses being delivered.

2.7.11. Also please note that further trips have been added into the modelling for Secondary school trips – this is summarised below in the modelling update section.

Shopping

2.7.12. As noted above, the development will provide a community centre that will include other retail and shopping needs within the site. This will include food related shopping, such as a medium sized local shop, which will be able to provide for the local residents. There will also likely be coffee shops and other ancillary uses that traditionally lie adjacent to shopping facilities. As such, it was considered appropriate that a 1/3rd of residential trips would utilise such provision.

Other work, other escort and personal business

2.7.13. The community centre will also include a Health Centre, and it is envisaged that other service type shops will be located within an accessible location for the new residents. As such, it was estimated that one-quarter of residential trips would be able to use these on an average day.

Visiting friends/entertainment/sport

2.7.14. The development proposes green corridors and leisure routes, including River walks. Further to this, the site also houses archaeological findings which will also have their own routes. In addition, sports pitches and allotments, alongside play areas across the site are being designed into the masterplan. This presents residents with ample opportunities to undertake an active and leisure filled lifestyle. It is considered appropriate that a 1/5th of residents on an average day would stay within the area for such trip making purposes.

Holiday/Day trip/Other

2.7.15. As outlined in Table 2-2 no factor was applied for this Journey purpose.

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2.8 Details of the trip generation for education uses and how this will change during the build out of the site.

2.8.1. As correctly identified by AECOM, the Development Framework identifies that School and other land use provision will be a phased approach that mirrors the build out of the site.

2.8.2. However, the Development Framework sets out the that the social infrastructure would be delivered by the residential milestones. So, by the completion of Phase 2, 2 x Primary Schools, 1 x Secondary School and the Health Hub would also be developed. This ensures that appropriate land uses are delivered in line with the number of residential units. Furthermore, it is worth noting that the HIF funding includes for delivering a primary school and health centre and consequently these will be delivered at the outset of the development.

2.8.3. It is 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.

2.8.4. Furthermore, as the HIF road network will be in place early, the early phase residents that may travel externally will primarily seek to find education sources close to their houses. This would place trips on the local network, not on the strategic road network.

2.8.5. 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.

2.8.6. The 2031 FM adjustments take into account the forecast trends and less uptake in mobility as a service in its analysis. As shown in TTN3, and summarised above in 2.2, this results in a lower shift away from private vehicle use in 2031 versus the 2048.

2.8.7. It is considered therefore that the adjustments take into account the likely differences that would occur between 2031 and 2048. It should be noted, that 2031 would also have Travel Plan and Public Transport measures in place, which have not been explicitly accounted for within the trip generation.

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2.9 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.

2.9.1. The figures presented indicate that there would be a minimal change in the total number of person trips generated by the site but there would be an increased uptake of future mobility modes and a corresponding reduction in lone driver trips.

2.9.2. It is agreed that walking and cycling trips are likely to increase – potential in lieu of vehicle trips, both in line with National and Local guidance and aspirations for Milton Keynes.

2.9.3. For the purposes of the modelling, the focus is on vehicular impact as this has the greater link to capacity implications both on the SRN and LRN.

2.9.4. As shown in Tables 4-6 and 4-7 of TTN3 - the internal trips within the site are expected to have a high proportion of walking trips (c 50%) to various land uses.

2.9.5. In reality, in terms of external trips the 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.

2.9.6. The proposed development is introducing Redways along the HIF network, alongside further green corridors and walking / cycling routes across the site – tying into existing networks whilst enabling residents and staff to travel sustainably.

2.9.7. The TA will be supported by a Travel Plan which will further look at the potential change between trip mode shares. As mentioned above, the Travel Plan strategy for MKE is in discussion with MKC officers, but the currently includes a monitoring strategy and use of a Travel Plan Steering Group, which could be made up of key stakeholders, such as Milton Keynes Council, Berkeley's and Highways England. This Steering Group, alongside the monitoring strategy will be able to review what measures are working and where further investment could be required to achieve the modal splits required.

2.9.8. For the purposes of the modelling however, the focus has been on the worst case vehicular based impacts.

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2.10 MODELLING UPDATE

2.10.1. In terms of modelling, it was previously outlined that due to the services provided by the site in terms of the community hub and education facilities that these would not generate significant external trips and therefore not be included in the strategic modelling.

2.10.2. WSP have reviewed this and have agreed with MKC to alter this assumption slightly to take into account the jobs (and therefore trips) that could be generated from those elements of the proposals.

2.10.3. Therefore, it should be noted that as part of the Stage 3 modelling (with development tests) an allowance has been made to account for the jobs generated by the community hub and the Secondary school;

- Community Hub – 50 jobs
- Secondary School – 250 jobs (with 50% of trips being external)

2.10.4. The above is considered a robust inclusion in terms of additional vehicular demand on the network. It is likely that a number of the jobs both in the Community and Schools would be served by those living closely and it is not considered that a high number would be from external zones. 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.

2.10.5. The resulting trips added onto the network therefore are higher than those presented under the Future Mobility methodology in TTN3.

TRANSPORT TECHNICAL NOTE 3.2 – Trip Gen: Response

DATE:	26 March 2021	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Trip Generation: Response to comments 2		
PROJECT:	Milton Keynes East	**AUTHOR:**	A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1 INTRODUCTION

1.1.1. 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).

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

1.1.3. WSP issued a Transport Assessment Scoping Report and accompanying Transport Technical Note 3 (TTN3) in June 2020 to stakeholders for comment. TTN3 set out the proposed Trip Generation for the MKE development which was developed using a 'traditional' methodology of forecasting flows alongside a 'Future Mobility' based approach, which built upon the flows and applied forecast trends to account for shifts away from private vehicle use.

1.1.4. Highways England, and their consultants AECOM, issued a response to the Scoping Report and TTN3 in a combined note 'TN7' issued by Highways England on 11 September 2020.

1.1.5. The comments raised in AECOM's TN7 regarding the Scoping Note have been reviewed and these will be addressed in the TA accordingly. A response to trip generation comments was issued via TTN3.1 on 18 November 2020, which focused on the queries raised by AECOM and provided a further response.

1.1.6. Highways England / AECOM have provided further comments on the trip generation assumptions applied. This was set out in AECOMs TN08, provided by Highways England on 07 January 2021. Table 2-1 below summarises the latest comments received by Highways England (specifically relating to Trip Generation, as TN08 also included elements in relation to the TA scoping). This note, TTN3.2, therefore provides some additional information as requested.

2 FURTHER RESPONSE TO AECOM / HE COMMENTS

2.1.1. As set out in Highway England's / AECOMs response note TN08, a request for further clarification on a small number of items was outlined. Table 2-1 summarises the pertinent points / comments raised in relation to trip generation only. It is acknowledged that TN08 had further comments raised, which have been addressed within the Transport Assessment.

TRANSPORT TECHNICAL NOTE 3.2 – Trip Gen: Response

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Table 2-1 – Highways England Comments (TN08 - Trip Generation comments only)

Ref	Comment / Area	Response
AECOM agrees to the following responses provided in WSP's TTN3.1:		
1	TA should demonstrate the differences in terms of trip generation between the two methodologies identified in TTN3.	TTN3 provides a comparison in the trip generation methodologies and numbers. TTN3.1 also sets out additional information. The differences were reviewed by Highways England, and *represents an average 11% peak period mode shift to future mobility modes by 2031 and a 20% shift by 2048. This is considered a reasonable target given that Travel Plan mode shift targets typically seek to achieve a 20% reduction in single occupancy peak hour vehicle trips within the first five years post occupation.*
2	The TA and other supporting documentation should outline all the specific sustainable infrastructure to be delivered along with its corresponding phasing schedule.	See Section 11 of the TA and TTN's 8,9, 10 and 11 that set out the supporting Walking and Cycling, PRoW and parking strategies for the site. Please also see the Residential and Workplace Travel Plans that provide further information not only on what measures can be adopted, but also on the monitoring strategy and implementation for the site. The Public Transport Strategy document also sets out the proposals for the site, included dedicated bus services, changes to existing services and the implementation of Demand Responsive Travel (DRT).
3	No further adjustment taken into account from either the travel plans or the MRT & PR for robustness purposes.	Agreed and no further amendment has been applied.
4	TRICS trip rate output files are to be appended to the TA.	See Appendix N of the TA.
5	Methodology of using multi-modal trip rates as well as Census data in determining vehicular trips as well as non-vehicular trips is accepted.	Noted. For reference this is set out within TTN3.
6	Approach in which internalisation is not applied to trips associated with employment uses is accepted.	Noted. For reference this is set out within TTN3.
7	Evidence-based approach of selecting appropriate surrounding MSOAs to provide a comparison with the proposed development is accepted.	Noted. For reference this is set out within TTN3.

8	Internalisation factor of 73% for Education and Escort Education once the site is fully built out and occupied is accepted.	Noted. For reference this is set out within TTN3.
9	Journey purpose - holiday/day trip/other, no internalisation factor was applied. AECOM agrees with this proposed assumption.	Noted. For reference this is set out within TTN3.
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	Please see further text in Section 5 of the TA and Table 2-2 below.
11	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.	Please see further text below.
12	Evidence-based justification that 'a third' adopted for Shopping internalisation factor is a reasonable assumption is provided.	Please see further text below.
13	Evidence-based justification that 25% of trips adopted for 'other work, other escort and personal business' internalisation factor is a reasonable assumption is provided	Please see further text below.
14	Evidence-based justification that 20% internalisation factor adopted for visiting friends/entertainment/sports is a reasonable assumption is provided	Please see further text below.
Recommendations regarded as important but not critical to the acceptability of the Transport Assessment		
15	Consideration should be given as to which mode will be used to access rail and underground modes from the site.	Mode shares are discussed in TTN3, with further information in the RTP/WTP and PTS Documents.
16	The internalisation assumptions and build-out of the site	Discussed in Section 5 of the TA (build out), and further information below.
17	Further information on the trip generation for education uses for the proposed assessment years	Discussed in Section 6.3 of the TA and below.
18	Further detail on which modes are anticipated to accommodate the forecast modal shift	Discussed in Section 6 of the TA, Walking and Cycling Strategy, RTP and WTP's.

19	Additional evidence to demonstrate that all of the sustainable modes of travel can be sufficiently supported by the proposed infrastructure associated with the development	Discussed in Section 5, 6 of the TA. Further evidence provided in TNs 3,6,8,9, 10,11 and , PTS and RTP/WTP
20	Internalisation factors updated to reflect the latest modelling	Discussed further below.

Note: AECOM / Highways England Comments 21 to 31 in TN08 responded to in TA.

2.2 Development Tested in the MKMMM

2.2.1. The trajectory and phasing of the development with the split of houses at 2031 and 2048 used in the modelling are shown in Table 2-2 below. The employment uses for each future year have also been provided.

Table 2-2 – MKE Development 2031 and 2048 Assumptions

Land Use	Type	MKE - 2031	MKE - 2048
Residential	Mixed Houses / Apartments – private	1,001	3,968
	Mixed Houses / Apartments – affordable	450	1,783
	TOTAL	*1,450*	*5,750**
Employment	B1a	16,387 m²	37,161 m²
	B1c / B2**	40,967 m²	92,903 m²
	B8***	201,938 m²	354,889 m²
	TOTAL	*259,292 m²*	*484,954 m²*

**Updated post submission of TN3 **Assumed as B2 ***Combined Segro and Berkeley (full allocation)*

2.2.2. It should be noted that as the modelling tests the whole allocation, the employment elements included in the modelling are different than that set out in the parameter plans. However, for clarity, with regards to the Berkeley site – the worst case assumptions in terms of traffic generation have been applied.

- Berkeley Site - Employment Total floorspace (GIA): 4,345,000 sq ft (403,650 m2)
  - Of which:
    - Max 400,000 sq ft (37,160m2) Class E (Offices / Light Industrial)
    - Max 1,000,000 sq ft (92,900 m2) B2
    - Max 4,345,000 sq ft (403,650 m2) B8

2.2.3. So, for traffic modelling the worst case scenario would be;

- 400,000 sq ft Class E (Offices / Light Industrial);

- 1,000,000 sq ft B2; and
- 2,945,000 sq ft B8.

2.2.4. The above assumptions have been included in the modelling.

2.2.5. It should be noted that the parameter plans allow for flexibility on site and as such, the development could also implement full (4,345,000 sq ft) of B8 use (with 250,000 sq ft ancillary offices). As B8 / warehousing units will generate less traffic than other office uses, this would result in less traffic being generated by the development.

2.2.6. As outlined in TTN3.1 part of the Stage 3 modelling (with development tests) an allowance has also been made to account for the jobs generated by the Community Hub and the Secondary School:

- Community Hub – 50 jobs; and
- Secondary School – 250 jobs (with 50% of trips being external).

2.2.7. The above is considered a robust inclusion in terms of additional vehicular demand on the network. It is likely that a number of the jobs both in the Community and Schools would be served by those living closely and it is not considered that a high number would be from external zones. 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.

2.3 Employment Internalisation – 15%

2.3.1. The points raised by Highways England in Table 2-1 are acknowledged – however, given the large scale employment opportunities proposed at MKE, the availability for living and working nearby increase compared to the MSOA's that exhibit lower ranges of internalisation.

2.3.2. The nearby MSOA's reviewed in TTN3 and TTN3.1 - indicate that up to 18% of workplace trips remain local (internalisation). These MSOA's are local and immediately adjacent to the MKE area and therefore provide an evidence base that justifies the potential employment internalisation that could be achieved.

2.3.3. MSOA004, which is located in Newport Pagnell immediately north of the MKE site, contains both residential and an industrial / employment area (Interchange Park). This MSOA records a internalisation percentage of 14%, confirming that a nearby site can achieve an internalisation factor to that proposed for the MKE site.

2.3.4. The MSOA review therefore already provides evidence that this is achievable. Furthermore, the supporting documentation, such as Travel Plans, Public Transport Strategy and Walking and Cycling Strategy outline how internal connections will be achieved for new residents that promote non-car based travel through the site.

2.3.5. It is considered therefore assuming a 15% is justifiable and defendable.

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2.4 Shopping Internalisation

2.4.1. As noted in TTN3.1, and as set out above in Section 2.2, the development will provide a community centre that will include other retail and shopping needs within the site. This will include food related shopping, such as a medium sized local shop, which will be able to provide for the local residents. There will also likely be coffee shops and other ancillary uses that traditionally lie adjacent to shopping facilities. As such, it was considered appropriate that a 1/3rd of residential trips would utilise such provision.

2.4.2. To provide further evidence of potential internalisation, a review of the Cambourne Village data has been undertaken. This study was completed by TRICS in 2018. Cambourne Village is a substantial free-standing community in Cambridgeshire, and at the time of the survey (June 2018) had a total site area of 400 hectares. The development comprised 4,250 new homes, split between 2,975 privately owned and 1,275 non-privately owned dwellings. In addition, the site included a varied mix of non-residential developments, including retail, schools, a hotel, a sports centre, a community centre and other uses.

2.4.3. The Cambourne study can be accessed via an online tool, which can then be interrogated to select certain trip types and user groups. For shopping, the Cambourne Morrisons, Pound World and Just for Pets land uses were selected as comparative sites to what could be included within MKE. The AM and PM peak periods were then reviewed to ascertain what the breakdown of trips by person type. Table 2-3 below provides a summary of the shopping trips, broken down by user type.

Table 2-3 – Cambourne Village – Shopping type trips, breakdown of user type

Land Use	User Type	AM (08:00 – 09:00) – Trips	% share	PM (17:00 – 18:00) – Trips	% share
Morrisons / Pound World / Just for Pets	Live	66	58%	203	70%
	Visitor	21	19%	60	21%
	Work	12	11%	7	2%
	Work Live	14	12%	22	8%

2.4.4. The Cambourne data indicates that in the AM peak, those users that either live or work/live at Cambourne were the predominant trip generators to the shopping elements, equating to 70% of trips in that period. In the PM, this increases to 78%, suggesting that a higher level of internalisation could be possible.

2.4.5. It is acknowledged that Cambourne presents a more built out development, however indicates that significant internalisation of trips related to retail / shopping is possible. It is considered therefore that MKE development is well placed to achieve similar levels of internalisation. To ensure robustness however, a lower level of internalisation for shopping trips, set at 33% has been adopted.

It is likely that the shopping facilities in central Milton Keynes would still be an attractive choice for new residents at MKE. However, as seen in the Cambourne evidence, there remains a high propensity for internal based trips. It is therefore presented that a 33% internalisation factor is appropriate for use within the analysis.

2.5 Other Work, other escort and personal business internalisation

2.5.1. The community centre will also include a Health Centre, and it is envisaged that other service type shops will be located within an accessible location for the new residents. As such, it was estimated that one-quarter of residential trips would be able to use these on an average day.

2.5.2. A similar exercise to the above has been undertaken using the Cambourne data. The Cambourne Village study does not have the same specific proposed land uses as MKE, however it is considered appropriate to combine the Community Centre & Library with the Health Centre results as a proxy for the MKE other work, other escort and personal business internalisation review.

2.5.3. Table 2-4 below provides a summary of the Cambourne Village trip data for community centre / health centre tips by user type.

Table 2-4 – Cambourne Village – Community Centre / Health Centre trips, breakdown of user type

Land Use	User Type	AM (08:00 – 09:00) – Trips	% share	PM (17:00 – 18:00) – Trips	% share
Community Centre & Library / Health Centre	Live	358	48%	615	41%
	Visitor	154	21%	639	43%
	Work	144	19%	119	8%
	Work Live	92	12%	116	8%

2.5.4. The data indicates that in the AM peak, internal trips (live or work/live) represent 60% of the movements, whereas in the PM peak, this falls to just under 50%.

2.5.5. The data suggests that a significant proportion of trips to these land uses are represented from those in close proximity. Compared with the Cambourne data, it is therefore robust to assume that a lower percentage, 25%, would remain internal at MKE for those journey purposes.

2.6 Visiting friends / entertainment / sports internalisation

2.6.1. The development proposes green corridors and leisure routes, including River walks. Further to this, the site also houses archaeological findings which will also have their own routes. In addition, sports pitches and allotments, alongside play areas across the site are being designed into the masterplan. This presents residents with ample opportunities to undertake an active and leisure filled lifestyle. It is considered appropriate that a 1/5th of residents on an average day would stay within the area for such trip making purposes.

2.6.2. The Cambourne study did not survey leisure route trips per se, but did include a Fitness Centre and a Church within its land uses. Whilst it is appreciated that these are not exactly the same as green corridors, those land uses do represent both a sports focused trips, or a visiting friends style journey purpose. As such, a review into the Cambourne trips for those two land uses have been interrogated as a useful tool to outline what sort of internalisation could occur.

2.6.3. Table 2-5 below provides a summary of the Cambourne Village trip data by user type for the Fitness Centre and Church uses.

Table 2-5 – Cambourne Village – Fitness Centre / Church, breakdown of user type

Land Use	User Type	AM (08:00 – 09:00) – Trips	% share	PM (17:00 – 18:00) – Trips	% share
Community Centre & Library / Health Centre	Live	350	47%	554	37%
	Visitor	155	21%	593	40%
	Work	152	20%	124	8%
	Work Live	86	11%	122	8%

2.6.4. The Cambourne data suggests that in the AM peak, internal trips make up 58% of those recorded, whereas in the PM peak this reduces to 45%.

2.6.5. It is acknowledged that the land uses are not exactly the same, however, the evidence suggests that suitable provision of facilities will encourage use by local residents. As the MKE site will have multiple leisure facilities, alongside the opportunities for groups to congregate at shared spaces – a 20% internalisation factor does not seem unreasonable.

2.7 Consideration should be given as to which mode will be used to access rail and underground modes from the site.

2.7.1. It is acknowledged that due to the location of the site, the use of rail mode shares will be through a linked trip, with users utilising sustainable modes initially to then access rail services. This could be residents or workers walking and cycling to the interchange hub, or utilising the proposed bus services (both new and existing diverted services) to then access railway stations. As the proposed development also includes demand responsive travel (DRT), this provides flexibility in terms of pick up location and route choice / end destination giving further options for linked travel.

2.7.2. The Public Transport Strategy make an allowance for those travelling by rail within its bus patronage calculations. As such, the site considers how those users can utilise the services proposed and has designed them appropriately to accommodate the potential numbers of users.

2.7.3. The masterplan provides an interconnected network of footways, cycleways, Redways, public rights of ways, Bridleways and green corridors to promote sustainable based travel. The community hub, situated in the centre of the site will benefit from these linkages as well as central multi-modal interchange, allowing all residents and workers a location to access non-car modes.

2.7.4. In addition, the Residential and Workplace Travel Plans set out measures for the promotion of non-private vehicular use and also summarises a monitoring strategy for the MKE site that will record what modes are being utilised. The travel plans also set out use of a steering group that will review the findings and utilise funding available, via the MK tariff to implement sustainable travel focus initiatives.

2.8 The internalisation assumptions and build-out of the site

2.8.1. The internalisation assumptions remain largely the same as presented inTTN3 and TTN3.1 as the assessed years are 2031 and 2048. As such, the internalisation included reflects the build out of the development for those two future years. The build out and phasing of the site is discussed in Section 5.3 of the TA.

2.8.2. Whilst internalisation may vary throughout the build of the site, the MKE development is committed for early delivery of social uses, as set out in the development framework. Alongside this, the employment proposals, also ensure that ample work opportunity is provided alongside residential build out.

2.9 Further information on the trip generation for education uses for the proposed assessment years

2.9.1. The education uses are considered to be primarily for the new MKE residents. Highways England, MKC and AECOM have agreed that the internalisation assumptions regarding the education trips are acceptable.

2.9.2. As shown in the Development Framework sets out the that the social infrastructure would be delivered by the residential milestones. So, by the completion of Phase 2, 2 x Primary Schools, 1 x Secondary School and the Health Hub would also be developed. This ensures that appropriate land uses are delivered in line with the number of residential units.

2.9.3. As set out in TTN3.1, it is 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.

2.9.4. As such, home based to education and home based to education (escort) trips are accounted for in both the 2031 and 2048 modelling scenarios. The lower overall unit numbers in 2031 reflect the build out and result in less education based trips.

TRANSPORT TECHNICAL NOTE 3.2 – Trip Gen: Response

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2.10 Further detail on which modes are anticipated to accommodate the forecast modal shift

2.10.1. The forecast use of sustainable modes is discussed further in Section 6 of the Transport Assessment. Uptake and suitability of development proposals are also considered further in the Walking and Cycling Strategy (TTN9), the residential travel plan (RTP), workplace travel plan (WTP) and Public transport strategy.

2.11 Additional evidence to demonstrate that all of the sustainable modes of travel can be sufficiently supported by the proposed infrastructure associated with the development

2.11.1. The suitability of the masterplan and development proposals at MKE is set out discussed further in Sections 5 and 6 of the Transport Assessment. Further evidence is also provided in TTNs 3,6,8,9, 10,11, the residential travel plan (RTP), workplace travel plan (WTP) and Public transport strategy.

2.11.2. The Design and Access Statement (DAS) alongside the Parameter Plans also set out how the site has endeavoured to create a sustainably focused development, with a green corridor / lattice enabling sustainable routes throughout, connecting with public transport options.

2.12 Internalisation factors updated to reflect the latest modelling

2.12.1. As set out in TTN3.1, allowances for jobs at the community hub and secondary school were applied. As these focused on the employment uses, no real changes to the internalisation for residential trips are expected.

2.12.2. For the community hub, a robust assumption of jobs was applied assuming all were external. Assuming the same internalisation as for home based to employment trips, it is sensible to consider that as a minimum 15% of the community hub jobs would be served purely by the MKE site. No adjustment was applied however.

2.12.3. For the Secondary School trips, the allowance was included to account for the potential jobs / employment generated by the site. Therefore, no changes to home based education or education escort trip purposes has occurred. Similarly, to the community hub, it is expected that the MKE site would generate live work users, that would take the opportunity of the sustainable options to travel to and from the school site. Therefore, no further amendments are necessary.

Appendix A.4

TTN4 – FUTURE YEAR ASSUMPTIONS

TRANSPORT TECHNICAL NOTE – TTN4 Growth and Future Year Modelling Approach for Milton Keynes East

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Growth and Future Year Modelling Approach v2		
PROJECT:	Milton Keynes East	**AUTHOR:**	F Imramovsky
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1 INTRODUCTION

1.1.1. The current local plan entitled Plan:MK 2016 – 2031 (hereinafter referred to as Plan:MK) adopted by Milton Keynes Council (MKC) in March 2019 *"…sets out the vision and framework for the future development of the area…"*, and considers the Milton Keynes Borough's (MKB) needs until 2031.

1.1.2. It is understood that the current Milton Keynes Multi-Modal Model (MKMMM) was developed to enable testing Plan:MK options with the horizon year of 2031 (i.e. Reference Case scenario). The build-out of the proposed Milton Keynes East Sustainable Urban Extension (referred to as MKE for ease throughout this note) development and its expected completion are anticipated to extend beyond the Plan:MK period, with full build-out expected to be in 2048. As such, due consideration should be given to potential growth in the area after the end of Plan:MK; i.e. beyond 2031.

1.1.3. The MKE site has been identified as an allocation for a strategic urban extension within Plan:MK and MKC's aspirations for the allocation is set out within Policy SD12 of Plan:MK as well as in the site-specific Milton Keynes East Strategic Urban Extension Development Framework Supplementary Planning Document (SPD). 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"*, which is echoed in the Development Framework SPD

1.1.4. MKE is strategically well 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.

1.1.5. 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 SPD.

1.1.6. The MKE site includes parcels which will be delivered by other parties (i.e. not Berkeley), including Bloor, Segro (Roxhill) and MKC.

1.1.7. Given the strategic nature of the proposals, WSP is engaged in ongoing consultations with MKC and Highways England. At a meeting held on 17 December 2019, it was agreed that a review of the growth between the Plan:MK period ending in 2031 and the expected full build-out in 2048 (N.B. the future year of 2039 was discussed initially) should be undertaken. This exercise would aim 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.

1.1.8. In general, it is understood that MKC and Highways England are content with the assumptions applied for the Milton Keynes Borough (MKB) in the MKMMM up to 2031. It is understood that planning officers are reviewing the residential and employment forecasts beyond 2031 for inclusion in the reference cases to ensure that the latest available data is included within the MKMMM.

1.1.9. As a result, WSP have undertaken a high-level review of the growth in the MKB area, but it is considered that this does not need to be explored in detail by WSP at this stage and the MKC officers will lead on the sites within the borough. This Transport Technical Note (TTN4) reviews the 2031-2048 growth and suggests an approach to be employed in future year modelling within MKMMM.

TRANSPORT TECHNICAL NOTE – TTN4 Growth and Future Year Modelling Approach for Milton Keynes East

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
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PROJECT:	Milton Keynes East	**AUTHOR:**	F Imramovsky
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2 FORECASTING CONSIDERATIONS

2.1.1. As outlined above, it is expected that the proposed MKE development would be delivered over a number of years, with full build-out envisaged by 2048. Therefore, for the purposes of the modelling exercise, the future year of 2048 is to be adopted. As agreed with MKC and Highways England, an interim year test of 2031 will also be completed, with a partially built-out MKE scheme; however, this note focuses on the expected growth assumptions to be applied in the 2048 model.

2.1.2. Previous discussions and versions of this note considered 2039 as the further future year assessment. Recent discussions between MKC and Berkeley St James has acknowledged the need for a build out schedule that is resilient, accurate, defendable and realistic. As such, a revised full build out year of 2048 has been calculated.

2.1.3. It should also be noted that the land allocated for the MKE development consists of several sites under different ownership with Berkeley St James (hereinafter referred to as Berkeley) controlling the vast majority of the allocated land. It is acknowledged that the other landowners would also aim to develop their respective sites, but 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).

TRANSPORT TECHNICAL NOTE – TTN4 Growth and Future Year Modelling Approach for Milton Keynes East

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3 SIGNIFICANT PLANNED/COMMITTED DEVELOPMENT

3.1 Overview

3.1.1. During the discussions with MKC and Highways England, it was established that consideration should be given to any large-scale development in the wider area outside Milton Keynes. These developments may have an impact on certain links and corridors in the MKE locality and should be included in the future year modelling.

3.1.2. It was suggested by MKC in the December 2019 meeting, that development sites in the following locations should be considered and potentially included in the modelling:

- Wellingborough
- Bedford Commercial Park
- Northampton – Rail Freight
- Cranfield
- Marston Moretaine
- M1 Junction 13
- Central Bedfordshire Local Plan (CBLP, currently draft)

3.1.3. While some of the development locations outlined above are quite specific and refer to the individual schemes, some may include multiple sites; e.g. Wellingborough or Cranfield. Further clarification on the specific development sites, including their individual characteristics in terms of development type (e.g. residential, employment) and quantum was sought from MKC.

3.1.4. The email correspondence between WSP and MKC regarding the strategic sites to be included in the modelling is provided in **Appendix A** of this TN.

3.1.5. In addition to the sites/areas outlined above, it was also suggested during discussions with MKC's Highway Officer that consideration should be given to development at Tickford Field Farm to the east of Newport Pagnell forming part of Strategic Reserve land.

3.1.6. The site was identified and allocated in the Newport Pagnell Neighbourhood Plan (2016) for residential development. The plan was made part of the Development Plan by MKC and included in Plan:MK, which considers the site for 930 dwellings with full build-out by 2031.

3.1.7. Given that the development is already included in Plan:MK and that it is expected to be completed by 2031, confirmation whether it is already included in the MKMMM's Reference Case was sought from MKC. MKC confirmed that the Tickford Fields development is included in the updated 2031 Reference Case with 940 dwellings as well as associated employment elements.

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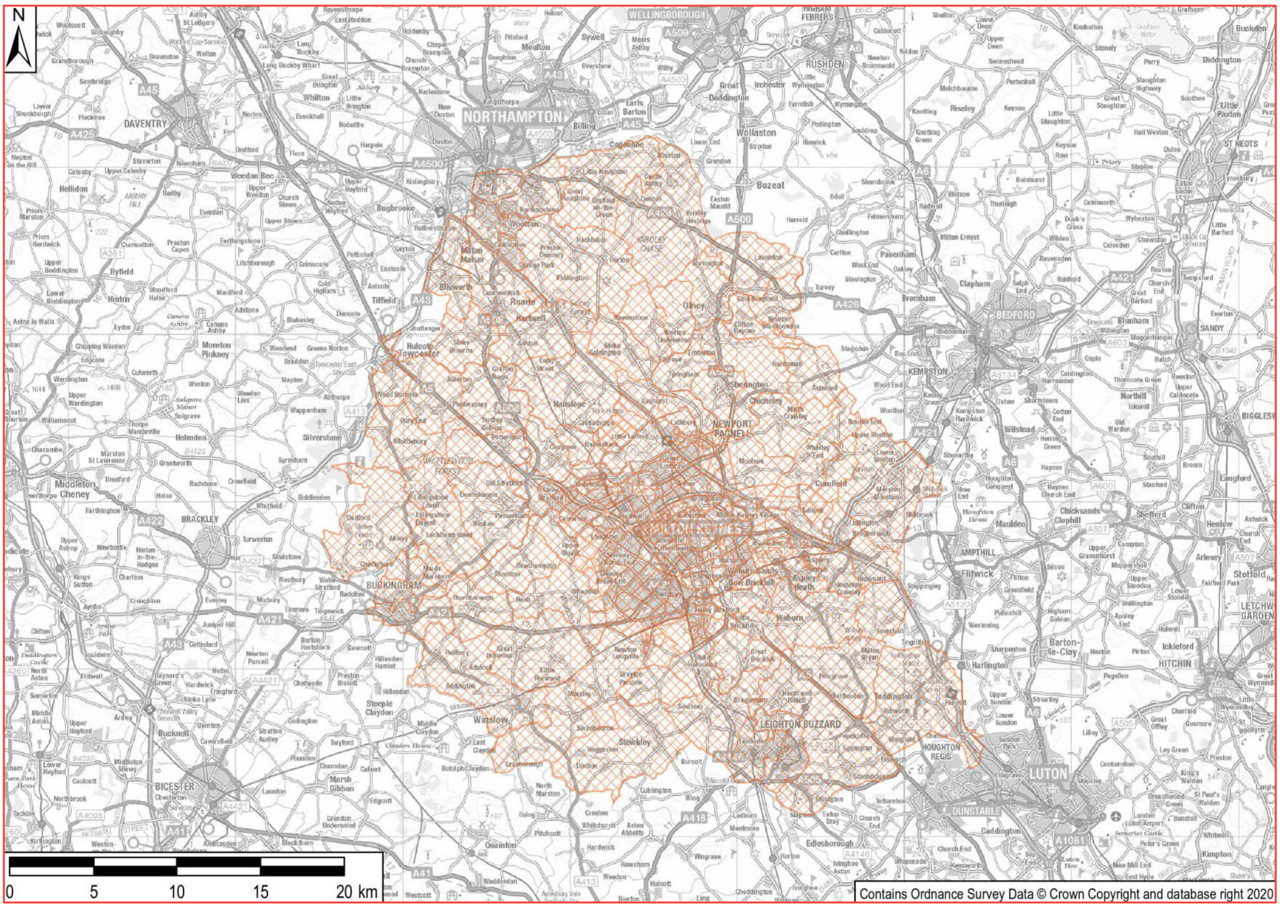
CHECKED:	A Smith	**APPROVED:**	A Norcutt

3.2 MKMMM Extent

3.2.1. During discussions with MKC, it was identified that the extent of the Trip End External Model Area within the MKMMM would limit the number of sites/developments that could be included in the modelling. The geographical extent of the model is illustrated in **Figure 3-1** below.

Figure 3-1: Geographical Extent of MKMMM



3.2.2. The extent of the MKMMM, as illustrated in **Figure 3-1** above, covers the whole of Milton Keynes Borough (MKB) and the surrounding area. It is not considered practicable to introduce the sites outside of this area into the model and override the assumptions of the National Trip End Model (NTEM) employed by the MKMMM.

3.2.3. As a result of the above geographical constraints, the list of the sites/locations to be included in the future year modelling had to be, in consultation with MKC, refined.

3.2.4. It is the intention to progress and agree on the future year strategy with MKC as the leading planning authority as far as practical. The refined list of the development sites will also be consulted and agreed with Highways England. However, it is expected that Highways England will also consult with MKC over the acceptability of the sites included.

3.2.5. The following reiterates the developments/areas that were considered, including the rationale behind the decision whether to include or exclude them from the future year modelling based on their geographical location relative to the model extent. All listed sites are illustrated in **Figure 3-2** below:

- Wellingborough
  - Sustainable Urban Extension (SUE) North (**Figure 3-2**, Ref. 1)
  - Sustainable Urban Extension (SUE) East (**Figure 3-2**, Ref. 2)

  Both sites to be excluded due to their location outside the MKMMM extent.
- Cranfield (**Figure 3-2**, Ref. 3)

  Multiple sites in the location to be included in 2048 assumptions.
- Marston Moretaine
  - Marston Vale New Villages (**Figure 3-2**, Ref. 4)

  Development to be included in the 2048 assumptions.
- Bedford Commercial Park (**Figure 3-2**, Ref. 5)

  Development to be excluded due to its location outside the MKMMM extent.
- Northampton – Rail Freight
  - Northampton Gateway (Strategic Rail Freight Interchange (SRFI)) (**Figure 3-2**, Ref. 6)

  Development to be excluded due to its location outside the MKMMM extent.
- M1 Junction 13
  - Marston Gate Expansion (**Figure 3-2**, Ref. 7)

  Development to be included in the 2048 assumptions
- (Draft) Central Bedfordshire Local Plan
  - M1 Junction 11a – Sundon Rail Freight Interchange (RFI) (**Figure 3-2**, Ref. 8)
  - North of Luton (**Figure 3-2**, Ref. 9)
  - RAF Henlow (**Figure 3-2**, Ref. 10)
  - Holme Farm Biggleswade (**Figure 3-2**, Ref. 11)
  - East of Biggleswade (**Figure 3-2**, Ref. 12)
  - East of Arlesey (**Figure 3-2**, Ref. 13)

  All sites to be excluded due to their location outside the MKMMM extent.

3.2.6. As outlined above and illustrated in **Figure 3-2** below, three sites/locations were identified to be potentially included in future year modelling. The details of each are provided in the following section.

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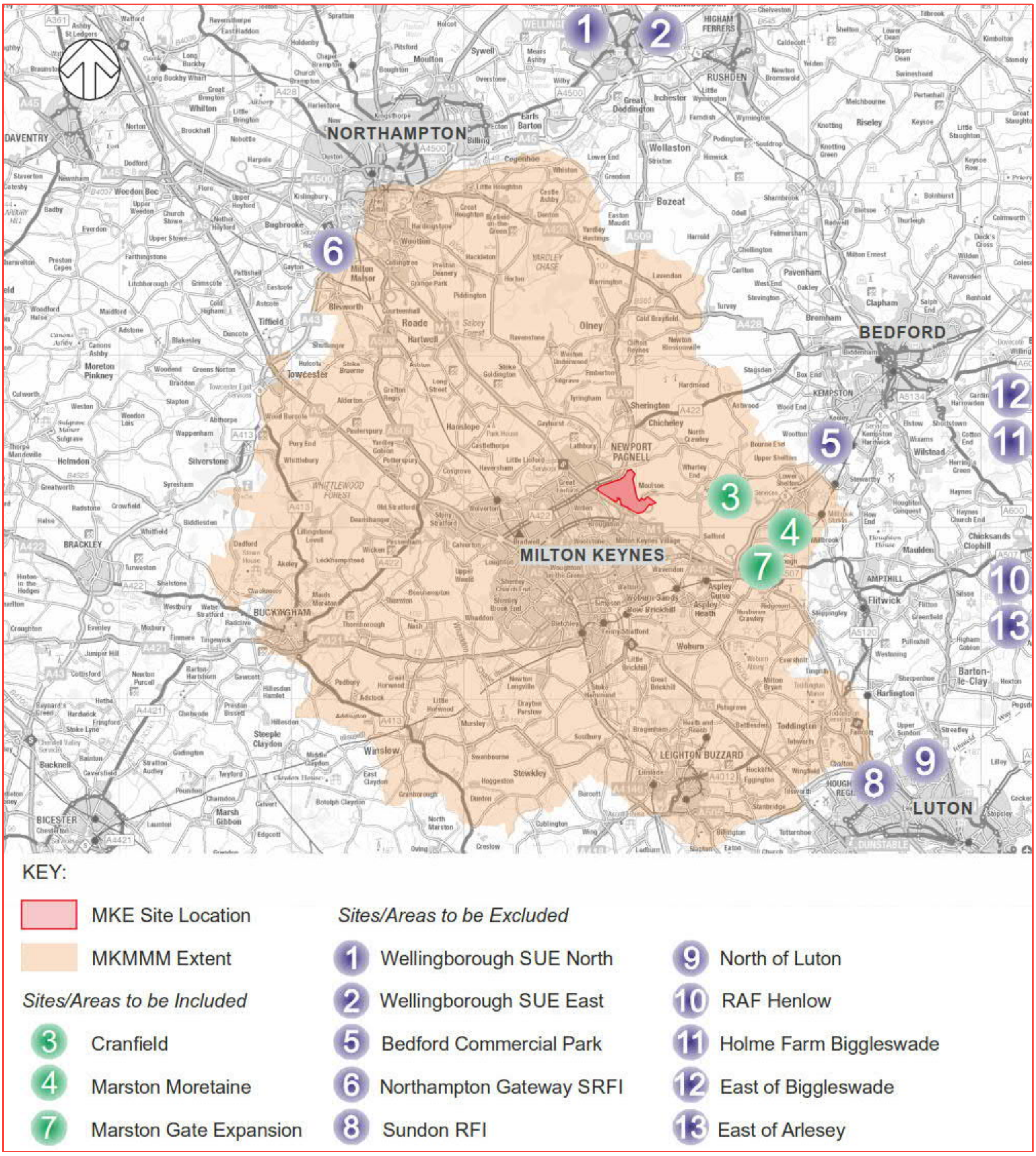
PROJECT:	Milton Keynes East	**AUTHOR:**	F Imramovsky
CHECKED:	A Smith	**APPROVED:**	A Norcutt

Figure 3-2: Considered Development Sites/Areas



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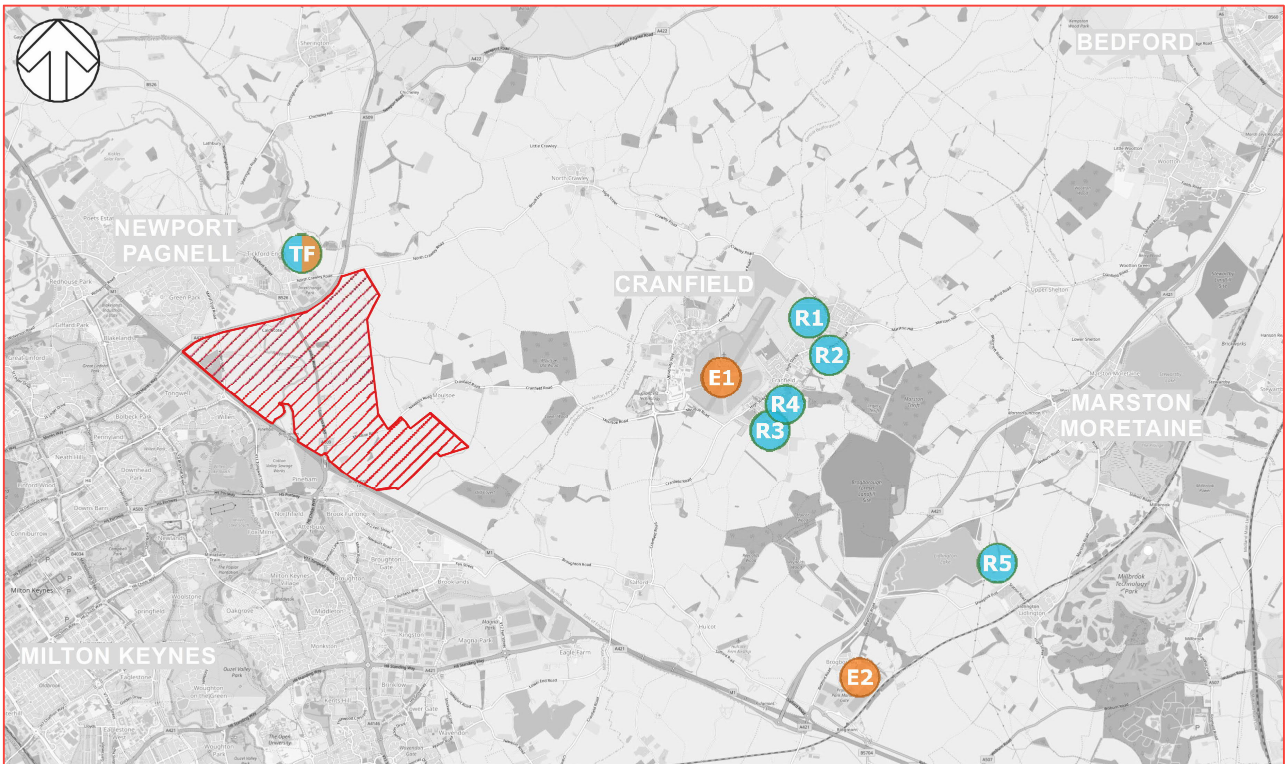
3.3 Identified Planned/Committed Development

3.3.1. The location of the identified sites/areas (as outlined in Section 3.2 above) relative to the proposed MKE development is illustrated in **Figure 3-3,** with their corresponding descriptions below.

Figure 3-3: Identified Development



KEY:

MKE Site Location

TF Tickford Fields Development (Residential / Employment)

Employment Sites

E1 Cranfield Airport

E2 Marston Gate Expansion

Residential Sites

R1 Land West of Mill Road Phase1 and Phase 2

R2 East End Farm

R3 Land West of Lodge Farm

R4 Home Farm

R5 Marston Vale New Villages

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CRANFIELD

3.3.2. Cranfield is a village situated to the northeast of Milton Keynes and east of the proposed MKE development. The village is located immediately adjacent to Cranfield Airport and Cranfield University using the former RAF airport for business aviation, private flights, and for research and development activities. The Cranfield area is shown in **Figure 3-2** above under reference no.1.

3.3.3. Given the above, the area of Cranfield is already and will likely be subject to substantial development in the future. This may include expansion/upgrades of the airport itself as well as delivery of several predominantly residential developments.

3.3.4. Upgrades to Cranfield Airport consist of the provision of new aircraft hangars and an associated business terminal, new office space, a hotel and various upgrade works within the airport, with these being granted an outline planning permission in 2018. The so-called Air Park development is expected to be delivered in two separate phases with the full completion in 2024. The Air Park, once completed, is estimated to generate approximately 600 new jobs (**Figure 3-3**, Ref. E1).

3.3.5. It is understood from discussions with MKC that the Air Park development was not included in the 2031 Reference Case scenario of the MKMMM. This is due to limited details being available at the time of the model development, and the proposals were covered by the TEMPRO/NTEM assumptions included in the MKMMM.

3.3.6. Given that the Air Park development has already been granted the planning permission, it is therefore considered that the TEMPRO/NTEM employed by the MKMMM could be overridden with the more refined information as outlined above, and the development included in the updated 2031 Reference Case scenario as well as the future year modelling.

3.3.7. In addition to the above and based on the information provided by MKC, several residential developments are expected to be delivered in Cranfield, including:

- Land West of Mill Road Phase1 and Phase 2 (Figure 3-3, Ref. R1);
- East End Farm (Figure 3-3, Ref. R2)
- Land West of Lodge Farm (Figure 3-3, Ref. R3)
- Home Farm (Figure 3-3, Ref. R4)

3.3.8. The majority of the developments outlined above are considered by MKC to be 'near-certain' with only one site classified as 'more than likely' (Land at East End Farm). As such, the likelihood of these developments being delivered is high, and they should all be considered in the updated 2031 Reference Case/future year scenario of the MKMMM. Section 4 below outlines the number of units, which WSP believe should be included within the modelling as a minimum.

MARSTON MORETAINE

3.3.9. Central Bedfordshire Council (CBC) identified in their (pre-submission) Local Plan 2035 (2018) and Strategic Land Allocation land to the south of the village of Marston Moretaine for strategic development. The Marston Moretaine area is shown in **Figure 3-2** above under reference no.4.

3.3.10. The development called Marston Vale New Villages (Figure 3-3, Ref. R5) is expected to deliver a series of up to four villages with a range of facilities and employment opportunities.

3.3.11. The proposals consist of:

- Up to 5,000 new homes (Class C2 and C3);
- Up to 30 hectares of employment land (class B1 and B2) plus employment uses (B1a) within the community hubs;
- Up to 9,500m2 of retail uses (A1-A5 use class) including a food store (A1) of up to 2,500m2;
- Up to 5,000m2 for hotel use (class C1);
- Up to 1,750m2 of community uses (class D1);
- Up to 4,000m2 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;
- Formal open space (up to 17ha) including playing fields and sports pitches (including associated sports pavilions and lighting) and children's play areas.

3.3.12. The development, when complete, is estimated to generate approximately 4,180 Full Time Equivalent (FTE) jobs.

3.3.13. 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 not yet committed, but 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. Section 4 below outlines the number of homes/jobs, which WSP believe should be included within the modelling.

MARSTON GATE EXPANSION

3.3.14. Marston Gate Expansion site (Figure 3-3**,** Ref. E2) is situated to the east of Milton Keynes, immediately adjacent to Junction 13 of the M1 motorway. The site is identified under 'Policy SE2' of CBC's Pre-submission Local Plan. The site is also shown in **Figure 3-2** above under reference no.7.

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3.3.15. The development, promoted by Prologis UK, would form an extension to the existing Prologis Park Marston Gate Distribution Centre. The development proposals comprise of up to 166,000m^2 (gross external area) of storage and distribution facilities (Use Class B8) with ancillary office accommodation; HGV and car parking (including a dedicated lorry park and separate recreational use car park); new and diverted footpaths, cycle routes and bridleways; landscaping, drainage and associated works.

3.3.16. 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).

3.3.17. It should be noted that the 'Policy SE2' of CBC's Pre-submission Local Plan identified the land to provide up to 35ha (350,000m^2) of new employment consisting of B8, associated B1 and A3 land uses creating in a region of 2,000 jobs delivered approximately by 2037.

3.3.18. Given its allocation in the Local Plan, it could be assumed that the development would be already considered within the MKMMM. However, as confirmed by MKC, the developments outside the borough were covered by the TEMPRO/NTEM assumptions included in the MKMMM. As such, the information provided above and in Section 4 below should be considered in refining the MKMMM's 2031 Reference Case and creating the future year scenarios.

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4 HOUSING/EMPLOYMENT PROJECTIONS BEYOND 2031 – OUTSIDE OF MILTON KEYNES BOROUGH

4.1.1. The review of planned/committed development in the locality of the proposed MKE site, as set out in the preceding section, 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.

4.1.2. Given that plans for the majority of the identified sites have not yet been developed in detail and the development schedules are not known, it is considered appropriate to apply a linear growth to the expected development quantum based on the predicted annual build-out rates provided by MKC.

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

2031 – 2039 GROWTH

4.1.4. The growth between 2031 and 2039 based on the available information is summarised in **Table 4-1**.

Table 4-1: 2039 Housing/Employment Projection

Residential	No. of Dwellings (2031)	No. of Dwellings (2039)	Growth between 2031 and 2039
Land West of Mill Road (Phase 1) Land West of Mill Road (Phase 2)	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 (Residential)	2,765	5,000	2,235
TOTAL DWELLINGS			**2,256**

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Employment	No. of Jobs (2031)	No. of Jobs (2039)	Growth between 2031 and 2039
Cranfield Airport	600	600	0
Marston Gate Expansion	1,733	2,000	267
Marston Vale New Villages (Employment)	2,312*	4,180	1,868*
TOTAL JOBS			**2,135**

* Estimated values, refer to para 4.1.7 for details

4.1.5. The growth between 2031 and 2039 based on the available information is summarised in Table 4 1 above suggests that an additional 2,256 dwellings would be delivered by 2039. It should also be noted that the growth between 2031 and 2039 predominantly results from the residential element of Marston Vale New Villages as the majority of other planned developments would be completed or very near completion in 2031.

4.1.6. Similar to the projected number of new dwellings, the vast majority of the jobs generated between 2031 and 2039 would be a result of the delivery of the employment element of Marston Vale New Villages. However, it should be highlighted that due to the limited information about the Marston Vale New Villages development, the number of jobs generated by 2031 is not yet known.

4.1.7. As there is currently no detailed information about the amount of employment and phasing/delivery of the development available, it is considered that the estimate of the number of jobs in 2031 could be related to a number of dwellings delivered as follows:

Total no of dwellings: 5,000

Total no of jobs: 4,180

Jobs per dwelling: 4,180 / 5,000 = 0.836

No of dwellings delivered by 2031: 2,765

No of jobs delivered by 2031: 2,765 x 0.836 = 2,312

4.1.8. As a result of the above assumption, the number of jobs delivered by Marston Vale New Villages between 2031 and 2039 would increase by 1,868. The total increase in jobs in the area between 2031 and 2039 would subsequently equate to 2,135.

4.1.9. The full calculation is included in **Appendix B.**

GROWTH UP TO 2048

4.1.10. As outlined above, the housing/employment growth beyond 2039 up to 2048 (i.e. 2040 – 2048 as 2039 is covered under known expected development in the area) is to be included in the MKMMM based on the TEMPRO/NTEM forecast growth due to a relatively high level of uncertainty about the future development in the area. The use of TEMPRO/NTEM is considered to be a conservative but sensible approach.

4.1.11. Assumed changes in housing/employment quanta, were obtained from the DfT's TEMPRO v7.2b database. The data was extracted for geographical areas (defined as Middle Layer Super Output Areas (MSOA)), which are covered by the extent of the MKMMM (except MKB). The selected MSOAs include:

- Central Bedfordshire 007, 009, 019, 020, 021, 022, 023, 024;
- Aylesbury Vale 001, 003, 005, 006;
- South Northamptonshire 002, 003, 005, 008;
- Northampton 027, 028, 030, 031.

4.1.12. The summary of the data extracted is provided in **Table 4-2** below.

Table 4-2: 2048 Housing/Employment Projection

Residential	No. of Households (2040)	No. of Households (2048)	Growth between 2040 and 2048
Central Bedfordshire			
007	4,284	4,540	256
009	5,030	5,357	327
019	5,420	5,745	325
020	4,189	4,458	269
021	5,659	6,022	363
022	3,751	3,991	240
023	3,192	3,397	205
024	5,639	6,000	361
Aylesbury Vale			
001	4,972	5,484	512
003	3,590	3,965	375
005	3,899	4,273	374
006	3,921	4,330	409

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Residential	No. of Households (2040)	No. of Households (2048)	Growth between 2040 and 2048
South Northamptonshire			
002	3,472	3,657	185
003	7,085	7,533	448
005	4,649	4,943	294
008	4,689	4,985	296
Northampton			
027	3,121	3,306	185
028	4,708	4,986	278
030	4,654	4,930	276
031	3,844	4,072	228
TOTAL	89,768	95,974	6,206
Employment	**No. of Jobs (2040)**	**No. of Jobs (2048)**	**Growth between 2040 and 2048**
Central Bedfordshire			
007	8,429	8,652	223
009	3,133	3,218	85
019	4,468	4,586	118
020	1,619	1,663	44
021	5,954	6,113	159
022	1,681	1,727	46
023	921	947	26
024	6,727	6,907	180

Residential	No. of Households (2040)	No. of Households (2048)	Growth between 2040 and 2048
Aylesbury Vale			
001	5,591	5,742	151
003	2,115	2,171	56
005	1,992	2,045	53
006	2,520	2,589	69
South Northamptonshire			
002	2,484	2,548	64
003	5,628	5,780	152
005	3,477	3,571	94
008	3,232	3,321	89
Northampton			
027	1,804	1,852	48
028	24,484	25,137	653
030	4,099	4,208	109
031	1,884	1,934	50
TOTAL	92,242	94,711	2,469

Source: TEMPRO v7.2b

4.1.13. The TEMPRO results provided in **Table 4-2** shows that TEMPRO/NTEM forecast the increase of 6,206 dwellings during the future period between 2040 and 2048. The increase in job numbers is forecast to be of 2,469 jobs within the same period.

2031 – 2048 GROWTH

4.1.14. As a result of the review of the 2031 - 2039 and 2040 - 2048 growth provided above, the total residential/employment development quanta, which should be considered in the MKMMM modelling beyond the 2031 Reference Case scenario up to the future year of 2045 are provided in Table 4-3 below.

Table 4-3: 2031 – 2048 Growth (Planned Development + TEMPRO/NTEM)

	Dwellings / Jobs (2031 – 2039 Growth)	Dwellings / Jobs (2040 – 2045 Growth)	Growth between 2031 and 2045
Residential	2,256	6,206	8,462
Employment	2,135	2,469	4,604

4.1.15. As shown in **Table 4-3** above, it is forecast that the total number of dwellings could increase by 8,462 during the 2031-2045 period. The number of jobs is forecast to increase by 4,604 within the same period.

4.1.16. It should also be highlighted that the sums outlined above are the result of a combination of the planned development in the area and the growth assumed by TEMPRO/NTEM.

TRIP GENERATION AND DISTRIBUTION

4.1.17. As agreed with MKC, it is suggested that the default MKMMM trip rates for both residential and employment would be applied to the information above to create the 2048 future year. Distribution of the resultant trips generated by the developments in the area would be undertaken by MKMMM. This would ensure a consistent approach is applied to the background growth assumptions.

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5 TEMPRO/NTEM GROWTH ONLY– OUTSIDE OF MILTON KEYNES BOROUGH

5.1.1. During the consultations with MKC, the possibility of using TEMPRO/NTEM as a blanket growth factor to account for the planned/committed development in the area was discussed. There was a consensus that using this blanket factor could underestimate the level of growth in the locality of MKE as well as the broader area covered by the MKMMM.

5.1.2. However, before ruling out this approach, the housing/job forecasts in TEMPRO/NTEM should be compared against the estimated values provided in Section 4 of this TTN to ensure that they are robust.

5.1.3. Assumed changes in housing/employment quanta, were obtained from the DfT's TEMPRO v7.2b database. The data was extracted for geographical areas (defined as Middle Layer Super Output Areas (MSOA)) in which the identified developments reside. The selected MSOAs include:

- Central Bedfordshire 007 (Cranfield); and
- Central Bedfordshire 009 (Marston Vale New Villages and Marston Gate Expansion).

5.1.4. The summary of the data extracted is provided in **Table 5-1** below.

Table 5-1: TEMPRO Projected Development (outside of MKB)

Residential	**No. of Households (2031)**	**No. of Households (2039)**	**Growth between 2031 and 2039**
Central Bedfordshire 007 - Cranfield	3,984	4,252	268
Central Bedfordshire 009 - Marston Vale New Villages	4,649	4,989	340
TOTAL			**608**
Employment	**No. of Jobs (2031)**	**No. of Jobs (2039)**	**Growth between 2031 and 2039**
Central Bedfordshire 007 - Cranfield Airport	8,207	8,404	197
Central Bedfordshire 009 - Marston Vale New Villages - Marston Gate Expansion	3,047	3,123	76
TOTAL			**273**

5.1.5. The TEMPRO results provided in **Table 5-1** shows that TEMPRO/NTEM forecast the increase of 608 dwellings during the future period between 2031 and 2039. The increase in job numbers is forecast to be of 273 jobs within the same period.

5.1.6. From the comparison of the TEMPRO/NTEM forecast with the values estimated in **2031 –** 2039 GROWTH

5.1.7. The growth between 2031 and 2039 based on the available information is summarised in **Table 4-1.**

5.1.8. Table 4-1 above, it is evident that TEMPRO/NTEM underestimates the growth in the areas adjacent to the proposed MKE development.

5.1.9. The projected growth beyond 2039 (i.e. 2040 – 2048) based on the TEMPRO/NTEM assumptions is outlined in Section 4. The total projected growth outside of MKB based solely on TEMPRO/NTEM is summarised in **Table 5-2** below.

Table 5-2: 2031 – 2048 Growth (TEMPRO/NTEM)

	Dwellings / Jobs (2031 – 2039 Growth)	Dwellings / Jobs (2040 – 2048 Growth)	Growth between 2031 and 2048
Residential	608	6,206	6,814
Employment	273	2,469	2,742

5.1.10. The TEMPRO/NTEM analysis suggests that the 2031–2048 growth would result in additional 6,814 dwellings and 2,742 jobs by the end of the period. When compared to the forecast growth outlined in Section 4 above, it is evident that TEMPRO/NTEM underestimates the growth in MKB by approximately 1,648 dwellings and 1,862 jobs.

5.1.11. Notwithstanding the above, it is acknowledged that the calculated values are based on the combination of the areas where significant development is planned (2031–2039 period) and the forecasts for the whole MKB area (except Milton Keynes) beyond 2039. This is due to minimal information about specific sites, and their locations post 2039 with this approach allowing for 'like-for-like' comparison.

5.1.12. As a result of the analysis above, it is not deemed appropriate to use a blanket growth factor (2031 – 2048) to develop the future 2048 Reference Case scenario.

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6 HOUSING/EMPLOYMENT PROJECTIONS BEYOND 2031 – MILTON KEYNES BOROUGH

6.1.1. As outlined above, the MKE site is situated in Milton Keynes Borough, immediately to the north of Milton Keynes and the M1 motorway. Although the proposed MKE development would form a large proportion of the future development in the borough, several other potentially significant schemes may come forward post 2031. As such, consideration should be given to the growth beyond 2031 within the borough itself.

6.1.2. The future development and strategic allocations in the Milton Keynes area beyond the period of the current local plan (Plan:MK) and up to 2040 are expected to be captured in detail in the new local plan for the borough. However, this new local plan is yet to be developed, and the growth in the area determined in years to come. MKC's document entitled Milton Keynes Strategy for 2050 (MK 2050) currently provides a vision and high-level forecasts of the growth within the borough beyond 2031.

6.1.3. The MK 2050 assumes steady growth of the population in the Milton Keynes area to 500,000 by 2050. The strategy states that around 41,000 new homes are already in the existing and emerging plans of the local councils, which represent delivery average to 2030 of 2,700 homes per year. However, at this delivery rate, the number of new houses would support the population growth only to around 400,000 people by 2040. The MK 2050, therefore, suggests that a modest increase in the number of homes per annum would be required in order to reach the population of 500,000 by 2050. In order to achieve the population goal, the average number of homes delivered per year would have to rise to 2,900 (averaged across 30 years to 2050). This increase would then result in 46,000 new houses in addition to 41,000 already planned and the grand total of 87,000 by 2050.

6.1.4. Based on the above, it can be concluded that about 49,300 new homes could be potentially delivered between 2031 and 2048 (part of which would be from MKE).

6.1.5. The MK 2050 also anticipates an increase in job numbers and suggests that the growth in job numbers is related to housing growth. The number of jobs in the city continues to grow steadily and in recent years has outpaced housing growth.

6.1.6. The strategy refers to the National Infrastructure Commission's analysis of the so-called Oxford-Cambridge Arc in which the borough resides and suggests that as a result of the Arc's anticipated economic potential there could be around 130,000 additional jobs in the borough by 2050.

6.1.7. As stated above, the growth in job numbers is related to housing growth. The number of new homes (87,000) in combination with the projected number of new jobs (130,000) by 2050, therefore, indicate that each new home in the borough would create approximately 1.5 additional jobs. As a result, the potential number of new jobs created in the borough between 2031 and 2048 would be in a region of 73,950 jobs (part of which would be from the employment element of MKE).

6.1.8. By applying the same methodology as above, it can also be concluded that about 55,100 new homes and 82,650 jobs could be potentially delivered by 2050.

6.1.9. Notwithstanding the above, it is understood from the ongoing discussions with MKC that the MKC's planning team undertakes a review of the 2031-2039 growth associated with the schemes internal to the borough. Given the uncertainty about developments post the 2031-2039 period, it is assumed that MKC would apply similar TEMPRO/NTEM assumptions as outlined in this TTN to the internal developments to develop projections beyond 2039 up to the 2048 final build out year. With MKC leading on the internal developments, the focus of this TTN, at this stage, is primarily aimed at the growth external to the borough.

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CHECKED:	A Smith	**APPROVED:**	A Norcutt

7 TEMPRO/NTEM GROWTH – MILTON KEYNES BOROUGH

7.1.1. Similar to the growth projections outside the borough, consideration was also given to the housing/job forecasts in TEMPRO/NTEM to provide a comparison between the MK 2050 and TEMPRO/NTEM.

7.1.2. As with the growth outside the borough, the assumed changes in housing/employment quanta were obtained from the DfT's TEMPRO v7.2b database. The data was extracted for MSOAs forming the MKB.

7.1.3. The summary of the data extracted is provided in **Table 7-1** below. It should be noted that the data in **Table 7-1** are provided for all MSOAs in the borough with the MSOAs adjacent to the MKE site shown separately to illustrate the differences.

Table 7-1: TEMPRO Projected Development 2031-2048 (MKB)

Residential	No. of Households (2031)	No. of Households (2048)	Growth between 2031 and 2048
Milton Keynes 002 (MKE)	5,330	6,530	1,200
Milton Keynes 004 (adjacent NW) Milton Keynes 005 (adjacent W) Milton Keynes 007 (adjacent SW) Milton Keynes 017 (adjacent S)	19,955	24,376	4,421
Milton Keynes All (except the above)	112,114	136,876	24,762
TOTAL MKB	**137,399**	**167,782**	**30,383**

Employment	No. of Jobs (2031)	No. of Jobs (2048)	Growth between 2031 and 2048
Milton Keynes 002 (MKE)	4,955	5,227	272
Milton Keynes 004 (adjacent NW) Milton Keynes 005 (adjacent W) Milton Keynes 007 (adjacent SW) Milton Keynes 017 (adjacent S)	34,126	35,995	1,869
Milton Keynes All (except the above)	140,212	147,888	7,676
TOTAL MKB	**179,293**	**189,110**	**9,870**

7.1.4. The TEMPRO results provided in **Table 7-1** shows that TEMPRO/NTEM forecast the increase of 30,383 dwellings during the future period between 2031 and 2048. The increase in job numbers is forecast to be of 9,870 jobs within the same period.

7.1.5. From the comparison of the TEMPRO/NTEM forecast in **Table 7-1** above with the values estimated by the MK 2050 strategy, it is evident that TEMPRO/NTEM underestimates both the number of new households and jobs within the borough in the 2031-2048 period. As a result, and similar to the growth outside the borough, it is not deemed appropriate to use a blanket growth factor to develop the future 2048 Reference Case scenario.

7.1.6. In order to illustrate the difference between the MK 2050 strategy and the TEMPRO/NTEM forecasts for MKB, the same methodology was applied to the future year of 2050 (i.e. the end of the MK 2050 strategy).

7.1.7. The summary of the data extracted from TEMPRO is provided in **Table 7-2** below.

Table 7-2: TEMPRO Projected Development 2031-2050(MKB)

Residential	No. of Households (2031)	No. of Households (2050)	Growth between 2031 and 2050
Milton Keynes 002 (MKE)	5,330	6,671	1,341
Milton Keynes 004 (adjacent NW) Milton Keynes 005 (adjacent W) Milton Keynes 007 (adjacent SW) Milton Keynes 017 (adjacent S)	19,955	24,894	4,939
Milton Keynes All (except the above)	112,114	139,779	27,665
TOTAL MKB	**137,399**	**171,344**	**33,945**

Employment	No. of Jobs (2031)	No. of Jobs (2050)	Growth between 2031 and 2050
Milton Keynes 002 (MKE)	4,955	5,257	302
Milton Keynes 004 (adjacent NW) Milton Keynes 005 (adjacent W) Milton Keynes 007 (adjacent SW) Milton Keynes 017 (adjacent S)	34,126	36,203	2,077
Milton Keynes All (except the above)	140,212	148,741	8,529
TOTAL MKB	**179,293**	**190,201**	**10,908**

7.1.8. The comparison of the MK 2050 and TEMPRO projections for the period of 2031-2050 is summarised in **Table 7 3** below.

Table 7-3: 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

7.1.9. The above comparison suggests that the growth projected by TEMPRO is very conservative with the 2050 residential forecasts lower by 21,155 compared to the 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.

7.1.10. It is considered appropriate not to include the aspirational MK 2050 growth assumptions within the committed development modelling for MKE. The MK 2050 strategy is not adopted yet, and whilst we have considered its growth above, the inclusion of the housing and jobs suggested could mask the impacts of the MKE site through too much background traffic being added on to the network.

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CHECKED:	A Smith	**APPROVED:**	A Norcutt

8 SUMMARY & CONCLUSION

8.1.1. This TTN reviewed the expected 2031-2048 growth by identifying several expected development areas that should be considered in the development of the future year (2048) scenarios in the MKMMM.

8.1.2. It was found that the identified development sites outside MKB in combination with the TEMPRO/NTEM growth would generate approximately 8,462 dwellings and approximately 4,604 jobs within the 2031-2048 period.

8.1.3. Due consideration was also given to TEMPRO/NTEM forecasts for the geographical areas in which the identified developments reside. The results indicate that TEMPRO/NTEM underestimate the growth in the area forecasting only additional 6,814 dwellings and 2,742 jobs during the 2031-2048 period.

8.1.4. Consideration was also given to the growth within MKB. However, it is understood that MKC's planning team undertakes a review of the 2031-2039 growth associated with the schemes internal to the borough. However, based on the publicly available information contained in MK 2050 strategy, it is forecast that about 49,300 new homes and 73,950 jobs could be delivered in the 2031-2048 period.

8.1.5. Similar to the growth outside the borough, TEMPRO/NTEM underestimate numbers of both new households and jobs by forecasting an increase of only 30,383 and 9,870 respectively during the 2031-2048 period.

8.1.6. It is suggested that the use of a blanket growth factor to develop the future 2048 Reference Case scenario is not appropriate, and estimates provided in this TTN are used instead. This approach would ascertain that the 2048 Reference Case scenario is robust and representative of the likely future conditions.

8.1.7. A comparison of the full MK 2050 strategy (i.e. the number of dwellings and jobs in 2050) against the 2031-2050 TEMPRO/NTEM forecast was also provided further confirming the conclusion above.

TRANSPORT TECHNICAL NOTE – TTN4 Growth and Future Year Modelling Approach for Milton Keynes East

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PROJECT:	Milton Keynes East	**AUTHOR:**	F Imramovsky
CHECKED:	A Smith	**APPROVED:**	A Norcutt

APPENDIX A – EMAIL CORRESPONDENCE

Imramovsky, Filip

From:	Tate, Martin <Martin.Tate@milton-keynes.gov.uk>
Sent:	11 March 2020 09:53
To:	Smith, Alex; Norcutt, Allan; Imramovsky, Filip
Cc:	Gonzalez, Ana; Povey, James; Turner, Andrew
Subject:	MKE update
Attachments:	Complete_Flow_25ME_vs_19ME_AM MK.pdf; Complete_Flow_Values_25ME_vs_19ME_AM MKE.pdf; MKMMM_A509 A422 Delays_v1_9AM.pdf; MKMMM_A509 A422 Delays_v2_5_AM.pdf; Trip End Model External Area.pdf

Alex, Alan, Filip,

There have been a few related emails recently so it might help if I cover the various items in one.

Updated cal/val:

I'd be grateful for any comments you may have on the summary results from AECOM, uploaded to OneDrive and covering the current results by time period from the re-run of the calibration using matrix estimation and the various network enhancements that were agreed. Also attached here are the following plots that are referred to later:

- The AM actual flow difference plots between the original (v 1.9) and new (v 2.5) calibrations (note AECOM has enabled comparisons here even where the network has changed).
- The AM absolute link delay plots for the original and new calibrations separately, since for the delay, comparison plots do not show the differences where the coding has changed, so would miss bits out.
- The Trip End Model External Area definition

Overall, the results for each period are of a similar standard to those of the original. There are however a few specific issues it's worth drawing attention to around the A509 due to its proximity to the site and its focus in the past for the Local Stakeholder Group:

- Route 2 w/b, AM: Delays between Chicheley Roundabout and Marsh End Roundabout inclusive match the June 2016 TrafficMaster timings quite well, and the June 2018 TrafficMaster timings, which were also checked being the newest available. In total the overall delay on this section is about the same between the old and new calibration: just under 4min to get from Chicheley through Marsh End Roundabout. However the new model improves the source of these delays in that they are now more accurately generated from Tickford and Marsh End Roundabouts rather than from Renny Lodge Roundabout. What stands out is that currently, delays on this section often reach 10min (measured by me on numerous trips into work between 0800 and 0900), suggesting a considerable worsening of conditions since 2016. The w/b flow on the A509 is also much less than in the original calibration (700pcu/hr less) and while that link did not have a count on previously, it still seems a large reduction in modelled flow, possibly suggesting that the 2019 count (at the North Crawley Road Bridge) might be counting 'actual' queued flows for some of the time rather than upstream demand flows on the link. However when AECOM tried increasing the count by 30% to represent more of an upstream 'demand' flow, the traffic volumes through Newport Pagnell increased significantly rather than the flows and delays on the A509. So while the data matches the June 2016 times quite well, there is a slight concern that this apparent worsening between 2016 and 2019/20 will be picked up on later, and/or that the new Reference Cases may show a more favourable outcome than we see currently on the A509, which could undermine credibility. (However there would also be the opportunity to mitigate any perceived inaccuracy through the detailed junction modelling that would be needed for the TA).
- Route 2 e/b PM: This route has a long modelled delay approaching Tickford Roundabout that isn't in the 2016 TrafficMaster timings, but it just about comes in on the limit at +15%, and unlike the AM case above is actually more representative of current conditions than it is of the 2016 observed times.

- The AM, n/b flow on M1 north of J14 is lower than the count by some 400pcu/hr, and is lower than in the previous calibration. While not critical for the scheme, it is something that may concern HE.

It's likely that any further improvements would be beyond the scope of what Matrix Estimation should be allowed to do, however before we accept the cal/val as it is, it would be useful if you could have a look and I speak further to others at MKC. AECOM has pretty much reached their budget allowed for this so if we were to continue to refine the cal/val there would be a cost implication.

External developments for the Reference Cases

For large developments outside MKB the view of the planners here is as follows, in relation to Filip's email (in italics) – however please note that some of these are not practicable as they are outside the Trip End External Model Area, an area surrounding and including MKB (see attachment) outside which it is not straightforward to override the NTEM assumptions. Apologies, I had forgotten about this restriction when we first discussed the shortlist and it does rule some of them out, in red text:

The following list outlines the sites we have identified to date:

- *Wellingborough*
  Sustainable Urban Extension (SUE) East
  Sustainable Urban Extension (SUE) North
  We would like to include these but they are outside the trip end model external area

- *Cranfield*
  There seems to be quite a lot going on in the area, and it is unclear what strategic development sites may come forward (e.g. Cranfield Airport? If so, are there any specific plans as the CBLP does not mention the area).

Agreed it's difficult to get a view on this with so many small sites, mainly residential. We'd like to include an approximate representation on the basis some will go ahead

- *Marston Moretaine*
  Marston Vale New Villages (also included in the CBLP)

Please include this: draft allocation with planning application likely to be determined by end of 2020, so not committed, but steer from CBC is to include

- *Bedford Commercial Park*
  Currently under construction with initial phases operational. Assumed full completion well before 2031. As such, this should be already included in the MKMMM.

It will be but only insofar as it is in NTEM. It would be better to include it explicitly but it is also outside the trip end model external area

- *Northampton*
  Northampton Gateway (Strategic Rail Freight Interchange (SRFI))
  Consent granted by SoS, but outside the trip end model external area

- *M1 Junction 13*
  Marston Gate Expansion (also included in the CBLP)
  Please include this

- *Central Bedfordshire Local Plan*
  Marston Vale New Villages
  Marston Gate Expansion
  North of Luton (possibly exclude?)
  M1 Junction 11a – Sundon Rail Freight Interchange (RFI) (possibly excluded due to distance from MKE?)
  Agree, exclude N of Luton and Sundon

  RAF Henlow – proposed to exclude due to distance/location relative to the MKE

Holme Farm Biggleswade – proposed to exclude due to distance/location relative to the MKE
East of Biggleswade – proposed to exclude due to distance/location relative to the MKE
East of Arlesey – proposed to exclude due to distance/location relative to the MKE
Agree, exclude all

In addition to the above, are you aware of any other strategic sites that you would expect to be included? Also, the list above contains mainly strategic sites, but there will several smaller sites that may be included or get allocated through the CBLP. We do not intend to review these smaller sites and will focus on the strategic sites, however, should there be any sites that you feel should be included/reviewed, could you please provide the relevant details?
The only other possibility is the 'Aspley Triangle' just west of Junction 13 and bounded by the A421 and the railway line. An application has previously been refused by CBC and there is a very small chance it could end up in their Local Plan, but we do not think it is reasonable to include it as this stage.

Within MKB, it's likely that we'll use the existing scenario 2a as the new Reference Case, as per the HIF work, with the addition of the university proposals in CMK that were originally part of Scenario 2b. With this and all the above, for consistency I'd envisaged estimating homes and jobs only and using default rates from the model. Thus we'd only be using bespoke trip rates for MKE itself in the With Development scenarios.

Future programme

AECOM has indicated that a programme of c. 12 weeks should cover the four core runs and a fifth sensitivity test (2039 With-Development plus a representation of MRT). However with some uncertainty about the mobility measures to be included – and whether these are all subsumed in the internalisation and MKE trip rates – it is difficult for them to be more precise at this stage. Also, this will necessarily follow-on from decisions about the base model cal/val. They have suggested dealing with the Reference Cases and With Development cases separately and in that order in terms of cost and programme as there is less uncertainty associated with the reference cases.

I therefore think we need further discussion to determine the next With Development stages in detail. Also, we should give HE the opportunity to comment on the revised cal/val and future development assumptions, as they are likely to require some time to consider this.

Kind regards,
Martin

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TRANSPORT TECHNICAL NOTE – TTN4 Growth and Future Year Modelling Approach for Milton Keynes East

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Growth and Future Year Modelling Approach v2		
PROJECT:	Milton Keynes East	**AUTHOR:**	F Imramovsky
CHECKED:	A Smith	**APPROVED:**	A Norcutt

APPENDIX B – PROJECTION ANALYSIS BEYOND 2031

MILTON KEYNES EAST - PLANNED/COMMITTED DEVELOPMENT TO BE INCLUDED IN MKMMM BEYOND 2031 UP TO 2039

Residential	No. of Dwellings (2022)	No. of Dwellings (2037)	Change between 2022 and 2037 (dwellings)	Years between 2022 and 2037	Dwellings per Annum	Years between 2022 and 2031	No. of Dwellings (2031)	No. of Dwellings (2039)	Growth between 2031 and 2039
Land West of Mill Road (Phase 1) Land West of Mill Road (Phase 2)	225	230	5	15	0	9	228	230	2
East End Farm	0	48	48	15	3	9	29	48	19
Land West of Lodge Farm	15	15	0	15	0	9	15	15	0
Home Farm 1	68	68	0	15	0	9	68	68	0
Home Farm 2	42	42	0	15	0	9	42	42	0
Home Farm 3	16	16	0	15	0	9	16	16	0
Home Farm 4	10	10	0	15	0	9	10	10	0
Marston Vale New Villages (Residential)	125	4,525	4,400	15	293	9	2,765	5,000	2,235
TOTAL									2,256

Employment	No. of Jobs (2022)	No. of Jobs (2037)	Change between 2022 and 2037 (jobs)	Years between 2022 and 2037	Jobs per Annum	Years between 2022 and 2031	No. of Jobs (2031)	No. of Jobs (2039)	Growth between 2031 and 2039
Cranfield Airport*	600	600	0	15	0	9	600	600	0
Marston Gate Expansion**	1,333	2,000	667	15	44	9	1,733	2,000	267
Marston Vale New Villages (Employment)	0	unknown	n/a	15	n/a	9	n/a	4,180	4,180
TOTAL									4,447

* Cranfield Airport is expected to be delivered in 2024
** Approximately half of the expectede mployment in Marston Gate Expansion is expected to be delivered in approximately 2025 (PLEASE NOTE: The above is not an exhaustive list of committed developments considered within the modelling, and reference should be made to the Transport Assessment and corresponding ES Transport Chapter. These documents contain further details on the modelling scenarios and assumptions applied.

Area	Base HH	Base Jobs	Future HH	Future Jobs	Base HH	Base Jobs	Future HH	Future Jobs
Central Bedfordshire 007 (E020...	3984	8207	4252	8404	3984	8207	4252	8404
Central Bedfordshire 009 (E020...	4649	3047	4989	3123	4649	3047	4989	3123

Tempro 7.2b
2031-2039

Base HH	Future HH	Difference	Base Jobs	Future Jobs	Difference
3984	4252	268	8207	8404	197
4649	4989	340	3047	3123	76
	Total	608		Total	273

Appendix A.5

TTN5 – LINK FLOW CAPACITY REVIEW

TECHNICAL NOTE 5 – Review of Link Capacity

DATE:	28 April 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Review of modelled link capacity		
PROJECT:	Milton Keynes East	**AUTHOR:**	A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1 INTRODUCTION

1.1.1. 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).

1.1.2. To assess the impact of MKE and the associated infrastructure sought to be delivered as part of the recent Housing Infrastructure Funding (HIF) bid, the Milton Keynes Multi-Modal Model (MKMMM) was used to test a number of scenarios. The MKMMM is held by MKC and managed by AECOM (Milton Keynes Council's consultants) on MKC's behalf.

1.1.3. As the modelling required to support the planning application has not yet been completed, a review of the previously run MKMMM outputs has been completed to understand which links require dualling and whether any links are better suited for single carriageway.

1.1.4. Whilst ensuring highway capacity is a key objective for the development, promoting sustainability is at the forefront of the site and its design and so there should not be an overreliance on highway infrastructure. If the supporting infrastructure were to be over-engineered, then this could lead to an uplift in vehicular attraction on surrounding links and the strategic road network (SRN).

1.1.5. Discussions over the proposed modelling approach for the development are being held with MKC and Highways England, however it is the intention to agree that certain links can be modelled as single carriageway based on a review of the previous data so that the model can be updated accordingly for the application.

1.1.6. This TTN specifically reviews the available modelling data for a number of key links at the proposed site.

2 HIF / MKMMM MODELLING DATA REVIEWED

2.1.1. As part of the scenarios and analysis supporting the HIF bid, a Scenario 10 model was created within the MKMMM for an alternative future year (2035 instead of 2031), which tested the full allocation build out in terms of residential units, plus the full employment allocation (whereas the HIF economic analysis was primarily focused on just the residential).

2.1.2. Whilst it is acknowledged that those final development numbers may change, Scenario 10 still provides a useful indication of the likely traffic flows. It is also acknowledged that some of the proposed links, junctions and connections to the wider MK area may also change, however, the assessments below still provide a likely indication of demand that is not considered to vary considerably.

2.1.3. The HIF infrastructure used in Scenario 10 is shown below in Figure 2-1.

TECHNICAL NOTE 5 – Review of Link Capacity

DATE:	28 April 2020	**CONFIDENTIALITY:**	Public
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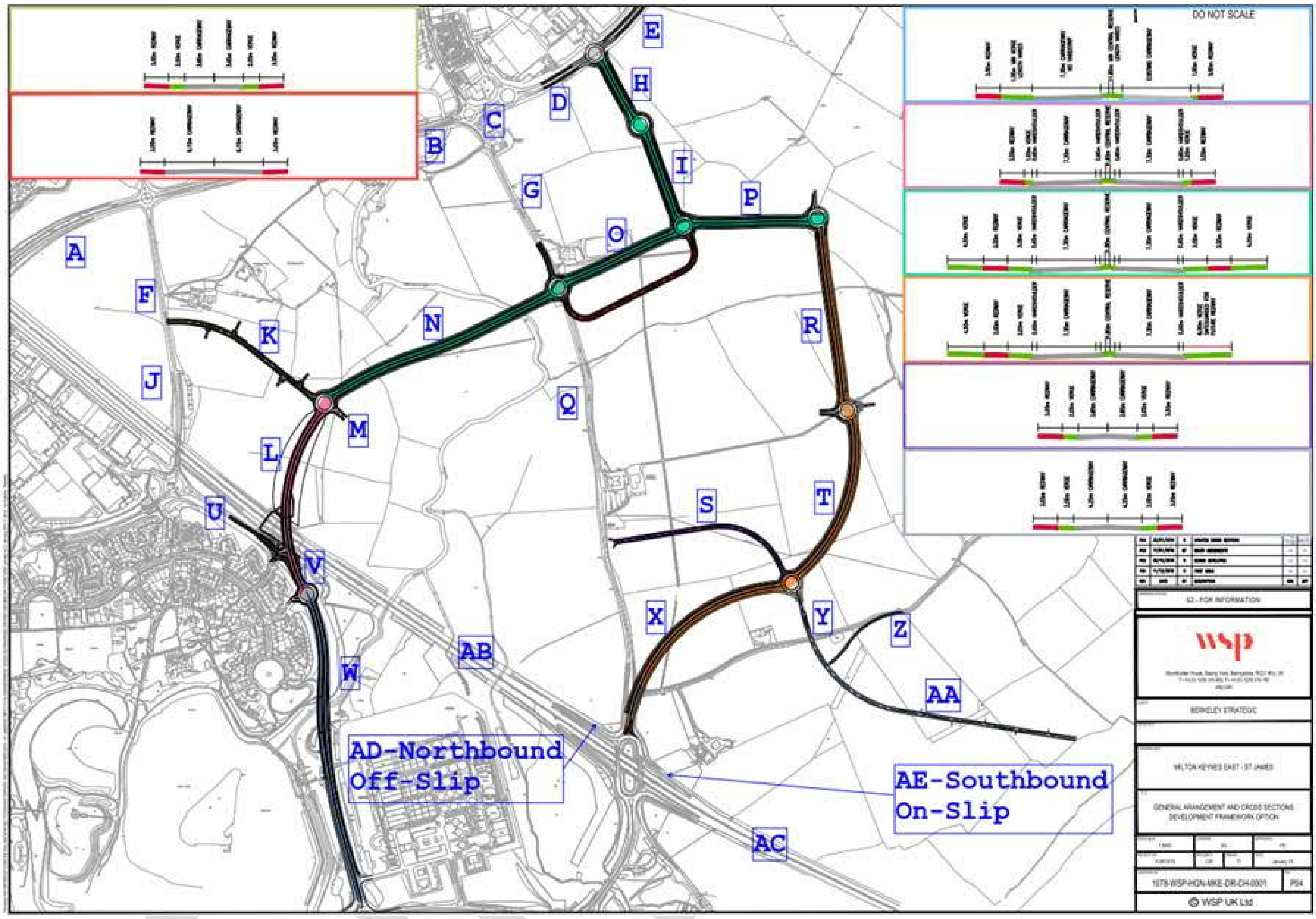
PROJECT:	Milton Keynes East	**AUTHOR:**	A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

Figure 2-1 – MKE Modelled links within Scenario 10 of MKMMM



2.1.4. Link flow data from the MKMMM was provided for all of the links listed above. Flow data for the AM and PM peaks by direction was provided.

2.1.5. Using DMRB TA79/99[1], a review of the MKMMM outputs by link and how they correspond to the relevant thresholds per each link type has been undertaken. Annex A provides the MKMMM output tables and the analysis, undertaken within excel.

2.1.6. The areas of focus within this TTN is Links R and T, which form part of the Eastern Perimeter Road (EPR) and Links Q and S, which form part of the A509, where it is proposed to be partly retained and a connection made to the new EPR.

[1] It is noted that as of April 2020, the DMRB has been updated and that TA79/99 has been superseded by WebTAG. However, at the time of writing, no similar capacity thresholds were found for the analysis within the WebTAG guidance. As such, TA79/99 thresholds have been used as they remain a valid test of link capacity.

TECHNICAL NOTE 5 – Review of Link Capacity

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CHECKED:	A Smith	**APPROVED:**	A Norcutt

Retained Sections / Links to A509

2.1.7. As noted above, two A509 links have been reviewed specifically. The retained section south of the community hub, and the connection from the old A509 alignment to the Eastern perimeter road. Table 2-1 provides the analysis of the model outputs against the TA79/99 capacity thresholds for UAP1 and UAP2 typologies. It should be noted that as mentioned in the table, the highest one way flow from the MKMMM was used for the capacity review.

Table 2-1 – Retained links of the A509 – review of MKMMM flows vs TA79/99

A509 Retained (Link Q)

Heaviest one-way flow 620

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	39.0%	33.3%	42.2%	40.0%	17.2%	19.4%

A509 Connection (Link S)

Heaviest one-way flow 693

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	43.6%	37.3%	47.1%	44.7%	19.3%	21.7%

2.1.8. As shown above, when reviewed against the DMRB thresholds the A509 links considered do not go above 48% (max is 47.1%) of the typical capacity of a single carriageway (regardless of width or UAP type).

2.1.9. When reviewing against the dual carriageway thresholds, the forecast flows on both links would only generate in the order of 22% of the available capacity.

2.1.10. Typically, some spare residual capacity should be accounted for in highway design, however links approach 85% of capacity are normally considered as potentially requiring improvement.

2.1.11. The two A509 links considered above do not approach this threshold (85%) under single lane carriageway assumptions. This suggests that a single lane carriageway would be appropriate for use in this area.

Eastern Perimeter Road Links

2.1.12. A similar review of the two Eastern Perimeter Road (EPR) links, R and T, has been completed and is shown in Table 2-2 below;

Table 2-2 – Eastern Perimeter Road links – review of MKMMM flows vs TA79/99

Eastern Perimeter Road (Link T)

Heaviest one-way flow 664

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	41.8%	35.7%	45.2%	42.8%	18.4%	20.8%

Eastern Perimeter Road (Link R)

Heaviest one-way flow 833

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	52.4%	44.8%	56.7%	53.7%	23.1%	26.0%

2.1.13. Similar to the A509 links, the EPR links, when reviewed against the DMRB thresholds do not go above 57% (max is 56.7%) of the typical capacity of a single carriageway (regardless of width or UAP type).

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CHECKED:	A Smith	**APPROVED:**	A Norcutt

2.1.14. When reviewing against the dual carriageway thresholds, the forecast flows on both links would only generate in the order of 26% of the available capacity.

2.1.15. Using the typical 85% threshold to determine capacity, the two EPR links do not approach this level (85%) under single lane carriageway assumptions. This suggests that a single lane carriageway would also be appropriate for use in this area.

3 SUMMARY

3.1.1. A review of available MKMMM output data has been undertaken to ascertain whether certain highway links meet the capacity thresholds for single or dual carriageway types.

3.1.2. The links reviewed, including the retained A509 links and connections or the Eastern Perimeter Road (EPR) are shown to be within the capacity thresholds for single lane carriageways when using the MKMMM outputs.

3.1.3. It is therefore suggested that the modelling of these links is completed assuming they are single lane carriageways. This would reduce construction costs whilst ensuring that vehicle use is not promoted where it is not necessary.

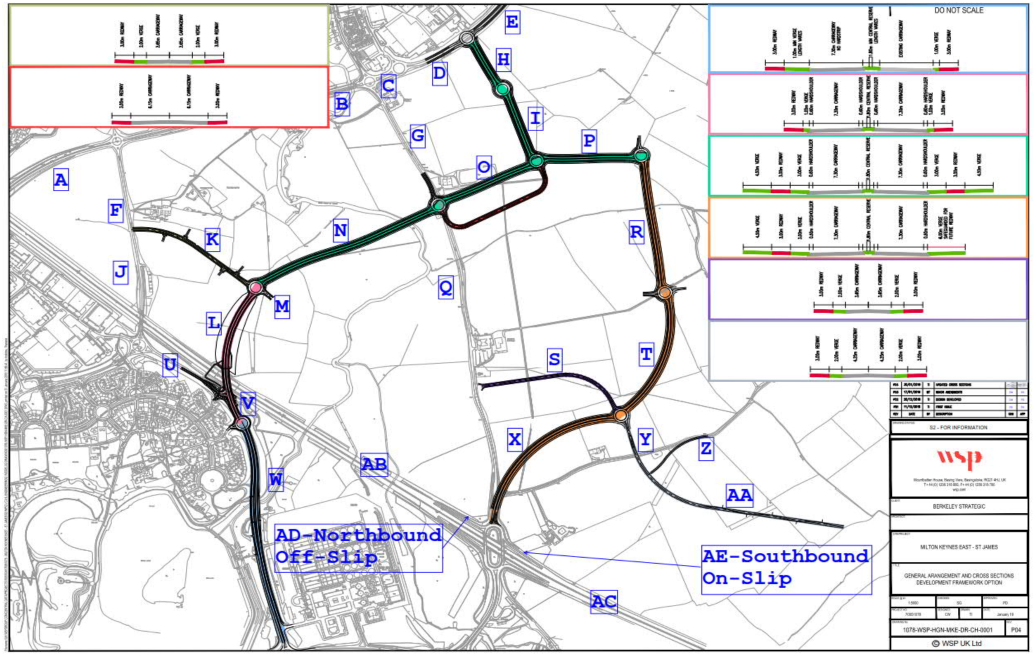
3.1.4. The development could safeguard land for dualling, if required, however, the modelling completed to date appears to suggest that single lane carriageways are sufficient.

TECHNICAL NOTE 5 – Review of Link Capacity

DATE:	28 April 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Review of modelled link capacity		
PROJECT:	Milton Keynes East	**AUTHOR:**	A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

ANNEX A – MKMMM and Excel Outputs

ID	ANode	BNode	Veh_AM	HGV_AM	Veh_PM	HGV_PM	SpeedAM	SpeedPM	WSP_ref	direction
21126	5715	1273	1030	23	1870	15	99	96	A	EB
18660	1273	5715	1185	29	1474	19	99	98	A	WB
25806	99559	91092	27	0	41	0	40	40	AA	WB
25329	91092	99559	48	0	32	0	40	40	AA	EB
21713	9509	2006	5773	655	5345	564	96	99	AB	SB
21712	9504	9511	4192	532	5375	517	104	99	AB	NB
20955	4605	94585	5409	594	5427	500	99	99	AC	NB
20224	2006	2008	1774	107	1256	40	45	45	AD	SB
19592	1566	99580	904	25	1764	46	84	84	AE	SB
21120	5515	1273	1978	37	1692	26	95	97	B	WB
18662	1273	5515	1066	24	1775	12	99	97	B	EB
21122	5515	1928	808	18	1322	11	45	45	C	EB
20178	1928	5515	1545	31	1629	21	40	40	C	WB
25776	99546	1928	1427	31	1551	22	98	98	D	WB
20180	1928	99546	894	19	1333	12	99	98	D	EB
25777	99546	91233	888	74	1912	28	99	96	E	NB
25593	91232	99546	2445	50	1551	50	92	97	E	SB
25824	99571	1273	515	5	874	11	83	76	F	NB
18659	1273	99571	1535	35	731	11	59	79	F	SB
25797	99554	99546	755	59	1501	21	79	78	H	NB
25775	99546	99554	1689	20	923	33	77	79	H	SB
25800	99555	99554	687	58	1594	21	79	77	I	NB
25796	99554	99555	1722	20	888	33	77	79	I	SB
25822	99571	1302	1426	21	569	8	62	82	J	SB
18764	1302	99571	268	3	1008	11	86	72	J	NB
25813	99567	99552	519	14	666	3	60	58	K	SB
25790	99552	99567	718	2	307	0	57	63	K	NB
25817	99569	99567	452	14	603	3	61	59	K	SB
25821	99571	99569	521	14	686	3	60	58	K	SB
25814	99567	99569	649	2	243	0	59	63	K	NB
25818	99569	99571	727	2	337	0	57	63	K	NB
25829	99575	99552	824	10	1581	12	79	77	L	NB
25789	99552	99575	1696	24	908	10	77	79	L	SB
25812	99566	99552	177	0	108	0	40	40	M	WB
25788	99552	99566	68	0	162	0	40	40	M	EB
25793	99553	99552	1425	12	659	11	78	80	N	WB
25791	99552	99553	462	10	1635	15	80	77	N	EB
25799	99555	99553	1202	10	545	10	78	80	O	WB
25795	99553	99555	380	10	1061	12	80	79	O	EB
25801	99555	99547	593	10	511	22	80	80	P	EB
25779	99547	99555	379	47	702	9	80	80	P	WB
25792	99553	99551	122	0	620	3	40	40	Q	SB
25786	99551	99553	261	2	161	0	40	40	Q	NB
25810	99561	99547	405	47	792	9	80	79	R	NB
25778	99547	99561	833	10	558	22	79	80	R	SB
25802	99557	99549	436	0	680	4	40	40	S	EB
25803	99557	99551	301	2	117	0	40	40	S	WB
25787	99551	99557	105	0	642	3	40	40	S	EB
25783	99549	99557	693	2	269	0	40	40	S	WB
25808	99561	99549	664	10	518	22	80	80	T	SB
25784	99549	99561	228	45	504	9	80	80	T	NB
25833	99578	1302	347	14	375	10	64	64	U	NB
25832	99578	99575	208	3	683	20	68	55	U	SB
18761	1302	99578	208	3	683	20	68	55	U	SB
25828	99575	99578	347	14	375	10	64	64	U	NB
25827	99575	1327	1801	27	1238	31	76	78	V	SB
18849	1327	99575	1068	24	1603	22	79	77	V	NB
18851	1328	1327	1142	28	1635	23	99	97	W	NB
18847	1327	1328	1757	28	1246	32	97	99	W	SB
19754	1629	1565	1289	12	1250	30	79	79	X	SB
25782	99549	1629	1289	12	1250	30	78	78	X	SB
19591	1565	1629	790	50	679	10	79	80	X	NB
19755	1629	99549	790	50	679	10	79	80	X	NB
25781	99549	91092	178	5	320	2	64	63	Y	EB
25330	91092	99549	499	4	466	2	61	61	Y	WB
25331	91092	4705	205	5	360	2	40	40	Z	EB
20965	4705	91092	546	4	499	4	40	40	Z	WB



ANALYSIS USING TA 79-99)

Tongwell Street (Link W)

Heaviest one-way flow 1757

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	110.5%	94.5%	119.5%	113.4%	48.8%	54.9%

Link within Site Connecting to new M1 Overbridge (Link W)

Heaviest one-way flow 1696

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	106.7%	91.2%	115.4%	109.4%	47.1%	53.0%

Link over floodplain (Link W)

Heaviest one-way flow 1635

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	102.8%	87.9%	111.2%	105.5%	45.4%	51.1%

North-South Link to A509 (Max of Links H and I)

Heaviest one-way flow 1722

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	108.3%	92.6%	117.1%	111.1%	47.8%	53.8%

East-West Links from floodplain bridge to eastern perimeter road (O and P)

Heaviest one-way flow (O) 1202
Heaviest one-way flow (P) 702

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity of O	75.6%	64.6%	81.8%	77.5%	33.4%	37.6%
Link Capacity of P	44.2%	37.7%	47.8%	45.3%	19.5%	21.9%

Reconfigured Link to A509 (Link X)

Heaviest one-way flow 1289

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	81.1%	69.3%	87.7%	83.2%	35.8%	40.3%

Eastern Perimeter Road (Link T)

Heaviest one-way flow 664

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	41.8%	35.7%	45.2%	42.8%	18.4%	20.8%

Eastern Perimeter Road (Link R)

Heaviest one-way flow 833

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	52.4%	44.8%	56.7%	53.7%	23.1%	26.0%

A509 Retained (Link Q)

Heaviest one-way flow 620

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	39.0%	33.3%	42.2%	40.0%	17.2%	19.4%

A509 Connection (Link S)

Heaviest one-way flow 693

	Single Carriageway				Dual Carriageway	
	UAP1		UAP2		UAP1	UAP2
	7.3m	9m	7.3m	9m	7.3m	7.3m
Urban Road Capacity (TA79-99)	1590	1860	1470	1550	3600	3200
Link Capacity	43.6%	37.3%	47.1%	44.7%	19.3%	21.7%

Appendix A.6

TTN6 – P&R AND MRT RESEARCH

TECHNICAL NOTE 6 – MRT and Park and Ride Supplementary information

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – MRT and P&R Proposal Supplementary Information		
PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1 INTRODUCTION

1.1.1. 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).

1.1.2. 'Milton Keynes East' (MKE) has been identified as an allocation for a strategic urban extension within Plan:MK. Milton Keynes Council's (MKC) aspirations for the allocation is set out within Policy SD12 of Plan:MK, stating that the land is allocated "for a comprehensive residential-led mixed use development of approximately 5,000 dwellings to meet the needs of Milton Keynes up to 2031 and beyond."

1.1.3. MKE is strategically well located. It is immediately north-east of Junction 14 of the M1, one of the two main motorway junctions serving Milton Keynes. It is c.3.5 kilometres north-east of Central Milton Keynes, with good and direct walking, cycling and highway links to the city centre. It is well located for proximity to the central business district of Milton Keynes (Central Milton Keynes, or "CMK").

1.1.4. As set out in Plan:MK, growth east of the M1 is reliant upon strategic highway and social infrastructure being provided to accommodate the demand from the strategic extension at MKE. And whilst ensuring highway capacity is a key objective for the development, promoting sustainability is at the forefront of the site and its design. Public transport will form part of the wider sustainable travel strategy for the site.

1.1.5. In 2015, Milton Keynes Council established the MK Futures 2050 Commission to help it plan for the next phase of the city's journey. The Commission's report "Making a Great City Greater" was published in July 2016 and set out the general vision and direction of the growth to 2050 in Milton Keynes and the borough.

1.1.6. In their draft Milton Keynes; Strategy for 2050 document, MKC propose a long-term 2050 vision. As part of that, the MK 2050 mobility strategy looks to develop a movement network that works for everyone, so that there are efficient, cost-effective and reliable alternatives to using the private car.

1.1.7. 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 is therefore closely aligned with the future provision of a fast **M**ass **R**apid **T**ransit (MRT) system linking the urban extension with CMK.

1.1.8. The MRT will be supported by a feeder network of other local mobility services to cater for 'first/last mile' demand. This will provide links to the MRT network for those people who live some distance from a stop. It will also meet the need for journeys that are likely to be in less demand and for which the cost of providing MRT services is not viable.

TECHNICAL NOTE 6 – MRT and Park and Ride Supplementary information

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
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PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1.1.9. This wider network of mobility services is crucial to the success of the MRT system in a low density city like Milton Keynes because it will significantly increase access to the system for more people. This supporting, feeder network of solutions is likely to include:

- City-wide public bike, e-Bike and scooter hire, with an improved cycle network
- Local buses
- On-demand minibus and taxi services
- Car clubs and flexible car hire services

1.1.10. Discussions have been underway with MKC regarding the potential for a MRT system to pass through the site and be integrated in to the development, to provide fast, efficient and frequent sustainable movement within Milton Keynes and Milton Keynes East. Similarly, MKC have aspirations to introduce a new Park-and-Ride facility to the north-east of Milton Keynes, on land just to the north-east of the MKE development site and adjacent to the A509.

1.1.11. This TN provides a brief overview of existing MRT and Park and Ride facilities within England, alongside the work undertaken by MKC on the possible introduction of an MRT to inform the grounding basis for how the future introduction of an MRT system by MKC could influence travel behaviours within the MKE development and encourage a shift away from the use of the private car, in particular sole occupancy trips.

1.1.12. The intention is to use the datae within this not to provide an evidence base on the adjustments / factors applied to the MKE trip generation to account for Future Mobility and MRT at the MKE site. This will ensure that the positive mode shift benefits that arise from MRT and park and ride sites are captured within the development.

1.1.13. This TN should therefore be read in conjunction with the TTN3 Trip Generation note. The percentage modal shift which is considered achievable, will be agreed with Milton Keynes Council, alongside TTN3, prior to inclusion in the modelling tests.

2 MK2050 – MK MOBILITY AND MASS RAPID TRANSIT STUDY

2.1.1. Milton Keynes Council is already at the forefront of considering future mobility and how this is linked with planned and aspirational growth in the area. A report, supporting the evidence base of the MK 2050 strategy, published in March 2019[1] investigated how a Rapid Transit (RT) network might form a core component of a 'smart, shared, sustainable mobility' system for Milton Keynes

[1] MK2050 Growth Study Mobility and Mass Rapid Transit Study (March 2019) available here; https://ddd3d78e-749e-4b55-9eee-73303fdcb896.filesusr.com/ugd/02d3f7_f30afad72eaf42aa996741eb44542ead.pdf

TECHNICAL NOTE 6 – MRT and Park and Ride Supplementary information

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – MRT and P&R Proposal Supplementary Information		
PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle
CHECKED:	A Smith	**APPROVED:**	A Norcutt

2.1.2. Consultants, Integrated Transport Planning (ITP) were commissioned to consider how a RT network, focused on the MK area, could be delivered alongside planned growth for more homes and jobs.

2.1.3. The scope of their work was focused on RT, but also considered the wider, high-level, mobility implications of the proposed strategy. This included considering how technology might present alternative options, as well as linked opportunities for improving cycling infrastructure and better integrating other modes (car, rail, cycling, walking, bus and freight) to encourage smarter and more active travel around the MK area. The report set out a proposed RT network, as described in Table 2-1 and Figure 2-1 below;

Table 2-1 – Proposed MRT Routes in the MK Area

LINE	DESCRIPTION
Line 1: CMK loop	Serves growing employment and residential demand in CMK
Line 2: Bletchley to CMK	Line 2: Bletchley to CMK Serves regeneration of CMK and V7 corridor as well as key trip generators as the stadium and hospital
Line 3: Caldecotte Growth Area and A5 P&R to CMK	Serves Plan:MK allocated growth as well as the Open University campus and hospital and potential A5 P&R
Line 4: Woburn Sands to CMK	Serves Plan:MK allocated growth as well as Kingston, Magna Park, a proposed new E-W station and new community
Line 5: Cranfield Uni to CMK	Serves Cranfield Uni and new communities surrounding it, Plan:MK allocations and new communities E of M1 and the existing J14 P&R
Line 6: East of M1 Growth Area and P&R to CMK	**Serves Plan:MK allocated growth as well as new communities east of Newport Pagnell and a potential A509 P&R.**
Line 7: Northern MK Growth Area to CMK	Serves a new community to the north of the city as well as Hanslope Park and potential regeneration sites along V6 and V7
Line 8: NW MK Growth Area and A5 P&R to CMK	Serves Plan:MK allocated growth, a new community to the NW of the city and development along Portway and potential A5 P&R
Line 9: Winslow to CMK	Serves new communities in AVDC from Winslow, including a potential E-W station at Winslow
Line 10: SW MK Growth Area to CMK	Serves Plan:MK allocated growth, new communities around Newton Longville, regeneration at West Croft and a potential A421 P&R

Source: MK2050 Growth Study Mobility and Mass Rapid Transit Study (March 2019)

TECHNICAL NOTE 6 – MRT and Park and Ride Supplementary information

DATE:	26 June 2020	**CONFIDENTIALITY:**	Public
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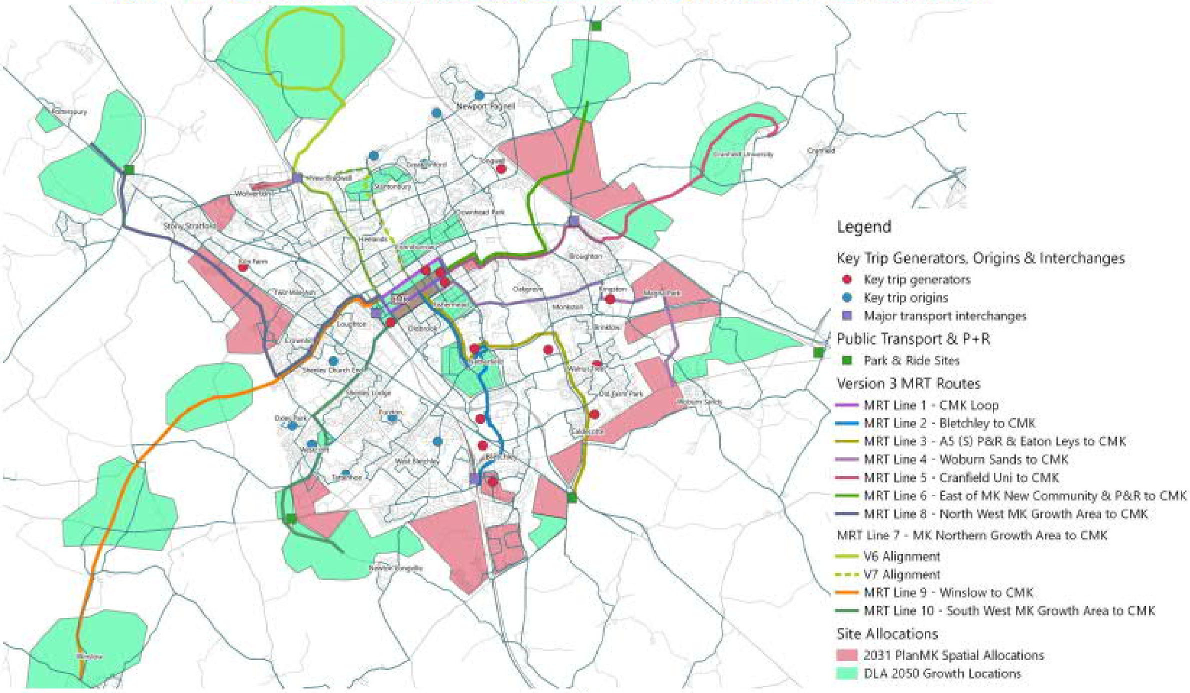
CHECKED:	A Smith	**APPROVED:**	A Norcutt

Figure 2-1 – Replication of Figure 4-3 showing the proposed 2050 RT network

Figure 4-3: Proposed 2050 RT network with existing demand, Plan:MK growth and new communities shown



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2.1.4. As shown above, the indicative alignment of MRT Line 6 connects the proposed MKE development area to the MRT network and Central Milton Keynes. The development proposals are therefore well placed to build upon this vision. Further description on Line 6 is below:

Line 6: East of M1 Growth Area and A509 P&R to CMK

2.1.5. Line 6 will serve the strategic housing and employment Plan:MK allocations to the east of the M1, along with significant growth areas to the east of Newport Pagnell and a new P&R on the A509. The line assumes serving approximately 10,200 new homes by 2050, around half of which are delivered by 2031 as part of the Eastern Urban Extension allocated in Plan:MK (our site 'MK East'). An alternative routeing via Dansteed Way and V8, rather than Childs Way, could be considered that would provide enhanced access to the network for estates along the route. However, this would add additional distance (and therefore journey time) and cost, as the route would not be sharing RT infrastructure with Line 5.

2.1.6. It is forecast that Line 6 would recover 106% of its costs through operating revenue by 2031. The line will have a significant role in unlocking development to the east of the city by 2031 and, through the provision of a new park and ride on the A509, will free up parking and highway capacity within CMK for other uses. The delivery of a new crossing over the M1 with dedicated running for RT will be essential to the implementation of this line. It is worth noting that this new crossing is being delivered as part of the MKE development site and will provide a connection between the A509 and Tongwell Street.

Forecast Demand

2.1.7. The report indicates that 85% of new residential development post 2031 could be assumed to be served by RT. ITP acknowledge that to achieve this, would require higher densities than traditionally delivered in MK and that they have focused on residential trips only.

2.1.8. Park and Ride (P&R) is also highlighted as being an important element in intercepting trips and has the potential to generate a significant amount of demand that can help drive the viability of RT, which would serve any P&R facility including that north-east of MKE.

2.1.9. The future demand on the RT network in the report was calculated based on three mode shares scenarios as follows:

- low (6%),
- medium (15%) and
- high (29%).

2.1.10. The low scenario is based on MK's existing bus mode share, 15% reflects the mode share of Helsinki's BRT light, whilst the high scenario reflects public transport mode share along Nottingham's established tram corridors.

2.1.11. The report indicates that by 2031 Lines 3 and 6 would be the most profitable, reflecting the potential additional demand generated by P&R and the large amount of new housing planned within their catchments, including MKE.

Phasing Up to 2031

2.1.12. The report indicates that the following lines are proposed to be delivered in the first phase of implementation running to 2031:

- • Line 1: CMK Loop
- • Line 2: Bletchley to CMK
- • Line 3: Caldecotte Growth Area and A5 P&R to CMK
- • Line 4: Woburn Sands to CMK
- • Line 6: East of M1 Growth Area and A509 P&R to CMK

2.1.13. These lines are focused on areas that will accelerate delivery of housing and employment land that is already allocated for development by 2031, and create scope to intercept CMK-bound trips through placement of Park & Ride sites on edge of the city's urban area, as well as acting as catalysts for regeneration. It can therefore be seen that by 2031 both the P&R and MRT could be serving the MKE site.

Supporting Measures

2.1.14. ITP outline that whilst the forecast uptake of the MRT is strong, especially for Line 6, a number of supporting measures will be required in order to ensure those lines that do not perform as well on journey time remain competitive with the private car, and are similarly appealing to car drivers. These are expected to include:

- A high quality 'first/last mile' transport network, particularly for those lines that depend more heavily on the existing urban area for demand where the opportunities to densify around the route are relatively limited in comparison to new development, such as Line 2.
- Traffic management measures within the city centre in relation to vehicle access, as well as parking management (quantity, location and price).
- Wider speed restrictions that reduce the general speed of traffic, improve safety and alter the noise levels associated with MK's grid roads. This will improve the quality of the environment along the grid roads and reducing their severance effect, all of which is crucial to ensuring the RT stops are attractive to use.

2.1.15. The report continues and outlines other measures required to support RT

- City wide parking strategy, including P&R
- City centre access control and pricing
- Safeguarding of RT routes
- Reducing car parking levels and vehicle access in new developments
- Enhanced walking and cycling network
- Delivering Transit Oriented Development
- Prioritising RT infrastructure
- Multimodal integration

2.1.16. The MKE development is well placed and well suited for a MRT line as described in the report above. It is also considered that the strategy to provide dual carriageways along the MRT route (between the A509 and Pineham Roundabout through the widening of Tongwell Street) enables a lane in either direction to be reallocated to MRT in the future should this be deemed appropriate in order to facilitate fast journey times and an attractive alternative to use of the private car.

2.1.17. To further understand the levels of mode share which could be achieved, the next section reviews the case studies in more detail.

TECHNICAL NOTE 6 – MRT and Park and Ride Supplementary information

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3 CASE STUDY ANALYSIS

3.1.1. Whilst there are a number of Mass Rapid Transit Systems within the UK providing efficient and sustainable transport, four examples have been considered and are discussed in detail below. These are:

- Sheffield Supertram,
- Cambridgeshire Guided Busway,
- Leigh – Salford – Manchester BRT and Leigh to Ellenbrook Busway,
- Kent – Fasttrack,
- Gilder Belfast, and
- Eclipse BRT.

3.1.2. These systems have been identified as the most relevant due to their connection to additional transport networks and Park & Ride schemes. In all instances it has been demonstrated that a MRT system can be integrated with Park & Ride facilities to reduce the number of vehicles within the town or city centre.

3.1.3. It should be noted that the Bath proposed Tram network was also reviewed in this analysis but has limited data available, and whilst it is assumed to be going through planning processes or equivalent, no definitive extraction rates were available to be included within this summary. Therefore, this specific scheme has not been added to the summary chapter at the end of the note.

PARK AND RIDE

3.1.4. A number of the case studies considered above include either dedicated Park and Ride sites within the wider schemes or provide connections to Park and Ride opportunities. As such, it is considered likely that similar modal shifts occur for Park and Ride as demonstrated above.

3.1.5. From WebTag unit M5-1, Park-and-Ride can usefully be considered under the following headings:

- rail based park-and-ride using rail station car parks, where spaces may be limited;
- rail based park-and-ride using available parking spaces in the areas surrounding rail stations (which may or may not have a car park of limited capacity as specified above);
- rail based park-and-ride at large scale 'parkway' stations with substantial car parks able to cope with projected demands, and with little opportunity for off-site parking;
- formal bus based park-and-ride schemes with dedicated services (operating non-stop between the parking site and the urban central area) and substantial car parks able to cope with projected demands; and
- informal use of car as an access mode to a standard bus service, tram or metro, with parking on highway near to the bus or tram stop or metro station.

3.1.6. The wider MKE allocation includes land owned by MKC which could be allocated for a Park and Ride site which, once developed, is envisaged to form one of the stops for the MKE MRT service.

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3.1.7. The form of the Park and Ride at MKE is not known at this stage, however it is likeled to fit into a similar heading as shown above, with a distinct connection to the MRT service. It is considered that this will attract a higher mode shift onto the services for the last part of user's journeys. The systems along with their Park and Ride counterparts are discussed in greater detail below.

3.2 Sheffield Stagecoach Supertram

3.2.1. The Sheffield Supertram began servicing the City in 1994 and runs using a series of electric trams on tram routes. Four tram routes make up the network serving key residential areas around Sheffield and Rotherham, as well as the both Universities, City Centre, Meadowhall retail park, entertainment complexes and the Olympic Legacy Park. The network continues to undergo expansion proposals and developments.

3.2.2. The trams carry approximately 250 passengers, with 32 vehicles in operation serving 50 stops, with all trams fully electric and producing 0% street level carbon emissions.

3.2.3. The image above shows the large number of linked locations available such as Park & Ride sites and Network Rail Stations

3.2.4. The trams run approximately every 10 minutes in both directions on Monday to Friday for the most central lines. The Purple line, runs every 30 minutes and connects the two major retail sites within Sheffield; the city centre and Meadowhall retail park.

3.2.5. Ticket prices are set between £1.20-£2.10 for a single journey, dependant on the distance travelled, and are valid an hour from issue. Ticket conductors operate on the trams and sell tickets. Additional ticket package options are available in conjunction with the city's buses; for example, a dayrider can be used on all Sheffield buses and trams.

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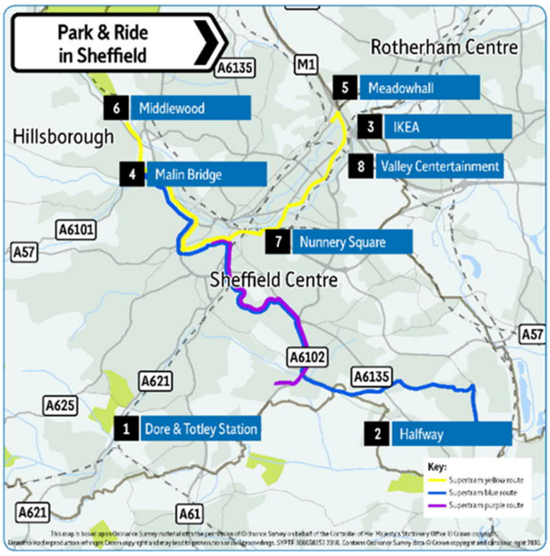
3.2.6. Analysis of the tram network has identified a 22% modal shift away from cars. This was reported by the South Yorkshire Passenger Transport Executive to the Select Government Committee of Environmental Transport and Regional Affairs[2] when reporting on the first 5 years of operation following the opening of the Supertram network. In addition to this shift it is producing approximately 1.9 annual users, with 6,090 estimated average passengers per day.

Sheffield Park & Ride

3.2.7. There are eight Park & Ride locations operated in Sheffield and connect external neighbourhoods to the city centre via Supertram routes and a small number of buses.



3.2.8. Ticket costs at each of the Park & Ride facilities vary. In some instances, the parking is free and the user pays for their tram ticket instead, in other instances a 'Park & Ride' ticket is purchased and covers the cost of parking and the tram or bus journey.

3.2.9. Packaged ticket deals are available, such as 5 one-day tickets, a weekly ticket or a monthly ticket benefitting commuters using the service.

3.2.10. The car parks are also available for uses out of commuting periods, with a leisure parking period available after 18:00 at a slightly reduced cost.

Sheffield Tram Train Service

3.2.11. The Tram trains service opened in 2018, and integrates the aforementioned Sheffield Supertram system with the Network Rail track through Rotherham Central Station. The route is currently operating under a 2 year pilot study to identify operating frequencies and management but general customer feedback has been positive, with more detail found within the latest transport focus passenger survey.

3.2.12. The Tram Train service is government funded and was created in partnership with Network Rail, the Stagecoach Supertram, Northern Rail, and the South Yorkshire Passenger Transport Executive, or SYPTE (the same company to manage the Sheffield Park & Ride facilities).

[2] https://publications.parliament.uk/pa/cm199900/cmselect/cmenvtra/153/153ap32.htm

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3.2.13. Three Tram trains an hour currently run, between the City Centre to Rotherham Parkgate via an extension of one of the Supertram lines. If the pilot scheme continues to prove successful it will continue to run as a local service.

Stagecoach Supertramlink

3.2.14. This is a dedicated bus service connecting rural villages to the north and west of Sheffield City Centre to the Supertram network. It stops at Sheffield Interchange, Hillsborough, Park and Ride facilities and Stocksbridge leisure centre.

3.2.15. These services run from approximately 0500 on weekdays, with returning services operating until 1815. The service operates at a reduced service on weekends.

3.2.16. Ticket pricing is done in the same way as the regular supertram network, with prices relative to stops travelled, and group or bulk ticket purchasing available.

3.3 Cambridgeshire Guided Busway

3.3.1. The Cambridgeshire Guided Busway was created in 2011 and connects Cambridge, Huntington and St Ives. Services are operated by Stagecoach, with an additional service connecting Eddington to Cambridge operated by Whippet.

3.3.2. The buses run on the former railway lines in the area and use specially adapted buses where the driver is not required to use the steering wheel on guided sections of the route. A guidewheel-on-concrete-kerb method is used for this to be achieved.

3.3.3. Four services are operated through the busway scheme as seen by the image to the right.

3.3.4. A return ticket from the Cambridgeshire locations to town centres costs £3, with 'short hop' services costing £2.50 for shorter journeys. Group fares are offered along with further grouped fares with public transport in Cambridge or all public transport in Cambridgeshire.

3.3.5. 4.2 million annual passenger numbers are seen on the service with approximately 13,462 average weekday passengers.

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3.3.6. The estimated modal shift away from cars is 25%[3], and in a 2017 bus user research survey, 54% of service users stated they would have driven themselves or been given a lift by car if they were not using The Busway, suggesting that the service is maintaining a good level of mode shift away from the car.[4]

3.3.7. During the weekday peak periods, routes A and D have up to 15 services per hour. The Monday to Saturday off-peak timetable has four buses an hour and on weekends there are two buses an hour.

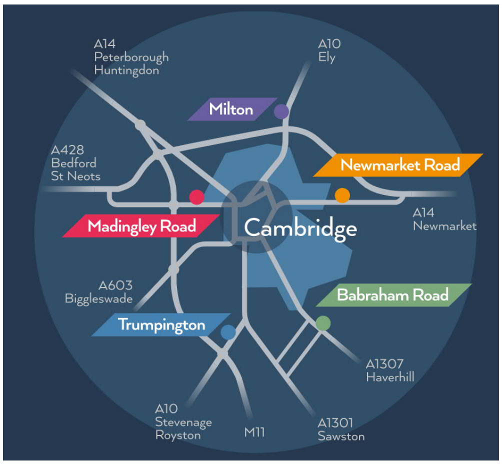
3.3.8. Route B runs less frequently than routes A and D and has four services an hour during peak periods, with approximately one bus an hour during off peak periods Monday to Saturday.

3.3.9. Route U operated by Whippet was launched in 2016 and is subsidised by funding from the University of Cambridge. It runs four buses an hour on weekdays, three buses an hour on Saturdays and two buses an hour on Sundays.

Cambridgeshire Park & Ride

3.3.10. In addition to the above services, Cambridgeshire Guided Busway runs an additional service 'R' that provides four journeys an hour during peak periods. This route operates from Trumpington park and Ride and Cambridge Railway Station to meet commuter demand from those locations. The route bypasses less in demand locations such as Addenbrooke's in order to provide a swifter and more efficient service.

3.3.11. There are five key Park & Ride facilities circulating Cambridge City centre. The designated Park & Ride routes serve locations such as the science park, central Cambridge, Addenbrooke's hospital, Cambridge Hospital and the University of Cambridge.



3.3.12. Parking is available in all Park and Ride locations 24/7, with the Park and Ride service running 0700-1830. Buses run every 10 minutes Monday to Saturday and every 15 minutes on Sundays. It therefore targets more than just the commuter audience and is often used by visitors and tourists.

3.3.13. Across the Park & Ride locations there are approximately 5,393 vehicle parking spaces, with bicycle racks located at all, and cycle lockers at most of the locations. Most of these Park & Ride sites are

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[3] Atkins (2013) Cambridgeshire Guided Busway: Post-Opening User Research. Final Report, September
& Brett, A. and Menzies, B. 2013. Cambridgeshire Guided Busway – Usage Research, as presented to the European Transport Conference 2013

[4] https://citydeal-live.storage.googleapis.com/upload/www.greatercambridge.org.uk/transport/transport-projects/Appendix%20C1.pdf

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located on the Guided Busway Network mentioned above with some having their own dedicated bus service removed from the Guided Busway Network.

3.3.14. Payment within all locations is made for the service rather than the parking facilities. The pricing scale is determined in the same way as the guided busway, with a £3 return journey cost and a 'short hp' return priced at £2.50. Commute packages are also available.

Cambridge Autonomous Metro

3.3.15. A Cambridge Autonomous Metro has been proposed to connect the regional settlements, major city fringe employment sites and key satellite growth areas across the region. It is expected to be technologically advanced, sustainable, highly flexible trackless and electric.

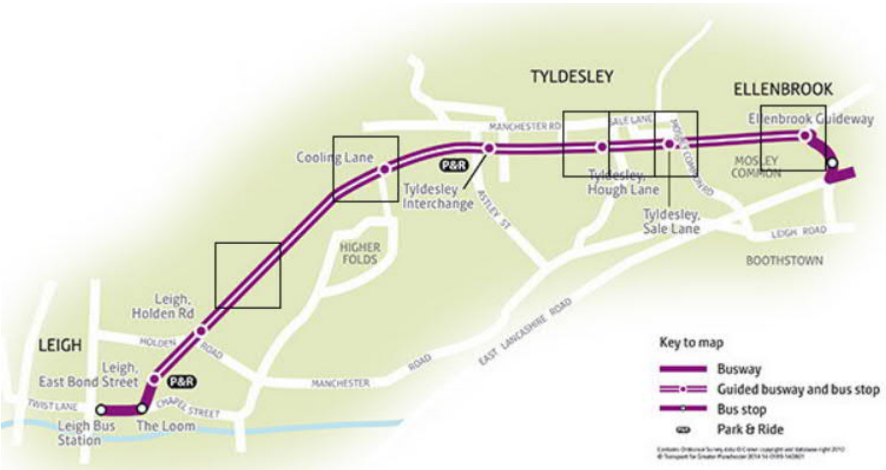
3.3.16. Public consultation was being undertaken during the first half of 2020 but has since been put on hold as a result of the coronavirus pandemic.

3.3.17. This is expected to build on the existing Guided Busway system and Park & Ride sites within Cambridgeshire as seen in the image below.

3.3.18. The CAM is expected to operate through underground tunnels, using low-floor 'trackless metro' vehicles.

3.4 Leigh to Ellenbrook busway and the Leigh – Manchester BRT

3.4.1. The Leigh to Ellenbrook busway forms the most western section of the Leigh-Salford-Manchester BRT. Leigh is one of the largest towns in the UK without a train station and therefore required an efficient and frequent transport network to help link the town to neighbouring Manchester and Salford.



3.4.2. The Busway, using a guided busway approach similar to the Cambridgeshire system, connects Leigh and Ellenbrook, serving a number of small settlements in-between as well as two Park & Ride sites. This Busway then continues east to Manchester in the form of the Leigh – Salford – Manchester BRT. Both services are run by First Great Manchester with a 10 year contract from TfGM.

3.4.3. Electric hybrid double deckers are used to run the full length service, with 10 fully electric buses running the Busway from Leigh to Ellenbrook, intended to be introduced in March 2020. The route is currently operated by Vantage Buses.

3.4.4. Weekday and Saturday services of the Busway run approximately eight services an hour in each direction, with services beginning at 0400 leaving Leigh and final return services from Ellenbrook at 2400, with a similar pattern in the return direction.

3.4.5. The guided busway has seen a 20% modal shift away from private vehicle use[5]. Additionally, the wider BRT network has seen a similar trend with 20% of passengers surveyed switching from using their cars.[6] It was identified that more than a quarter of Busway users walked or travelled more than a kilometre to reach the Busway. By the third year of its operation, it was being estimated that 580,000 car trips per year along the BRT route had transferred to bus ridership.

[5] https://www.ceequal.com/case-studies/leigh-to-ellenbrook-guided-busway/
[6] http://www.urbantransportgroup.org/system/files/general-docs/BRT%20briefing%20designed%202018%20FINAL.pdf

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3.4.6. During the first three years of operation, the BRT saw a continuous increase with up to 63,000 passengers in September 2018.

3.4.7. Tickets can be purchased from the driver via cash or contactless payment or online, with an unlimited day travel ticket at £5, a 'FirstWeek' ticket provides unlimited travel for 7 days at a cost of £17. A 'TenTrip' ticket provides 10 single journey tickets at a cost of £30 to be used at any time, and a 'FirstMonth' ticket provides unlimited travel for a month at a cost of £62.

3.4.8. Stops along the route include Salford Crescent station, Salford Central Station, Oxford Road Station and St Peter's square Tram stop. This increases the opportunity for linked public transport journeys, linking to the Manchester Metro Link and Network Rail.

Park & Ride Locations

3.4.9. There are 3 Park and Ride locations along the route of the busway; Astly Street, East Bond street and East Lancashire Road Park and Ride. In most instances these Park & Ride facilities are managed privately.

3.4.10. The sites are free for commuters to park in with funding subsidised by the Local Government. Those using the facilities are expected to just pay the Busway and BRT ticket price. The car park is open 0430 – 0030 on weekdays and 0600-0030 on Saturdays and Sundays.

3.4.11. The Park & Ride sites were located to attract commuters from areas such as Wigan and Bolton.

3.4.12. The three mentioned Park and Ride facilities have a total of 436 parking spaces, with electric vehicle charging spaces and bike storage locations. Additional Park and Ride facilities do run the circumference of Manchester and Salford but the above three are the only ones that link to the BRT specific route.

3.5 Kent Fastrack

3.5.1. An additional BRT system reviewed is the Kent Fastrack, which provides transport across Kent Thameside through developments around Dartford, Bluewater, Ebbsfleet and Gravesend.

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3.5.2. Kent Fastrack is not as well integrated with a network of services as the three other case studies presented above, but is a good example of a well-used and growing MRT bus system and provides services to local railway stations.

3.5.3. Operated by Arriva, Fastrack B was introduced in 2006 between Dartford and Gravesend. Fastrack A was then introduced in 2007 between Dartford and Bluewater and was partially funded by Prologis as part of a local development. The service is well used and a route C and D have been proposed.

3.5.4. 40,000 weekly passenger numbers, an estimated 667 average weekday passengers per day and has demonstrated a 19% modal shift from car use.[7]

3.5.5. A range of bus types are used across the Fastrack network. The majority of services are run by a single decker, low emission diesel bus with electrically-drive cooling fans. From 2018, Fastrack took part in a trial scheme where an hourly journey was made by an electric Volvo bus, with a main charging point installed at the front of Greenhithe railway station allowing the bus to be fully charged within six minutes.

3.5.6. Buses along both routes run every 10 minutes Monday to Saturday and every 20 minutes evenings and Sundays.

3.5.7. Route A has a standard fare rate of £2.40 single trip ad £3.60 return. In comparison Route B has zonal pricing with prices ranging from £3.60 to £5.50 return. Tickets can be purchases at the bus stops via ticket machines. 'Short hop', child, weekly and monthly fares are available.

3.6 Glider Belfast

3.6.1. The Northern Ireland capital's 'Glider' system spans the city on a 22km east-west corridor with an additional spur running north from the centre to the Titanic Quarter. It replaces most of the main Metro services on the routes that it serves: Metro 4 in East Belfast and Metro 10 in West Belfast. Some Metro services, which serve destinations off the Glider routes, continue to use parts of the Glider routes and therefore benefit from the increased bus priority.

[7] https://www.intelligenttransport.com/transport-articles/1443/fastrack-project-update/ & http://www.landor.co.uk/transittxt/busrapid_transit.pdf

3.6.2. Metro bus feeder services are provided with appropriate interchange facilities and co-ordinated timetables. The interchange facilities are provided at Dundonald Park & Ride in the east and at Colin Town Centre Transport Hub in the west. Metro bus feeder services connect Glider passengers to the Dundonald and Colin residential areas.

3.6.3. The scheme represents an investment of over £90m, and delivers high quality, high capacity, bus-based rapid transit system.

3.6.4. Glider routes have seen the following benefits;

- 25% reduction in public transport journey times
- Improvement in journey time reliability
- Integration with other forms of transport
- Cross-city services - better access to jobs, health, leisure, etc.
- Improved passenger safety and security - both on the vehicles and at halts
- Attractive alternative to travel by private car

3.6.5. Whilst no modal shift information is available at this time, in the first six months of operation journey numbers were hitting levels that the business case projected for 2031. This amounted to an additional 40,000 passenger journeys a week compared to bus patronage along the route in 2017. The system is also helping to reduce emissions and increase community integration[8].

3.7 Eclipse BRT

3.7.1. The Eclipse Busway provides a priority public transport route connecting Fareham in the north to Gosport in the south. The existing route, completed in 2012, is largely off-road with a dedicated section following the line of a former railway.

3.7.2. The Eclipse busway is a 3.4km car-free stretch of road running parallel to the A32, enabling buses to bypass traffic congestion and deliver reliability. Phase one of the Eclipse BRT scheme has been completed and a Phase 2 is being considered / planned.

3.7.3. The figures in 2012 / 2013 confirmed that the service was popular, with a 16% year-on-year increase in passenger numbers recorded for services operating in the Gosport and Fareham area.

3.7.4. In 2013, the Managing Director outlined that a 14% modal shift was achieved and more than 1.3 million customers in Year One[9]. In the years after the completion, initial reports suggested that up to a 21% modal shift occurred, with continual growth reported on the service and on the corridor as a whole[10].

[8] https://www.ciht.org.uk/media/10885/april-magazine-2019-belfast-brt-scheme.pdf
[9] http://www.passengertransport.co.uk/2013/07/first-now-has-a-service-that-eclipses-all-others/
[10] https://www.hants.gov.uk/get-decision-document?documentId=15978&file=Bus%20Rapid%20Transit%20Presentation.pdf&type=pdf

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4 SUMMARY AND CONCLUSIONS

4.1.1. Table 4-1 below provides an outline of studies discussed within this report, as well as services reviewed elsewhere that have been considered at a high level. The table summarises key extraction rates and characteristics that could be considered for an MRT and / or Park & Ride scheme for the MKE development.

Table 4.1: Summary Table

MRT / BRT Scheme	Annual passenger numbers	Weekly passenger numbers	Estimated avg weekday passengers per day	Modal shift away from private vehicles
Sheffield Supertram	1.9 million	-	6,090	22%
Cambridgeshire Guided Busway	4.2 million	-	13,462	25%
Leigh to Ellenbrook Busway	-	-	-	20%
Leigh-Salford-Manchester BRT	3.0 million	15,750	-	20%
Fastrack Kent	-	40,000	6,667	19%
Glider Belfast	-	40,000	5,500	-
Eclipse BRT Fareham to Gosport	-	-	-	14-21%

**Not all schemes have comparable data available*

4.1.2. As shown, the modal shift achieved across the schemes reviewed ranges from 14% to 25%. The average across the sites considered equates to a potential 20% shift away from private vehicles.

MKE, FUTURE MOBILITY AND MRT

4.1.3. WSP have prepared a technical note TTN3 – Trip Generation, that looks at the potential trips from the MKE site, accounting for future mobility trends in the future year scenarios.

4.1.4. The Future Mobility approach is designed to ensure that assertions for design including the provision for public transport, mobility services and layout (such as increased car sharing / opportunities for taxi and shared mobility) result in the MKE scheme being Future Ready; i.e. a scheme design that is resilient and can accommodate likely potential future mobility scenarios through to a full development build out year. The resultant outcome being incrementally realised throughout the build period as new technologies and mobility services are introduced and adopted and as emerging technologies and mobility services come forwards over time.

TECHNICAL NOTE 6 – MRT and Park and Ride Supplementary information

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4.1.5. The future mobility analysis undertaken by WSP aligns with the information set out in the MKC 2050 Strategy. The "MK2050 Growth Study Mobility and Mass Rapid Transit Study" (March 2019) by ITP demonstrates the benefits based on a medium demand scenario (15%) and high demand scenario (29%), both based off of existing real world examples.

4.1.6. This correlates with the Future Mobility approach and trend analysis that overall reductions are likely to be seen in the proportion of trips to/from the site undertaken in 'Privately owned vehicles' whilst 'Shared mobility' trips are seen to increase.

4.1.7. Shared Mobility in this regard encompasses 'taxi', 'private hire vehicle' and 'bus' trips, as well as any future shared mobility vehicular services to be introduced to the development.

4.1.8. Whilst not explicitly linked with MRT trips, it can be argued that the future mobility adjustments made to trip generation would also include the changes as a result of a combined MRT / P&R proposal at the site. The change in mode shift from Privately owned vehicle to shared mobility in our analysis is shown in Table 4-1 below;

Table 4-1 – WSP – MKE Proposals and shift in mode share to account for Future Mobility

		CHANGE IN MODE SHIFT		
Year	**Type**	**AM (two way)**	**PM (two way**	**Average Change**
Interim build out (assumed end of plan period 2031)	**Privately Owned Vehicle**	-8%	-13%	-11%
	Shared Mobility	8%	13%	11%
MKE Full build out year scenario	**Privately Owned Vehicle**	-14%	-25%	-20%
	Shared Mobility	15%	25%	20%

4.1.9. Focusing on the average, the interim build out year (assumed as 2031 to align with the plan period) sees a shift of approximately 11% from private vehicle to shared mobility. Whereas the full build out scenario (2048) exhibits a shift of approximately 20%. As noted above, this compares well to the case studies, where an average of 20% is calculated and also compares well to the MK2050 medium scenario (15%), although it should be noted that the mode change is not purely MRT, and includes other mobility uses.

4.1.10. The "MK2050 Growth Study Mobility and Mass Rapid Transit Study" (March 2019) suggests that the MRT Line 6 (through the proposed MKE site) might be delivered by 2031. However, as shown in the table, we have been robust in assuming that the full benefit of mobility measures won't be realised until somewhere between 2031 and the 2048 full build out year.

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4.1.11. It is therefore considered appropriate that the future mobility changes to the trip generation account for MRT to some degree. In reality, the mode shift, including accounting for trip extraction off the network at the Park and Ride site could be higher than that included above, and as such, making no further adjustments to the trip generation (other than the Future Mobility adjustments) is considered robust.

4.1.12. Any adjustments to the trips (applied through a corresponding reduction in the vehicular trips) will be applied to those generated by the site only at this stage and not applied to wider background traffic. Whilst a MRT will clearly benefit a wider catchment than just the MKE site, applying a factor to that traffic could over-estimate the level of trips from elsewhere in the network.

4.1.13. This approach is considered robust and gives a further supporting evidence based approach to applying the adjustments to the trip rates to account for Future Mobility trends. It should be noted that the level of MRT use will therefore be higher (as those outside of the development will also use it) and as such, greater shift away from private vehicle use can be expected.

4.1.14. The above assumptions will need to be agreed with MKC prior to the with development modelling runs.

Appendix A.7

TTN7 – DO SOMETHING MODEL INPUTS

TRANSPORT TECHNICAL NOTE 7 – With Development Modelling Inputs

DATE:	26 March 2021	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – With Development Modelling Inputs		
PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1 INTRODUCTION

1.1.1. 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).

1.1.2. 'Milton Keynes East' (MKE) has been identified as an allocation for a strategic urban extension within Plan:MK. Milton Keynes Council's (MKC) aspirations for the allocation is set out within Policy SD12 of Plan:MK, stating that the land is allocated "for a comprehensive residential-led mixed use development of approximately 5,000 dwellings to meet the needs of Milton Keynes up to 2031 and beyond."

1.2 Context

1.2.1. It was agreed with both MKC and Highways England that the use of a Strategic Transport model, combined with more detailed analysis tools, including (Paramics microsimulation and junction assessment packages) would be utilised in the assessment of the scheme.

1.2.2. As such, the Milton Keynes Multi-Modal Model (MKMMM) was used with updated information as the basis for the assessment of the scheme. The MKMMM is held by MKC and managed by AECOM (MKC's consultants) on MKC's behalf.

1.2.3. Whilst the MKMMM model used as the evidence base to support Plan:MK was deemed appropriate to assess the scheme as part of the HIF submission, it was considered that some refinement of the model, particularly within the area of the MKE site, was required to ensure that it is deemed robust and defensible for use in a planning application. This refinement includes accurately reflecting bespoke trip rates associated with the proposed development and subsequently an accurate representation of development impacts.

1.2.4. The previous versions of the MKMMM existed for several scenarios, with those most applicable to the MKE site being the 2031 Reference Case scenario and a 2031 MKE scenario. It was 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.

1.2.5. The separate 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 Highways England in March 2019 (with minor updates re-issued in May 2019). TTN1 was issued and prepared such that MKC and Highways England could review the proposed methodology for refining the model, that the traffic survey specification was signed off and that the approach to assessment was agreed in principle.

1.2.6. MKC's modelling team, AECOM notes TN29 and TN30, contained in Appendix K of the TA - should also be read in conjunction with this note as these provide details on how the model baseline validation and calibration were improved as well as how the Proposed Development has been incorporated into the Do Something (with development) tests.

1.2.7. 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 C of the TA.

1.2.8. The Highways England 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, Highways England 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."

1.2.9. As part of the ongoing modelling discussions regarding the Modelling Approach Note, meetings were held in December 2019 with MKC and Highways England, 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.

1.3 Supporting Information

1.3.1. A number of specific development inputs were agreed with MKC Highways to develop the modelling scenarios required for the proposed development for inclusion in the TA.

1.3.2. A number of supporting Technical notes, contained within the Appendices of the TA should be read to provide further background on various matters. It is not the intention to repeat the information contained within those notes in this TN, but for reference the specific TNs that are relevant to the modelling process are as follows;

- **Transport Technical Note 1**: Modelling Approach discussing the Milton Keynes Multi-Modal Model (MKMMM) and the adjustments deemed appropriate to make the model fit for purpose (i.e. assessment of the proposals).
- **Transport Technical Note 2**: Review of Growth between 2016 and 2019 – Traffic Data discussing the suggested approach for factoring the 2019 data to be included in the MKMMM, the base year of 2016.
- **Transport Technical Note 3**: Trip Generation exploring the options and methodology for developing bespoke trip rates.
- **Transport Technical Note 4**: Growth and Future Year Modelling Approach considering potential growth in the MKE locality beyond 2031 up to 2048 for information purposes.

Third Party Technical notes – *Supporting the strategic modelling*

- AECOM Technical Note 29 – MKMMM Revalidation and Calibration
- AECOM Technical Note 30 – Future Year Impacts

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

TRANSPORT TECHNICAL NOTE 7 – With Development Modelling Inputs

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PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1.4 Contents

1.4.1. This TTN covers the following elements;

- Summary of Reference Case future year models - Committed infrastructure and developments;
- Proposed development modelling including trip generation and distribution; and
- Model scenarios to be reviewed;

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2 REFERENCE CASE – FUTURE YEAR MODELS

2.1 Introduction

2.1.1. 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 also be undertaken for informative purposes. 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. The suggested approach and its application are discussed in detail in a separate TTN 4: Growth and Future Year Modelling Approach.

2.1.2. The previous version of the MKMMM had a future year of 2031 to align with the local plan period. As discussed in the TTN1: Modelling Approach v2, it was initially agreed that a 2031 year and 2039 year test would be adopted, with the latter representing the full build out year of development at that time.

2.1.3. 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.

2.1.4. It should be noted that both future years 2031 and 2048 have been assessed, and the information regarding phasing and delivery of committed developments and infrastructure has been agreed by all parties.

2.2 Committed Development and Committed Infrastructure

2031 GROWTH

2.2.1. The 2031 Reference Case scenario includes the currently planned growth in Milton Keynes Borough up to 2031 which includes approximately 29,000 dwellings and 30,700 jobs with infrastructure that is expected to be in place by 2031, as derived from the 'Uncertainty Log', described further below.

2.2.2. The 2031 Reference Case scenario also includes some specified growth in the external area; specifically, in Central Bedfordshire including approximately 3,100 dwellings and 4,600 jobs.

2.2.3. Outside the Milton Keynes Borough TEMPRO growth has been applied, including Central Bedfordshire where TEMPRO growth has not been constrained to the National Trip End Model (NTEM) predictions. TEMPRO is DfT software that interrogates and computes information from their NTEM, projections in terms of demographic forecasts and trip end growth factors by traveller types. Its use to control overall forecasts ensures consistency across models nationally.

2048 GROWTH

2.2.4. It was agreed with MKC that 2048 TEMPRO growth would be applied (unconstrained) to both Milton Keynes Borough and outside of Milton Keynes Borough, excluding 5 developments in Central Bedfordshire where specific growth has been applied, including approximately 2,800 dwellings and 2,400 jobs. These are discussed further in TTN4.

UNCERTAINTY LOG

2.2.5. AECOM TN30 contains the Uncertainty Log used within the formation of the reference case models. The uncertainty log collates a list of future developments and scheme assumptions whilst applying a level of certainty as to how likely they are to be built. This is then used to inform the Reference Case scenario providing a more accurate local estimate of development growth than TEMPRO.

COMITTED INFRASTRUCTURE

2.2.6. The schemes listed in Table 2-1 are those included in the reference case highway model. East-West rail was the only scheme added to the Public Transport Model. Apart from East-West Rail, no information was available on any proposed amendments to bus and rail services, so PT routes and frequencies were assumed to remain the same as in 2016.

Table 2-1 – Reference case Infrastructure Assumptions

Scheme	Delivered by
A421 Dualling	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
Kelly's Kitchen Junction Improvements (Hamburger junction)	By 2031
M1 J14 SMP improvements	By 2031
A421 Dualling	By 2031

2.3 Summary

2.3.1. It should be noted that Stage 1 (base model revalidation) and Stage 2 (future year Do Minimum, 2031 and 2048) models have been agreed by both Highways England and Milton Keynes Council. A Stage 2 covering letter summarising the results was issued and is contained in Appendix C of the TA.

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3 PROPOSED DEVELOPMENT MODELLING

3.1 Introduction

3.1.1. Stage 1 (baseline) and Stage 2 (future year reference case) have been signed off for use in the assessment of MKE.

3.1.2. The Stage 3 (with development, Do Something 2031 and 2048) has been agreed for use in the assessments by Milton Keynes Council, it is acknowledged that Highways England had requested further information on some of the development specific inputs, this is covered in more detail in the TA.

3.2 Inputs provided to AECOM / MKC for inclusion in the MKMMM

3.2.1. As part of the model build process, WSP and AECOM (on behalf of MKC as modelling consultants) have had regular meetings to discuss all stages. This continued with the Stage 3 (with development) preparations. Following a series of meetings, the following information was provided to the AECOM team;

- Trip Generation (External trips and internal zone to zone);
- Highway proposals and loading points;
- Skeleton LinSigs (for signalised junctions along Willen Road);
- Build out assumptions; and
- Public Transport changes

3.3 Development Tested in the MKMMM

3.3.1. The trajectory and phasing of the development with the split of houses at 2031 and 2048 used in the modelling are shown in Table 3-1 below. The employment uses for each future year have also been provided.

Table 3-1 – MKE Development 2031 and 2048 Assumptions

Land Use	Type	MKE - 2031	MKE - 2048
Residential	Mixed Houses / Apartments – private	1,001	3,968
	Mixed Houses / Apartments – affordable	450	1,783
	TOTAL	*1,450*	*5,750**
Employment	B1a	16,387 m²	37,161 m²
	B1c / B2**	40,967 m²	92,903 m²
	B8***	201,938 m²	354,889 m²
	TOTAL	*259,292 m²*	*484,954 m²*

**Updated post submission of TN3 **Assumed as B2 ***Combined Segro and Berkeley (full allocation)*

3.3.2. It should be noted that as the modelling tests the whole allocation, the employment elements included in the modelling are different than that set out in the parameter plans. However, for clarity, with regards to the Berkeley site – the worst case assumptions in terms of traffic generation have been applied.

- Berkeley Site - Employment Total floorspace (GIA): 4,345,000 sq ft (403,650 m2) Of which:
  - Max 400,000 sq ft (37,160m2) Class E (Offices / Light Industrial)
  - Max 1,000,000 sq ft (92,900 m2) B2
  - Max 4,345,000 sq ft (403,650 m2) B8

3.3.3. So, for traffic modelling the worst case scenario would be;

- 400,000 sq ft Class E (Offices / Light Industrial);
- 1,000,000 sq ft B2; and
- 2,945,000 sq ft B8.

3.3.4. The above assumptions have been included in the modelling.

3.3.5. It should be noted that the parameter plans allow for flexibility on site and as such, the development could also implement full (4,345,000 sq ft) of B8 use (with 250,000 sq ft ancillary offices). As B8 / warehousing units will generate less traffic than other office uses, this would result in less traffic being generated by the site.

3.3.6. As part of the Stage 3 modelling (with development tests) an allowance has also been made to account for the jobs generated by the community hub and the Secondary school:

- Community Hub – 50 jobs; and
- Secondary School – 250 jobs (with 50% of trips being external).

3.3.7. The above is considered a robust inclusion in terms of additional vehicular demand on the network. It is likely that a number of the jobs both in the Community and Schools would be served by those living closely and it is not considered that a high number would be from external zones. 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.

TRIP ENDS

3.3.8. WSP provided AECOM with a set of target Origin and Destination trip-ends for each development zone within MKE, which they believe better reflects the likely travel patterns that will be generated by the development and provide a higher-level accuracy than the model average rates. These can be found in Appendix A.

3.3.9. The outputs from the trip end spreadsheets with details of flows, unit numbers and job numbers are contained in Appendix A and show the following;

- MKMMM_MKE_Stage 3 Inputs_Trips by Zone (splits residential and employment trips by each zone, by year. AM, PM and IP.)

3.3.10. As set out above, the overall quantum has been uplifted to ensure flexibility and robustness. Discussions with the planning consultants have resulted in a small adjustment to match the EIA scoping submitted by Bloor and to give some room for a density uplift at the community hub to support a MRT pick up point.

3.3.11. This equates to a 15% uplift in the 2048 year (to a total of 5,750 units). The 2031 number has been adjusted slightly to match the buildout schedule sent to Homes England.

3.3.12. For residential elements these are shown as total vehicle trips, but following discussions with AECOM, the MKE development generates internal trips from these (that as such need to be captured on the MKE road network, but won't go outside of the MKE area). The internal trip information was provided via a set of intra-development zone matrices (Residential trips made up of Car and LGV only); essentially a set of mini matrices specifying Origin and Destination totals for movements between development zones. These can be found in Appendix B and further information can be found in the WSP technical note TTN3 – Trip Generation.

3.4 Proposed Development Trip Generation

3.4.1. TTN3 provides information on the trip generation forecasts applied in the modelling. This sets out the approaches and evidence in determining the likely number of vehicular trips on the network.

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3.4.2. 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. The scenarios set out in that TTN are therefore:

- 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);
- 2031 with Development Scenario – Future Mobility Scenario vehicular forecasts applied to 2031 Mobility Masterplanning scenario to form interim year test;
- 2048 with Development Scenario – traditional methodology (similar to 2031, but with a bespoke future year + committed development; and
- 2048 with Development Scenario – Future Mobility Scenario – 2048 with Development Scenario forecasts applied to relevant Mobility Masterplanning scenario to represent total buildout scenario.

3.4.3. TTN3 sets out two methodologies. A "traditional" approach, that focuses on applying current mode shares to forecast trip generation and a "Future Mobility" approach, that looks at emerging technologies and the uptake of shared mobility.

3.4.4. It should be noted, that neither approach take into account the use of MRT of P&R facilities and so remain very much vehicular focused. However, as agreed with MKC the assessments within the TA have been based on the Future Mobility with development tests will be assessed against the relevant reference cases (2031 and 2048).

3.4.5. The MKMMM loads trips by housing unit numbers and by job type. The bespoke trip rates for employment land weren't calculated by job type, but were based on floor area – however, job numbers were calculated using the HCA Densities guide.

3.4.6. TTN3 initially set out that the primary schools and community centre are not likely to be external trip generators. Upon review, it was considered that the secondary school may have a larger catchment and include trips from Willen / Newport Pagnell. WSP believes that most of these trips will utilise the public transport or walking /cycling network – however for robustness some external trips in that zone should be added.

3.4.7. As such, the spreadsheets provided to AECOM outline the external trips / corresponding jobs for the secondary school element – primarily located in Zone 1571. The trip rates were extracted from a TRICS selection, and have taken into account Home Based (HB) to Education (and Escort) Education trips.

3.4.8. A further adjustment of 50% has been applied to factor in that the MKE site will likely attract people who will work and live in close proximity. This results in both residential and employment uses in Zone 1571

3.4.9. Similarly, for robustness it was considered that trips should be included to account for some jobs within the community centre. Given the variability of land uses in the Community Centre, these trips were generated using the default MKMMM trip rates.

3.5 Proposed Development Trip Distribution and Assignment

3.5.1. The distribution and assignment of the traffic generated by the proposed MKE development has been 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.

3.5.2. 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.

3.5.3. The gravity model uses calibrated functions developed for the base year matrices (trip-length profiles) to estimate a trip distribution based on available attractions. This ensures that the distribution for the development is not swayed by existing zones (that have little or no development within them) and ensures that the distribution is a fair representation of a large-scale site.

3.6 Proposed Development Zones and Loading

3.6.1. Tables 3-2 and 3-3 below provide a tabulated summary of the development zones and the corresponding residential (number of dwellings) and employment (jobs) included in the forecast.

3.6.2. As noted above, the employment trip generation has been calculated by floor area, as such the number of jobs is a rough approximation based on appropriate HCA Density guides for each land use. The Trip rates, and associated trips generated by the employment are set out in more detail within TN3.

3.6.3. The job types and numbers with the 2031 and 2048 summary tables are as follows, applying the following assumptions on the employment types;

- E03 – Primary and Secondary
- E07 – Retail – representing the Community Hub
- E09 – Services – Representing the B1c / B2 jobs
- E10 – Industry, construction – representing the B8 jobs
- E14 – Business – representing the B1a jobs.

Table 3-2 – MKE Development 2031 Assumptions (Resi and Employment) by Zone

		RESI	EMPLOYMENT TYPE (JOBS)					*TOTAL JOBS*	*HOUSEHOLDS*
Zones	**Land**	**Dwellings**	**E03**	**E07**	**E09**	**E10**	**E14**	**E01**	**E02**
1515	SEGRO (Employment)	0	0	0	0	1004	0	1004	0
1521	BLOOR (Resi)	650	0	0	0	0	0	0	650
1523	-	0	0	0	0	0	0	0	0
1524	-	0	0	0	0	0	0	0	0
1525	-	0	0	0	0	0	0	0	0
1529	-	0	0	0	0	0	0	0	0
1531	-	0	0	0	0	0	0	0	0
1535	*No change (not used)*	0	0	0	0	0	0	0	0
1566	MKE (Employment)	0	0	0	683	745	630	2058	0
1567	MKE (Employment)	0	0	0	683	745	630	2058	0
1571	MKE - Resi & Centre	800	250	50	0	0	0	300	800
1572	-	0	0	0	0	0	0	0	0
1573	*No change (not used)*	0	0	0	0	0	0	0	0
	TOTAL	1450	250	50	1366	2493	1261	**5419**	**1450**

Table 3-3 – MKE Development 2048 Assumptions (Resi and Employment) by Zone

		RESI	EMPLOYMENT TYPE (JOBS)					*TOTAL JOBS*	*HOUSEHOLDS*
Zones	**Land**	**Dwellings**	**E03**	**E07**	**E09**	**E10**	**E14**	**E01**	**E02**
1515	SEGRO (Employment)	0	0	0	0	1004	0	1004	0
1521	BLOOR (Resi)	800	0	0	0	0	0	0	800
1523	MKE	340	0	0	0	0	0	0	340
1524	MKE	135	0	0	0	0	0	0	135
1525	MKE	360	0	0	0	0	0	0	360
1529	MKE	60	0	0	0	0	0	0	60
1531	MKE	1250	0	0	0	0	0	0	1250
1535	*No change (not used)*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
1566	MKE (Employment)	0	0	0	1548	1689	1429	4667	0
1567	MKE (Employment)	0	0	0	1548	1689	1429	4667	0
1571	MKE – Resi & Centre	1545	250	50	0	0	0	300	1545
1572	MKE	1260	0	0	0	0	0	0	1260
1573	*No change (not used)*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	TOTAL	5750	250	50	3097	4381	2859	**10637**	**5750**

3.6.4. To provide context of the proposed MKE site and development per zone, the following figures set out the model loading for both dwellings and employment;

- Figure 3-1 – MKE Zone Loading - Dwellings – 2031
- Figure 3-2 – MKE Zone Loading - Dwellings – 2048
- Figure 3-3 – MKE Zone Loading - Jobs – 2031
- Figure 3-4 – MKE Zone Loading - Jobs – 2048

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Figure 3-1 – MKE Zone Loading - Dwellings - 2031

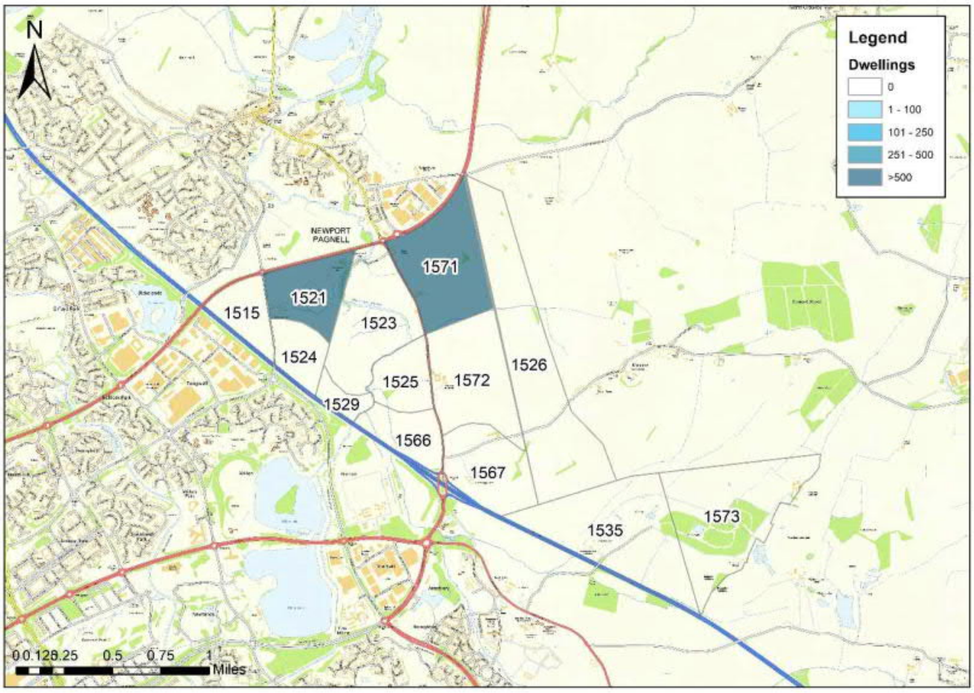


Figure 3-2 – MKE Zone Loading - Dwellings - 2048

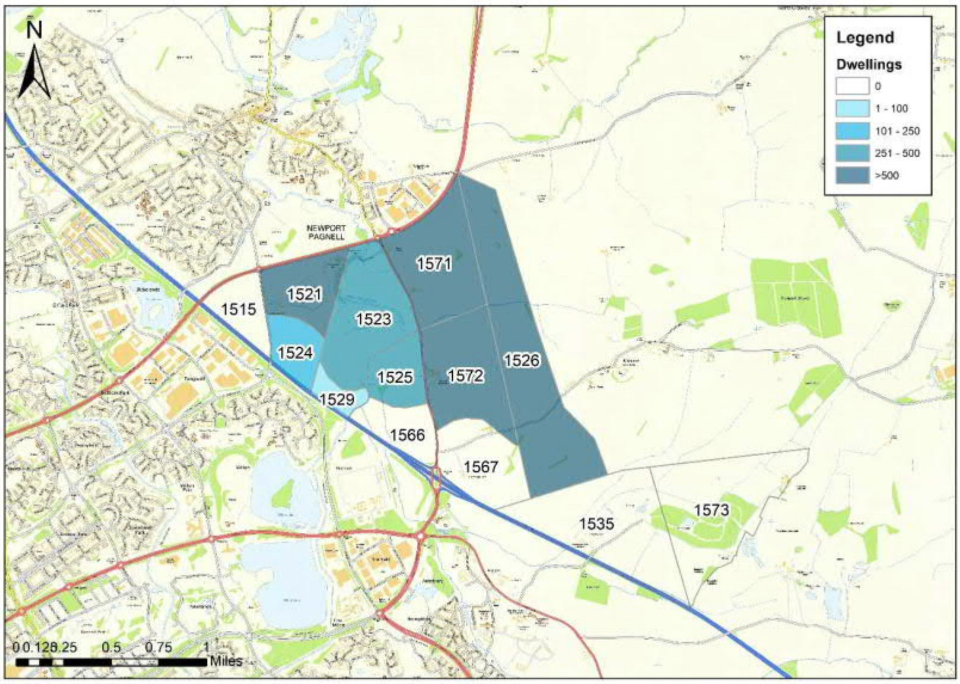


Figure 3-3 – MKE Zone Loading - Jobs - 2031

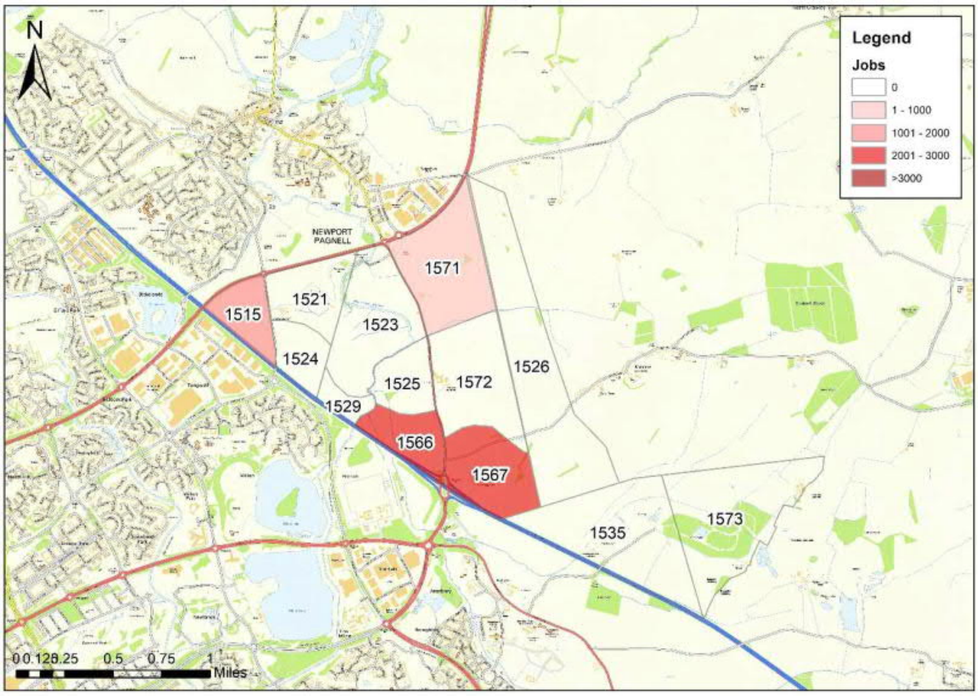
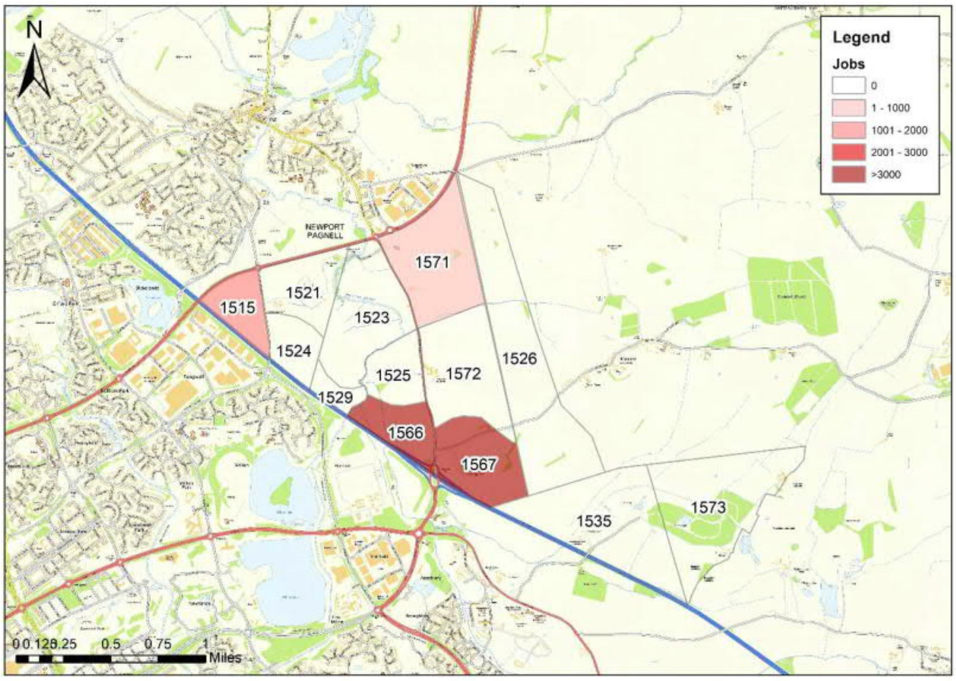


Figure 3-4 – MKE Zone Loading - Jobs - 2048



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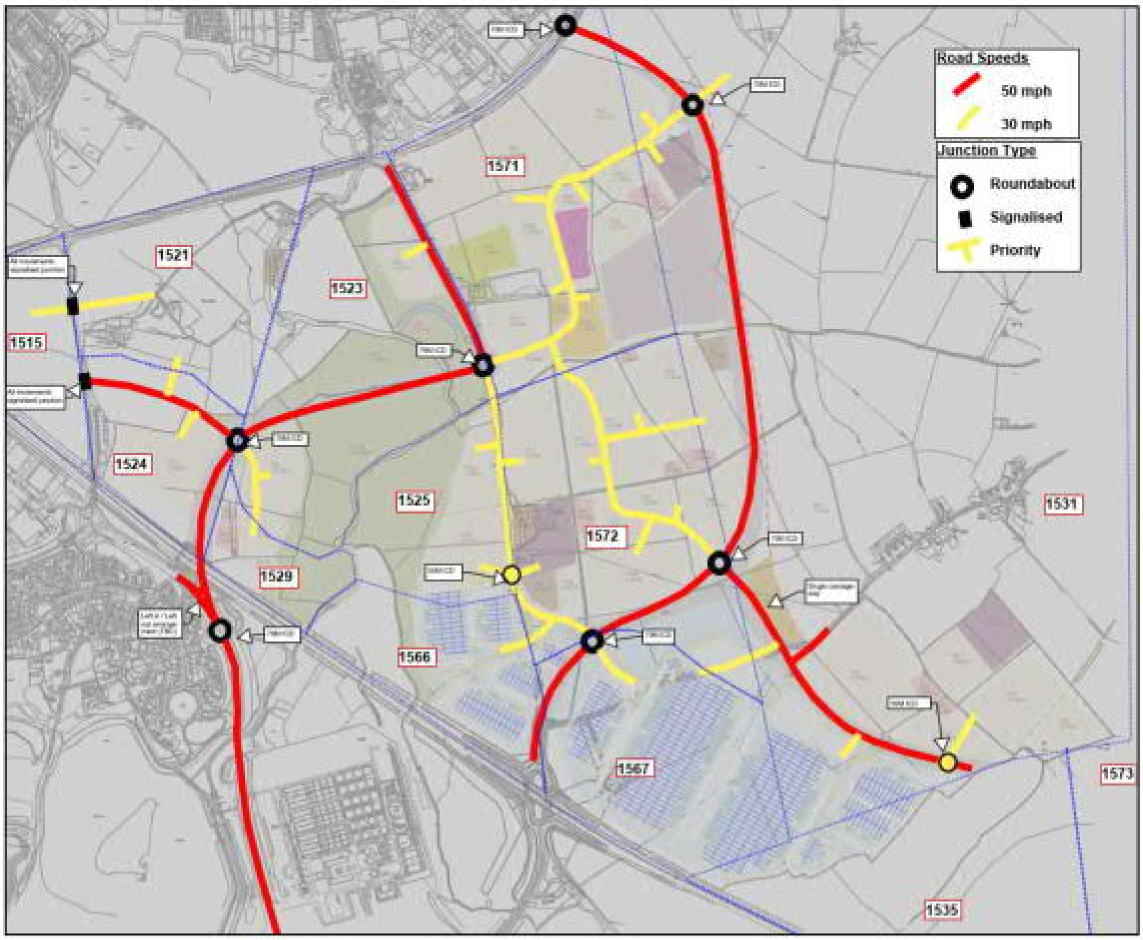
HIGHWAY NETWORK

3.6.5. Figure 3-5 below shows the proposed indicative network layout with junction type, speed limit and zone connectors, as issued to AECOM for inclusion in the MKMMM.

Figure 3-5 – Indicative MKE Network layout for inclusion in the MKMMM



3.6.6. Following discussions with MKC, AECOM and WSP an appropriate model network was agreed with reduced zone connectors. This can be seen in Figure 3-6.

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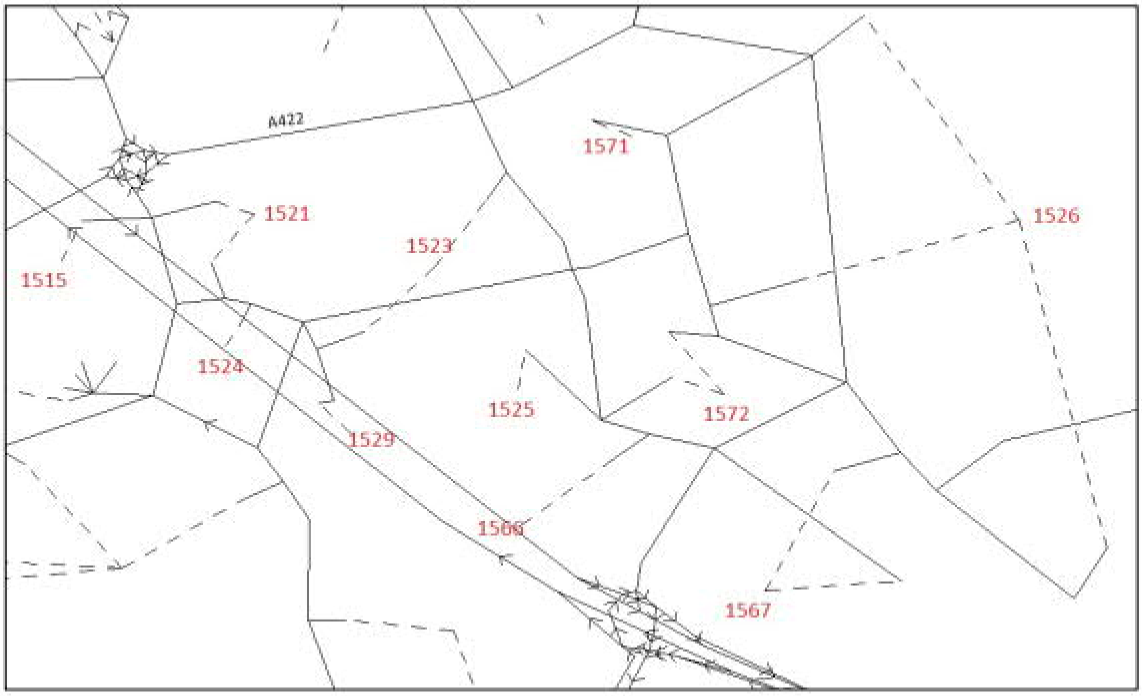
Figure 3-6 – Coded MKE Network layout in the MKMMM



3.6.7. Both the 2031 and 2048 networks are consistent, excluding signal configuration which varies between peak period.

3.6.8. As shown in Figure 3-5, there are a number of assumptions to reflect the nature of the various parcels, these assumptions are set out as follows;

- The links in red would be modelled as 50mph, with those in yellow, being 30mph.
- The yellow links align with the parcels indicated in land budget plan – and represent the main local distributor / access roads – as mentioned above, the number of connectors were reduced following review.
- On the main grid roads, where dualled, these will widen to 3 lanes at the approaches to the major roundabouts
- Where links are single carriageway, these will widen to 2 lane approaches at roundabouts (where appropriate)
- Eastern perimeter road only has roundabout connections at the north and southern points
- Whilst Bloor straddles zones 1521 and 1524 – it was agreed to just include Bloor flows in 1521 (the connections reflect this) – this has been agreed in principle with RPS / Bloor
- The downgraded A509 south of the community centre would be a 30mph link
- Whilst the MKE employment straddles certain zones, it is sensible to limit it to zones 1566 and 1567 only to simplify modelling outputs.

3.6.9. As part of the information pack issued to AECOM, LinSig files (and word document reports) outlining the northern and southern signalised junctions along the Willen Road were also provided.

3.6.10. The LinSig files set out the designs of the signal junctions based on a pragmatic solution at this stage. It is expected that further detailed assessments will be undertaken by the land owners directly attributed for these access junctions. However, for the purposes of the MKMMM modelling, the files were used for general timings and a request was made to AECOM that during the modelling, the team sought to optimise timings once they were included in the final strategic model runs.

Northern Access – 4 arm signalised crossroads

- Combined crossroads with Segro / Roxhill access
  - Segro arrival / departure flows taken from their TA
  - Trips from Bloor site – using the trip rates WSP have developed for the MKE site
- Assumed simplified staging (reviewed against the Segro proposals, but allocating a stage for Bloor access)

Southern Access – 3 arm signalised junction

- As this includes the Willen Link road connecting to the HIF infrastructure, the flow profiles are naturally going to change, as the modelling progressed;
- As such, to generate timings the NB and SB flows were taken from 2031 and 2048 reference case model outputs (Stage 2).

3.6.11. The signal timings and general layout have been shared and agreed with Bloor's transport consultants RPS.

PROPOSED BUS ROUTE

3.6.12. In terms of public transport, it was agreed that no changes would be made to the Public Transport elements of the model.

3.6.13. This was due to the fact that the trip generation profiles account for mode shift aspirations and so any further amendment would risk double counting.

3.6.14. To ensure that the highway model included the vehicular trips associated with operating buses, WSP provided a figure that set out a high level principal bus line for inclusion. This was added in in both 2031 and 2048 at the same frequency. See notes below.

3.6.15. The principal bus line from MKE to MK central, has been plotted on what is believed to be likely to be the potential routeing from the site. The route starts from the centre, uses the proposed new bridge over the M1 and serves both MK Central and the Rail Station.

3.6.16. WSP is proposing a 10 minute frequency service, with limited stops to aid average speed. At an achievable 30kph average, this would require 5 buses to operate the service.

3.6.17. For robustness, 6 buses per hour were added doing the route (12 trips two way).

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4 MODELLING SCENARIOS

4.1 Core MKMMM Scenarios

4.1.1. The MKMMM will be run for the following Core scenarios:

- 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

4.2 MKMMM Sensitivity and Further runs

4.2.1. As further analysis on the site was completed, it was apparent that further MKMMM runs would be required to full ascertain the potential impacts of the development on the local road network and the strategic road network.

4.2.2. As set out above, the 'Core' scenarios have been run using the strategic MKMMM model, with these being; 2031 Do Minimum / Do Something and 2048 Do Minimum / Do Something.

4.2.3. The core runs have been used within the TA and the Paramics modelling to get an understanding of the impacts relative to the wider MK area as a result of background traffic, route displacement, development proposals and infrastructure.

4.2.4. During the modelling exercises, it was evident further MKMMM and Paramics runs would be of benefit to assist in the assessment of the site, to enable a greater understanding of impacts and solutions.

4.2.5. The use of modelling iterations and sensitivity tests is a standard practice to inform decision makers on the outcomes of the impacts should certain key variables be altered.

4.2.6. Figure 4-1 sets out the modelling tests undertaken and the data used across the three key modelling tools (Strategic – MKMMM, Paramics and TA Local junction tests).

[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 was issued and agreed with MKC and Highways England.

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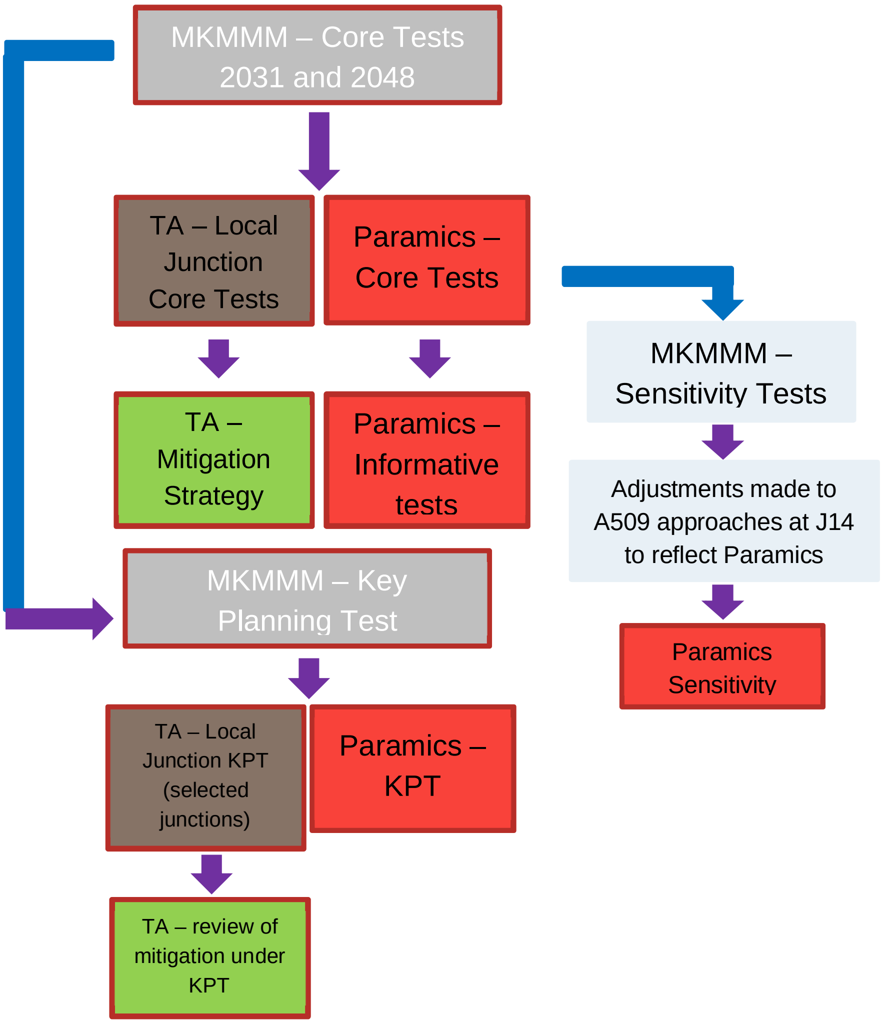
CHECKED:	A Smith	**APPROVED:**	A Norcutt

4.2.7. As outlined above, the MKMMM has been run for 3 main tests. The modelling scenarios are discussed in more detailed below and in Table 4-1:

- **Core:** Core models represent the outputs from the Saturn MKMMM, without any adjustments and have been used in both the TA and Paramics models. These represent a partial build in 2031 and full build out in 2048. These provide the definitive tests that have been reviewed in detail in the local junction modelling.
- **Sensitivity**: these outputs represent adjustments to the MKMMM at J14, following review of the capacity at the A509 approaches. These were used in the Paramics modelling only.
- **Key Planning Test**: these add the full development (assuming full build out) onto the 2031 DM flows. These have been run with and without the sensitivity tests. These are the outputs from the MKMMM and have been used primarily in the Paramics modelling, but have also been used to review certain junctions on the local network.

Figure 4-1 - Modelling Tests Undertaken in the MKMMM



4.2.8. Table 4-1 provides a breakdown of the scenarios and what was considered in terms of general build out.

Table 4-1 – Modelling Scenarios completed

Type	Year / Scenario	Development Test
Core	2031 Do Minimum	n/a
	2031 Do Something	Partial build out
	2048 Do Minimum	n/a
	2048 Do Something	Full build out
Sensitivity	2031 Do Minimum – Sensitivity	n/a
	2031 Do Something – Sensitivity	Partial build out
	2048 Do Minimum – Sensitivity	n/a
	2048 Do Something – Sensitivity	Full build out
Key Planning Tests	2031 Key Planning Test (DM + Full development)	Equivalent to full build out – run through MKMMM
	2031 Key Planning Test – Sensitivity (DM + Full Development)	Equivalent to full build out – run through MKMMM

Core Tests

4.2.9. As described above, the core results provide a definitive test using the calibrated MKMMM model. These outputs have been used in the following sections of the TA to understand junction impacts, both at a micro-simulation (Paramics) and local junction level. These outputs represent a key scenario to assess the impacts of the development against the future baseline.

Sensitivity Tests

4.2.10. As shown in Diagrams 4-1 a MKMMM sensitivity test has been run, which applies specific alternative assumptions, focusing on the A509 approaches to J14. This was due to a review of the Paramics modelling (using the core results) against the MKMMM (core test) to understand whether the strategic model was reflecting the delays and queuing observed in the micro-simulation (Paramics) model. This iterative approach is a common practice, and the adjustments and results of these sensitivity tests are set out in Section 8.5 of the TA.

Key Planning Tests

4.2.11. As outlined in Diagram 4-1, the MKMMM has been run for two future years, 2031 and 2048. The 2048 year includes significant growth beyond the Local Plan period and includes assumptions about the level of growth that may or may not occur. The 2031 year has a greater level of certainty and accuracy, as this represents the MK Local Plan period. The 2031 future growth has also been reviewed by WSP and MK planning officers in depth before being utilised in the recent MKMMM outputs.

4.2.12. In the February 2021 meeting, it was discussed that the 2031 future year would be considered the key planning test for the MKE impacts at J14. This was predominantly focused on the Paramics tests applied at this junction (discussed further below).

4.2.13. Whilst the 2048 future year presents a useful indication of the likely stresses across the network, it is considered likely that further Local Plans and infrastructure development programmes would be implemented between 2031 and 2048. Therefore, whilst used as an informative, the 2048 years cannot be considered an entirely accurate position of growth in the MK area. This is particularly true given that the 2048 DM scenarios do not account for the planned growth as part of the MK2050 Strategy, the omission of which was agreed with MKC during the modelling process.

4.2.14. The key planning test on the Strategic Road Network (i.e. that for which Highways England are responsible), in accordance with Circular 02/2013, is to assess the impact of committed development (the Reference Case) alongside the proposed development against a period of 10-years after the date of the planning application or the end of the Local Plan period, whichever is the greater. For MKE, these dates coincide with 2031.

4.2.15. Strictly speaking, the circular test for the Reference Case should be based on development already permitted development only. It has, however, been agreed with MKC and Highways England to undertake a test that compares a 2031 Do Minimum Reference Case (i.e. full Local Plan growth) with a 2031 Do Minimum plus development scenario (Do Something), including both the proposed MKE highway infrastructure plus the full proposed build-out at MKE.

4.2.16. Therefore, it is considered more appropriate and accurate to assess the development against the 2031 future year. This is because this time period reflects the full Local Plan build-out, would be 10-years beyond planning submission and would be 6+ Years beyond the first occupation at the site.

4.2.17. The key planning test is a theoretical exercise to fulfil the planning requirements of the development. It is acknowledged that even with an accelerated build out, the MKE development is unlikely to be fully completed by 2031. However, the MKE allocation is included and accounted for, at a strategic level, in the MK 2031 Local Plan. It has been discussed with MKC officers that work is due to start on preparation of the next local plan, that will consider the future and aspirational growth in the MK area further, including where strategic infrastructure or mitigation measures may be required.

4.2.18. The key planning test, creating an alternative 2031 Do Something test (including full build-out) was undertaken within the MKMMM such that any potential re-routeing of 2031 Do Minimum traffic resulting from the introduction of the new infrastructure is fully accounted for.

4.2.19. To ensure that the impacts at J14 and Northfields are adequately assessed, the demand from the full development (equivalent to the total development flows at 2048) was added to the 2031 DM flows. As a result, two planning tests have been completed:

- 2031 Do Min and 2031 Key Planning Test (DM + Full MKE Development and Infrastructure) Compared; and
- 2031 Do Min and 2031 Key Planning Test (DM + Full MKE Development and Infrastructure) Compared – Sensitivity Test (for information).

4.2.20. These outputs will be used primarily within the Paramics modelling platform, but will also be used to review certain key junctions across the MK network. The additional supplemental information is provided in Technical Note PTN1 (Appendix M of the TA).

TRANSPORT TECHNICAL NOTE 7 – With Development Modelling Inputs

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5 MODEL OUTPUTS

5.1 Context

5.1.1. This section of the TN covers the following elements:

- Assessed junction list;
- Model outputs

5.2 Junctions for Assessment

5.2.1. The process of identifying junctions for assessment was set out in TN1. Furthermore, the information set out below was issued to MKC for their review and comment. No disagreement on the junctions included in this TA was provided by the MKC Highways Team.

5.2.2. As set out in the TA Scoping Note, it was the intention that a review of the Volume over capacity (VOC) would be undertaken to ascertain the junctions that should be included for further assessment. The review of the junction VOC will allow the likely impacts to be ascertained across the network.

5.2.3. The VOC changes were assessed for the 2048 Do Something (with development) and the 2048 Do Minimum (without development but including all committed development) scenarios as a worst case. This has used the Core results from the MKMMM outputs.

5.2.4. The Do Something results may not indicate that the development itself has impacts at the junction and could include traffic re-routeing, however, this methodology provides a good basis to understand the likely areas of focus. For clarity, whilst the 2048 results have been used to determine junctions to be reviewed, the same junctions for the 2031 assessment year have also been completed.

5.2.5. The core junctions as well as all nodes / junctions that are shown to have a VOC over 0.85 in the 2048 future year were reviewed. Where the Do Minimum scenario indicates junctions already experiencing high VOCs, the relative impact from the development scenario was then reviewed. Where the change, either increase or decrease, hasn't been considered material, or if the junction is considered to be too far from the development to represent impacts generated from the site, then these have been discarded.

5.2.6. It should be noted that under the DS scenario, some junctions also experience significant improvements e.g. reductions in VOC, however these may continue to be included in the assessments due to the importance on the local road network.

5.2.7. The summary Table 5-1 below sets out the junctions assessed and included in the further assessments below:

Table 5-1 – Junctions to be assessed in detail

Junction Names	Assessed / detail	Notes
Core Junctions		
M1 J14 and Northfields Roundabout	Yes - Paramics	The strategic modelling does not suggest that there will be a material impact. However, this will be completed within the Paramics microsimulation model.
Tongwell Street Roundabout	Yes	The VOC shows improvements in the DS scenario, however will be assessed due to its importance in the local network
Willen Road Roundabout	Yes	The DS scenario shows minor changes at the junction, however will be assessed due to proximity and local importance
Pagoda Roundabout	Yes	The DS scenario does not indicate any material effect at the junction. This will be confirmed within Junctions 9 modelling
Woolstone Roundabout	Yes	The DS scenario shows an improvement over the DM, however will be confirmed in the TA
Blakelands Roundabout	Yes	The DS scenario shows an improvement over the DM, however will be confirmed in the TA
Fox Milne	Yes	The DS scenario does not indicate any material effect at the junction. This will be confirmed within Junctions 9 modelling
Pineham Roundabout	Yes	The VOC analysis does not show a material change overall, but does show an increase in VOC. Due to the importance of the junction with the new infrastructure - this will be assessed in detail
Renny Lodge Roundabout	Yes	The VOC shows increases in the DS scenario and this will be assessed in the TA.
Tickford Roundabout	Yes	The DS scenario shows an improvement over the DM, however will be confirmed in the TA
Marsh End Roundabout	Yes	The DS scenario shows an improvement over the DM, however will be confirmed in the TA
Tongwell Street / Carleton Gate	Yes	The DS scenario, which proposes to upgrade this junction to a roundabout shows changes to the VOC. As such, this will be reviewed in detail in the TA.
M1 J13	Yes - Link flow check	The DS shows a minor change compared to the DM. As agreed, the link flow changes have been reviewed in the TA.
Additional Junctions – following review		
Marshend Rd / Wolverton	Yes - Link flow check	The VOC analysis does not show a material change overall, however a link / turning flow check of the junction has been undertaken in the TA.
High Street / St. John Street	Yes - Link flow check	The VOC analysis does not show a material change overall, however a link / turning flow check of the junction has been undertaken in the TA.
A509 / A422 Newport Road - Chicheley Hill Roundabout	Yes	The VOC analysis shows an increase in the AM in 2048, so a more detailed review of the junction will be in the TA.
Development Junctions – DS Only		
New Signals 1 - Willen Road (Bloor / Segro Access)	Yes	The signals junction will be checked to ascertain that the outline designs remain appropriate
New Signals 2 - Willen Road (New Willen Link Road)	Yes	The signals junction will be checked to ascertain that the outline designs remain appropriate
Internal Jcts 1 to 9	Yes	The "internal" or new development roundabout and junctions will be assessed to ensure that the designs are appropriate. This includes the new junction arrangement with Tongwell Street south of the new bridge etc.

5.2.8. The assessment has indicated that an additional junction (compared to the Core list identified previously) - A509 / A422 Newport Road - Chicheley Hill Roundabout should be included for a more in-depth review. This will be undertaken using Junctions9 software.

5.2.9. The other junctions in Newport Pagnell (Marsh End / Wolverton and High Street / St John Street) have been identified to experience some minor changes and so will be included as link / turning flow checks.

5.3 Model Outputs

5.3.1. It was agreed with MKC and AECOM that the Saturn output files would be provided to WSP to enable output generation. The output files provided do not allow the re-running of the models, but allow the runs to be opened within the Saturn platform for further data extraction.

5.3.2. These outputs were then used to create various turning flows and cordons for use within the local junction and Paramics assessments.

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APPENDIX A – TRIP GENERATION INPUTS (WSP)

20202.11.16_MKMMM_MKE_Stage 3_Trips by Zone_v2.xlsx

DISCLAIMER

VersionCtrl

Log of the modifications made to this workbook

Model Map

Version Number	Modification Date	Developer	Comment	Review		
				Reviewed By	Date	Comment
v1.00	*01 Oct 2020*	*APS*	*Issue to client team*			
v1.00	*02 Oct 2020*	*APS*	*Issue to MKC and AECOM*			
v2.00	*19 Nov 2020*	*APS*	*Updated trips by zone - to reflect internal matrices. Please note - trip numbers updated. Internal matrices forecast movements between resi and employment zones. Eg. 1515 to 1521. There is not residential in 1515 - but this reflets the internal movements. In each zone - Cells highlighted in Yellow - have been updated. Orange = remain as per previous version*			

Total Vehicle Trips

2031

		Residential									Employment								
		AM			PM			IP			AM			PM			IP		
Zones Used in Modelling	Land	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	SEGRO (Employment only)	9	3	11	5	9	13	3	3	7	206	57	263	59	180	239	89	103	191
1521	BLOOR (Resi)	73	162	235	145	86	231	84	76	160	0	0	0	0	0	0	0	0	0
1523	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1524	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1525	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1529	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1531	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1535	*No change (not used)*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1566	MKE (Employment only)	9	3	11	5	9	13	3	3	7	252	53	305	56	250	306	105	121	227
1567	MKE (Employment only)	9	3	11	5	9	13	3	3	7	252	53	305	56	250	306	105	121	227
1571	MKE - Resi	99	202	301	189	126	315	121	114	234	114	82	196	21	14	35	21	27	48
1572	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1573	*No change (not used)*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SUB - TOTAL	199	372	570	348	237	585	214	200	414	824	244	1068	192	695	887	321	373	693

	AM			PM			IP		
	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
TOTAL - 2031	1022	616	1638	539	933	1472	535	573	1108

2048

		Residential									Employment								
		AM			PM			IP			AM			PM			IP		
Zones Used in Modelling	Land	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	SEGRO (Employment only)	30	9	38	9	17	26	11	26	37	200	55	255	57	176	232	86	100	186
1521	BLOOR (Resi)	93	173	266	144	98	242	116	110	226	0	0	0	0	0	0	0	0	0
1523	MKE	21	68	89	55	31	87	42	31	73	0	0	0	0	0	0	0	0	0
1524	MKE	9	27	36	22	13	35	17	13	30	0	0	0	0	0	0	0	0	0
1525	MKE	22	72	94	59	33	92	45	32	77	0	0	0	0	0	0	0	0	0
1529	MKE	5	12	17	10	6	16	8	6	14	0	0	0	0	0	0	0	0	0
1531	MKE	119	262	381	217	139	355	171	149	321	0	0	0	0	0	0	0	0	0
1535	*No change (not used)*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1566	MKE (Employment only)	30	9	38	9	17	26	11	26	37	542	115	658	123	539	661	230	265	496
1567	MKE (Employment only)	30	9	38	9	17	26	11	26	37	542	115	658	123	539	661	230	265	496
1571	MKE - Resi	187	336	523	280	194	474	227	220	446	114	82	196	21	14	35	21	27	48
1572	MKE	119	264	384	218	140	358	173	150	323	0	0	0	0	0	0	0	0	0
1573	*No change (not used)*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SUB - TOTAL	663	1241	1904	1033	705	1738	831	789	1621	1399	368	1767	323	1267	1590	568	657	1225

	AM			PM			IP		
	ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
TOTAL - 2048	2062	1609	3671	1356	1972	3328	1399	1447	2846

2031		**Residential**			**Employment Type (Jobs)**				***Total Jobs***	***louseholds***
Zones Used in Modelling	**Land**	**Dwellings**	**E03**	**E07**	**E09**	**E10**	**E14**		**E01**	**E02**
1515	SEGRO (Employment only	0	0	0	0	1004	0		1004	0
1521	BLOOR (Resi)	650	0	0	0	0	0		0	650
1523	-	0	0	0	0	0	0		0	0
1524	-	0	0	0	0	0	0		0	0
1525	-	0	0	0	0	0	0		0	0
1529	-	0	0	0	0	0	0		0	0
1531	-	0	0	0	0	0	0		0	0
1535	*No change (not used)*	0	0	0	0	0	0		0	0
1566	MKE (Employment only)	0	0	0	683	745	630		2058	0
1567	MKE (Employment only)	0	0	0	683	745	630		2058	0
1571	MKE - Resi	800	250	50	0	0	0		300	800
1572	-	0	0	0	0	0	0		0	0
1573	*No change (not used)*	0	0	0	0	0	0		0	0
		1450	250	50	1366	2493	1261	0	**5419**	**1450**

2048		**Residential**			**Employment Type (Jobs)**				***Total Jobs***	***louseholds***
Zones Used in Modelling	**Land**	**Dwellings**	**E03**	**E07**	**E09**	**E10**	**E14**		**E01**	**E02**
1515	SEGRO (Employment only	0	0	0	0	1004	0		1004	0
1521	BLOOR (Resi)	800	0	0	0	0	0		0	800
1523	MKE	340	0	0	0	0	0		0	340
1524	MKE	135	0	0	0	0	0		0	135
1525	MKE	360	0	0	0	0	0		0	360
1529	MKE	60	0	0	0	0	0		0	60
1531	MKE	1250	0	0	0	0	0		0	1250
1535	*No change (not used)*	0	0	0	0	0	0		0	0
1566	MKE (Employment only)	0	0	0	1548	1689	1429		4667	0
1567	MKE (Employment only)	0	0	0	1548	1689	1429		4667	0
1571	MKE - Resi	1545	250	50	0	0	0		300	1545
1572	MKE	1260	0	0	0	0	0		0	1260
1573	*No change (not used)*	0	0	0	0	0	0		0	0
		5750	250	50	3097	4381	2859	0	**10637**	**5750**

2031

Zone 1515
Resi 0
Employment yes

1 2 3
Employment Type B8
Job type E10

B8 B2 B1 B8 B2 B1
Employment Size 875,000 81,290 - -
Employment Jobs 1004 1004 0 0

Residential

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	Resi (Total)	9	3	11	5	9	13	3	3	7
	Resi (Internal)									
	Resi (External)									

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	VEHICLES (Total)	206	57	263	59	180	239	89	103	191
	HGV	42	34	76	14	15	29	23	29	53
	CAR / LGV	163	23	186	45	165	210	65	74	139

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2048

Zone 1515
Resi n/a
Employment yes

1 2 3
Employment Type B8
Job type E10

B8 B2 B1 B8 B2 B1
Employment Size 875,000 81,290 - -
Employment Jobs 1004 1004 0 0

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	Resi (Total)	30	9	38	9	17	26	11	26	37
	Resi (Internal)									
	Resi (External)									

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	VEHICLES (Total)	200	55	255	57	176	232	86	100	186
	HGV	41	33	74	13	15	28	23	28	51
	CAR / LGV	159	22	181	43	161	204	63	72	135

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1515	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2031

Zone 1521
Resi 650
Employment n/a

	1	2	3
Employment Type			
Job type			

	B8	B2	B1	B8	B2	B1
Employment Size				-	-	-
Employment Jobs				0	0	0

Residential

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1521	Resi (Total)	73	162	235	145	86	231	84	76	160
	Resi (Internal)	42	53	95	32	23	56	24	23	47
	Resi (External)	31	109	140	112	63	175	59	53	113

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1521	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1521	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1521	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2048

Zone 1521
Resi 800
Employment n/a

	1	2	3
Employment Type			
Job type			

	B8	B2	B1	B8	B2	B1
Employment Size				-	-	-
Employment Jobs				0	0	0

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1521	Resi (Total)	93	173	266	144	98	242	116	110	226
	Resi (Internal)	60	60	60	60	60	60	60	60	60
	Resi (External)	32	113	145	103	58	161	58	53	111

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1521	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1521	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1521	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2031

Zone 1523
Resi 0
Employment n/a

1 2 3
Employment Type
Job type

B8 B2 B1 B8 B2 B1
Employment Size - - -
Employment Jobs 0 0 0

Residential NO CHANGE IN 2031

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1523	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1523	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1523	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1523	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2048

Zone 1523
Resi 340
Employment n/a

1 2 3
Employment Type
Job type

B8 B2 B1 B8 B2 B1
Employment Size - - -
Employment Jobs 0 0 0

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1523	Resi (Total)	21	68	89	55	31	87	42	31	73
	Resi (Internal)	7	20	27	11	7	18	18	8	26
	Resi (External)	14	48	62	44	25	68	25	22	47

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1523	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1523	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1523	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2031

Zone 1524
Resi 0
Employment n/a

	1	2	3				
Employment Type							
Job type							
	B8	B2	B1	B8	B2	B1	
Employment Size				-	-	-	
Employment Jobs				0	0	0	

Residential NO CHANGE IN 2031

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1524	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1524	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1524	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1524	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2048

Zone 1524
Resi 135
Employment n/a

	1	2	3				
Employment Type							
Job type							
	B8	B2	B1	B8	B2	B1	
Employment Size				-	-	-	
Employment Jobs				0	0	0	

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1524	Resi (Total)	9	27	36	22	13	35	17	13	30
	Resi (Internal)	4	8	12	5	3	8	7	4	11
	Resi (External)	5	19	25	17	10	27	10	9	19

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1524	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1524	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1524	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2031

Zone	1525						
Resi	0						
Employment	n/a						
	1	2	3				
Employment Type							
Job type							
	B8	B2	B1		B8	B2	B1
Employment Size					-	-	-
Employment Jobs					0	0	0

Residential NO CHANGE IN 2031

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
	Resi (Total)	0	0	0	0	0	0	0	0	0
1525	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
1525	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
1525	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
1525	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2048

Zone	1525						
Resi	360						
Employment	n/a						
	1	2	3				
Employment Type							
Job type							
	B8	B2	B1		B8	B2	B1
Employment Size					-	-	-
Employment Jobs					0	0	0

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
	Resi (Total)	22	72	94	59	33	92	45	32	77
1525	Resi (Internal)	7	21	29	12	7	19	19	9	27
	Resi (External)	15	51	65	47	26	73	26	24	50

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
1525	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
1525	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
1525	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2031

Zone	1529		
Resi	0		
Employment	n/a		
	1	2	3
Employment Type			
Job type			

	B8	B2	B1	B8	B2	B1
Employment Size				-	-	-
Employment Jobs				0	0	0

Residential NO CHANGE IN 2031

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1529	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1529	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1529	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1529	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2048

Zone	1529		
Resi	60		
Employment	n/a		
	1	2	3
Employment Type			
Job type			

	B8	B2	B1	B8	B2	B1
Employment Size				-	-	-
Employment Jobs				0	0	0

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1529	Resi (Total)	5	12	17	10	6	16	8	6	14
	Resi (Internal)	2	4	6	2	2	4	4	2	6
	Resi (External)	2	8	11	8	4	12	4	4	8

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1529	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1529	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1529	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2031

Zone 1531
Resi 0
Employment n/a

1 2 3

Employment Type
Job type

B8 B2 B1 B8 B2 B1

Employment Size - - -
Employment Jobs 0 0 0

Residential NO CHANGE IN 2031

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1531	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1531	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1531	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1531	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2048

Zone 1531
Resi 1250
Employment n/a

1 2 3

Employment Type
Job type

B8 B2 B1 B8 B2 B1

Employment Size - - -
Employment Jobs 0 0 0

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1531	Resi (Total)	119	262	381	217	139	355	171	149	321
	Resi (Internal)	68	86	154	55	49	104	80	67	147
	Resi (External)	51	176	227	162	90	252	91	82	173

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1531	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1531	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1531	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2031

Zone	1535					
Resi	0					
Employment	n/a					
	1	2	3			
Employment Type						
Job type						
	B8	B2	B1	B8	B2	B1
Employment Size				-	-	-
Employment Jobs				0	0	0

Residential NO CHANGE in 2031

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1535	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1535	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1535	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1535	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2048

Zone	1535					
Resi	0					
Employment	n/a					
	1	2	3			
Employment Type						
Job type						
	B8	B2	B1	B8	B2	B1
Employment Size				-	-	-
Employment Jobs				0	0	0

NO CHANGE in 2048

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1535	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1535	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1535	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1535	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

2031

Zone	1566
Resi	0
Employment	yes

	1	2	3			
Employment Type	B8	B2	B1			
Job type	E10	E09	E14			
	B8	B2	B1	B8	B2	B1
Employment Size	649,323	220483	88193.326	60,324	20,484	8,193
Employment Jobs	745	683	630	745	683	630

Residential

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1566	Resi (Total)	9	3	11	5	9	13	3	3	7
	Resi (Internal)									
	Resi (External)									

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1566	VEHICLES (Total)	153	42	195	43	134	177	66	76	142
	HGV	31	25	57	10	11	22	17	22	39
	CAR / LGV	121	17	138	33	122	156	48	55	103

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1566	VEHICLES (Total)	47	6	53	8	66	74	30	35	65
	HGV	2	2	4	3	2	5	2	2	4
	CAR / LGV	45	4	49	6	63	69	28	33	61

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1566	VEHICLES (Total)	52	5	57	4	51	55	9	10	20
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	52	5	57	4	51	55	9	10	20

2048

Zone	1566
Resi	0
Employment	yes

	1	2	3			
Employment Type	B8	B2	B1			
Job type	E10	E09	E14			
	B8	B2	B1	B8	B2	B1
Employment Size	1,472,500	500000	200000	136,800	46,452	18,581
Employment Jobs	1689	1548	1429	1689	1548	1429

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1566	Resi (Total)	30	9	38	9	17	26	11	26	37
	Resi (Internal)									
	Resi (External)									

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1566	VEHICLES (Total)	337	93	430	96	295	391	145	168	313
	HGV	69	56	125	23	25	48	38	48	86
	CAR / LGV	267	37	305	73	270	343	107	120	227

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1566	VEHICLES (Total)	104	13	117	19	145	163	67	77	144
	HGV	5	5	9	6	5	10	4	4	8
	CAR / LGV	99	9	108	13	140	153	62	73	135

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1566	VEHICLES (Total)	102	9	111	8	99	107	18	20	39
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	102	9	111	8	98	107	18	20	38

2031

Zone	1567					
Resi	0					
Employment	yes					
	1	2	3			
Employment Type	B8	B2	B1			
Job type	E10	E09	E14			
	B8	B2	B1	B8	B2	B1
Employment Size	649,323	220483	88193.326	60,324	20,484	8,193
Employment Jobs	745	683	630	745	683	630

Residential

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1567	Resi (Total)	9	3	11	5	9	13	3	3	7
	Resi (Internal)									
	Resi (External)									

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1567	VEHICLES (Total)	153	42	195	43	134	177	66	76	142
	HGV	31	25	57	10	11	22	17	22	39
	CAR / LGV	121	17	138	33	122	156	48	55	103

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1567	VEHICLES (Total)	47	6	53	8	66	74	30	35	65
	HGV	2	2	4	3	2	5	2	2	4
	CAR / LGV	45	4	49	6	63	69	28	33	61

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1567	VEHICLES (Total)	52	5	57	4	51	55	9	10	20
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	52	5	57	4	51	55	9	10	20

2048

Zone	1567					
Resi	0					
Employment	yes					
	1	2	3			
Employment Type	B8	B2	B1			
Job type	E10	E09	E14			
	B8	B2	B1	B8	B2	B1
Employment Size	1,472,500	500000	200000	136,800	46,452	18,581
Employment Jobs	1689	1548	1429	1689	1548	1429

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1567	Resi (Total)	30	9	38	9	17	26	11	26	37
	Resi (Internal)									
	Resi (External)									

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1567	VEHICLES (Total)	337	93	430	96	295	391	145	168	313
	HGV	69	56	125	23	25	48	38	48	86
	CAR / LGV	267	37	305	73	270	343	107	120	227

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1567	VEHICLES (Total)	104	13	117	19	145	163	67	77	144
	HGV	5	5	9	6	5	10	4	4	8
	CAR / LGV	99	9	108	13	140	153	62	73	135

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1567	VEHICLES (Total)	102	9	111	8	99	107	18	20	39
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	102	9	111	8	98	107	18	20	38

2031

Zone	1571							
Resi	800							
Employment	yes							
	1	2	3					
Employment Type	SECONDAI	COMMUNITY CENTRE						
Job type	E03	E07						
	B8	B2	B1		B8	B2	B1	
Employment Size					-	-	-	
Employment Jobs					0	0	0	

Residential

ZONE	VEHICLES (Cars)	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	Resi (Total)	99	202	301	189	126	315	121	114	234
	Resi (Internal)	60	68	128	51	48	99	48	48	95
	Resi (External)	39	134	173	138	77	215	73	66	139

Employment

ZONE	B8	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

ZONE	B1c / B2	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

ZONE	B1a	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

ZONE	SECONDARY SCHOOL	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	114	82	196	21	14	35	21	27	48

ZONE	COMMUNITY CENTRE	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	PLEASE USE DEFAULT TRIP RATES FROM MKMMM								

2048

Zone	1571							
Resi	1545							
Employment	yes							
	1	2	3					
Employment Type	SECONDAI	COMMUNITY CENTRE						
Job type	E03	E07						
	B8	B2	B1		B8	B2	B1	
Employment Size					-	-	-	
Employment Jobs					0	0	0	

ZONE	VEHICLES (Cars)	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	Resi (Total)	187	336	523	280	194	474	227	220	446
	Resi (Internal)	124	118	242	81	83	163	114	118	232
	Resi (External)	63	218	281	200	112	311	113	102	214

ZONE	B8	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

ZONE	B1c / B2	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

ZONE	B1a	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

ZONE	SECONDARY SCHOOL	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	114	82	196	21	14	35	21	27	48

ZONE	COMMUNITY CENTRE	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
1571	VEHICLES (Total)	PLEASE USE DEFAULT TRIP RATES FROM MKMMM								

Community Hub

	2031									
	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
Trip Rate per job	0.205	0.057	0.262	0.058	0.180	0.238	0.088	0.102	0.191
50 Total Vehicles	10	3	13	3	9	12	4	5	10

	2048								
	AM ARR	AM DEP	AM TOTAL	PM ARR	PM DEP	PM TOTAL	IP ARR	IP DEP	IP TOTAL
Trip Rate per job	0.199	0.055	0.254	0.057	0.175	0.232	0.086	0.100	0.186
50 Total Vehicles	10	3	13	3	9	12	4	5	9

2031

Zone 1572
Resi 0
Employment n/a

1 2 3

Employment Type
Job type

B8 B2 B1 B8 B2 B1

Employment Size - - -
Employment Jobs 0 0 0

Residential NO CHANGE IN 2031

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	SCHOOL	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	VEHICLES (Total)									

2048

Zone 1572
Resi 1260
Employment n/a

1 2 3

Employment Type
Job type

B8 B2 B1 B8 B2 B1

Employment Size - - -
Employment Jobs 0 0 0

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	Resi (Total)	119	264	384	218	140	358	173	150	323
	Resi (Internal)	68	87	155	55	49	104	81	67	148
	Resi (External)	51	178	229	163	91	254	92	83	175

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	SCHOOL	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1572	VEHICLES (Total)									

2031

Zone	1573						
Resi	0						
Employment	n/a						
	1	2	3				
Employment Type							
Job type							
	B8	B2	B1		B8	B2	B1
Employment Size					-	-	-
Employment Jobs					0	0	0

Residential NO CHANGE IN 2031

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

Employment

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	SCHOOL	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	VEHICLES (Total)									

2048

Zone	1573						
Resi	0						
Employment	n/a						
	1	2	3				
Employment Type							
Job type							
	B8	B2	B1		B8	B2	B1
Employment Size					-	-	-
Employment Jobs					0	0	0

NO CHANGE IN 2048

	VEHICLES (Cars)	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	Resi (Total)	0	0	0	0	0	0	0	0	0
	Resi (Internal)	0	0	0	0	0	0	0	0	0
	Resi (External)	0	0	0	0	0	0	0	0	0

	B8	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1c / B2	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	B1a	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	VEHICLES (Total)	0	0	0	0	0	0	0	0	0
	HGV	0	0	0	0	0	0	0	0	0
	CAR / LGV	0	0	0	0	0	0	0	0	0

	SCHOOL	AM			PM			IP		
ZONE		ARR	DEP	TOTAL	ARR	DEP	TOTAL	ARR	DEP	TOTAL
1573	VEHICLES (Total)									

TRANSPORT TECHNICAL NOTE 7 – With Development Modelling Inputs

DATE:	26 March 2021	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – With Development Modelling Inputs		
PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle
CHECKED:	A Smith	**APPROVED:**	A Norcutt

APPENDIX B – INTRA DEVELOPMENT ZONE INPUTS (WSP)

2020.11.16_Internal Trips Distribution v1.04.xlsx

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VersionCtrl

Log of the modifications made to this workbook

Model Map

Version Number	Modification Date	Developer	Comment	Review		
				Reviewed By	Date	Comment
v1.01	*07 Nov 2020*	*APS*	*Set up*			
v1.02	*08 Nov 2020*	*APS*	*Creation of 2048*			
v1.03	*09 Nov 2020*	*APS*	*Issue to AECOM modelling team*	*APS*	*09 Nov 2020*	
v1.04	*09 Nov 2020*	*APS*	*Combined matrices included*	*APS*	*09 Nov 2020*	
v1.05	*13 Nov 2020*	*APS*	*Further information on impacts / uplifts to Total numbers included.*	*APS*		

Intra development Zone Trips

2031

AM

Combined Matrix (Origin and Destination)

Origin:	1515	1521	1523	1524	1525	1529	1566	1567	1571	1572	1 / DEV ZONE	
1515	0	1	0	0	0	0	0	0	1	0	0	3
1521	4	17	0	0	0	0	4	4	24	0	0	53
1523	0	0	0	0	0	0	0	0	0	0	0	0
1524	0	0	0	0	0	0	0	0	0	0	0	0
1525	0	0	0	0	0	0	0	0	0	0	0	0
1529	0	0	0	0	0	0	0	0	0	0	0	0
1566	0	1	0	0	0	0	0	0	1	0	0	3
1567	0	1	0	0	0	0	0	0	1	0	0	3
1571	5	22	0	0	0	0	5	5	31	0	0	68
1572	0	0	0	0	0	0	0	0	0	0	0	0
1531 / DEV ZC	0	0	0	0	0	0	0	0	0	0	0	0
	9	42	0	0	0	0	9	9	60	0	0	

PM

Combined Matrix (Origin and Destination)

Origin:	1515	1521	1523	1524	1525	1529	1566	1567	1571	1572	1 / DEV ZONE	
1515	0	4	0	0	0	0	0	0	5	0	0	9
1521	2	5	0	0	0	0	2	2	12	0	0	23
1523	0	0	0	0	0	0	0	0	0	0	0	0
1524	0	0	0	0	0	0	0	0	0	0	0	0
1525	0	0	0	0	0	0	0	0	0	0	0	0
1529	0	0	0	0	0	0	0	0	0	0	0	0
1566	0	4	0	0	0	0	0	0	5	0	0	9
1567	0	4	0	0	0	0	0	0	5	0	0	9
1571	3	16	0	0	0	0	3	3	25	0	0	48
1572	0	0	0	0	0	0	0	0	0	0	0	0
1531 / DEV ZC	0	0	0	0	0	0	0	0	0	0	0	0
	5	32	0	0	0	0	5	5	51	0	0	

IP

Combined Matrix (Origin and Destination)

Origin:	1515	1521	1523	1524	1525	1529	1566	1567	1571	1572	1 / DEV ZONE	
1515	0	2	0	0	0	0	0	0	2	0	0	3
1521	1	5	0	0	0	0	1	1	14	0	0	23
1523	0	0	0	0	0	0	0	0	0	0	0	0
1524	0	0	0	0	0	0	0	0	0	0	0	0
1525	0	0	0	0	0	0	0	0	0	0	0	0
1529	0	0	0	0	0	0	0	0	0	0	0	0
1566	0	2	0	0	0	0	0	0	2	0	0	3
1567	0	2	0	0	0	0	0	0	2	0	0	3
1571	2	15	0	0	0	0	2	2	28	0	0	48
1572	0	0	0	0	0	0	0	0	0	0	0	0
1531 / DEV ZC	0	0	0	0	0	0	0	0	0	0	0	0
	3	24	0	0	0	0	3	3	48	0	0	

2048

AM

Combined Matrix (Origin and Destination)

Origin:	1515	1521	1523	1524	1525	1529	1566	1567	1571	1572	1 / DEV ZONE	
1515	0	1	1	0	1	0	0	0	2	2	2	9
1521	4	8	1	1	1	0	4	4	17	9	9	60
1523	2	3	0	0	0	0	2	2	6	3	3	20
1524	1	1	0	0	0	0	1	1	2	1	1	8
1525	2	3	0	0	0	0	2	2	6	3	3	21
1529	0	1	0	0	0	0	0	0	1	1	1	4
1566	0	1	1	0	1	0	0	0	2	2	2	9
1567	0	1	1	0	1	0	0	0	2	2	2	9
1571	8	17	2	1	2	1	8	8	34	19	19	118
1572	6	12	1	1	1	0	6	6	25	13	13	87
1531 / DEV ZC	6	12	1	1	1	0	6	6	25	13	13	86
	30	60	7	4	7	2	30	30	124	68	68	

PM

Combined Matrix (Origin and Destination)

Origin:	1515	1521	1523	1524	1525	1529	1566	1567	1571	1572	1 / DEV ZONE	
1515	0	2	1	0	1	0	0	0	4	4	4	17
1521	1	6	2	1	2	0	1	1	11	8	8	41
1523	1	1	0	0	0	0	1	1	2	1	1	7
1524	0	0	0	0	0	0	0	0	1	1	1	3
1525	1	1	0	0	0	0	1	1	2	1	1	7
1529	0	0	0	0	0	0	0	0	1	0	0	2
1566	0	2	1	0	1	0	0	0	4	4	4	17
1567	0	2	1	0	1	0	0	0	4	4	4	17
1571	2	12	3	1	4	1	2	2	23	16	16	83
1572	2	7	2	1	2	0	2	2	14	9	9	49
1531 / DEV ZC	2	7	2	1	2	0	2	2	14	9	9	49
	9	40	11	5	12	2	9	9	81	55	55	

IP

Combined Matrix (Origin and Destination)

Origin:	1515	1521	1523	1524	1525	1529	1566	1567	1571	1572	1 / DEV ZONE	
1515	0	4	2	1	2	0	0	0	7	6	6	26
1521	2	8	2	1	3	0	2	2	16	11	11	58
1523	1	1	0	0	0	0	1	1	2	1	1	8
1524	0	1	0	0	0	0	0	0	1	1	1	4
1525	1	1	0	0	0	0	1	1	3	1	1	9
1529	0	0	0	0	0	0	0	0	1	0	0	2
1566	0	4	2	1	2	0	0	0	7	6	6	26
1567	0	4	2	1	2	0	0	0	7	6	6	26
1571	3	16	5	2	5	1	3	3	33	23	23	118
1572	2	9	3	1	3	1	2	2	19	13	13	67
1531 / DEV ZC	2	9	3	1	3	1	2	2	19	13	13	67
	11	57	18	7	19	4	11	11	114	81	80	

Appendix A.8

TTN8 – MKE PARKING STRATEGY

TRANSPORT TECHNICAL NOTE 8 – MKE Parking Strategy

DATE:	26 March 2021	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Parking Strategy		
PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle / A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

1 INTRODUCTION

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 ('Milton Keynes East' or MKE).

1.1.2. 'Milton Keynes East' (MKE) has been identified as an allocation for a strategic urban extension within Plan:MK. Milton Keynes Council's (MKC) aspirations for the allocation is set out within Policy SD12 of Plan:MK, stating that the land is allocated "for a comprehensive residential-led mixed use development of approximately 5,000 dwellings to meet the needs of Milton Keynes up to 2031 and beyond."

1.1.3. As part of the consultation and review process with MKC officers prior to submission, various elements of the site were discussed, including the approach to public transport, walking, cycling and parking. This Transport Technical Note (TTN8) sets out the car parking strategy which is intended to be adopted for the site and has been shared with MKC to provide justification on the assumptions applied. This TTN also highlights the likely cycle parking standards to be adopted.

2 PROPOSED DEVELOPMENT AND PROMOTING MOBILITY

2.1 Milton Keynes East

2.1.1. 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). 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.

2.1.3. Through discussions with MKC, it has been suggested that a higher number of residential units is tested across the MKE allocation 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.

2.1.4. The MKE development quantum is therefore being assessed, and the final number in the application will be set out in the submission material. It is likely therefore, that Berkeley will submit an application in the region of 4,000 to 4,600 homes, with the higher number accounting for a 15% uplift, as part of a wider 5,750 homes – which includes 15% on the original 5,000 allocation) and 85 hectares of employment / circa 4M sqft (as part of a wider 105 hectares of employment).

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2.2 MKE Development Framework SPD

2.2.1. 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.

2.2.2. The DF SPD sets out in terms of parking;

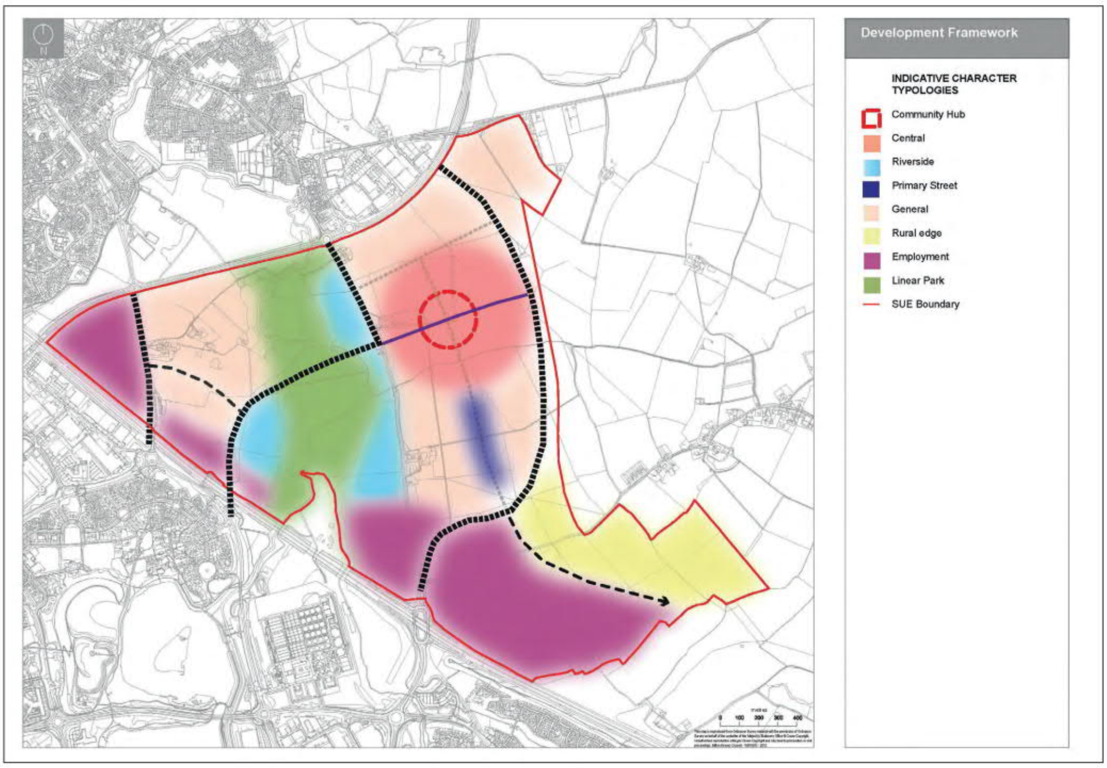
Higher densities around the community hub will increase patronage for the mass transit system. As this area will be well-served by public transport, housing development will be provided with lower levels of parking.

Where lower levels of parking are proposed, developers will be required to demonstrate that there is good accessibility to frequent public transport services, i.e. frequent public transport services to public transport nodes, district/town/local centres, schools and employment areas.

The highest density housing should predominantly be located within walking distance of the mass transit boarding point located within the community hub.

2.2.3. As such the parking strategy has reviewed how the proposed character areas can take advantage of proximity to public transport and higher densities, which in turn will reduce reliance on private vehicle use allowing reduced parking areas. Figure 2-1 below shows the MKE site and corresponding character areas as set out in the DF SPD.

Figure 2-1 – MKE Development Framework SPD – Character Areas



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2.2.4. The character areas and the relative densities (in dwellings per hectare / dph) are shown below;

- District Centre (80 – 100dph)
- Central Area (80 – 100dph)
- Primary Street (40 – 60dph)
- Riverside (40 – 60dph)
- General Area (25 – 40dph)
- Rural Edge (10 – 30dph)

2.2.5. As would be expected on a site like this, the character areas nearest to the centre will include the highest development density. In general terms, towards the outer edges of the development, densities decrease, however it is expected that all areas will have excellent walking, cycling and public transport opportunities.

2.3 Mobility Strategy for Milton Keynes 2018-2036 (LTP4) – 2018 and MK Futures 2050

2.3.1. The parking strategy is aligned closely with the access strategy for the MKE site, alongside the Travel Plans and Public Transport Strategy. The reason behind this is to ensure that the MKE site promotes a balanced approach between private vehicles and promotion of mobility by sustainable modes.

2.3.2. The MK Local Transport Plan 4 (LPT4) acknowledges the need to promote mobility, in all forms, through new developments for future residents as well as allowing existing communities to benefit from improved connections and services.

2.3.3. LTP4 notes that Milton Keynes is forecast to experience significant growth in the future, and MK 2050 strategy outlines the potential housing demands.

2.3.4. LPT4 realises that to accommodate this growth, and the corresponding increases in travel demand, the city needs to:-

- 1. Stabilise average journey times and ensure they remain competitive while **promoting the development of smart shared sustainable mobility** for all; to ensure all travellers and highway users continue to enjoy the levels of mobility required to meet their daily needs through congestion reduction measures.
- **2. Manage parking capacity to support a balance of modes accessing the city centre.**
- **3. Promote the development (and invest where necessary) of smart, shared sustainable, mobility** as described in the MK Futures 2050 report such as improved Public Transport, Cycling & Walking as well as promoting our wider Wellbeing and Health objectives.
- **4. Enable Mobility as Service to flourish within the city , for example mobile journey planning, integrated ticketing and journey arrangements, including shared mobility and approaches such as Demand Responsive Transport to meet growing expectations among younger generations for technology based journey planning rather than vehicle ownership.**
- 5. Further develop and **promote future technologies** such as autonomous and connected vehicles, advanced mass transit options and a connected highway.
- 6. Consider how the city's **future development can enable new smart, shared sustainable mobility** services to succeed.

TRANSPORT TECHNICAL NOTE 8 – MKE Parking Strategy

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MILTON KEYNES STRATEGY FOR 2050

2.3.5. The recent MK Strategy for 2050 document continues from LTP4 in reviewing the parking demand across MK and wider areas in response to expected growth strategies.

2.3.6. The MK 2050 strategy acknowledges that MK's parking provision is generous because of historic focus on cars, especially in the city centre, where a high ratio of parking spaces to jobs and relatively low parking charges. The Strategy outlines that more than one fifth of the space in the City centre is car parking, and prioritising attractive alternatives to the car will create possibilities to utilise that space differently.

2.3.7. The 2050 Strategy states that the transport, parking and land use approaches should work together to deliver an improved mobility network. This suggests the use of strategies such as 'park and ride' services, which will be more attractive in cost and time than driving to and parking in the City centre. In addition, Mass Rapid Transit (MRT) services will also be focused on and made attractive through priority at junctions where possible and fares that are competitive with parking charges.

2.3.8. The MK 2050 Strategy continues to acknowledge the importance of technology to allow people to plan journeys across different transport modes, book on-demand shared services and pay for journeys or parking through a single payment system that covers all transport providers.

2.3.9. The MK 2050 Strategy seeks to provide mobility for all and to make walking and cycling the first choice for most local journeys, making these more sustainable and more ingrained healthy travel choices. The Strategy summarises that this should be supported by reducing road speeds within developments and high quality paths and Redways that link to the wider mobility network. Secure and convenient cycle storage will also be important at homes and destinations, and developments should look at different ways to provide parking, especially as community pool car schemes and other new approaches to mobility emerge.

MKE AND POLICY

2.3.10. WSP has outlined in bold key points that need to be considered from LTP4 when developing the strategy for MKE. Essentially, the site will need to maximise the travel choices available to its residents and employees, without promoting damaging behaviours or technology (such as purely private vehicle led).

2.3.11. The MKE site will therefore look to provide an integrated journey, making transport available on a variety of technology platforms. This is considered essential, and acknowledge in LTP4 and MK 2050 Strategy, as today's travellers increasingly prefer good connectivity over the car both for journey planning and to stay connected on the move.

2.3.12. The MKE site will also look to use Mobility as a Service (MaaS) and has approached a number of suppliers on the scheme to get their views. This makes the most of new innovations and technology. Currently commuting by private car results in significant wasted resource being parked instead of used. New technology is now bringing new transport service models which support better use of on demand transport where vehicles are used "borrowed/hired" only as part of a journey enabling transport to be provided as a service reducing the need for car ownership. This is especially true for multiple car ownership allowing families to manage their budgets better.

2.3.13. The MKE site will support and encourage use of active modes throughout its design, which delivers health benefits, supports the council's Health and wellbeing Strategy, and is complementary to the aim to increase walking and cycling trips, whilst minimising CO2 and other pollutant emissions. Equally, and just as important, the development will ensure the safety of all travellers as a key priority throughout the masterplan design, with green corridors and red ways forming an integral element of the site access strategy.

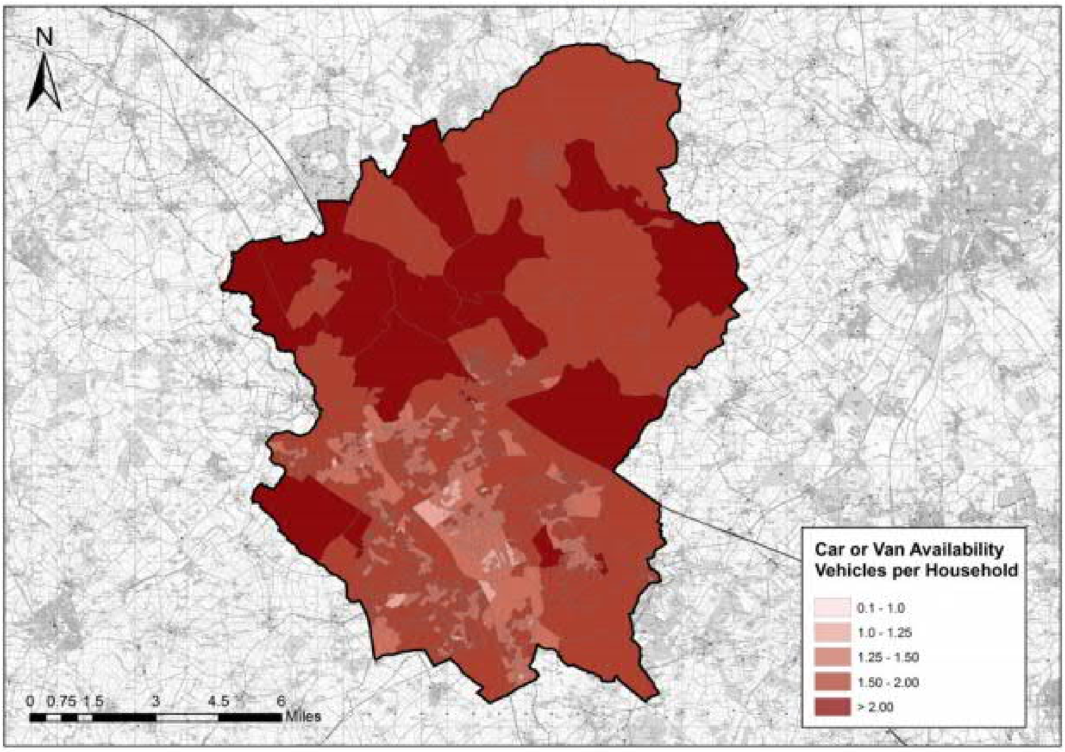
2.3.14. The reason in highlighting the above and the aspirations from LTP4 is that a change in thinking towards parking provision is needed, alongside supporting measures, to help positive travel behaviour be implemented at the site from the very beginning. This is further promoted and supported in the MK 2050 Strategy.

2.3.15. The MKC Mobility Strategy 2018 – 2036 set outs how programmes for influencing behaviour can be delivered which challenge embedded perceptions and tackle the habitual default use of the car. This is especially critical given the town's growth ambition, and it is important that they are implemented alongside infrastructure improvements and other interventions which will provide residents with real transport choices which enable and encourage more sustainable travel behaviour.

2.3.16. The car ownership per household in the Borough is highlighted in Figure 2-1. It shows the spatial distribution of car and van vehicles per household across the borough at the time of the last census (2011).

Figure 2-1 – Car Ownership across MKC (Taken from LTP4)

Figure 15 Car ownership – per household[21]



2.3.17. As expected, car ownership is sparser within CMK, where amenities are within walking or cycling distance and where there is access to more public transport options. Rural areas to the east and west of the Olney corridor show the highest car ownership per household, where public transport is least accessible.

2.3.18. Accessibility is one of the key issues preventing the use of public transport. Large rural areas, low density neighbourhoods in the city and complexity of urban estate networks make it difficult to provide a fast, frequent and efficient transport service, therefore reinforcing car ownership and car trips.

2.3.19. The MKE site will have a comprehensive public transport strategy alongside a walking and cycling strategy that maximises the ability for residents and employees to travel without having to resort to private vehicle.

2.3.20. This is important as an increase in cycling for example, can support a wide range of local objectives such as; improving public health and tackling health inequalities, reducing carbon emissions, improving air quality and reducing congestion.

TRANSPORT TECHNICAL NOTE 8 – MKE Parking Strategy

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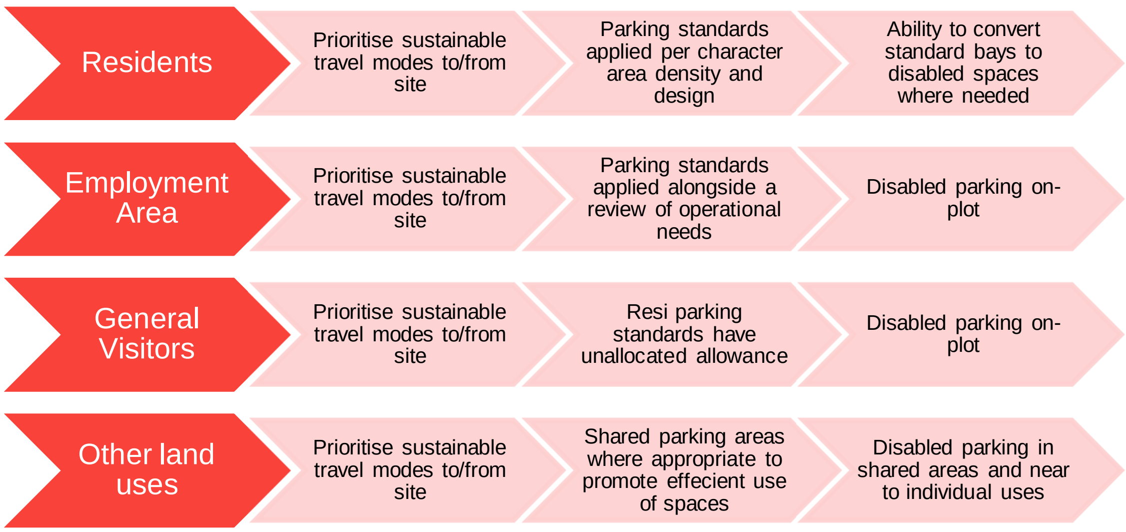
3 REVIEW OF PARKING REQUIREMENTS

3.1 Context

3.1.1. This TTN Note has been prepared to summarise the design assumptions made and provisional strategy developed with respect to vehicular parking associated with the MKE site.

3.1.2. Each land use has been split down into user groups and the parking expectation of each user group then outlined. A summary of this process is provided in Figure 3-1.

Figure 3-1: Parking Provision by User Type



3.1.3. For the majority of users of the site sustainable transport modes should be prioritised before private vehicular use. However, it is acknowledged that there is a requirement for some car parking to meet the needs of residents, employees and visitors.

3.1.4. It is proposed that the parking standards applied are reviewed over time and as each phase comes forwards. This will allow the MKE development to respond to future technologies and updated demand profiles in later years. For example, parking demand may go down as car use decreases and shared mobility increases, so it would be beneficial to re-utilise space required for parking instead of having wasted tarmac.

3.1.5. However, for the purposes of the masterplan and the proving layout, a parking standard has been applied that is pragmatic and corresponds with the density in each area. Alongside this, is the supporting network of complimentary measures that help reduce the reliance on private vehicle.

3.1.6. For residential parking consideration has been given to the standards that have been adopted in other large cities across the country as well as the current and emerging policy within Milton Keynes.

Further to this, and to reflect the character areas and density aspirations of the development a review of the most applicable parking standards based on current MKC zones has been applied.

3.1.7. The parking on site will be supported by a number of measures including a comprehensive public transport strategy, walking and cycling strategy, connections to public rights of way alongside future mobility iniatives and travel planning options e.g. car club.

3.1.8. A review of the MKC standards has also been considered for employment and has been implemented in line with commercial and operational needs associated with the land use.

3.1.9. For the other land uses and the community hub, it is proposed that shared parking facilities are provided that maximise the flexibility of the area. Complimentary land uses allow shared parking to be utilised, which fulfils one of the Development Framework SPD requirements.

3.2 Development of Strategy

3.2.1. During the development of the site layout for the outline application, due consideration has been given to the current standards and recent discussions held with MKC officers have set out the need to review the amount of parking provided within different areas of the masterplan depending on the specific land uses.

3.2.2. Currently, the applicable parking standards are detailed in MKC's document entitled *Parking Standards - Supplementary Planning Document* (January 2016). It is noted that MKC are reviewing their parking standards, however it is understood that these have not been formally adopted yet.

3.2.3. Parking requirements across the site have been calculated for each land use reflecting the sustainable aspirations of the development. Figure 3-1 outlines the parking methodology applied to each land use to identify appropriate parking standards.

3.2.4. It should be noted that the MKE will also include land for a potential Park and Ride facility and as such it is considered that a large number of users would be able to utilise this not only for access to central Milton Keynes but also access to the community facilities at MKE itself. They would then be able to use public transport / shuttles proposed to transfer to the central areas of MKE, most notably the potential MRT. For the purposes of this TTN, a review of land use specific parking standards and strategies will be presented.

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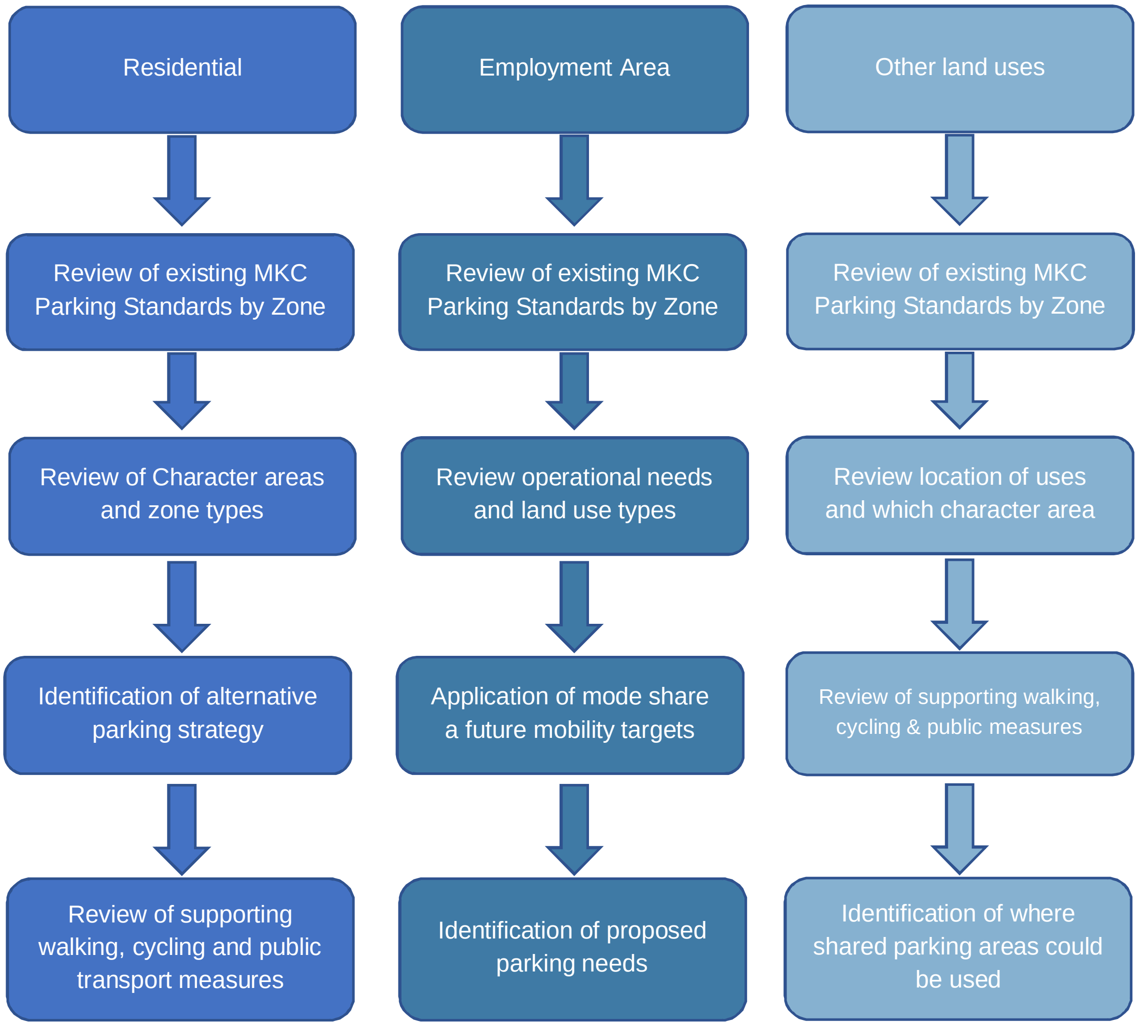
Figure 3-1 – Car Parking Flow Chart



3.2.5. The MKE development will be a highly connected site, with improved public transport and walking / cycling connections. Furthermore, as set out in the Development Framework SPD, 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.

3.2.6. Disabled users would be catered for by provision of parking spaces either on-plot or adjacent to specific land uses.

3.2.7. 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 in Chapter 4 below.

4 RESIDENTIAL PARKING STRATEGY

4.1 Current Standards

4.1.1. The current MKC residential (use class C3) parking standards applicable to each of the zones outlined above are summarised in Table 4-1 below.

4.1.2. The 2016 Supplementary Planning Document (SPD) applies a zonal approach to the parking provision:

- Zone 1: Central Milton Keynes and Campbell 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.

Table 4-1 – MKC 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)

4.1.3. It is considered that reviewing against current SPD mapping, in geographic terms only, 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.

4.2 Proposed Strategy

4.2.1. It is proposed that a mix of parking standards that reflect the character areas of the Development Framework and MKE proposals are applied.

4.2.2. MKC's "The Mobility Strategy 2018 – 2036" acknowledges that MK has a historic reliance on car use and relative high car ownership in CMK (compared to the rest of England). The 2018 – 2036 Mobility strategy seeks to continue the programmes set out in LTP3, to influence travel behaviour and challenge the embedded default use of the private vehicle.

4.2.3. The proposals at MKE therefore need to balance the need between parking provision for residents that is at a suitable level without promoting car use, whilst at the same time offering real alternatives to private vehicle use through walking, cycling and public transport options.

4.2.4. For residential land uses there is generally no direct link between usage and overall parking demand as cars are generally only used for a fraction of the time. Instead, consideration has been given to how cars will be used in the future with reference to other exemplar schemes.

4.2.5. The pattern of car ownership is changing with the traditional hire purchase method being phased out and in its place car manufacturers have been offering personal leasing. The uptake in personal car leasing has meant that the length of time people own a car has reduced.

4.2.6. In larger urban areas alternative car ownership models have emerged with car clubs and ride hailing services growing. Whilst initially research has suggested that car clubs assist in removing the need for a second car, over time it is anticipated that the growth of this sector has the potential to remove the need for car ownership entirely for some families.

4.2.7. Combined with this is the growth in personal travel. Initially this was seen with the growth of smartphones that could plan for you how to get from A to B. However, this is now evolving with the development of ride hailing services, car clubs, cycle hire and demand responsive bus travel. Combined, these services are known as Mobility as a Service (MaaS). Over time it is anticipated that levels of car ownership will reduce, albeit the demand for travel will still exist, but catered for across multiple modes of transport within a MaaS transport ecosystem.

4.2.8. Whilst strategic developments that plan for this future MaaS scenario are currently rare the current MKC parking SPD acknowledges that parking demands based on dwelling types do change, but does not necessarily account for how complimentary services can assist in reducing private vehicle use. This also aligns with the LTP4 strategy to capitalise on MaaS where possible to respond to changes in private vehicle use.

4.2.9. It is not just the number of spaces that are provided which will dictate the propensity for residents to own and use a private vehicle. In addition to provision, consideration should be given to how parking is managed.

4.2.10. Other exemplar sustainable schemes such as BedZED in Hackbridge (South London) and Vauban in Freiburg (Germany) do not feature parking within the curtilage of properties. Instead parking is located remote from the dwellings and the use of parking spaces is charged. In these examples, the additional provision of a car club assists in encouraging families not to own a vehicle. These examples could be considered for use within certain areas or later phases of MKE and could be used to encourage sustainable living and being located in large urban areas.

4.2.11. Acknowledging the scale of the development proposed at MKE it is recommended that vehicular access and parking is permitted to properties within a mixture of on plot and on-carriageway solutions.

4.2.12. Whilst the below will form the over-arching parking strategy for the site, it is suggested that parking provision is reviewed as each Phase comes forward. This will enable a review of measures and initiatives to be undertaken to inform the parking numbers for the next area. This will allow both a re-distribution of parking areas should demand decrease, or increased provision of other modes (such as improved public transport options) to ensure that parking levels and car use stayed at the same levels.

TESTED CAR PARKING STANDARDS WITHIN THE MASTERPLAN

4.2.13. The clients and architectural team have tested a number of scenarios within the masterplan site to understand the implications of parking on land take; including a lower provision of parking within the central zones (Zone 1) to reflect the higher density and higher connectivity in those locations.

4.2.14. Acknowledging the comments made by MKC Officers and query over the acceptability of using Zone 1 within the central parcels of the site, the team have also tested what the impact would be if the central character area were allocated as Zone 2. This would require approximately 1Ha of land to provide the additional visitor parking.

4.2.15. As the site develops and as each RMA comes forward it is likely that parking standards will be reviewed to ensure that best practice is applied that responds accurately to latest trends and data. Whilst early stages will apply agreed parking standards, later phases may review the demand and uptake and seek alternative provision. This will allow the MKE site to follow the principles set out in LTP4 and MK 2050 Strategy documents – minimising car dominated landscapes, instead focusing on sustainable travel connections and lower private vehicle use.

PARKING STANDARDS APPLIED

4.2.16. Reviewing the distinct character areas, the likely housing density and supporting infrastructure, it is considered appropriate to apply a varying standard across the areas.

4.2.17. Preliminary discussions with MKC Officers have indicated that where Zone 3 is indicated, this should be provided in full, and Zone 2 could be applicable in higher density areas. As discussed above we consider the use of Zone 1 in the central / district areas would be applicable on the basis that it is supported by the green links, cycle parking, public transport (including high frequency bus services and potential MRT).

4.2.18. However, to begin with, it is acknowledged that parking provision in line with current standards will be required for the initial phases. This is so the site can be flexible whilst the sustainable infrastructure is being introduced and before advances in future mobility are ready higher ratios of provision could be provided with a view to this being reviewed through the Travel Plan monitoring process. Subsequent phases of MKE would then be monitored to ensure that the parking provided was adequate, but did not promote car use over sustainable options.

4.2.19. To support this lower level of provision and the management strategy, measures to encourage lower levels of car ownership will therefore be essential.

4.2.20. Car clubs could be considered for the new development and areas where a lower parking ratio is to be applied. Under the current parking standards, the parking ratio is relatively high. Car clubs in this location could therefore provide an alternative and support the lower level of parking proposed. To meet the standards for a healthy new community, the provision of sufficient high-quality cycle parking and high-quality cycling and walking routes will also be important.

4.2.21. The parking standards applied at this stage are shown in Tables 4-2 and 4-3 below;

Table 4-2 – Car Parking Provision – Zones and Standards

CHARACTER AREA	DENSITY	PARKING STANDARDS APPLIED	COMMENTS
District Centre	80 – 100dph	**Zone 2***	Highest level of public transport accessibility, access to other land uses, access to interchange and mobility hubs.
Central Area	80 – 100dph	**Zone 2***	Highest level of public transport accessibility, access to other land uses, access to interchange and mobility hubs.
Primary Street	40 – 60dph	Zone 2 or 3 (**Zone 3** adopted for the purposes of the application)	Good level of public transport access, and access to key walking and cycling links. Lower density reflected in standards.
Riverside	40 – 60dph	Zone 2 or 3 (**Zone 3** adopted for the purposes of the application)	Good level of public transport access, and access to key walking and cycling links. Lower density reflected in standards.
General Area	25 – 40dph	**Zone 3**	Good level of public transport access, and access to key walking and cycling links. Lower density reflected in standards.
Rural Edge	10 – 30dph	**Zone 4**	Medium level of public transport access, still good access to walking and cycling but standards reflect the distance to other uses.

*The early delivery of some of the Community facilities, alongside public transport and mobility provision will ensure that sustainable trips are prioritised over private vehicle use. As such, reduced or shared parking may be utilised in the Hub and central areas to provide flexibility as the site develops.

Table 4-3 –Car Parking Provision - Standards

	DISTRICT CENTRE CENTRAL AREA	PRIMARY STREET RIVERSIDE GENERAL AREA	RURAL EDGE
Dwelling Size	**Zone 2**	**Zone 3**	**Zone 4**
1 bedroom flat/house	1+0.33 unallocated	1+0.33 unallocated	1+0.33 unallocated
2 bedroom flat	1+0.33 unallocated	1+0.75 unallocated	1+0.75 unallocated
2 bedroom house	1+0.33 unallocated	2+0.25 unallocated	2+0.25 unallocated
3 bedroom house	2+0.33 unallocated	2+0.5 unallocated	2+0.5 unallocated
4+ bedroom house	2+0.33 unallocated	2+0.5 unallocated	3+0.33 unallocated

4.2.22. Table 4-3 outlines the applied standards within the MKE site, including the provision for visitor / unallocated space.

ALTERNATIVE RESIDENTIAL LAND USES

4.2.23. Whilst the detailed residential tenure and quantum profile is indicative, it is important to note that the development may include alternative residential uses within areas. Discussions with MKC have outlined that the introduction of Later Living (C2) units / parcels in the Site could be implemented in the Site.

4.2.24. As an example, C2 uses, applying the 2016 Parking SPD have a lower parking standard compared to a C3 use (apartments).

4.2.25. Depending on the type of later living / assisted living unit, it is considered that for a similar size plot C3 land uses could generate the need for 3 times as much parking as compared to C2 uses. This is an important consideration and enables the site to have flexibility in its parking stock provision as each phase comes forward should the land uses change.

4.2.26. It should be noted that the masterplan has not applied any Later Living units within the tests, and for the application has based the parking quantum on residential (C3) flats and house types.

4.3 Employment

4.3.1. It is widely acknowledged that restricting parking at the trip end is an effective way of influencing the way in which people choose to travel to work. This is supported by the successful implementation of the workplace charging levy in Nottingham which seeks to discourage parking and generate revenue for transport improvements.

DATE:	26 March 2021	**CONFIDENTIALITY:**	Public
SUBJECT:	Milton Keynes East – Parking Strategy		
PROJECT:	Milton Keynes East	**AUTHOR:**	R O'Boyle / A Smith
CHECKED:	A Smith	**APPROVED:**	A Norcutt

4.3.2. Potential parking demand has been calculated based upon two measures. Firstly, based upon staffing levels and secondly based upon the anticipated daily vehicular trip generation.

4.3.3. 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 4-4 below:

Table 4-4 - 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.

4.3.4. 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.

4.3.5. For the purposes of the application, the Employment uses will be based on **Parking Zone 3** standards.

4.3.6. The employment area is designed to B8 layouts on the basis that B1, B2 don't require same yard space and is car parking is required, it can utilise that space.

4.3.7. As B8 uses have lower employment densities compared to B1*abc* and B2 uses, it would be sensible to include flexibility and use of Zone 2, dependent / subject to employment densities as the employment area comes forward.

4.3.8. Whilst it is acknowledged that shift patterns in logistics tend to make public transport use less efficient, the MKE site will look to make use of feeder buses, electric bikes and e-scooters. This may require the use of a central management company, however is a positive way in encouraging non private vehicle use across all employment types at the site.

4.3.9. With the employment area, there is a potential opportunity to promote a space the assists with a wider MKC strategy, that could include vehicles / HGV parking from Magna Park / Segro and other employment sites. For example, should the MKE employment area not need as much operational parking, then that space could be utilised by others, with corresponding facilities for drivers. Whilst this isn't being proposed within this application, there is an ability to review this as the development builds out.

4.4 Education and Other uses

4.4.1. The primary schools and secondary schools have been designed to be an integral part of the community accommodating pupils who live on the site. Coupled with this, the masterplan and associated green link strategy allows residents to connect to central land uses sustainably, utilising walking and cycling corridors throughout the site.

4.4.2. As such, limited parking will be provided for education to ensure that private vehicle use is limited and that walking, cycling and public transport are prioritised. It is recommended that parking for disabled visitors (as a minimum - two spaces) along with space for mini-buses and coaches for pick-up/drop-off is provided on-plot for each school.

4.4.3. The summary of the current MKC minimum parking standards as outlined in the Parking Standards SPD is provided in Table 4-5 below.

Table 4-5 - 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.

4.4.4. 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.

4.4.5. Considering the availability of links for education and that schools have a great potential to imbed sustainably based travel from the outset, it is suggested that parking is reviewed and provided in line with the **Zone 1** standards. This would be reviewed before each school came forward, however, providing too many spaces at either primary or secondary schools will undermine the sustainable strategy for the site.

Other Land Uses / Community Hub

4.4.6. The development proposals also include a provision of a local centre with a range of facilities such as healthcare, retail and leisure. The uses within the community hub are being kept flexible at this stage to allow types to be development as market conditions develop. It is suggested that some shared parking between some of the land uses (e.g. small supermarket, café, community hall etc.) is utilised to maximise the efficiency of the space.

4.4.7. The community Hub is designed with walking / cycling connections and the promotion of green routes to encourage use of sustainable modes at its forefront. The use of shared parking facilities also fits the requirements from the MKE Development Framework which suggests;

The co-location of facilities and shared use of parking will be actively encouraged. Public parking should be provided that will be available to all users of the centre.

4.4.8. The community Hub and central areas will seek to reduce car dominance and reliance on private vehicle use where possible. This will be achieved through design and implementation of sustainable measures, such as public transport and walkable neighbourhoods.

4.4.9. As such these areas may apply lower parking provision in certain areas. The masterplan has flexibility to provide additional parking areas nearby to the community hub should the demand arise.

Supporting Masterplan Features

4.4.10. The MKE masterplan provides additional features such as parks, playing fields and burial grounds etc. It is proposed that small pockets of additional parking is provided at the larger scale locations, which will be reviewed in the detailed design stage. Smaller parks and green spaces will not have dedicated parking areas, as these will be directly accessible via green links and car parks nearby will promote car use instead of uptake in walking and cycling.

4.4.11. The residential parking standards do allow for visitor parking, and so it is expected that in certain areas these visitor parking spaces will be concentrated for use by residents and non-residents. This is an efficient use of space as those travelling to other features in the masterplan, such as the burial ground are likely to stay for a short duration during the day. Visitors spaces are typically utilised in the evening, and so there will be less conflict between user groups.

4.5 Parking for Electric Vehicles

4.5.1. The current parking SPD 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 4-6 below as a minimum but actively seek to improve on this across all areas.

Table 4-6 - 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

4.5.2. It should be noted that the standards above are for non-residential developments only. Berkeley St James are committed to delivering flexibility and EV provision to its new residents and so is looking to deliver 100% active chargers for houses, and 100% passive provision for apartments. This will be reviewed as each RMA stage comes forward, but outlines their commitment to EV use at MKE from the outset.

4.5.3. For employment areas specifically, it is proposed to have 10% passive charging EV spaces, with an ability to provide further passive provision for conversion at a later date. This will include reviewing EV technology for vans, LGVs and HGVs as well as employees private vehicles.

4.6 Parking for People with Disabilities

4.6.1. 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 as a minimum, 5% of provision for employment uses and 6% of all other non-residential use classes should be suitable for blue badge holders

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

4.7 Cycle Parking

4.7.1. 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.

4.7.2. Cycle parking standards are also detailed in the SPD. Table 4-7 below provides a summary of the residential cycle parking standards.

Table 4-7 – 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

4.7.3. Similar to the vehicular parking for other uses, the cycle parking standards provided in the Parking Standards SPD would be applied to other land use classes accordingly.

4.7.4. The MKE site will, as a minimum, provide cycle parking in line with the standards above. However, it is likely that the site will go above this, especially at key areas, such as interchange points and the community hub.

Appendix A.9

TTN9 – MKE WALKING AND CYCLING STRATEGY

TRANSPORT TECHNICAL NOTE: TTN9 Walking and Cycling Strategy

DATE:	26 March 2021	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Milton Keynes East – Walking and Cycling Strategy		
PROJECT:	Milton Keynes East	**AUTHOR:**	Filip Imramovsky / Elena Cristobal
CHECKED:	Alex Smith	**APPROVED:**	Allan Norcutt

1. INTRODUCTION

1.1 INTRODUCTION

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 are 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 detailed in the Transport Assessment submitted in support of the application, with Berkeley St James controlling the majority of the allocated land.. It is acknowledged that other landholders will also prepare separate applications under the framework umbrella, hence why this Walking and Cycling Strategy refers to the Berkeley St James site only.

1.1.5. **Table 1-1** 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 TTN9 AIM AND PURPOSE

1.2.1. This Transport Technical Note 9 (TTN9) aims to provide an initial walking and cycling strategy for the proposed development in alignment with the masterplan development assessed within the planning application for the MKE site.

1.2.2. This strategy has been produced through a review of existing walking and cycling infrastructure to connect and expand into the site reflecting the sustainable aspiration of the development, and identifies the key movement corridors and infrastructure that are proposed to create sustainable development.

1.2.3. Consideration is given within this TTN9 to:

- current conditions around and within the MKE site;
- forecasted walking and cycling patterns;
- key origins and destinations for walking and cycling trips to, from and within the site;
- the aspirations for achieving a high level of walking and cycling; and
- the masterplan strategy implemented to facilitate the forecasted travel patterns and encourage them by design.

2 EXISTING WALKING AND CYCLING CONDITIONS

2.1 INTRODUCTION

2.1.1. The MKE site is accessible to several walking and cycling routes in and around Milton Keynes. Many of the routes provide direct connections to key destinations in the local area, mostly alongside the existing highway network. There are however additional segregated routes which provide users with additional leisure walking and cycling infrastructure.

2.1.2. It should be emphasised, however, that the MKE site is a relatively large extent of geographic area of predominant rural character. Consequently, the site as currently is generates a very limited number of trips which means that the current walking and cycling demand is not significant.

2.1.3. In consideration of the currently low walking and cycling demand, this chapter of this TTN9 details the active travel infrastructure to which the MKE site connects, forming the basis of the future walking and cycling strategy designed for future users.

2.2 REDWAY NETWORK

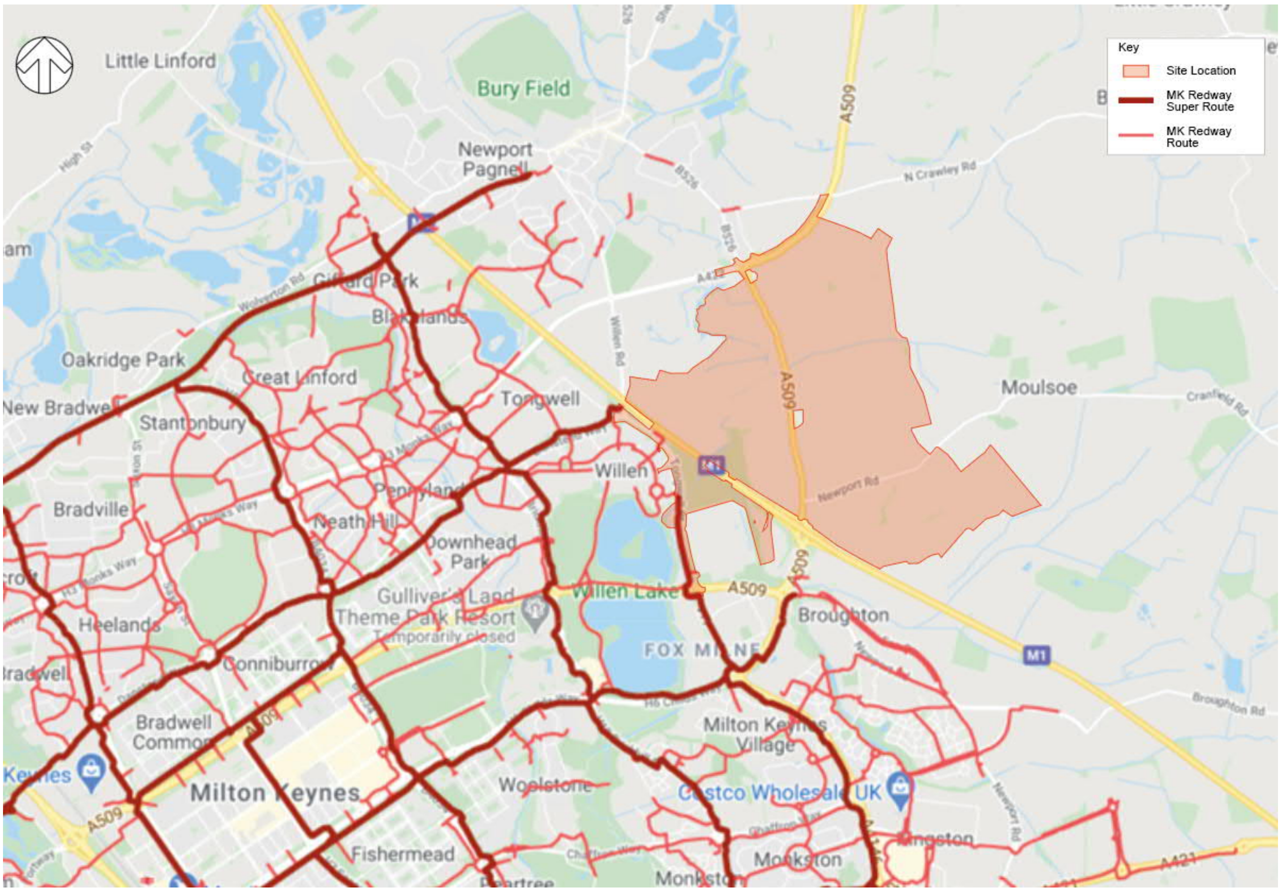
2.2.1. Redways are shared-use, traffic-free, routes for people on foot or cycles and are popular for both leisure and commuting. Milton Keynes and its immediate vicinity benefits from over 200 miles of shared-use paths for cycling and walking known as Redways. The traffic-free network covers most of the city with connections to nearby towns, such as Newport Pagnell to the northwest of the MKE site.

2.2.2. Most of the Redway routes are paved with a distinctive red tarmac, separate from the local highway network and sign-posted with standardised wayfinding.

2.2.3. The network is being continuously developed with improved wayfinding, vegetation cutback, cycle-friendly road junction design and extensions in certain areas to improve access to the network.

2.2.4. The Redway network consists of Redway Super Routes and Redway Routes running through Milton Keynes, creating direct routes for cycle commuters. These routes closely follow the grid roads and link residential areas to key destinations such as the city centre, railway stations and employment areas. The Redway network is illustrated below in the context of the MKE site.

Diagram 2-1: MKE – Redway Network



Source: MKC, 18/02/2021 (https://www.getsmartertravelmk.org/cycling/redways)

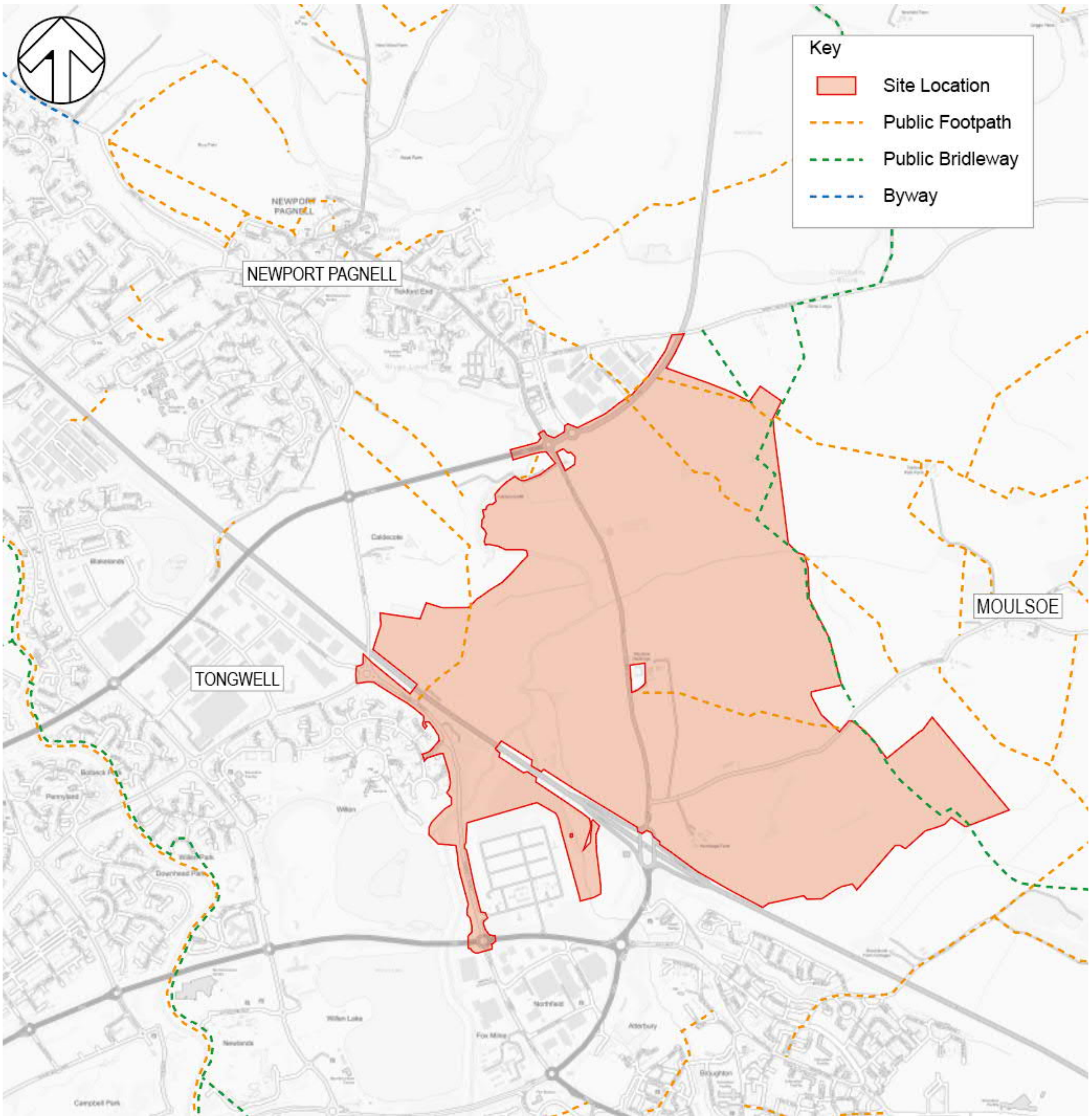
2.2.5. As illustrated above, the Redway network is accessible from the MKE site via Willen Road and Tongwell Roundabout, where one of the Super Routes currently terminates. The other Routes can be accessed via Tongwell Street further to the south.

2.3 PUBLIC RIGHTS OF WAY

2.3.1. Several Public Rights of Way (PRoWs) consisting of public footpaths and bridleways, run through or in the vicinity of the MKE site and provide connections to the wider area via the existing footway network. This infrastructure provides walking connections in addition to the Redway Network which has been detailed in the previous section.

2.3.2. The PRoW network in the vicinity of the MKE site and within the site boundary is illustrated below and has been considered as part of the masterplan to align with current connections and internally deviate them only where necessary in order to improve desire lines.

Diagram 2-2: MKE – PROW Network



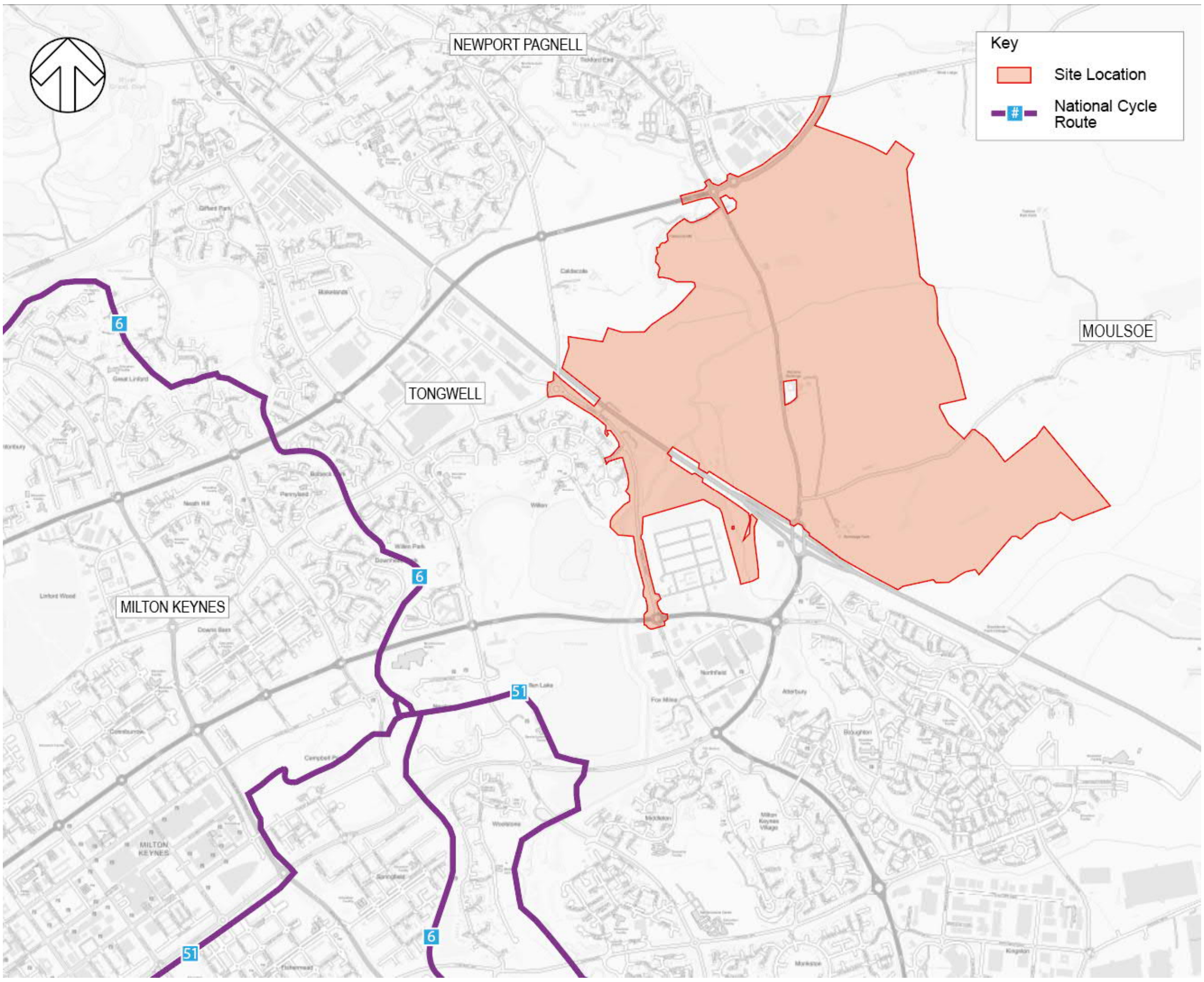
Source: MKC, 18/02/2021 (https://mapping.milton-keynes.gov.uk/mymiltonkeynes.aspx)

2.4 NATIONAL CYCLE NETWORK

2.4.1. In addition to the Redway and the PRoW networks, Milton Keynes and its immediate vicinity (including the MKE site) benefit from an extensive network of both on and off-road cycle routes providing both leisure and commuting opportunities in the area.

2.4.2. There are two National Cycle Network (NCN) routes running in the proximity of the MKE site, National Cycle Routes (NCR) 6 and 51. The routing of each is illustrated in **Diagram 2-3**, with corresponding descriptions provided below.

Diagram 2-3: MKE – National Cycle Network



Source: MKC, 18/02/2021 (https://mapping.milton-keynes.gov.uk/mymiltonkeynes.aspx)

2.4.3. NCR 6 is a long-distance route between London and the Lake District via Luton, Milton Keynes, Northampton, Leicester, Sheffield and Manchester amongst others.

2.4.4. Through Milton Keynes, NCR 6 runs in a broadly south to north direction approximately 1.6km from the MKE site, being predominantly traffic-free. NCR 6 can be accessed from the MKE site via the local cycle routes within a 6-minute cycling distance (based on a typical cycling speed of 16km/h).

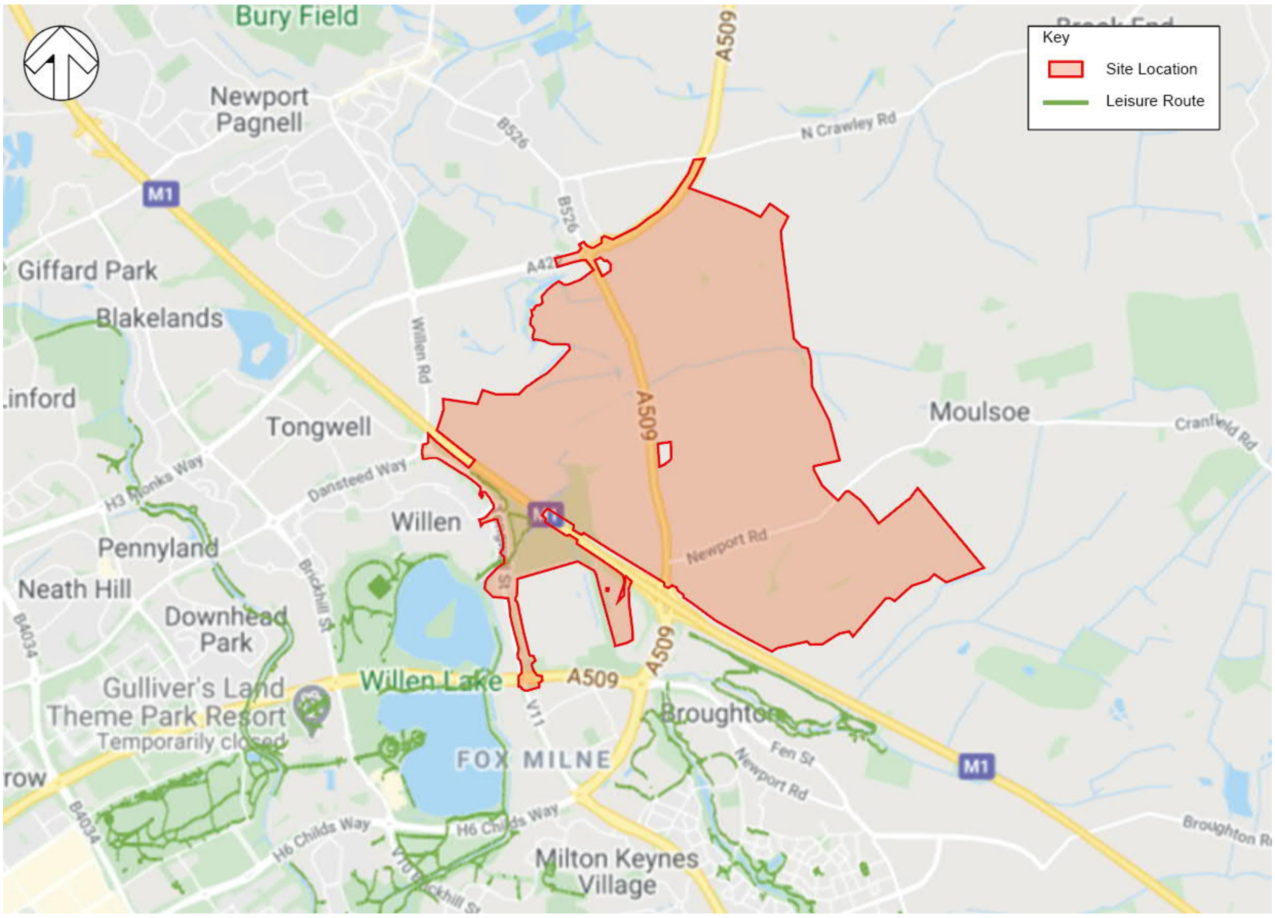
2.4.5. NCR 51 is also a long-distance route that connects major cities in the south of England. It links Oxford with Cambridge via Milton Keynes and Bedford. Past Cambridge it continues via Bury St Edmunds and Ipswich to the coast at Felixstowe before continuing to Harwich and Colchester.

2.4.6. NCR 51 through Milton Keynes is traffic-free, becoming an on-road route upon its way out of the city towards the M1 motorway and further northeast. NCR 51 runs through Milton Keynes in a distance of approximately 2.5km from the MKE site, and is accessible via the local cycle routes and NCR 6 within a 9-minute cycling distance (based on a typical cycling speed of 16km/h).

2.5 LEISURE CYCLE ROUTES

2.5.1. In addition to the Redway and PRoW network, there are several leisure traffic-free cycle paths across Milton Keynes, all located to the south of the MKE site. These predominantly leisure routes can be found in parks and by rivers and lakes and are accessible from the Redway network. The locations and routing of these in relation to the MKE site are shown in **Diagram 2-4** below.

Diagram 2-4: MKE – Leisure Routes



Source: MKC, 18/02/2021 (https://mapping.milton-keynes.gov.uk/mymiltonkeynes.aspx)

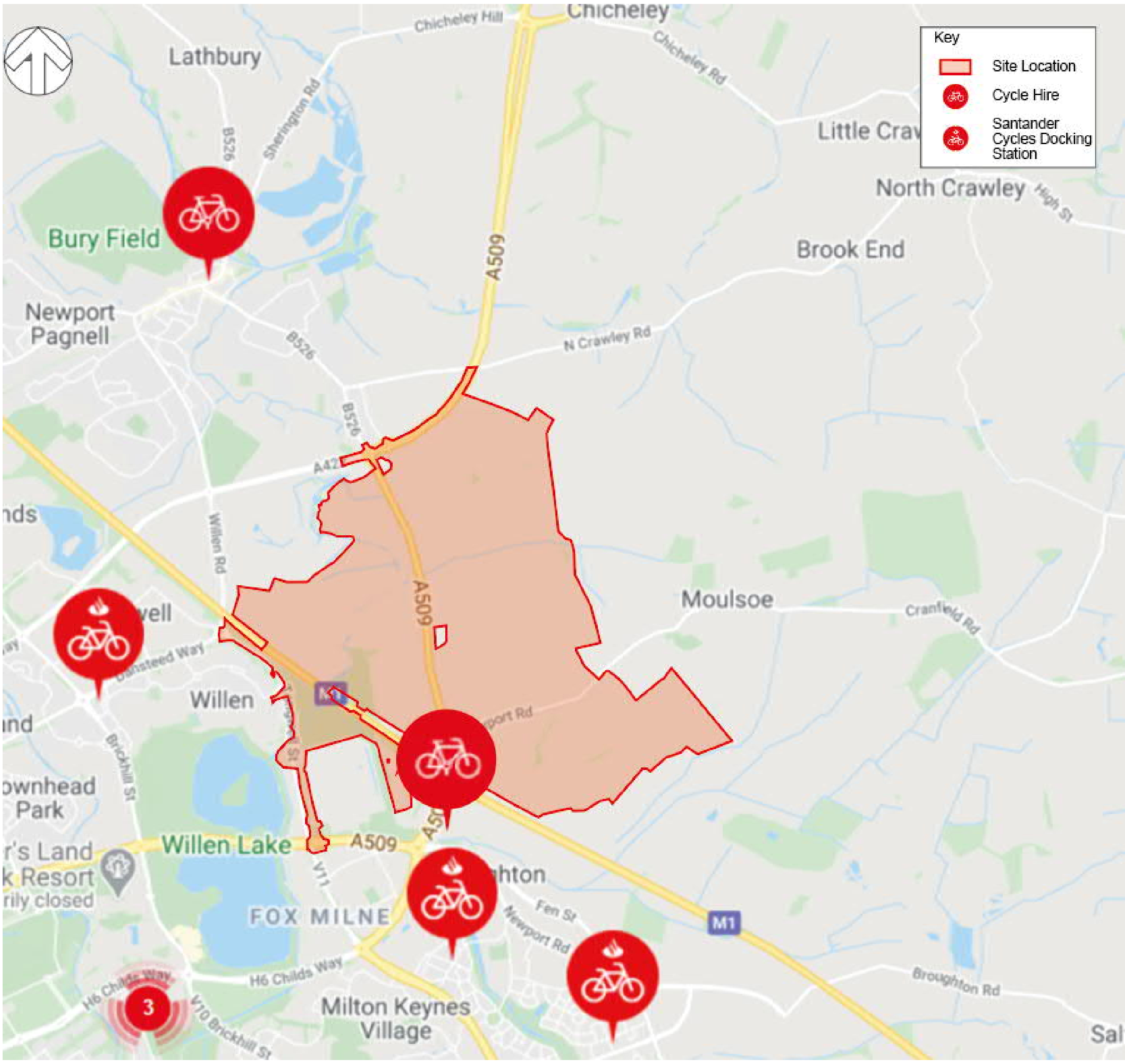
2.5.2. In addition to the leisure cycling infrastructure, several waymarked routes are also available throughout the city and include the Millennium Route, four Heritage Trails and five Cultural Routes. These routes are circular and cover a range of distances and difficulty, linking the cultural and heritage sites in Milton Keynes.

2.6 CYCLE PARKING AND HIRING FACILITIES

2.6.1. Milton Keynes is provided with cycle parking facilities across the city, including Sheffield stands for short stay users of specific land uses (such as retail and leisure) and also Santander Cycle Hire locations.

2.6.2. The locations of cycle parking and hiring facilities in relation to the MKE site are shown below.

Diagram 2-5: MKE – Cycle Parking and Hiring Schemes



Source: MKC, 18/02/2021 (https://mapping.milton-keynes.gov.uk/mymiltonkeynes.aspx)

3 CURRENT ACCESSIBILITY TO KEY FACILITIES & SERVICES

3.1 INTRODUCTION

3.1.1. As detailed in Section 2 of this TTN, the MKE site is located with connections to the local pedestrian and cycle networks, which, in combination with the local highway network, provide pedestrian and cycle access to local facilities and key destinations. This section considers the location of the site in the context of key local facilities.

3.2 WALKING AND CYCLING CONSIDERATIONS

WALKING

3.2.1. The Design Manual for Roads and Bridges (DMRB) TA 91/05 Provision for Non-Motorised Users (recently superseded by DMRB CD 143 Designing for walking, cycling and horse-riding) states that a distance of two miles (3.2km) could easily be walked by the majority of people. Paragraphs 2.2 and 2.3 states the following:

"2.2 Walking is a means of travel in its own right, but is an essential part of many other journeys, including those by car and public transport. However, there has been a decline in both the number and distance of journeys on foot since the mid-1980s. Nearly half of all journeys are less than 2 miles, a distance that could easily be walked by the majority of people.

2.3 Walking is used to access a wide variety of destinations including educational facilities, shops, and places of work, normally within a range of up to 2 miles. Walking and rambling can also be undertaken as a leisure activity, often over longer distances."

3.2.2. Although it is acknowledged that TA 91/05 has been replaced by CD 143, it is considered, in the absence of similar or new guidance in CD143, that the previous guidance in TA91/05 still provides a valid indication of a typical walking range applicable to the residents of the proposed development.

CYCLING

3.2.3. DMRB TA 91/05 also refers to cycling distances, stating that trips of up to five miles (8km) *"…could easily be cycled by the majority of people"*, and also that *"…cycling is used for accessing a variety of different destinations, including educational facilities, shops and places of work, up to a range of around 5 miles."*

3.2.4. Similar to walking, CD143 does not provide an indication of a distance that could be cycled by the majority of the people. TA91/05 therefore still provides useful guidance in terms of typical cycling distances.

3.2.5. The National Travel Survey (2019 data) suggests that the average cycle trip is currently 3.3 miles (5.3 km) long, which is a slightly shorter distance than that suggested by TA91/05. However, the distance cycled by a person depends on several factors such as the fitness level, confidence and ability. As such, it is deemed appropriate to utilise the lower value that represents an average cyclist.

3.3 ACCESSIBLE FACILITIES AND SERVICES

3.3.1. Access to facilities and services in the vicinity of the MKE site has been assessed with reference to those accessible within a reasonable walking and cycling distance. For the purposes of this TTN9, and given the guidelines outlined above, a reasonable walking distance is considered to be up to 3.2km and a reasonable cycle distance up to 5.3km.

3.3.2. Given the rural character of the MKE site, the pedestrian/cyclist facilities are limited to some PROW traversing the site. As a result, the distances to amenities are measured from the A509 London Road in the vicinity of Holiday Inn hotel which represents an approximate centroid of the MKE site.

3.3.3. It should also be highlighted that given the lack of pedestrian/cyclist provision in the area some of the routes or their sections may not be currently suitable for walking/cycling. It should also be noted that given the scale of the MKE site, the distances may vary significantly depending on the start point within the MKE site.

3.3.4. The proposed MKE development would provide a vast range of high-standard facilities through the site and appropriate connections to the existing pedestrian/cycle networks. It is acknowledged that the distances discussed further in this section are likely to change as a result of the new infrastructure, with some distances/journey times being possibly longer, while others reduce. It should also be emphasised that the proposed development aims to deliver a range of on-site amenities such as schools, retail and community hub, which would likely reduce the need for travelling outside of the site.

3.3.5. **Table 3-1** below presents the nearest examples of various types of facilities within 3.2km (walking) and/or 5.3km (cycling) of the site. These distances can be covered in approximately 40 minutes on foot (3.2km) and 20 minutes by cycle (5.3km).

Table 3-1: Accessibility to Local Facilities and Services

Facility Name	Facility Type	Approximate Distance from the Site	Approximate Walking/Cycling Time
CrossFit Milton Keynes	Gym	1.4km	18 / 5 min
Interchange Park	Employment	1.5km	19 / 6 min
BP Chicheley Park Simply Food	Convenience Store	2.0km	25 / 8 min
Brooklands Farm Primary School	Primary School	2.4km	30 / 9 min
M&S Simply Food	Food Store	2.5km	31 / 9 min
Broughton Dental Practice	Dental Practice	2.6km	33 / 10 min
Newport Pagnell Library	Library	2.8km	35 / 11 min
D W Roberts Optometrists	Optician	2.9km	36 / 11 min
Newport Pagnell Post Office	Post Office	3.0km	38 / 11 min
Newport Pagnell	Centres (City, Town, District)	3.2km	40 / 12 min

FACILITY NAME	FACILITY TYPE	APPROXIMATE DISTANCE FROM THE SITE	APPROXIMATE WALKING/CYCLING TIME
Pineham	Recreational Ground/Park	3.2km	40 / 12 min
NPMC @ Willen	GP Practice	4.0km	- / 15 min
Willen Pharmacy	Pharmacy	4.1km	- / 15 min
Oakgrove School	Secondary School	4.3km	- / 16 min
Blakelands Hospital	Hospital	4.5km	- / 17 min
Milton Keynes	Centres (City, Town, District)	5.3km	- / 20 min

3.3.6. **Diagram 3-1** illustrates pedestrian accessibility relative to the proposed MKE development site based on the typical walking speed of 4.8 km/h. It is evident that the site is situated within reasonable walking distance from the key destinations and facilities outlined above. The analysis demonstrates that Tickford End and Broughton are accessible in approximately a 20 to 25-minute walk from the site. Other nearby villages, including Willen and Moulsoe, can be accessed from the site in a 30 to 40-minute walk. The list of the nearest examples[1] of local facilities shown in Table 3-1 outline that some provision is available to the MKE site, albeit noting that existing demand will be low given the largely agricultural uses currently on site.

3.3.7. The MKE site's cycling accessibility based on the typical cycling speed of 16 km/h is shown in **Diagram 3-2** thereafter. It can be seen that the site is accessible by cycling from within a wider area.

[1] *Please note this is not an exhaustive list of facilities and covers those within the reviewed walking and cycling distances. This analysis provides an indication of the various options available.*

Diagram 3-1: Existing Pedestrian Accessibility

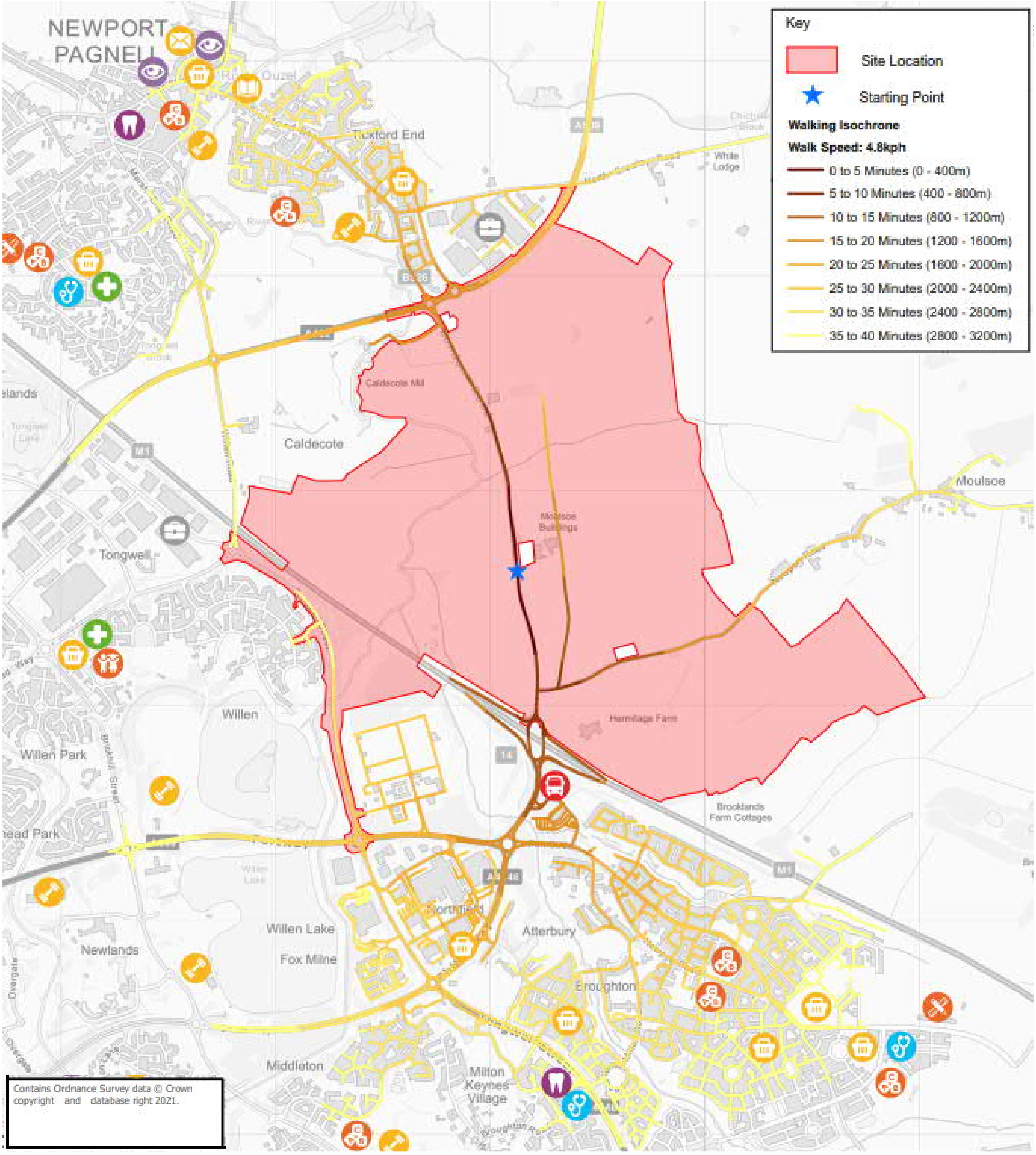
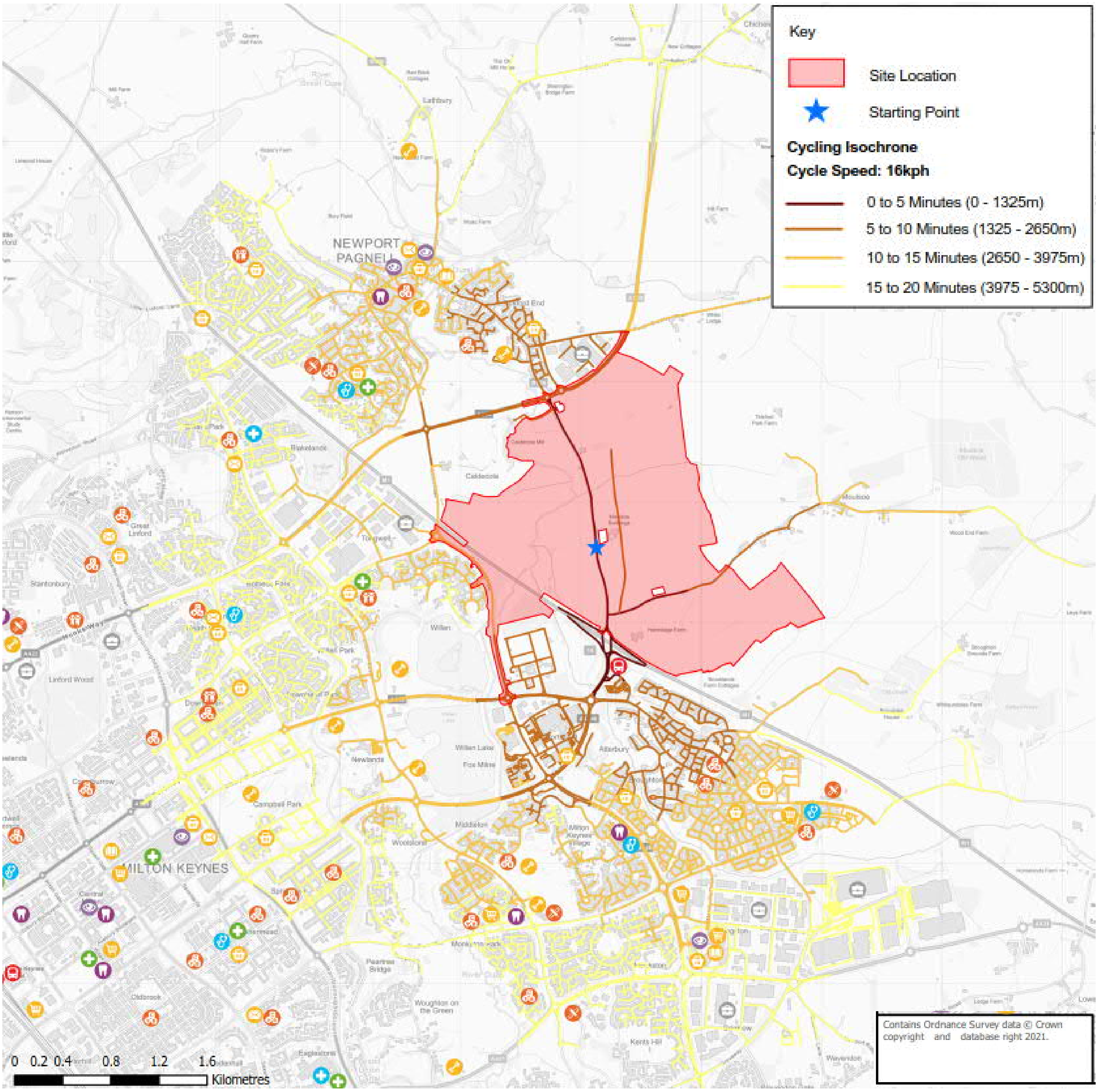


Diagram 3-2: Existing Cycling Accessibility



3.3.8. Diagram 3-2 shows the 3.3-mile (5.3km) cycling threshold set out in the National Travel Survey (2019). This has been created assuming a typical cycling speed of 16 km/h. The analysis demonstrates that Tickford End and Broughton are accessible in approximately a 5 to 10-minute cycle journey from the site. Other nearby towns/villages, including Newport Pagnell, Willen, Tongwell, Middleton and Moulsoe, can be accessed from the site within a 10 to 15-minute cycle.

4 TRIP GENERATION AND FUTURE MOBILITY

4.1 INTRODUCTION

4.1.1. A comprehensive trip generation methodology considering various land uses as well as trip purposes associated with both internal and external trips has been developed for the proposed MKE development and is discussed in detail in WSP TTN3: Trip Generation and Future Mobility.

4.1.2. The TTN3 discusses an approach to the forecast multi-modal trip generation based on typical industry methodologies and on a series of sustainable transport initiatives both on and off-site, but also develops a future-mobility approach which builds on the previous scenario and makes a series of assumptions about the changes in the ways of how people travel in the future.

4.1.3. Since the proposed MKE development was conceived as an exemplar of sustainable development where active and sustainable modes of travel are prioritised above those involving the use of a personal vehicle and single-occupancy journeys, TTN3 concludes that the future-mobility approach is likely to be more representative of the future year scenarios than the traditional approach, and suggests that it should be used as a basis for any assessment of the future conditions.

4.2 TRIP GENERATION

4.2.1. The forecast trip generation developed as part of TTN3 takes into account all land uses forming part of MKE (i.e. residential, education, employment) and gives due consideration to trip internalisation given by the nature of MKE and the character of the mixed land uses.

4.2.2. The review of both internal and external trips for all land uses contained in TTN3 results in an overall masterplan trip generation forecast which is summarised for walking and cycling in **Table 4-1** below. The values are provided for both future years of 2031 and 2048, representing the partial and full development build-outs respectively.

Table 4-1: Walking and Cycling Trip Generation and Mode Share (Initial Forecast)

Mode	AM Peak			PM Peak			Mode Share
	Arrival	Departure	Two-way	Arrival	Departure	Two-way	
2031 (Partial build-out)							
Walking	148	346	494	72	92	164	14.3%
Cycling	34	33	68	32	43	75	3.1%
2048 (Full build-out)							
Walking	463	1262	1724	255	250	505	16.5%
Cycling	84	119	203	103	108	211	3.1%

4.2.3. **Table 4-1** evidences that the 'future ready' measures in combination with the internalisation of the trips are forecast to result in a relatively high proportion of all journeys to be made on foot (14.3% and 16.5% on 2031 and 2048 respectively), while the proportion of trips expected to be made on a bicycle is similar for both build-out scenarios and current cycle modal share on the Milton Keynes local area.

4.3 MODAL SHARE TARGETS

4.3.1. In its aim to deliver an exemplar sustainable scheme encouraging walking and cycling, the proposals are accompanied by a Residential Travel Plan (RTP) and a Workplace Travel Plan (WTP). These will form a base for an individual Travel Plans (TP) concerned about the specific land uses which will be coordinated once the MKE site is operational.

4.3.2. The RTP and WTP provide estimated targets which, by way of encouraging active travel and micro-mobility modes, are **initially** based on not exceeding the number of vehicular trips extracted from TTN3 in the below table (aligned with the future-mobility scenario).

Table 4-2: Travel Plan Targets – Maximum Privately Owned Vehicular Trips – FM Scenario

Scenario	Land Use	AM Peak			PM Peak		
		Arr.	Dep.	Two-way	Arr.	Dep.	Two-way
2031 (Partial build-out)	**Residential (non education)**	62	217	279	314	176	490
	Residential (education)	40	138	178	9	5	14
	Employment (office)	105	9	114	9	101	110
	Employment (industrial)	502	68	571	130	551	681
	TOTAL	**709**	**432**	**1,142**	**462**	**833**	**1,295**
2048 (Full build-out)	**Residential (non education)**	169	589	758	855	477	1,332
	Residential (education)	146	507	653	34	19	53
	Employment (office)	204	18	222	17	197	214
	Employment (industrial)	902	122	1,024	229	1002	1,231
	TOTAL	**1,421**	**1,236**	**2,657**	**1,135**	**1,695**	**2,830**

4.3.3. To achieve these targets a combination of soft and hard measures is to be delivered. Whilst the soft measures are subject to the specific TPs as previously outlined, the hard measures involve infrastructure design and the development of routes and high-quality facilities within the MKE walking and cycling strategy proposals aimed at encouraging active travel as much as possible. This walking and cycling strategy therefore establishes the initial thinking behind the proposed travel planning measures.

4.3.4. It is acknowledged that future targets will be established following identification of travel choices/behaviours through the monitoring surveys, once the development is operational.

5 WALKING AND CYCLING STRATEGY

5.1 MASTERPLAN PRINCIPLES

5.1.1. The masterplan has been designed with a focus on providing future users of the development with an inter-connected network of active travel infrastructure to make walking, cycling, and the use of micro-mobility modes (such as e-scooters) the most attractive way of travelling to, from and across the Site.

5.1.2. The active travel network is comprised of green routes crossing the site as well as of infrastructure provided alongside vehicular routes. This way, connection to origins and destinations both off and on-site (including different land uses and links to public transport hubs) has been achieved by providing different types of active travel infrastructure which follow different forecasted desire lines and preferred routes.

5.1.3. The network of active travel infrastructure has also been adapted accordingly to the defined hierarchy of routes across the site, and is consequently comprised of Primary, Secondary and Tertiary Green Corridors in the way of Redways, PRoWs, and footways and cycleways along the relevant primary, secondary and tertiary streets. It has also been ensured that adequate links and crossings are provided where needed in order to follow desire lines and to achieve a high degree of non-vehicular permeability into and across the development.

5.1.4. The Movement and Access Parameter Plan included in **Appendix A** illustrates the masterplan principles which summarise the walking and cycling strategy detailed herein.

5.2 DETAILED WALKING & CYCLING STRATEGY

5.2.1. The Milton Keynes Redway Network extensively covers Milton Keynes west of the M1 and much of Newport Pagnell as detailed in Section 2.2 of this TTN9. This provision will be extended to the MKE development by implementing a network of high quality walking and cycle routes to connect together the key land uses and make walking and cycling a main modal choice as determined in **Table 4-1**.

5.2.2. Since walking and cycling are modes which may be chosen only by specific demographics of society, dedicated walking and cycling infrastructure has been introduced in MKE in a way which is built into the streetscape. The starting point is therefore a permeable street network that provides dedicated provision for both pedestrians and cyclists, following desire lines to minimise distances between key origins and destinations.

5.2.3. Crossing points between the development regions and connecting to external infrastructure and developments in Newport Pagnell and Milton Keynes has been proposed to ensure permeability. These can be seen in the Movement and Access Parameter Plan included in **Appendix A** and, in summary, will be a combination of new at grade, subway and footbridge crossings, both to link to existing infrastructure and to internally save roadway infrastructure.

5.2.4. Where the highway route has been designed to be used by motorised vehicles, dedicated facilities for active travel users will be provided alongside the carriageway but physically separated (in the way of footways and cycleways).

5.2.5. Cyclist and pedestrian infrastructure will also be provided by traffic-free routes where demand makes this necessary to reduce the potential conflict that results from differing speeds and different users' requirements.

5.2.6. There will be an extensive network of traffic-free routes throughout the development, fitting with the existing PRoW and Redway networks provisions and as illustrated in **Appendix A**.

5.2.7. MKC's guidance on Redways will be followed regarding design criteria which requires Redway routes to:

- Be red and easily identifiable due to their coloured surfacing;
- Be a minimum of 3-metres wide but on busy routes extended to 5 metres or more to allow sufficient space for all users.
- Where they are located adjacent to parallel car parking spaces, there should be a 1 metre 'wobble strip' to avoid car doors opening over the Redway.
- Have no building or wall within 500mm of the edge of a Redway.
- Have no shrubbery with a mature height of 300mm located within 1.5m of the edge of a Redway
- Set back lamp columns, sign posts, benches and litter bins by at least 500mm from the path edge.
- Maintain existing corridors or create new corridors to allow wildlife to move through the landscape.
- Take into account the needs of mobility impaired and visually impaired users. As a minimum, include flush crossing points, tactile paving units and appropriate signs and lighting.
- Have priority at road crossings to provide direct, convenient and safe routes.
- Be lit along whole lengths.
- Consider level changes to minimise the impact of gradients on all route users, taking in to consideration wheelchair users and those with poor mobility.
- Include rest areas where appropriate on routes with high gradients.
- Be shared and consider all potential users such as pedestrians, cyclists, wheelchair users, mobility scooters, delivery robots, e-bikes, e cargo bikes, skateboarders and in the not so distant future, e-scooters and potentially autonomous vehicles. Some users will have learning, mobility or sight concerns that make them more vulnerable.
- Be required on both sides of the grid road, forming the Redway Super Routes; adjacent to main arterial routes through estates that connect to the Redway Super Route network and key destinations within estates and through linear parks.
- Continue on the same side of the road as existing Redways where there is to be extensions and additions to the Redway Super Route network along the grid roads, and minimise the number of deviations and road crossings.

5.2.8. Additionally, a Green Linear Park is proposed and outlined in the Masterplan. This will mostly be used for leisure purposes however it will also be designed so that it can be utilised for those wishing to travel across the Green Linear Park for any purposes. As such, it will have a range of cycling and pedestrian opportunities and will also link to the existing Milton Keynes off-road active travel network.

CYCLE PARKING AND MICRO-MOBILITY HIRE SERVICES

5.2.9. Cycle parking provision will be provided within the MKE site in alignment with housing densities and attending mixed-land uses requirements. This is explained in detailed in Section 4.7 of WSP's TTN8: Parking Strategy, with **Table 5-1** below summarising the proposed cycle parking provision.

Table 5-1: Cycle Parking Standards

Use Class	Short Stay Provision	Long Stay Provision
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
Employment		
Business	Min 2, plus 1 per 500m^2 thereafter	1 per 120m^2 or 1 per 10 FTE staff
General industrial	Min 2, plus 1 per 500m^2 thereafter	1 per 400m^2 or 1 per 10 FTE staff
Storage and Distribution	Min 2, plus 1 per 1000m^2 thereafter	1 per 700m^2 or 1 per 10 FTE staff
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

5.2.10. The MKE development will, as a minimum, provide cycle parking in line with the standards above. However, it is likely that the development will go above this, especially at key areas, such as interchange points and the community hub. This will be finalised in the TA

5.2.11. Cycle hire provision such as the Santander Cycle Hire scheme already implemented in several locations across Milton Keynes is proposed to be incorporated in the MKE site. This will be completed by e-bike and e-scooter hire schemes, both of which form part of the Public Transport Strategy designed for the MKE site.

5.2.12. To encourage the uptake of micro-mobility, active travel on-demand modes (i.e. cycles, e-bikes and e-scooters), hiring provision locations will include those adjacent to high-density areas (such as the employment hub or district centres) and the central transport hub.

5.2.13. Dockless cycle and e-scooter hire schemes are one alternative option to consider, however these are still on trial across different locations of the UK. Whilst dockless cycle hire provides an approach to infrastructure needs which is minimal compared to the provision of traditional schemes, it is still deemed best practice to identify dedicated areas for the return of dockless bikes to prevent them being left in inappropriate locations. Incorporation of a central cycle hire point at the central transport hub will be critical.

5.3 FORECAST WALKING AND CYCLING ACCESSIBILITY

5.3.1. By following the walking and cycling strategy as detailed within this TTN9, a permeable masterplan has been developed which connects to existing walking and cycling infrastructure and will implement a permeable network to satisfy pedestrians and cyclists.

5.3.2. **Diagram 5-1** below illustrates the forecasted pedestrian accessibility relative to the proposed MKE development site based on the typical walking speed of 4.8 km/h and built upon the Access and Movement Parameter Plan included in **Appendix A**.

5.3.3. Similarly, the forecast MKE site's cycling accessibility based on the typical cycling speed of 16 km/h is shown thereafter in **Diagram 5-2**.

5.3.4. It is evident by comparing **Diagram 5-1** and **Diagram 5-2** with **Diagram 3-1** and **Diagram 3-2** respectively that the proposed walking and cycling infrastructure will improve permeability to adjacent areas of the MKE site, thereby improving existing walking and cycling connectivity.

5.3.5. It should be noted that the forecast accessibility diagrams only includes the key highway links and routes that will be available at the site. As shown in the masterplan, there will be an internal network of Redways, footpaths, PROWs, through the development parcels and linear park that will provide further connections as such. Therefore Diagrams 5-1 and 5-2 illustrate that at a minimum the provision in the local area will be significantly better than existing, which will be further enhanced as the masterplan and connections get built out.

5.3.6. More importantly, **Diagram 5-1** and **Diagram 5-2** illustrate that MKE has been designed to become a '15-minute neighbourhood' in which residents and users will be able to access all facilities and areas of the site within a 15-minute active travel trip.

5.3.7. This demonstrates that MKE aligns with latest urban planning trends and city models being developed worldwide, which are enabling self-sufficient communities based upon proximity, diversity, density and ubiquity, and consequently do not strictly need a car to satisfy their daily requirements.

Diagram 5-1: Forecast Pedestrian Accessibility

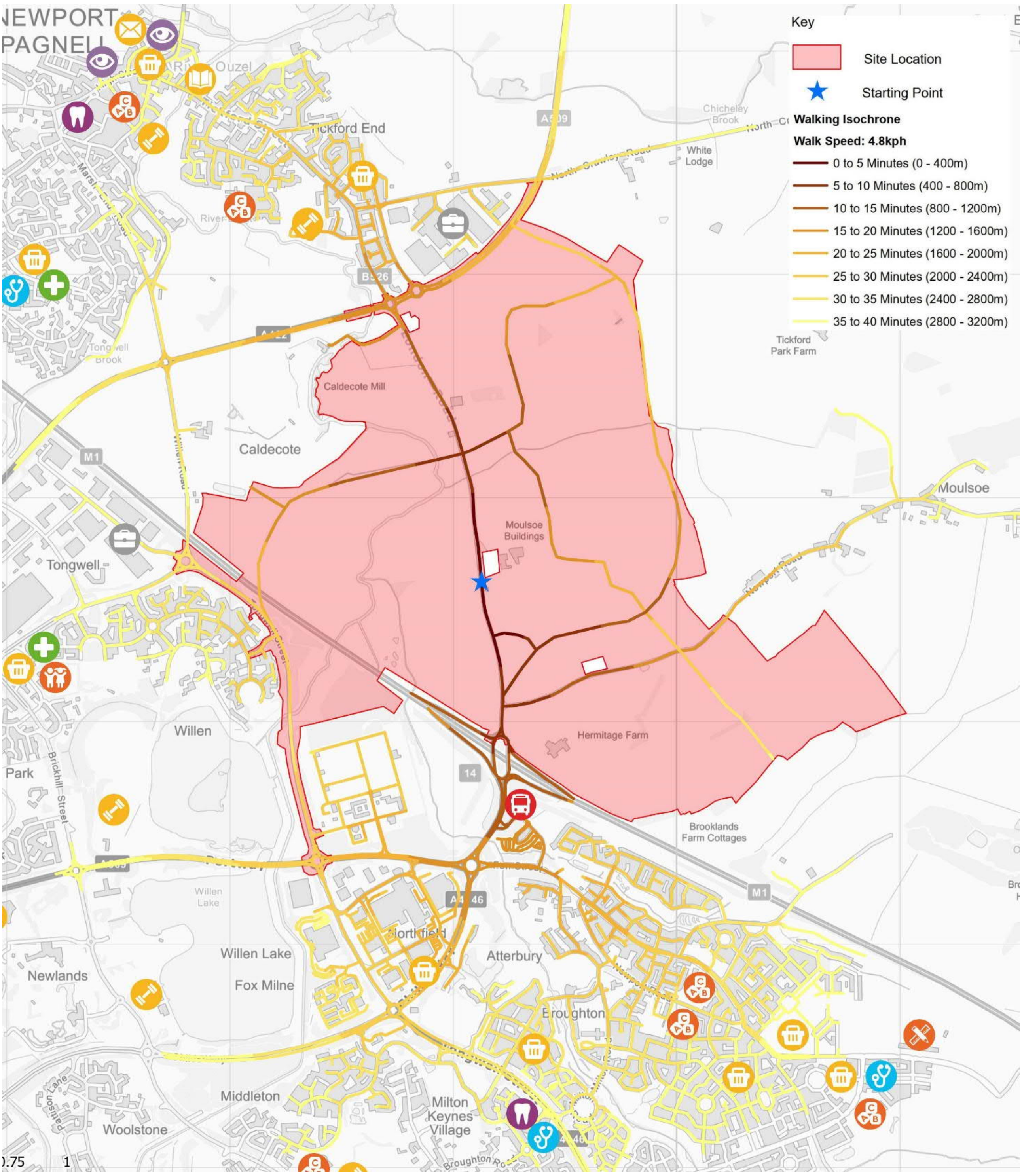
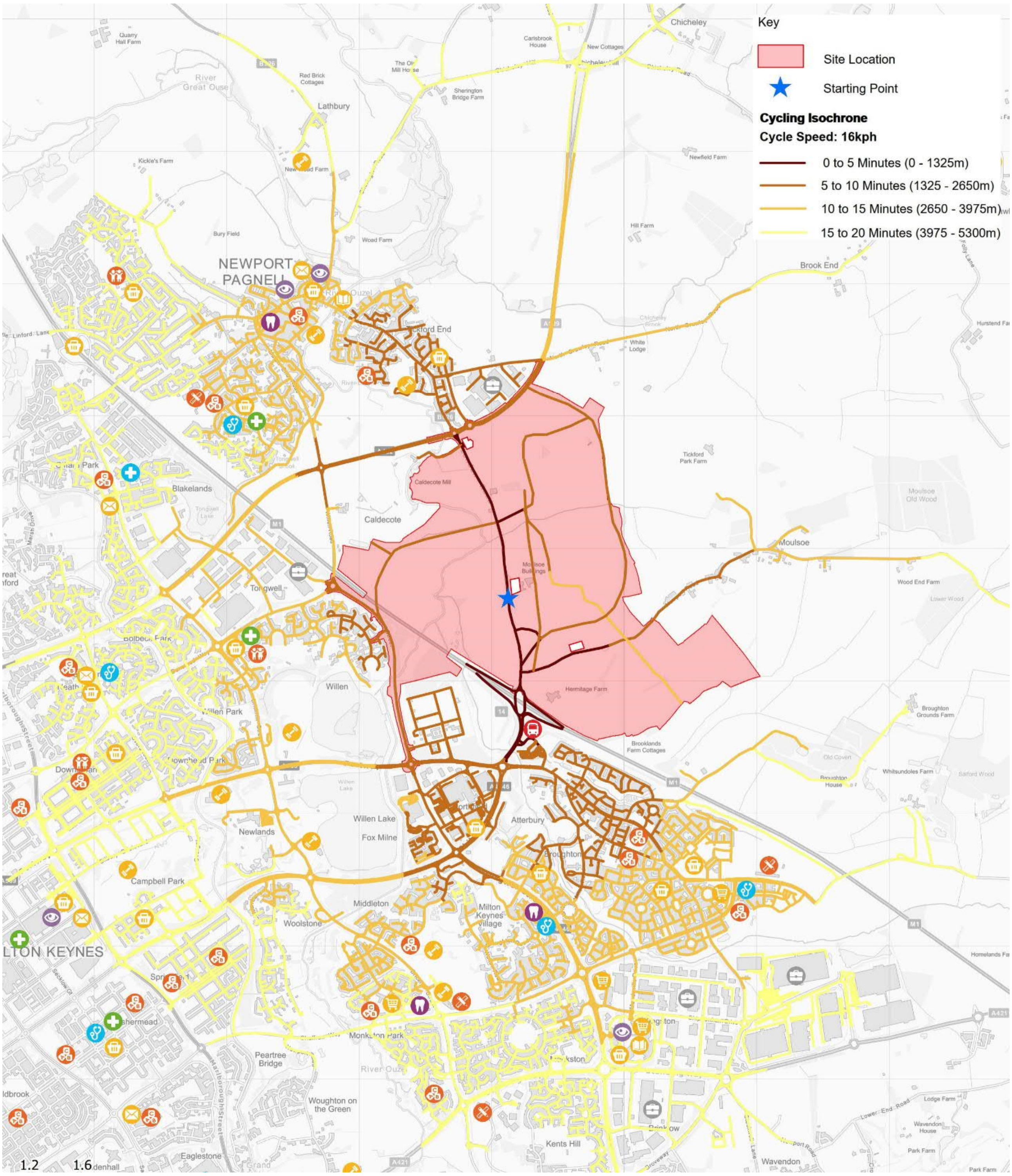


Diagram 5-2: Forecast Cycling Accessibility



5.4 WALKING, CYCLING AND CROSSINGS

5.4.1. The Walking and Cycling Strategy for the proposed MKE development is based on existing connections and with the layout designed as a permeable masterplan aligned with the current context of the site. The masterplan has been designed with a focus on providing future users of the development with an interconnected network of active travel infrastructure to make walking, cycling, and the use of micro-mobility modes (such as e-scooters) the most attractive way of travelling to, from and across the site.

5.4.2. Internally, the starting point of the Walking and Cycling Strategy is to provide dedicated provision for both pedestrians and cyclists along routes that follow desire lines to minimise distances between key origins and destinations:

- An extension to the MK Redway network will be provided within the site. This will effectively include super Redways running directly alongside Grid Roads through the development. These are provided on both sides of the Grid Roads where there is adjacent development and on one-side only where there is a development adjacent to that side of the road. This approach has been discussed and agreed upon with MKC highway officers.
- Grid Roads, where there are other highway routes through the site, dedicated facilities for active travel users will be provided alongside the carriageway but physically separated (in the way of footways and cycleways) in accordance with the MKC Design Guide.
- Cyclist and pedestrian infrastructure will also be provided by traffic-free routes where demand makes this necessary to reduce the potential conflict that results from differing speeds and different users' requirements.
- Crossings for non-motorised users will be provided as a combination of new at grade, subway, and foot/cycle bridge crossings to link to existing infrastructure and new internal infrastructure.

5.4.3. The applicant and WSP have also recently discussed the scheme with the Milton Keynes Cycling Forum, where several items were raised for consideration as the site develops. It is envisaged that the Cycling forum, alongside other stakeholders, are invited to the Travel Plan steering group meetings to help inform future decisions on cycling.

5.4.4. As set out in the Development Framework, the MKE site includes safeguarded land for further strategic walking and cycling crossings, including potential crossing south-east of M1 J14. The land associated with this will be made available to MKC as they review connectivity.

5.4.5. Upgrades to existing Bridleways and PRoWs have been reviewed and will be discussed with MKC as the masterplan develops, with further information provided below. Any upgrades will need to fit into MKC's wider strategic vision and will need to be appropriately designed based on forecast demand. If delivered by the MKE site, it needs to be linked/justified to the development impacts.

5.4.6. It is envisaged that a series of MKE Design guides will be developed with MKC that will, amongst others, outline the detail of the sustainable design elements and how these will be integrated within the various character areas. These design guides will utilise the latest guidance and best practise where feasible to do so, such as LTN1/20 and MKCs Redway Design guide; to provide an overarching framework, provide consistent design, and maximise connections to new and existing routes. It is expected that these design guides will also set out how the parking strategy, indicatively shown in TTN8, will also cater for cycle parking based on the MKC standards.

GRID ROAD CROSSINGS

5.4.7. As set out in the DAS and the Movement and Access Parameter plan, the development proposals include a mixture of grade-separated (either bridge or subway) and at-grade crossing points across the network. A strategy for crossing points has been developed at grid roads to ensure all parcels can safely navigate and connect to wider linkages, ensuring permeability and negating the risk of severance. These crossing points tie into the wider Walking and Cycling strategy and provide an attractive and cohesive set of crossing points for all residents and workplaces to utilise.

5.4.8. Where new grid roads are proposed, crossing points will be provided at junctions to allow movement and connection between parcels. Depending on the location and levels available, these may be subway structures or may require bridge elements. This is set out in the parameter plans.

5.4.9. In addition, as the floodplain link through the site is elevated, a subway beneath the floodplain link will be integrated with the bridge; i.e. the "subway" effectively passes beneath the bridge to allow connections to the A509, through the linear park and beyond.

5.4.10. At the new M1 bridge crossing, the existing farm track accommodation bridge will be retained for pedestrian and cycle access, with connections between that and the new Redways and PROW through the development. This will also provide connectivity into a reconfigured subway on Tongwell Street.

5.4.11. Furthermore, as outlined above, the development is safeguarding land for future improvements to walking and cycling connections, such as crossing point south-east of J14, should MKC wish to pursue these at a later date.

CONNECTIONS TO NEWPORT PAGNELL

5.4.12. Further to the development-specific crossings, the DF SPD for MKE identifies three crossing points across the A422/A509. These locations are across the A422 east of Marsh End Roundabout, across the A422/A509 in the vicinity of Tickford Roundabout and the A509 in the vicinity of Howard Way.

5.4.13. 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.

5.4.14. A grade-separated crossing of the A509 in the form of a bridge can be delivered in the vicinity of Howard Way. It 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 the M1 J14) having been delivered first. A link would be provided on the northern side of the A509 connecting that bridge with the existing PROW, which runs through Howard Way.

5.4.15. The provision of a crossing of the A422/A509 to the west of Tickford Roundabout is the most challenging crossing to deliver. Therefore, several options have been considered for this, and these are set out in TTN14 (Appendix A.14 of the TA). The study has concluded, in the context of the third crossing in the vicinity of Tickford Roundabout, that either:

- 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
- 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.

5.4.16. The final configuration of the crossings towards Newport Pagnell will be discussed during each RMA stage. However, the principles are considered deliverable and of benefit to not only new MKE residents but also existing Newport Pagnell resident and workforce populations.

PROW STRATEGY

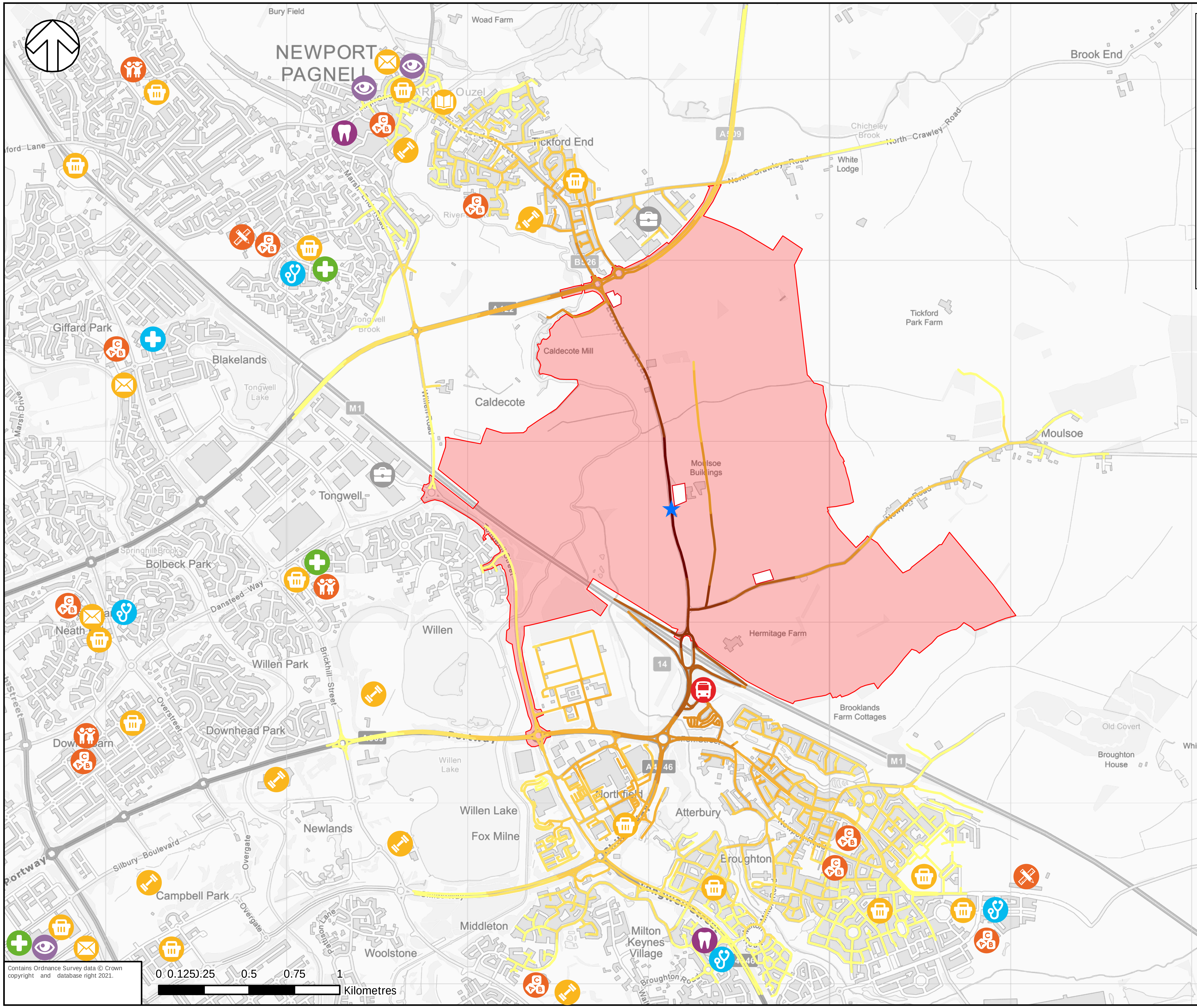
5.4.17. Alongside the Movement and Access Parameter Plan and the DAS, TTN10 sets out the site's PROW strategy (Appendix A.10 of the TA). This includes how each of the PRoWs, currently traversing the MKE development site, is either retained or diverted and incorporated with the proposals and the existing provision. 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’).

BRIDLEWAY STRATEGY

5.4.18. There is an existing bridleway that traverses the eastern edge of the site running from a point south of Newport Road to North Crawley Road and beyond. The new Eastern Perimeter Road bisects this bridleway, and so it is to be diverted from a point within the vicinity of the Moulsoe stream to the point where the existing bridleway diverges into two separate bridleways leading to North Crawley Road. The bridleway will run parallel to the Eastern Perimeter Road at the far eastern edge of the site boundary with a new hedge to be provided along the application boundary, and a 4m wide bridleway then provided adjacent to the hedge, with a 1m gap provided between the hedge and the edge of the bridleway. This has been discussed with the MKC PROW officer.

5.4.19. There is also an aspiration to facilitate access into the linear park for horses with the new Eastern Perimeter Road bridge over the Moulsoe Stream providing sufficient headroom beneath to enable riders to pass through on horseback and on to a link running along the southern side of the Moulsoe Stream through the site and into the linear park.

5.4.20. It should also be noted that the Broughton Grounds Lane bridge over the M1 has a bridleway connection off it which runs into our site. Therefore, the MKE development will look at how improvements can be implemented to increase the connectivity between the Broughton area of MK and the MKE development.

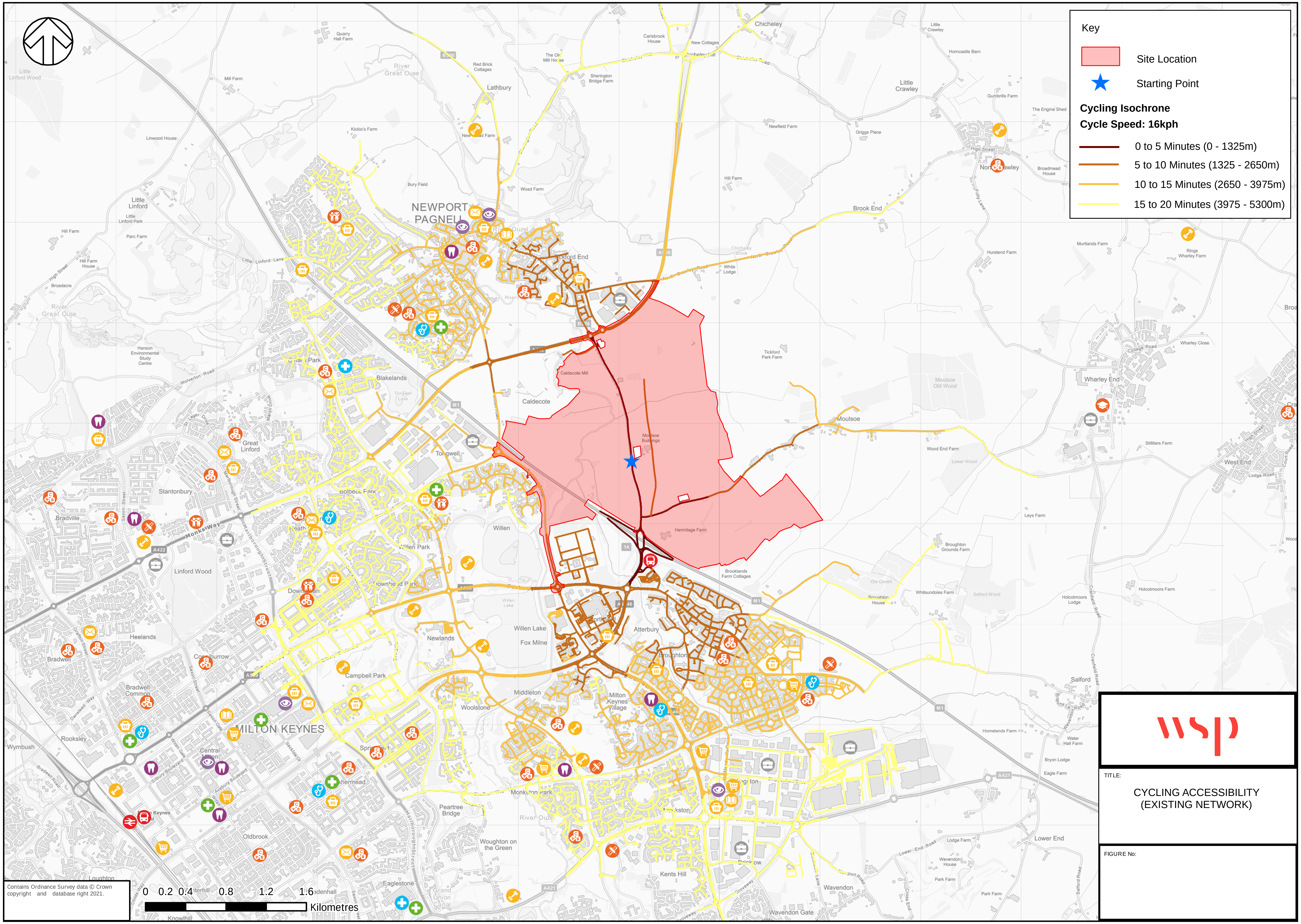


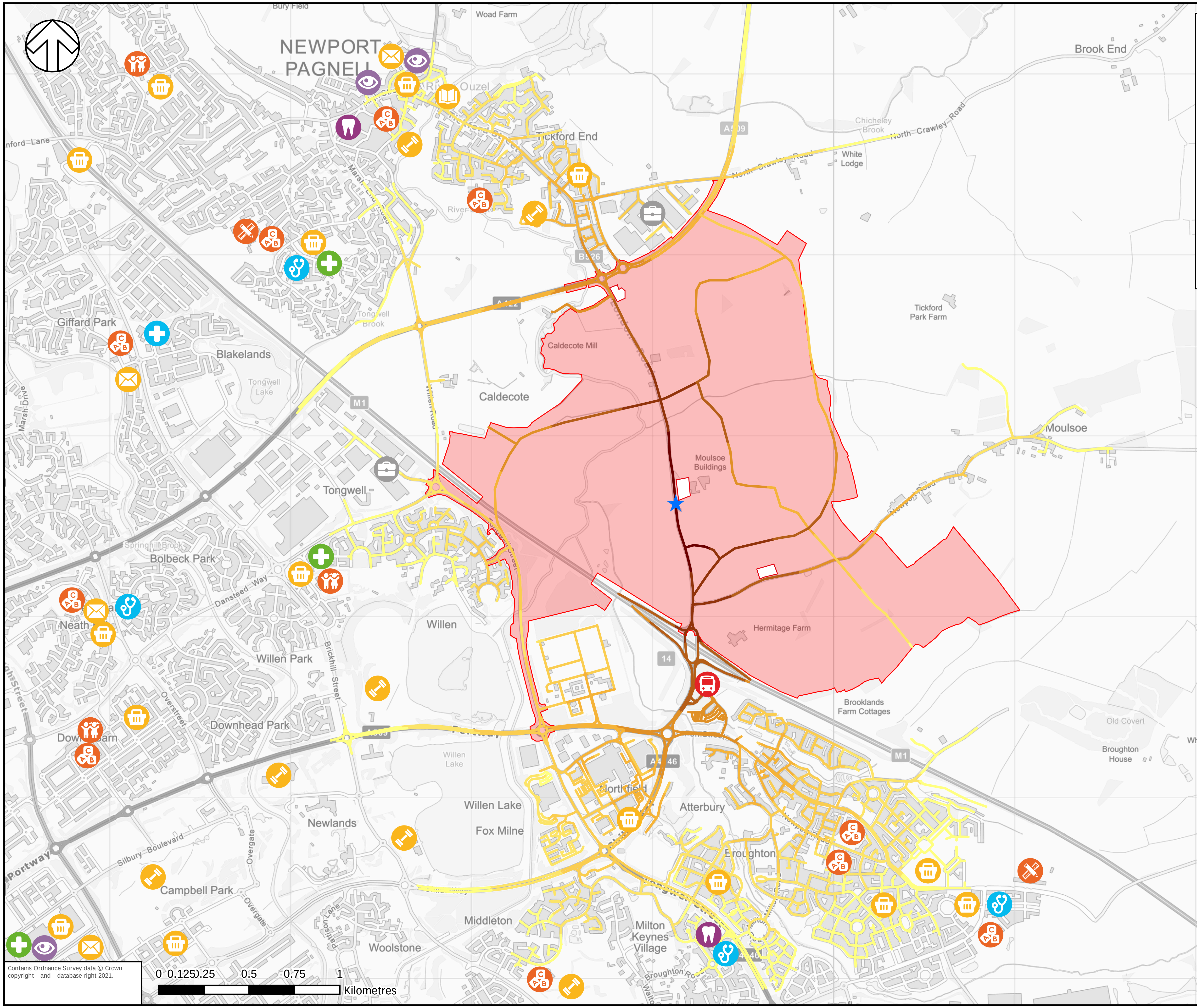
wsp

TITLE:

PEDESTRIAN ACCESSIBILITY (EXISTING NETWORK)

FIGURE No:


Key
Site Location
Starting Point
Cycling Isochrone
Cycle Speed: 16kph
0 to 5 Minutes (0 - 1325m)
5 to 10 Minutes (1325 - 2650m)
10 to 15 Minutes (2650 - 3975m)
15 to 20 Minutes (3975 - 5300m)
NEWPORT PAGNELL
MILTON KEYNES
0 0.2 0.4 0.8 1.2 1.6
Kilometres
wsp
TITLE:
CYCLING ACCESSIBILITY
(EXISTING NETWORK)
FIGURE No:



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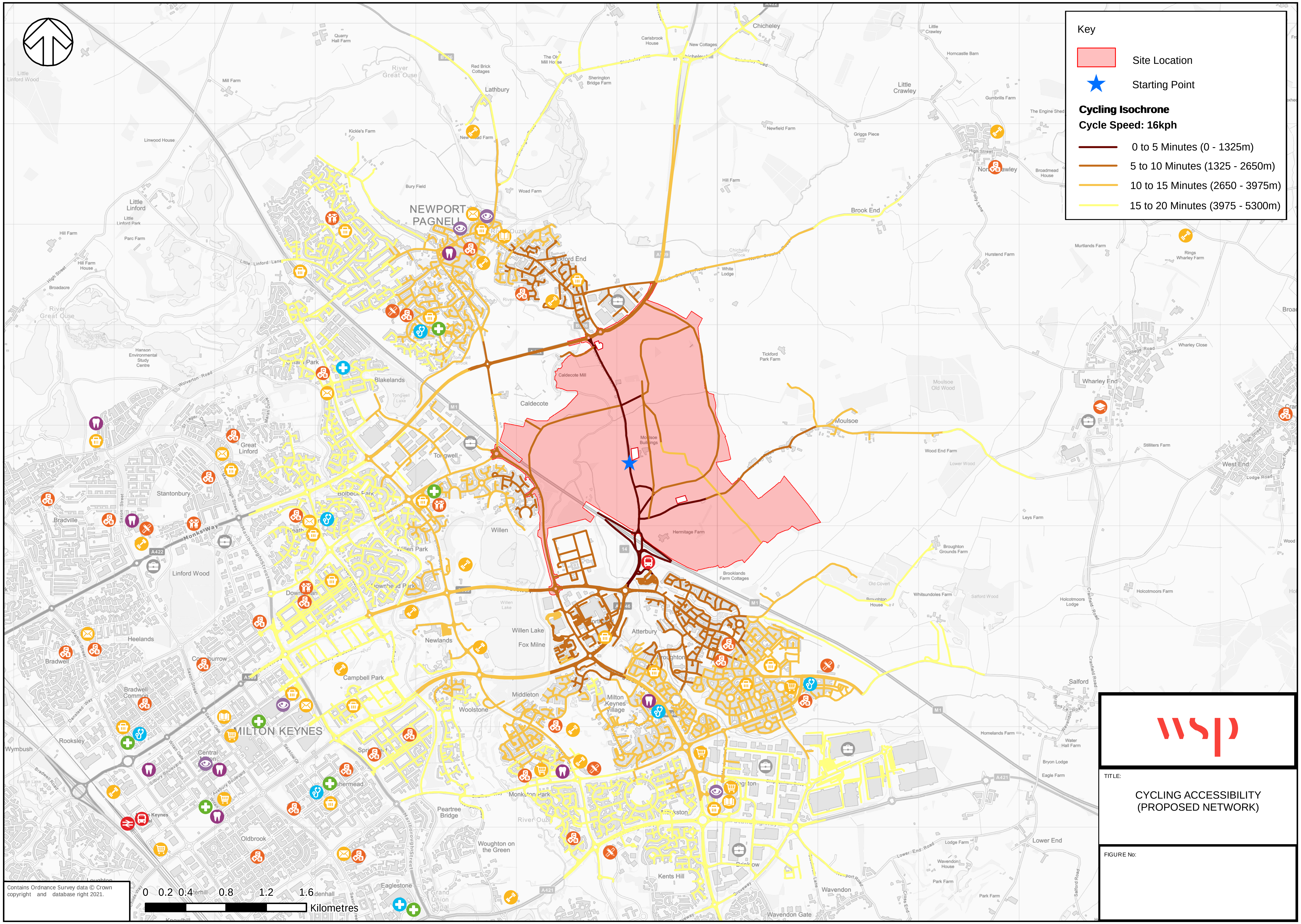
TITLE:

PEDESTRIAN ACCESSIBILITY (PROPOSED NETWORK)

FIGURE No:


Key
Site Location
Starting Point
Cycling Isochrone
Cycle Speed: 16kph
0 to 5 Minutes (0 - 1325m)
5 to 10 Minutes (1325 - 2650m)
10 to 15 Minutes (2650 - 3975m)
15 to 20 Minutes (3975 - 5300m)
0 0.2 0.4 0.8 1.2 1.6
Kilometres
Contains Ordnance Survey data © Crown copyright and database right 2021.
wsp
TITLE:
CYCLING ACCESSIBILITY (PROPOSED NETWORK)
FIGURE No:
NEWPORT PAGNELL
MILTON KEYNES
Chicheley
Lathbury
Caldecote
Tongwell
Blakelands
Great Linford
Stantonbury
Bradville
Linford Wood
Heelands
Bradwell
Bradwell Common
Rooksley
Wymbush
Campbell Park
Newlands
Willen Lake
Fox Milne
Willen
Willen Park
Middleton
Woolstone
Milton Keynes Village
Atterbury
Broughton
Monkston Park
Kents Hill
Woughton on the Green
Peartree Bridge
Oldbrook
Eaglestone
Wavendon
Wavendon Gate
Moulsoe
Salford
Lower End
Little Crawley
North Crawley
Brook End
Wharley End
West End
Little Linford
Hill Farm
Broadacre

APPENDIX A – MOVEMENT AND ACCESS PARAMETER PLAN