national highways

# M60/M62/M66

## Simister Island Interchange

Traffic Modelling Report for Consultation

## Document Control



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## Contents

# Executive Summary

This report describes the development of traffic models that have been used to assess the impact of the proposed M60 junction 18 Northern Loop scheme. It also summarises key results from the traffic models.

Traffic models were initially developed to represent the existing conditions of the strategic and local road network in and around M60 junction 18 Simister Island situated in the north of Greater Manchester. These models show the amount of traffic on each road in the model area, and the speeds at which vehicles typically travel. The traffic models were produced using information on people's travel patterns obtained by analysing anonymous records of mobile phone movements. The models also use information from traffic counts and demographic data on where people live and work.

Based on this information, traffic models were then produced to predict how traffic conditions may change in the future, both with and without the proposed scheme in place. By comparing different traffic model scenarios, the likely impact of the proposed scheme can be better understood.

The predicted impact of the proposed scheme is presented in this report. It shows that:

- Journey times through M60 junction 18 Simister Island would continue to worsen in the future if the proposed scheme is not built.
- The proposed free-flow link for traffic travelling between M60 junction 17 and M60 junction 19 removes a substantial traffic flow from the M60 junction 18 roundabout, reducing delays for other movements.
- There will be less delay caused by traffic joining and leaving the M60 between junction 17 and junction 18 as a result of the proposed fifth lane on the M60 between these junctions.
- The proposed scheme would offer journey time savings of up to 90 seconds from M60 junction 17 to M60 junction 19 and up to three minutes during rush hour between M66 junction 3 and M60 junction 17, compared to a scenario where the scheme is not built.
- Some local roads would experience decreases in traffic due to the scheme because reductions in delay on the motorway network will make this more attractive than travelling on local roads.
- A small number of local roads would experience increases in traffic, especially those which would be used to access the M60 in the vicinity of junction 18.

Further information on these traffic changes is provided throughout this report. This includes explanations for the changes, and the likely impact that any increases in traffic would have on the day-to-day performance of roads.

The predicted environmental impacts due to these changes in traffic (for example on noise and air quality) are described in the Preliminary Environmental Information Report provided as part of this consultation.

# 1. Introduction

## 1.1 Purpose of this report

1.1.1 This Traffic Modelling Report for Consultation gives an overview of the work carried out by National Highways to assess the need for, and impact of, the M60 junction 18 Simister Island improvement scheme. It presents the key findings of the differences in the performance of the road network in the future if the proposed scheme is built or not.

1.1.2 We have assessed the need for additional road capacity at junction 18, and the impact of providing this capacity, by developing a simulation of the transport system in the north of Manchester. This is referred to in this report as the 'traffic model'.

1.1.3 The traffic model shows the number of people and goods travelling by road and the routes they use now, and the routes they are forecast to use in the future. This enables us to predict how many vehicles will be using each part of the road network in the future and how long it would take to complete a journey. This helps to inform the design of the proposed scheme and to predict its environmental impacts. This report describes how we developed the traffic model and summarises its key findings.

## 1.2 Consultation

1.2.1 The M60/M62/M66 Simister Island Interchange is a critical part of our investment in the north-west, supporting economic growth by better connecting major cities across the north of England. The scheme is vital in reducing congestion now and in the future, improving safety, improving journey time reliability for all road users and increasing connectivity between local areas.

1.2.2 This scheme is categorised as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. As such, we are required to make an application for a Development Consent Order (DCO) to obtain permission to construct the scheme. For more information on this process, please visit: https://infrastructure.planninginspectorate.gov.uk/application-process/

1.2.3 We are currently in statutory consultation where we present our proposals and then consider and have regard to your feedback. This report forms part of a suite of documents that are published as part of the statutory consultation.

## 1.3 Scheme description

### Scheme Overview

1.3.1 We held a public consultation in summer 2020 which included two options for the improvement of the Simister Island Interchange, the "Northern Loop" and "Inner Links". The consultation found an overall preference for the Northern Loop option, which was supported by 67% of respondents.

1.3.2 An options appraisal was undertaken where the two options were considered against several criteria, including the scheme objectives, safety, benefits, costs, environmental effects, construction and feedback from the summer 2020 consultation. We announced the Northern Loop as our preferred route for improving the junction in January 2021.

1.3.3 For more information on the previous consultation results and the preferred route announcement please visit our webpage at https://nationalhighways.co.uk/our-roads/north-west/m60-junction-18-simister-island-interchange/

1.3.4 The scheme will improve junction 18 of the M60 and facilitate smoother flows of traffic along the M60, M62 and M66 in the scheme area, contributing to more reliable and safer journeys into and around Greater Manchester. To complement these improvements, a fifth lane will be added to the M60 between junctions 17 and 18 in both directions, along with a new hard shoulder which will provide refuge in an emergency.

## Detailed scheme proposals

1.3.5 A new structure providing a free-flow link from M60 eastbound to M60 southbound (clockwise), including a new bridge over the M66 and junction 18 slip roads.

1.3.6 Realignment of the interchange slip road from the M66 southbound to accommodate the loop. This includes a new bridge where the loop crosses the slip road, and realignment of the left turn lane to the M62 eastbound.

1.3.7 An upgraded two-lane link from the M60 northbound to the M60 westbound (anti-clockwise).

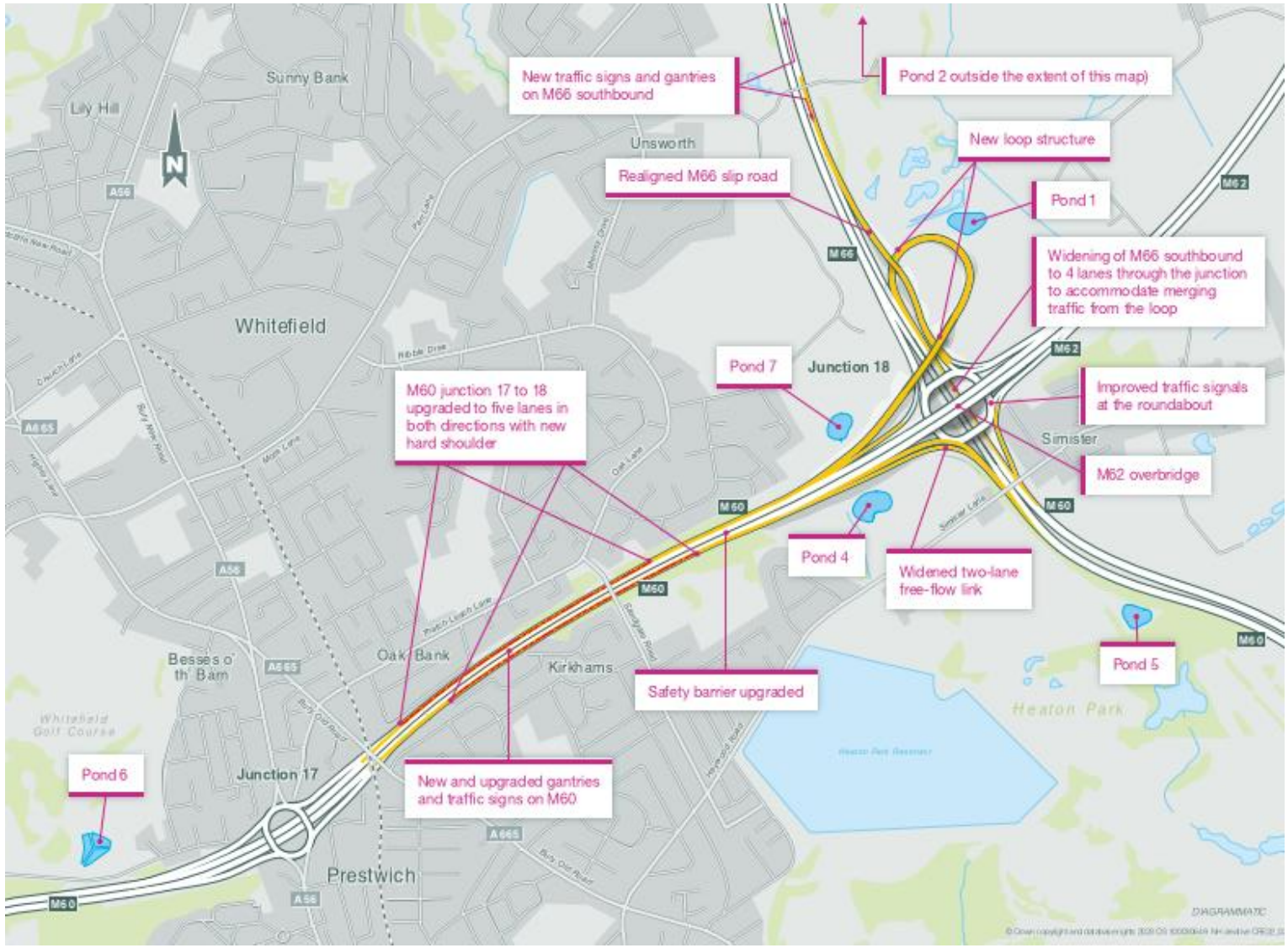
1.3.8 M66 southbound to be widened to 4 lanes as it passes through junction 18.

1.3.9 A new fifth traffic lane and hard shoulder will be provided between junctions 17 and 18. This will be achieved by widening the carriageway whilst minimising the impact to residents and properties.

1.3.10 Renewal of traffic signals, signs and street lighting at junction 18 and its approaches, and new gantries on the M66 southbound.

1.3.11 A map of the proposed scheme is provided in Plate 1-1 and for more information on the proposed scheme please see the Public Consultation Brochure.

**Plate 1-1 - Proposed Scheme Map**



# 2. How we modelled current conditions

2.1.1 This chapter sets out how we developed our traffic model to reflect baseline traffic conditions as they were in 2018.

2.1.2 The baseline traffic model was created to represent the transport system in this area of north Manchester on a typical weekday. The model covers the whole of the UK to capture the actual start and end of every trip but is more detailed in the area around Greater Manchester with a focus on the Manchester, Salford, Bury, Oldham and Rochdale local authority areas.

2.1.3 The hours modelled in the traffic model are from 7am to 9am in the morning (the morning peak period) and 4pm to 6pm in the evening (the evening peak period) as these are the busiest times of day around the M60 junction 18 area, confirmed by using traffic count data. A typical hour in the middle of the day is also modelled (the inter peak).

2.1.4 Details of the current transport network were taken from digital maps and from other recent transport models of the area. The road network within Greater Manchester is represented in detail, for example it includes the amount of red and green time at traffic signals and the number of lanes along each stretch of road and at junctions. The areas outside of Greater Manchester are represented in less detail, however they allow for long-distance movements on the strategic road network (SRN). The SRN is the network of roads that fall under the responsibility of National Highways and are generally motorways and strategic A-roads.

2.1.5 The information on where people are travelling to and from has been taken from analysis of the movement of a vast number of mobile phones in the UK. The mobile phone data are completely anonymous but provide details of the travel patterns of millions of mobile phones around the country. This information is scaled to match traffic counts in the area and then merged with other data sources to provide the travel patterns of cars, vans and Heavy Goods Vehicles (HGVs) across the country.

2.1.6 The traffic model is then used to predict on which routes vehicles will travel, considering:

- Where people want to travel to and where they are coming from
- People's preference between journey time and journey distance
- The actual speeds of vehicles on the road network

2.1.7 The amount of traffic using the road network predicted by the model is compared to actual counts (where available) of the number of vehicles on the road network, collected from traffic counters laid out on the road or specially commissioned video surveys. The times that journeys are predicted to take are compared with observations from in-vehicle satellite navigation devices which provide actual travel times, recorded during the modelled hours. This process is known as model calibration and validation.

2.1.8 The Department for Transport (DfT) has issued guidelines on how traffic models such as this should be built, and the extent to which the predictions of traffic flows and times made by the model compare with real life. These guidelines are called Transport Analysis Guidance (TAG) and are used in the assessment of transport schemes across the country.

2.1.9 To understand the impact of the proposed scheme when it opens, we firstly need to understand how the background traffic conditions will change in the future. The next section of the report describes how we use our traffic model to make these future traffic predictions.

# 3. How we forecast future conditions

## 3.1 Which scenarios have been modelled

3.1.1 We have produced traffic models to forecast traffic conditions for two different scenarios:

- A future scenario where the proposed scheme is not built. This is referred to as the do minimum (DM) scenario.
- A future scenario where the proposed scheme is built. This is referred to as the do something (DS) scenario.

3.1.2 The remainder of this chapter describes how these scenarios are modelled. It discusses how traffic levels are forecasted to change the future, including how new housing and employment developments are expected to affect this.

## 3.2 Which years have been modelled

3.2.1 The previous chapter described how we modelled traffic conditions as they were in 2018. Building on this, we have also forecasted future traffic conditions in the following three years:

- 2027, when the proposed scheme is expected to open
- 2042, scheme design year (fifteen years after the scheme has opened); and
- 2051, which is the final year for which DfT published traffic growth forecasts from its National Transport Model

## 3.3 Predicting the growth in traffic

3.3.1 The overall level of growth in car trips from 2018 to the three future year scenarios is taken from the DfT National Trip End Model forecasts, using the March 2017 version which was the latest at the time of preparing the forecast models.

3.3.2 These forecasts are based on estimates from the Office for National Statistics (ONS) on the number of people living in each area. The number of car trips made per person varies according to factors such as age, employment status, car ownership and household size. This is then applied to the number of people forecast in the future for these categories. This produces a forecast of the future number of car trips.

3.3.3 The growth in the number of trips made by vans and HGVs is taken from DfT road traffic forecasts as published in 2018 (RTF18), this was the latest version available at the time of preparing the forecast models.

## 3.4 Taking account of local developments

3.4.1 Adjustments to the location of future car trips are also made by including certain planned housing developments, and other developments such as employment, retail, and leisure sites. A list of these developments was from development and employment information compiled for other schemes planned in Greater Manchester. This information was reviewed and further updated through discussions with local planning authorities in Manchester, Salford, Bury, Oldham and Rochdale.

3.4.2 For the main traffic forecasts used to inform the highway design and economic and environmental appraisals, known as the ‘core scenario’, only developments with planning permission (or for which planning applications have either been submitted or are expected to be submitted imminently) are specifically included in the traffic model, in accordance with the principles set out in TAG. In addition, only developments over a certain size threshold are specifically included in the traffic model (because,

for example, a development with 200 houses will have more of an impact on the road network than a single house extension).

3.4.3 Any developments which are not specifically modelled are instead accounted for by general background traffic applied at a local authority level. In order to ensure that there is not too much traffic created on the network, the overall level of growth has been constrained to total local authority growth estimates from ONS data.

3.4.4 Maps of the specific local developments included within the traffic model (i.e. large sites with planning permission or planning applications) that are within close proximity of the proposed scheme are shown below. Plate 3-1 shows housing sites greater than 400 dwellings labelled with the total amount of dwellings at each site. Plate 3-2 shows the employment site locations.

**Plate 3-1 - Large housing sites included in traffic model (annotated with number of dwellings)**

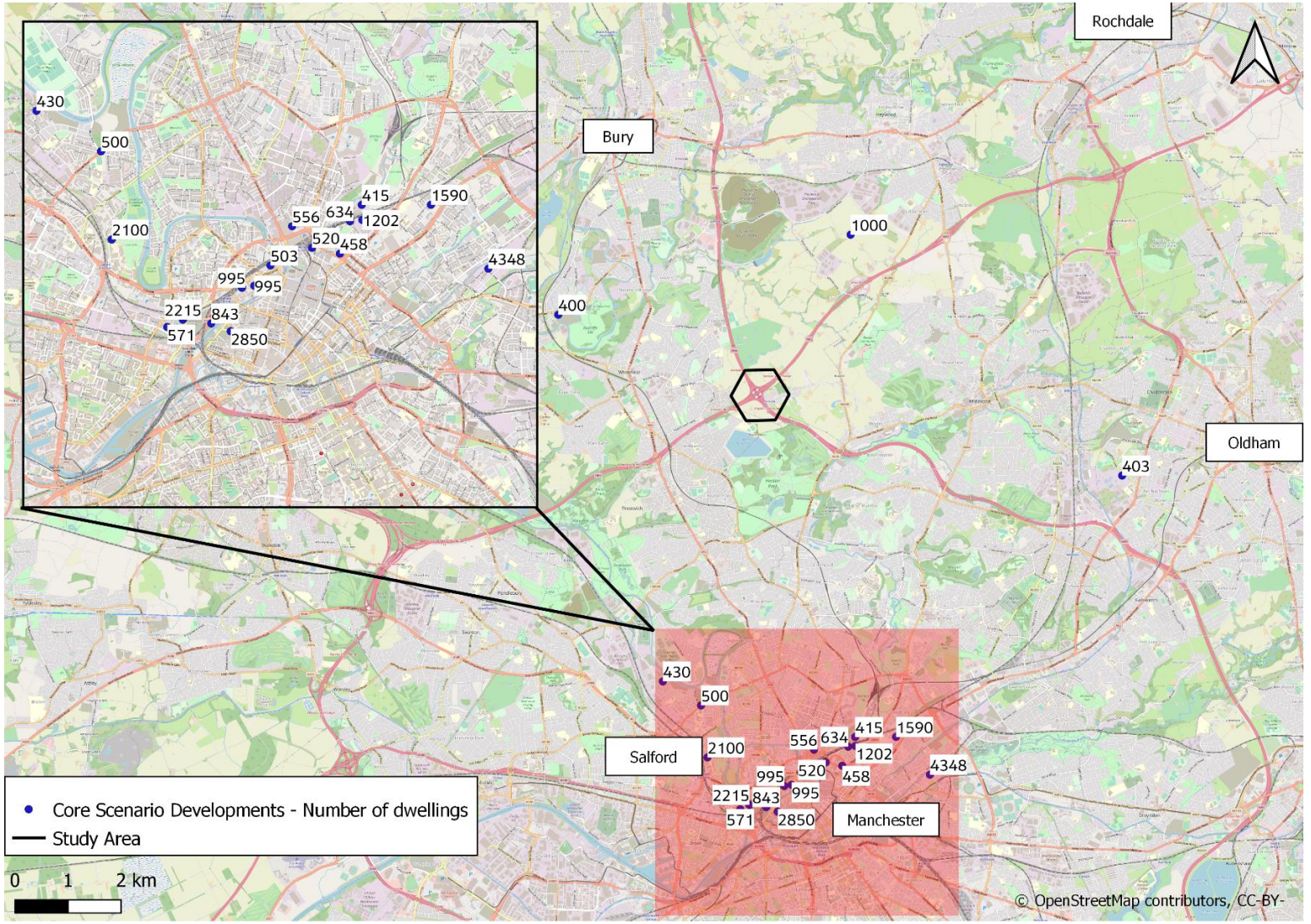


**Plate 3-2 - Large employment sites included in traffic model**

## 3.5 Taking account of future changes in the road network

3.5.1 The road network in the transport model has also been updated to include road schemes that are likely to be built, regardless of whether the proposed M60 junction 18 scheme is built or not. Road schemes that are considered too far away from M60 junction 18 to affect the scheme, or carry significant volumes of traffic that are expected to use M60 junction 18 have been omitted. This information has been provided by National Highways and local authorities in the area. For the purposes of our models, we have assumed that each of these schemes will be open by 2027.

## 3.6 How we treat the impact of Covid-19

3.6.1 The proposed scheme is not expected to open until 2027, and the likely long--term impacts of Covid-19 on travel demand are not yet understood.

3.6.2 The core traffic modelling scenario reported in this Traffic Modelling Report for Consultation is based on DfT traffic growth predictions which pre-date the Covid-19 pandemic.

3.6.3 However, sensitivity tests will be undertaken to understand the impact that higher or lower future traffic growth could have on the proposed scheme. As more is understood about the long-term impacts of Covid-19 on travel demand (DfT are likely to release some guidance in 2023), it is likely that additional traffic modelling will be produced to reflect this.

## 3.7 How we predict the impact of the proposed scheme

3.7.1 The sections above describe how we modelled the do minimum (DM) scenario, i.e. what future traffic conditions are predicted to be if we do not build the proposed scheme.

3.7.2 This section sets out how we modelled the do something (DS) scenario, which predicts the impact on the M60 J18, its surrounding junctions and other parts of the road network if the proposed scheme is built.

3.7.3 The model is used to predict changes in the time and cost of journeys if the proposed scheme is built, compared to the DM scenario. This includes traffic which does not pass through the M60 junction 18 improvements itself but whose journey times are affected by changes in traffic patterns as a result of the scheme. This could mean trips on minor roads having a faster journey time, due to less congestion from traffic that has now switched to the newly improved M60 junction 18.

3.7.4 The model also predicts how people will react to these changes in the time and cost of their journeys. The possible changes include how often they make the same trip, a change in the time of day they travel, a switch to or from public transport, where they travel to and from or what route they choose to take.

3.7.5 Evidence suggests that, generally, the same people will continue to travel by car but they may change where they travel to. As traffic speeds fall, or trips become more expensive, people tend to respond by making shorter journeys and where journeys become quicker or cheaper, some people choose to travel to places further away, for example, they choose employment further away from home.

3.7.6 The traffic model shows how many vehicles are expected to use each part of the road network, and the speeds they travel at. This information is then used to predict the environmental impacts of traffic (for example on noise and air quality). It is also used to measure the performance of the road network and to provide details on the location and level of congestion, the likelihood of accidents and changes in journey time reliability (i.e. the consistency of journey times from day to day).

# 4. What the model predicts

## 4.1 Worsening journey time over time if nothing is done

4.1.1 M60 junction 18 is already operating close to its capacity on some sections, causing congestion and delay for road users which in turn increases journey times. The traffic model predicts that as flows continue to increase over time, this situation will worsen if nothing is done.

4.1.2 Plate 4-1 shows how the base year (2018) journey times are forecast to change by the year 2042 if the proposed scheme is not in place. The plate shows movements along the M60 between junctions 17 and 18 as well as the right turn movements through junction 18 between adjacent junctions.

4.1.3 Both the morning and evening peaks show a considerable increase in journey time from the base year (2018) to the year 2042. M66 junction 3 to M60 junction 17 right turn shows a journey time increase of more than two minutes in the PM peak and the M60 south junction 19 to M62 junction 19 right turn shows an increase of more than on minute in both the AM and PM peak periods.

## 4.2 Improved journey time with scheme in place

4.2.1 Plate 4-2 shows the difference in journey time between the do minimum (DM) scenario and the do something (DS) scenario in 2042.

4.2.2 With the scheme in place, journey times for all the right turning movements decrease. There are journey time savings of more than one minute predicted in both the AM and PM peak period for the M60 junction 17 to M60 south junction 19 right turn movement as this traffic can now use the free flow-link. This also means a decrease in congestion on the circulatory at junction 18 allowing quicker journey times for the other movements through the junction.

4.2.3 In particular the M66 junction 3 to M60 junction 17 right turn in the PM has a journey time saving of up to three minutes as traffic can move more freely on the circulatory. Overall, all movements around the circulatory as well the mainline movements show a journey time saving as there is less congestion around the scheme area and surrounding junctions.

## 4.3 Change in flow on strategic roads

4.3.1 Plate 4-3 and Plate 4-4 present the predicted traffic flows on key roads in the Strategic Road Network, both with and without the proposed scheme in place. Traffic numbers are presented as the Annual Average Daily Traffic (AADT) by direction on the strategic road network mainline, on-slips and off-slips around M60 J18. Traffic numbers are presented for 2042 (the scheme design year) to the nearest 100 trips.

4.3.2 Plate 4-3 shows how the Base Year (2018) traffic is forecast to change by 2042 if the proposed scheme is not in place. The Plate highlights that the traffic will increase significantly within the vicinity of M60 junction 18. In particular, along the M60 and M62 mainline traffic is forecast to increase by more than 30%.

4.3.3 Plate 4-4 highlights that:

- Traffic would reduce significantly on the M60 junction 18 eastbound off-slip, and subsequently the circulatory, as traffic making the turn from M60 west towards the M60 south would now travel along the free-flow link.
- The increased traffic around junction 17 and junction 18 are due to the improvements in journey times and reliability leading to traffic rerouting onto the M60 mainline away from other less suitable routes. People are also expected to make more trips along the M60 in general if congestion is improved.

## 4.4 Change in flow on local roads

4.4.1 The local road network is defined as that owned by local authorities or private landowners, and is generally made up of the smaller roads that carry less traffic than the SRN.

4.4.2 With the scheme in place, local roads will be slightly impacted as a result of some traffic choosing different routes due to the reduced delays on the motorway network. In the first instance this means a slight reduction in traffic on local roads which act as alternative routes to using the M60/M66 such as sections of the A56 Bury New Road and A6045 Heywood Old Road.

4.4.3 Some local roads around M60 junction 17 and junction 19 are forecast to see a slight increase (<5%) in traffic flow as the proposed scheme attracts more traffic to access the M60 in this location. Plate 4-5 & Plate 4-6 shows the forecast traffic flow changes on the local road arms of junction 17 and junction 19 as a result of the proposed scheme.

4.4.4 The biggest increases at M60 junction 17 are shown to be on the A56 Bury New Rd to the south of junction 17 with a two-way AADT increase of 1200 and at junction 19 on the A576 with a combined two-way AADT increase of 900 extra vehicles to the west of junction 19.

**Plate 4-1 - Journey Time Base vs 2042 DM**

**Plate 4-2 - Journey Time 2042 DM vs 2042 DS**

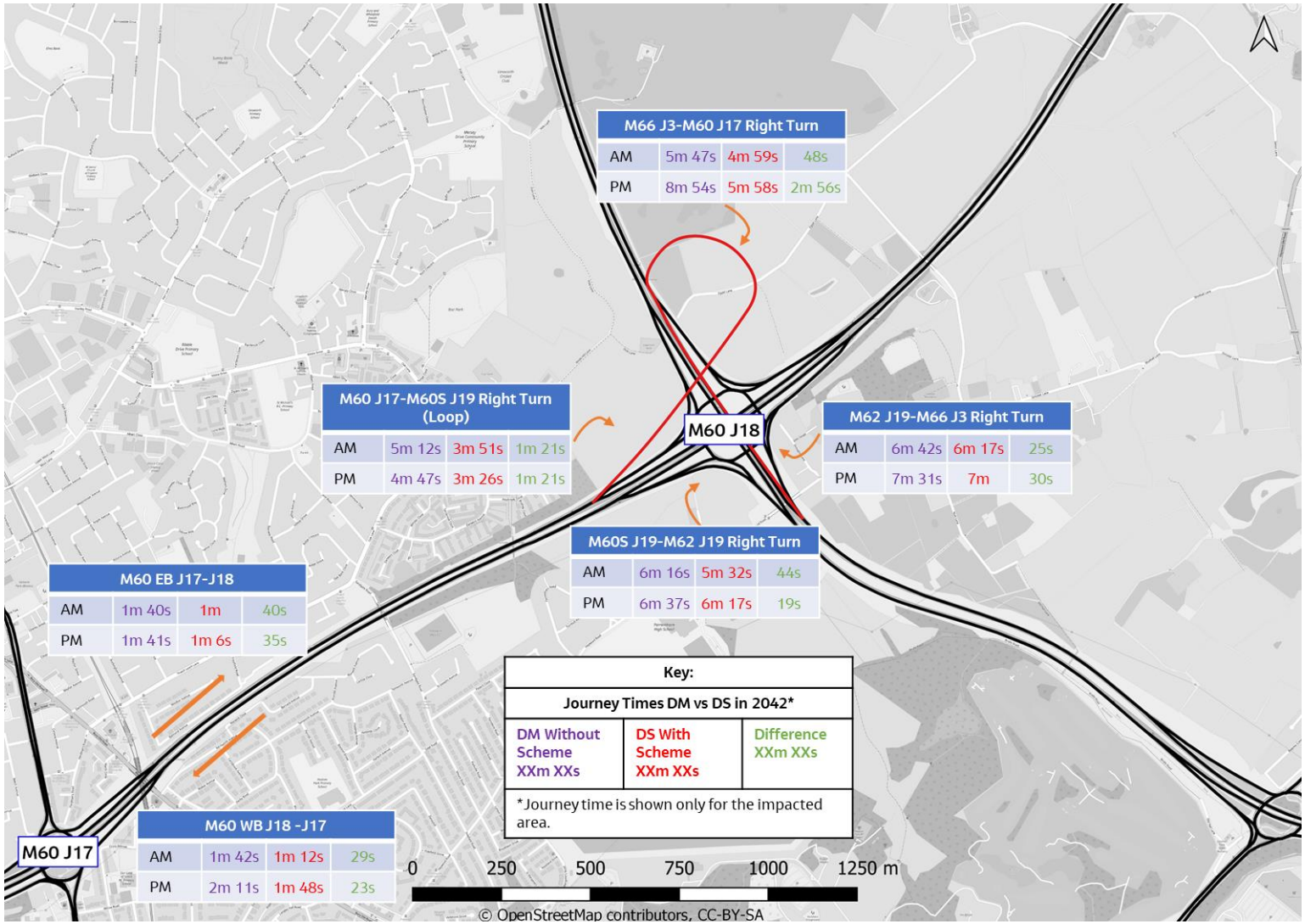


**Plate 4-3 - Strategic network Annual Average Daily Traffic (AADT) – Base vs DM 2042**

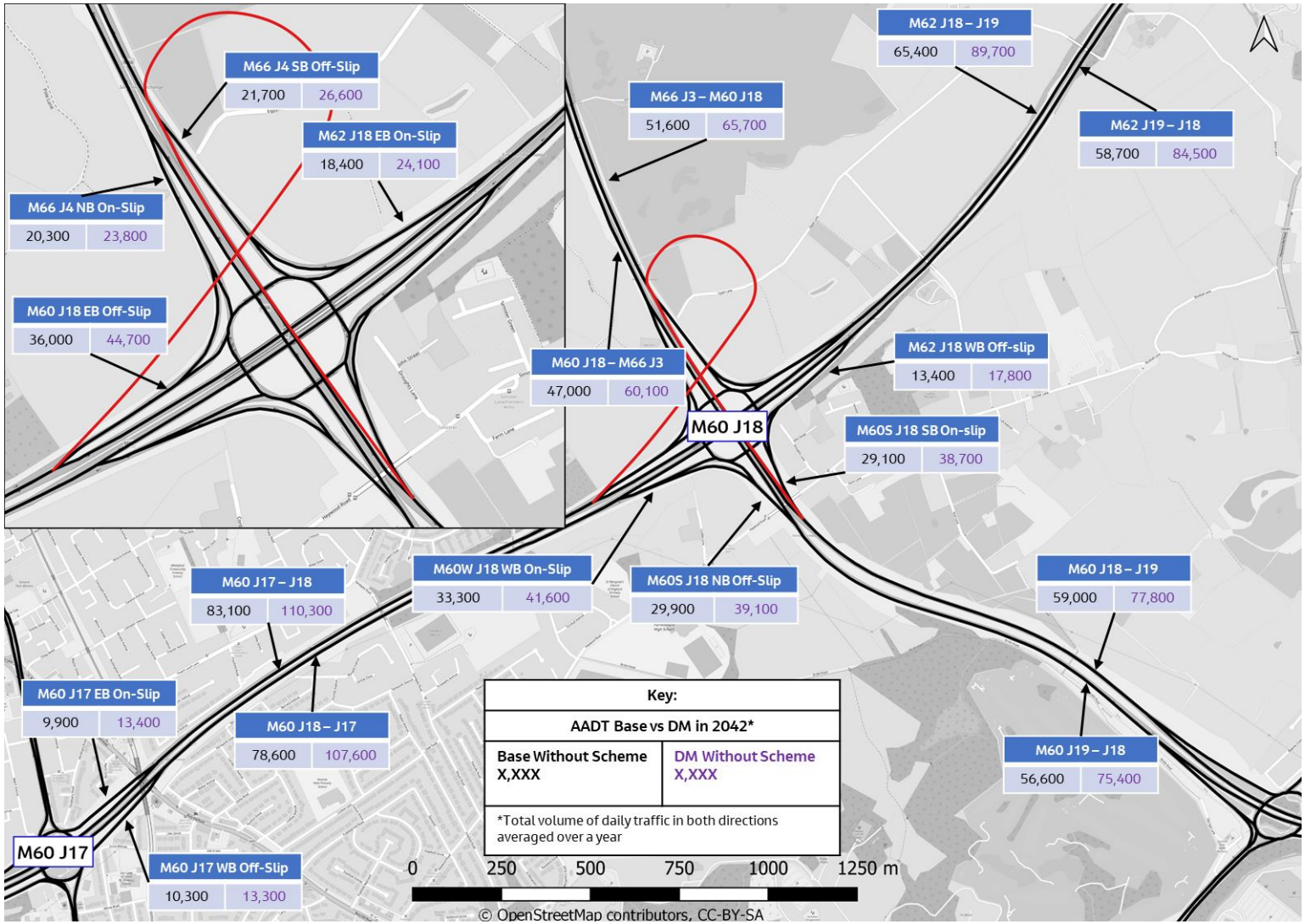


**Plate 4-4: Strategic network Annual Average Daily Traffic (AADT) – DM vs DS 2042**

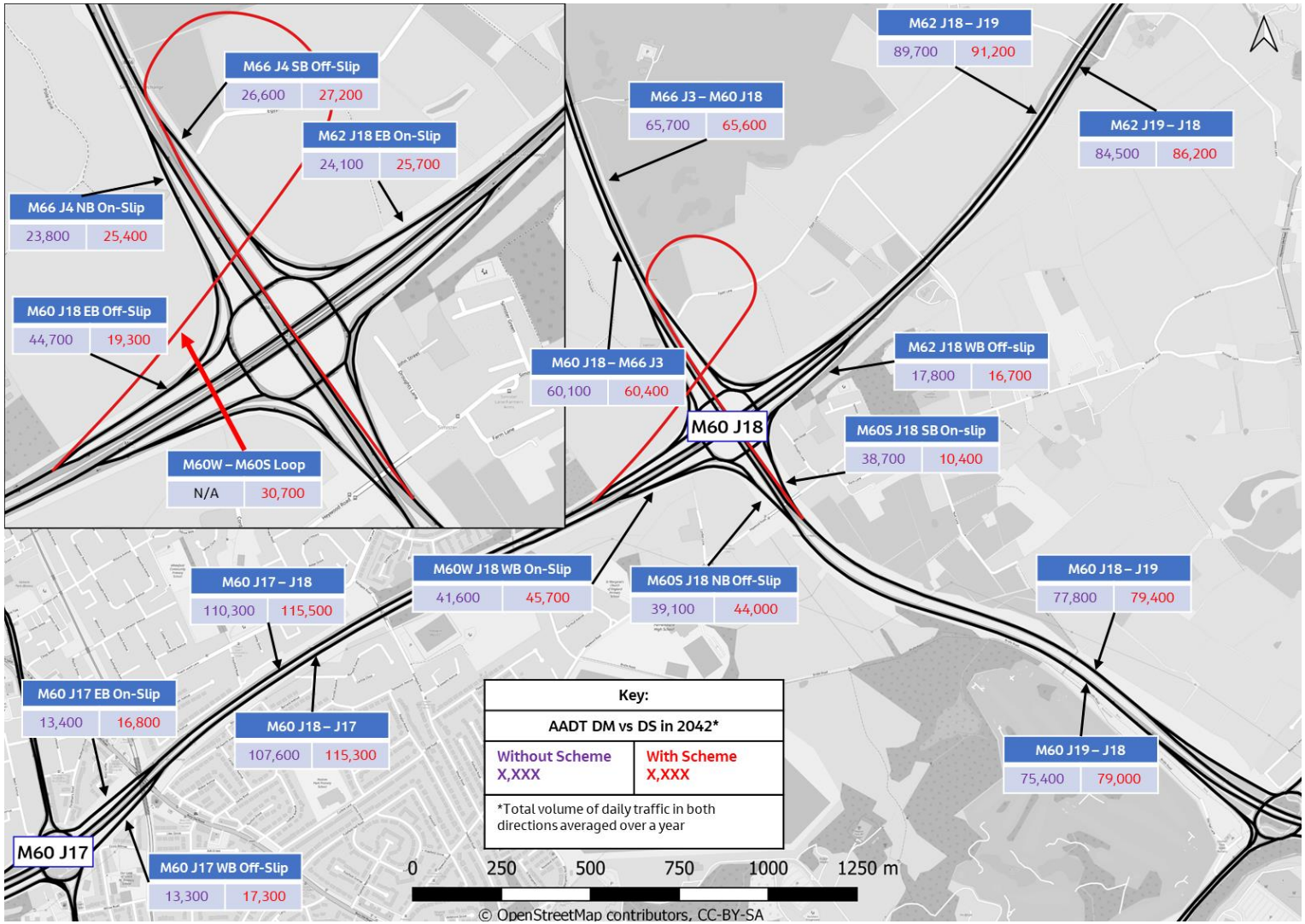


**Plate 4-5 - M60 junction 17 Local Road Annual Average Daily Traffic (AADT) - 2042**

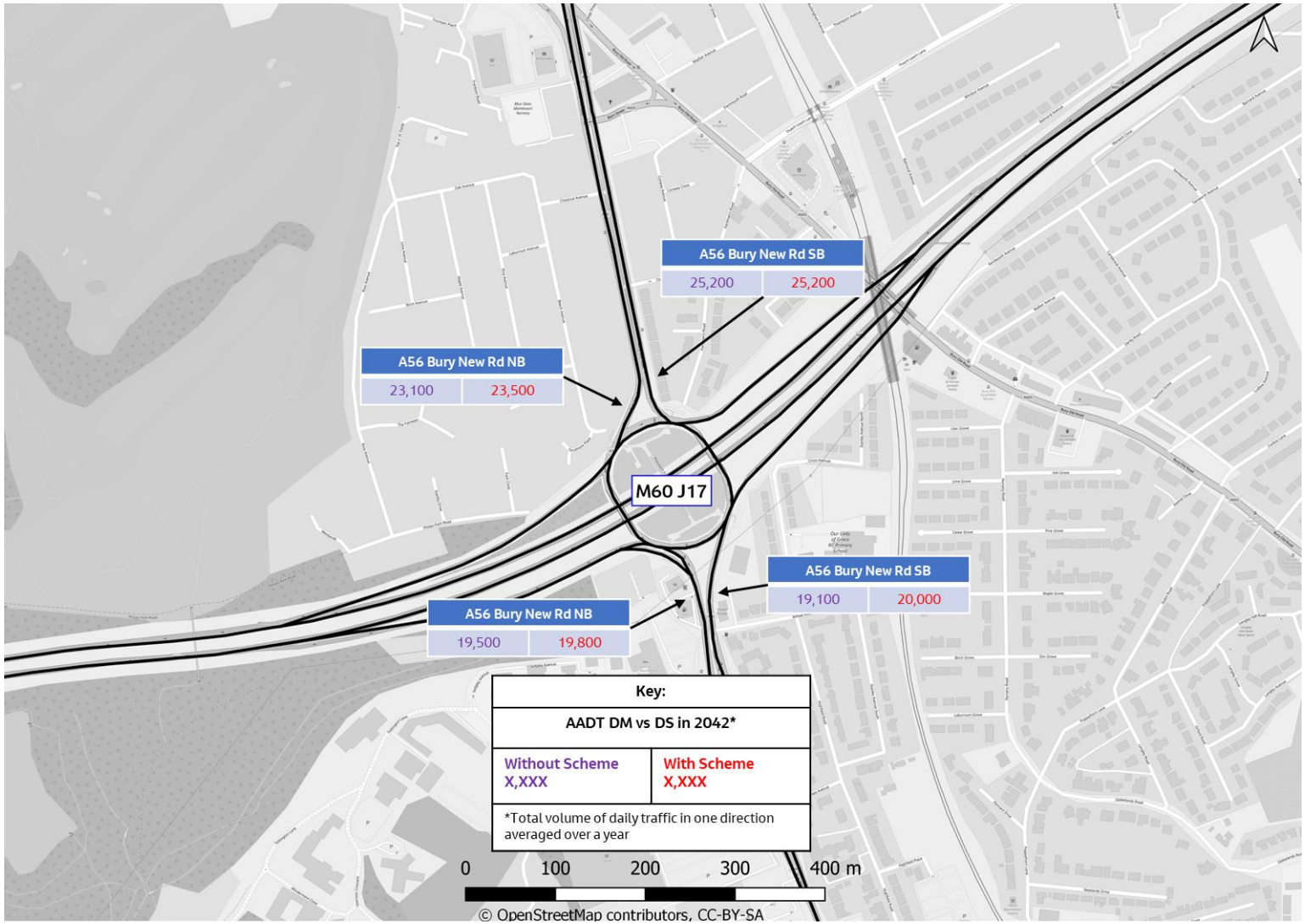
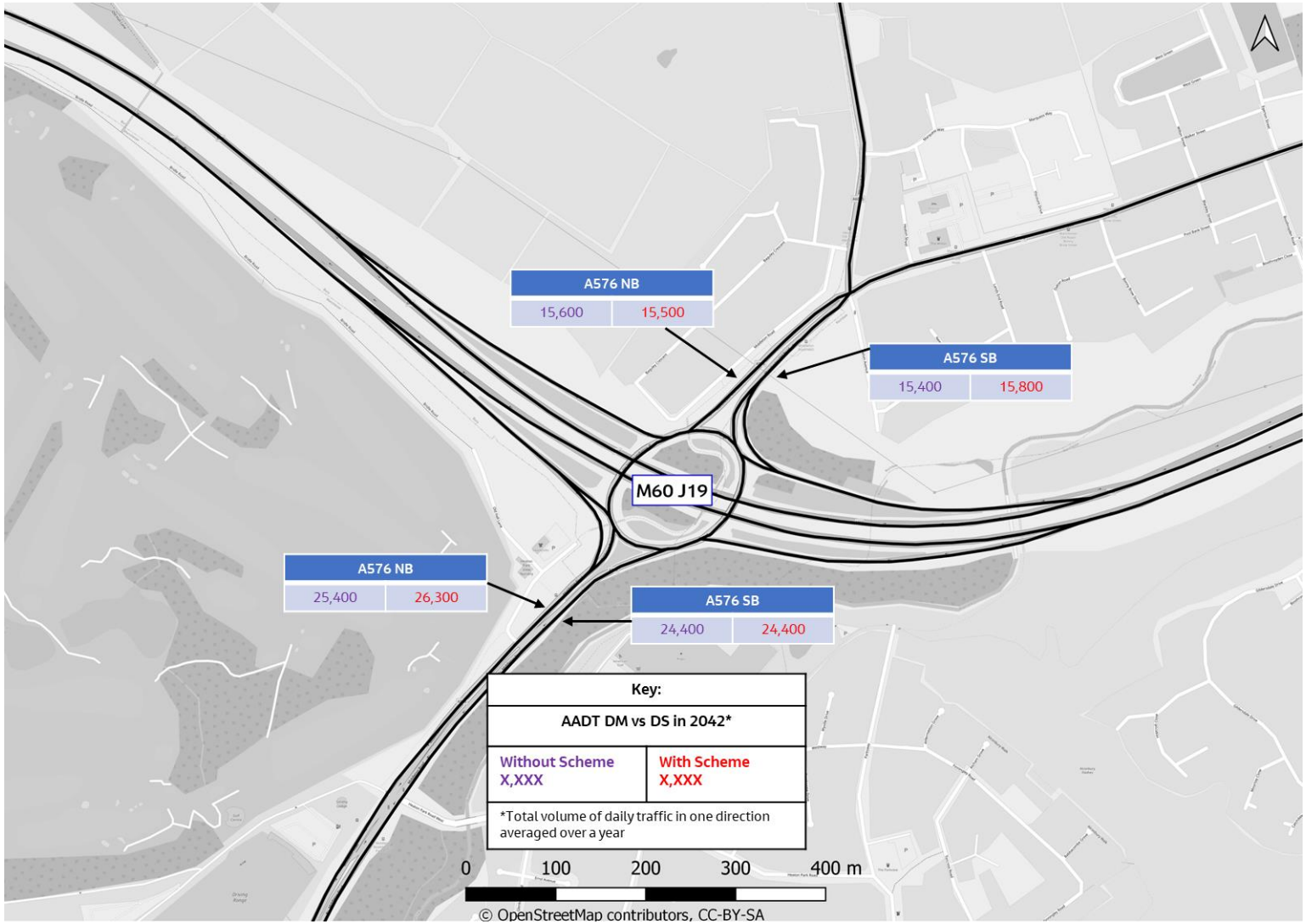


**Plate 4-6 - M60 junction 19 Local Road Annual Average Daily Traffic (AADT) - 2042**



# 5. Summary

## 5.1 Development of traffic models

5.1.1 Traffic models were initially developed to represent the existing conditions of the strategic and local road network in Greater Manchester. These models show the amount of traffic on each road in the model area, and the speeds at which vehicles typically travel. The traffic models were produced using information on people's travel patterns obtained by analysing records of mobile phone movements. The models also use information from traffic counts and demographic data on where people live and work.

5.1.2 Based on this information, traffic models were then produced to predict how traffic conditions may change in the future, both with and without the proposed scheme in place. By comparing different traffic model scenarios, the likely impact of the proposed scheme can be better understood.

## 5.2 Summary of predicted scheme impacts

5.2.1 The predicted impact of the proposed scheme is presented in this report. It shows that:

- Journey times through M60 junction 18 Simister Island would continue to worsen in the future if the proposed scheme is not built.
- The proposed free flow link for traffic travelling between M60 junction 17 and M60 junction 19 removes a substantial traffic flow from the M60 junction 18 roundabout, reducing delays for other movements.
- There will be less delay caused by traffic joining and leaving the M60 between junction 17 and junction 18 as a result of the proposed fifth lane on the M60 between these junctions.
- The proposed scheme would offer journey time savings of up to 90 seconds from M60 junction 17 to M60 junction 19 and up to three minutes during rush hour between M66 junction 3 and M60 junction 17, compared to a scenario where the scheme is not built.
- Some local roads would experience decreases in traffic due to the scheme because reductions in delay on the motorway network will make this more attractive than travelling on local roads.
- A small number of local roads would experience increases in traffic, especially those which would be used to access the M60 in the vicinity of junction 18.

5.2.2 The predicted environmental impacts due to these changes in traffic (for example on noise and air quality) are described in the Preliminary Environmental Information Report provided as part of this consultation.

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