

Warwickshire County Council

South Warwickshire Local Plan STA Testing

SLR Project No.: 431.000286.00100.09

12 May 2026

Revision: 01

BIDFORD ON AVON STA TESTING RESULTS SUMMARY

1.0 Introduction

- 1.1 SLR Consulting have been commissioned by Warwickshire County Council to undertake the traffic modelling analysis, in support of the Strategic Transport Assessment (STA), with the aim of identifying the predicted impacts resulting from the delivery of the developments included within the new South Warwickshire Local Plan (SWLP).
- 1.2 This technical note has been produced to outline the inclusions, initial impacts, required schemes and resultant model performance reported within the Bidford on Avon model network. The note has been produced following the release of the initial model output information pack, which is provided within **Appendix A**.
- 1.3 The extent of coverage included within the Bidford model is illustrated within the following figure. The Bidford base model has recently been calibrated to reflect 2025 network conditions, before being forecast to create a 2050 future year scenario. This represents predicted network conditions inclusive of all known highway schemes by 2050. There are no committed developments in this area, and therefore the scenario simply contains traffic growth forecasts. This is an estimate of the likely status of the network, if no other developments were to be approved between now and 2050.
- 1.4 The SWLP STA testing presented within this note has been completed using the 2050 Reference Case scenario, as a starting point/benchmark.

Figure 1: Bidford Model Network



Objectives

1.5 The objective of this assessment is to understand the implications of the proposed new Local Plan development allocation strategy which WDC/SDC are promoting through its SWLP submission. The initial findings from this assessment have been set out within this summary note which reports upon:

- The potential impact, on the Bidford highway network, of traffic growth arising from the allocation strategies.
- The mitigation measures required to support the growth and minimise the effect on the operation of the transport network.

2.0 STA Model Inclusions

2.1 The initial stages of this assessment details the predicted impacts associated with the inclusion of the core SWLP sites within the Bidford model demands. Details pertaining to the sites for inclusion within the core assessment have been provided by WDC/SDC.

2.2 WCC have provided trip rates, by land use, which SLR have then combined with the site information provided by WDC/SDC, to determine a trip generation estimate for each site to be considered.



- 2.3 An appropriate trip distribution assignment for each site was then derived, using WCC's 2023 Mobile Network Database (MND) database. Separate trip distributions were produced for each site depending on the predominant land use on each site. The WCC MND data considers all journey purposes and is more recent than the 2021 census, which was affected by the Covid-19 pandemic, and therefore is considered the most appropriate source of trip distribution information.
- 2.4 The distribution patterns have then been routed through the road network, via the use of TRACC, a tool developed by Basemap. The trip ends identified through the MND analysis for each distribution are weighted by population, and the TRACC is used to estimate the likely routes to be taken by drivers, between the given site and trip end location, based upon the time the trip is anticipated to take.
- 2.5 Once the trip distribution patterns were derived for each site, the anticipated trip generation values were also applied to the distribution, to determine traffic flow assignment patterns predicted to be generated by each development site.
- 2.6 The sites included within the modelling consist of Strategic Growth Locations (SGL) and Non-Strategic Growth Locations (NSGL), which are summarised within the following tables and figure:

Figure 2: SWLP STA Sites (Bidford Area)

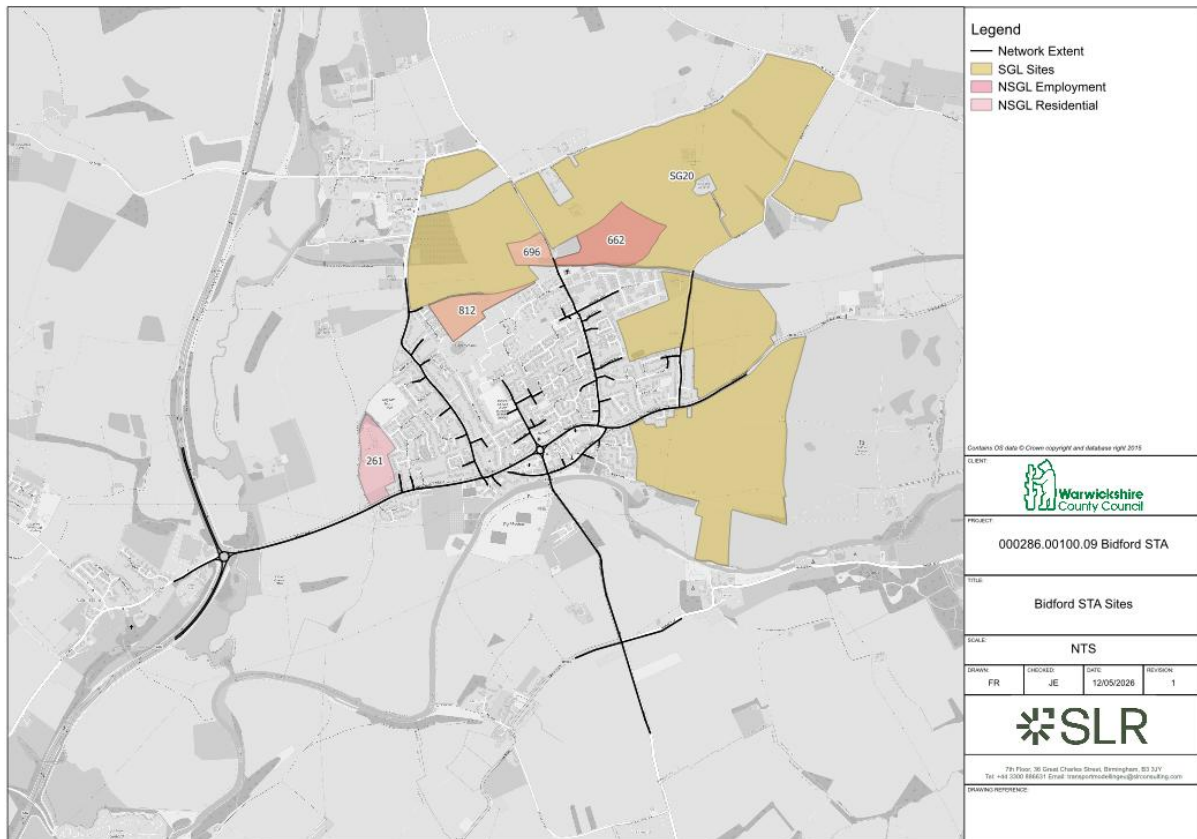


Table 1: SGL Sites

STA Sites	Build Out	
	Dwellings	Employment (ha)
SG01	3,940	1.5
SG02	0	93.85
SG04	626	0
SG05	1,363	0
SG06	2,143	0
SG08	1,200	0
SG09	750	121
SG10	1,945	0
B1	4,500	0
SG12	3,940	5
SG13	0	157.01
SG15	3,250	27
SG16	0	62.81
SG18-N	905	0
SG18-S	669	0
SG19	2,585	0
SG20	3,120	11
SG23	2,600	3.3
E1	4,000	69.8

**sites highlighted are those which lie within the Bidford model extent*

Table 2: NSGL Residential Sites (within Bidford Network)*

STA Sites	Build Out	
	Site Name	Dwellings
261	Land at Marriage Hill Farm, Bidford on Avon	159
696	Land at Waterloo Road, Bidford-on-Avon	75
812	East of Jacksons Meadow, Bidford-on-Avon/Moorland Lodge	143

**a further 59 NSGL residential sites lie outside the Bidford model extent*

Table 3: NSGL Employment Sites (within Bidford Network)*

STA Sites	Build Out	
	Site Name	Floor Area (ha)
662	Holders	10.23

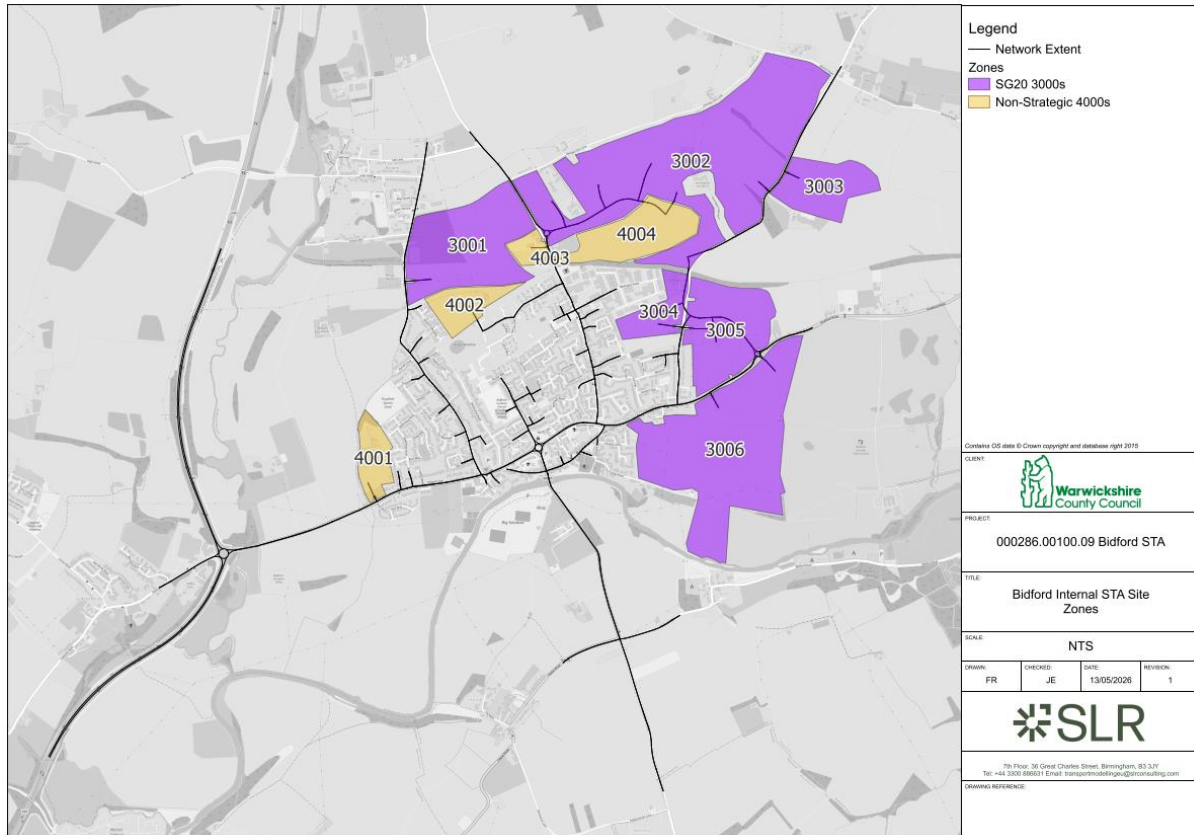
**a further 16 NSGL employment sites lie outside the Bidford model extent*



Internal Site Inclusions

- 2.7 Within the Bidford testing, the SG20 strategic site and the NSGL sites detailed within the previous tables have been included within the model in detail. The SG20 site has been divided into six parcels across Bidford, as presented within the following figure:

Figure 3: Internal STA Sites



- **SG20** (3,120 Dwellings and 11ha of employment site) - Zones 3001 – 3006 - accessed via off Victoria Road, Stratford Road, Grafton Lane;
- **Land at Marriage Hill Farm** – Zone 4001 - accessed via a new priority junction;
- **East of Jacksons Meadow** - Zone 4002 - accessed off Victoria Road;
- **Land at Waterloo Road** - Zone 4003 – accessed off Waterloo Road/Wellington Road roundabout
- **Holdings Employment Site** - Zone 4004 – accessed off Wellington Road

Scenarios Assessed

- 2.8 The analysis presented within this note is based upon a series of model scenarios, that are built up from the benchmark scenario, in this case, the existing 2050 Reference Case. This model is inclusive of all consented infrastructure, and background traffic growth up to 2050, within the Bidford model network.



- 2.9 There are no sites within the currently adopted plan, not yet consented, within the Bidford model extent, and as such there is no “Local Plan model” (as is the case for the other models within WCC) and therefore the Reference Case is considered the appropriate benchmark in these circumstances.

Do Nothing Scenario

- 2.10 Using the benchmark scenarios detailed above, the relevant sites from the proposed Local Plan have then been added into the Bidford model, to form the 2050 Local Plan Do Nothing scenario. At this stage the only infrastructure included relates to site specific access junctions.

Do Minimum (Mode Shift)

- 2.11 Following the review of the Do-Nothing scenarios, the first stage of mitigating the impacts arising from the inclusion of the Local Plan sites has been to consider the role that achieving mode shift (based on policy targets already defined by WCC through existing strategies and measures) has in reducing the potential adverse impacts of traffic growth. The application of the mode shift is considered the essential first stage of any mitigation strategy.

Do Something (Mitigation)

- 2.12 The Do Minimum scenarios represent the first phase of mitigation. This scenario is then interrogated to identify remaining residual impacts on the highway network which may necessitate mitigation via highway capacity improvements.
- 2.13 At this stage, mitigation has been included within the model to create the Do Something scenario, whereby infrastructure is gradually included within the network in response to the issues observed within the model.
- 2.14 Based on the above, the resulting model scenarios reported within this note are defined as follows:
- **2050 Reference Case:** The benchmark scenario inclusive of background traffic growth only (there are no committed developments);
 - **2050 Local Plan Do Nothing:** as per the Reference Case + full STA proposals;
 - **2050 Local Plan Do Minimum:** as per the Do Nothing with mode shift demand adjustments applied; and
 - **2050 Local Plan Do Something:** as per the Do Minimum with identified highway mitigation included.

Demand and Growth Level Summary

- 2.15 Following development of the corresponding demand sets for the Local Plan scenario, the resultant hourly demand totals and growth levels, over the 2025 baseline, are presented within **Table 4**.



- 2.16 Upon inclusion of the traffic demands associated with the proposed SWLP developments, the model demands have been reviewed and constrained against national forecasts using DfT's National Trip End Model (NTEM). The demands have been capped to a "target" growth factor from the TEMPro database, derived for the Bidford area using MSOA Stratford-on-Avon 004 to constrain the "internal" traffic growth, and at county level of "Warwickshire" for "external" trips.
- 2.17 This has been informed via adjusting the housing projections within the planning assumptions in TEMPro to reflect the housing delivery proposed for the Bidford Area and across the County respectively.

Table 4: Demand Totals & Growth Levels by Scenario

Scenario	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
2050 Reference	3,710	4,129	3,167	4,201	4,417	3,312
Growth	15.72%	15.92%	15.16%	16.60%	16.67%	16.54%
Local Plan Do Nothing	4,113	4,641	3,560	4,727	4,977	3,715
Growth	28.29%	30.27%	29.49%	31.19%	31.47%	30.74%

Effects of Modal Shift

- 2.18 Prior to the development of the 'Do Something' scenarios, which involves the identification and inclusion of targeted highway mitigation schemes, the first stage of mitigation within the Bidford model assessment is the consideration of the role of potential modal shift across the model network. The adopted methodology for the inclusion of modal shift is consistent with that applied across all SWLP STA models, as detailed within a separate technical note¹.
- 2.19 Adjustments have been made to the model demands to reflect "normal" and "optimistic" levels of mode shift. The "normal" mode shift adjustments are based upon targets within the LCWIP up to 2030 and have resulted in approximately 0.38% reductions in the model demands.
- 2.20 Given that Bidford is relatively remote from neighbouring town centres (i.e. Warwick, Leamington, Stratford upon Avon etc), there are predicted to be more limited opportunities to shift modes and for shorter distance trips, than in larger towns; meaning at this stage the "normal" levels of mode shift have been considered within this assessment. This lower level of mode shift is to be expected given the high proportion of longer distance trips, which are less likely to shift the mode of travel, within the Bidford model network.

¹ 000286.00100.R001.SWLP Mode Shift Methodology



- 2.21 Consideration as to how the “optimistic” targets affect the outcomes of the modelling is due to be considered via sensitivity testing following the completion and submission of the core testing.
- 2.22 **Table 5** presents the impact on the total model demands, once the “normal” levels of mode shift have been applied.

Table 5: Pre and Post Mode Shift Demand Comparison (Local Plan Options)

Scenario	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
2050 Reference	3,710	4,129	3,167	4,201	4,417	3,312
Growth	15.72%	15.92%	15.16%	16.60%	16.67%	16.54%
Local Plan Do Nothing	4,113	4,641	3,560	4,727	4,977	3,715
Growth	28.29%	30.27%	29.49%	31.19%	31.47%	30.74%
Local Plan Do Min (Normal)	4098	4623	3548	4709	4958	3701
Growth	27.91%	29.89%	29.13%	30.82%	31.09%	30.37%

3.0 Do Nothing Assessment

- 3.1 The initial stage of assessment considers the impact of the predicted Local Plan traffic, in addition to background traffic growth. The traffic predicted to be generated by the additional Local Plan sites has been included within the model, to form the “2050 Local Plan Do Nothing” scenario. The 2050 Local Plan Do Nothing scenario was run and the resultant model operation reviewed.
- 3.2 It was quickly apparent that the model becomes gridlocked in a number of the model runs, and is unable to provide reliable results, whereby the volume of traffic on the network becomes such that the road network becomes fully congested, after which traffic movements effectively stop. This is demonstrated by the following congestion profile graphs, which illustrate the number of vehicles on the model network across the AM and PM period.
- 3.3 It is typically expected that the number of vehicles on the network would build throughout the simulation period, to peak during the peak period, before dissipating. As is demonstrated within the following two figures, there is a high occurrence, particularly during the PM period, whereby the number of vehicles on the network continuing to build throughout the simulation, indicating that there is gridlocking occurring preventing vehicles from completing their journey.



Figure 4: Vehicles on the Network Congestion Profile – Do Nothing Scenario - AM Period

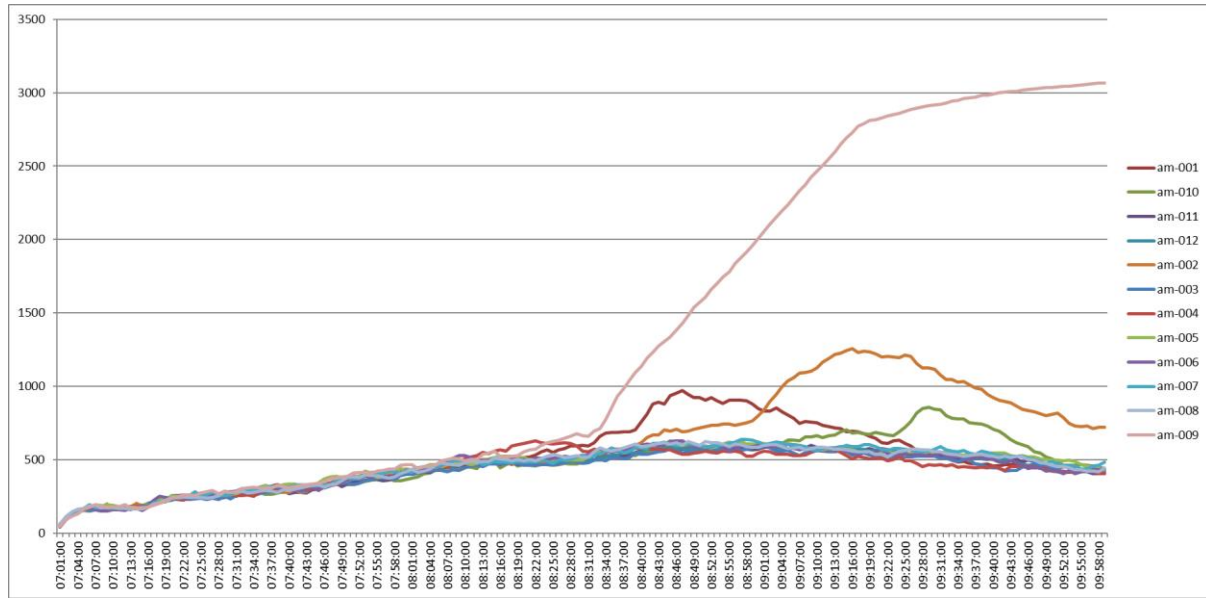
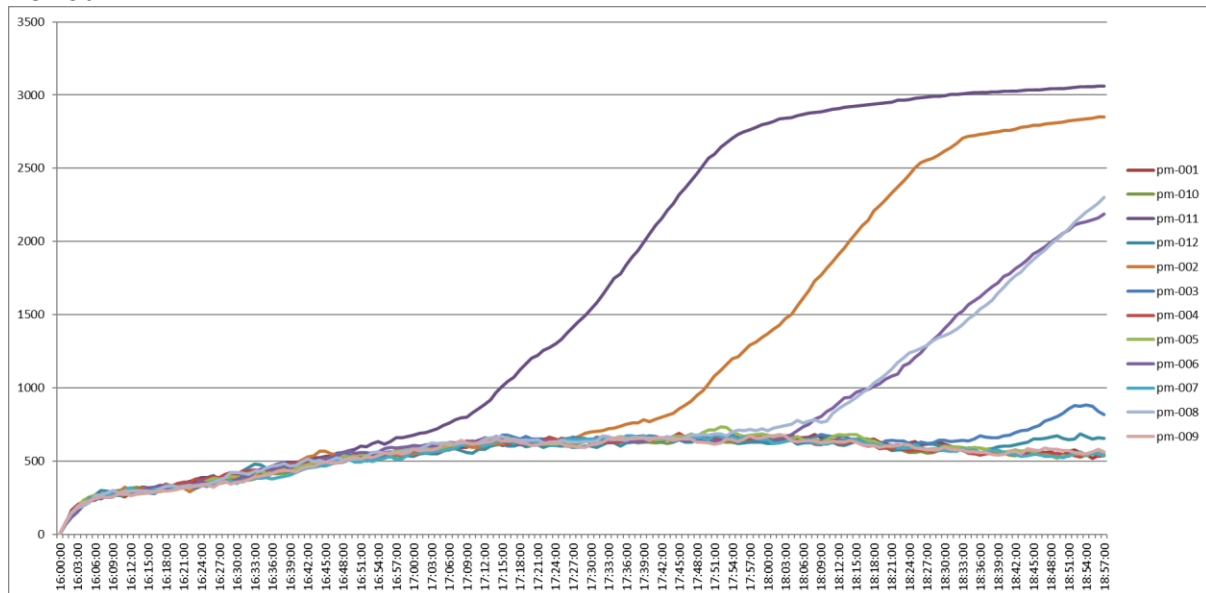


Figure 5: Vehicles on the Network Congestion Profile – Do Nothing Scenario - PM Period



3.4 Based upon the congestion profiles presented, and a visual review of the model operation, without further interventions, the network does not have capacity for the volume of traffic assigned without significant queues and model stability issues. As a result, the following section details the first stage of intervention in the form of mode shift demand changes.

4.0 Do Minimum (Mode Shift) Assessment

4.1 Following the reporting of the Do Nothing scenario, the mode shift adjustments have been applied to the model demands, in line with the description provided within the previous text. These demands have been assigned to the models, and the model runs and reported within the following section.



Figure 6 Vehicles on the Network Congestion Profile – Do Minimum Scenario - AM Period

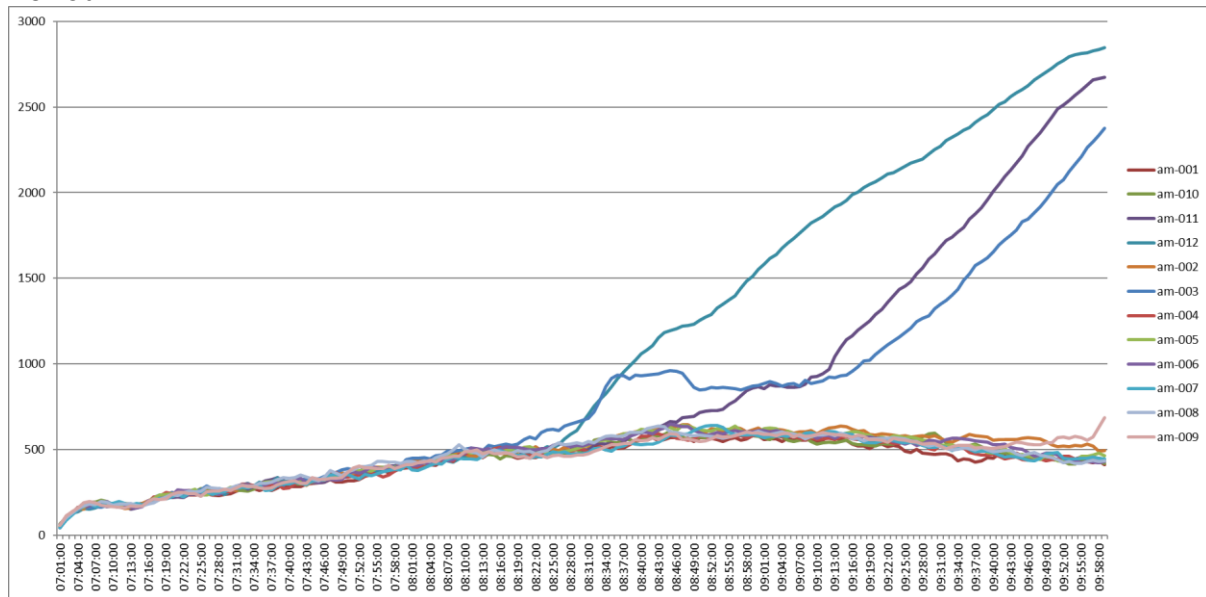
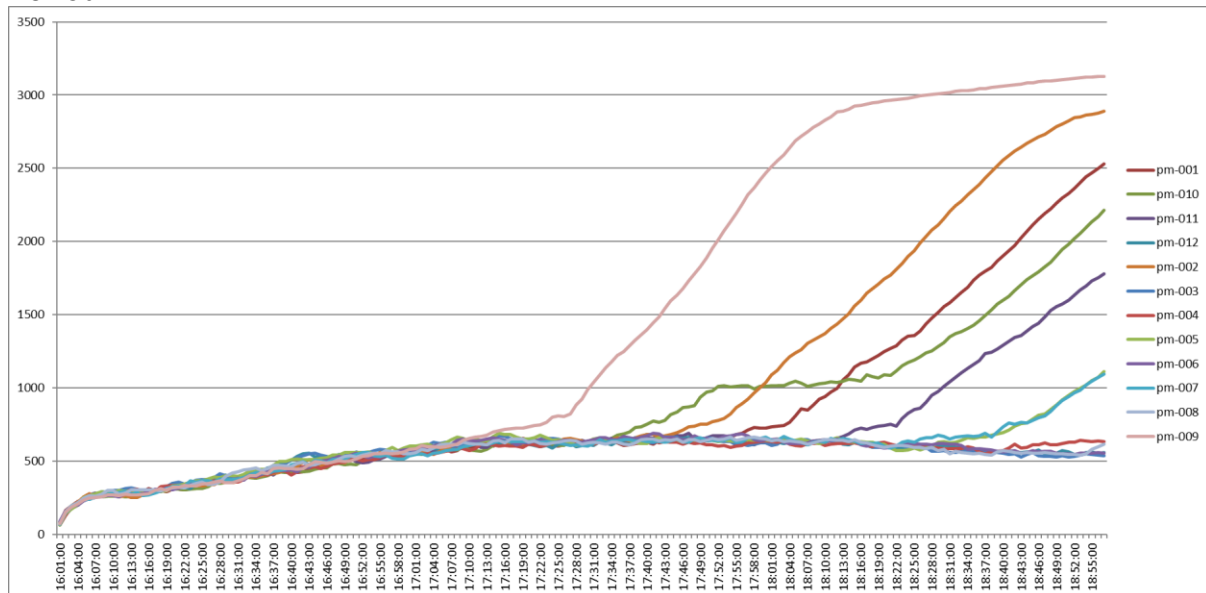


Figure 7 Vehicles on the Network Congestion Profile – Do Minimum Scenario – PM Period



- 4.2 The vehicles on the network profiles presented within the previous two figures has demonstrated that with the mode shift applied, the model stability has not improved over that reported within the Do Nothing scenarios, and there remains a number of instances of “failed” runs, indicating that there is a risk that significant issues will remain that will prevent the network from functioning acceptably.
- 4.3 Alongside the congestion profiles, a consideration of the impacts that the inclusion of the STA sites, along with the application of a mode shift impacts has, is reported within the following outputs, initially focusing on changes in the average journey time results, at a strategic level, before providing a more localised assessment through queue length analysis.

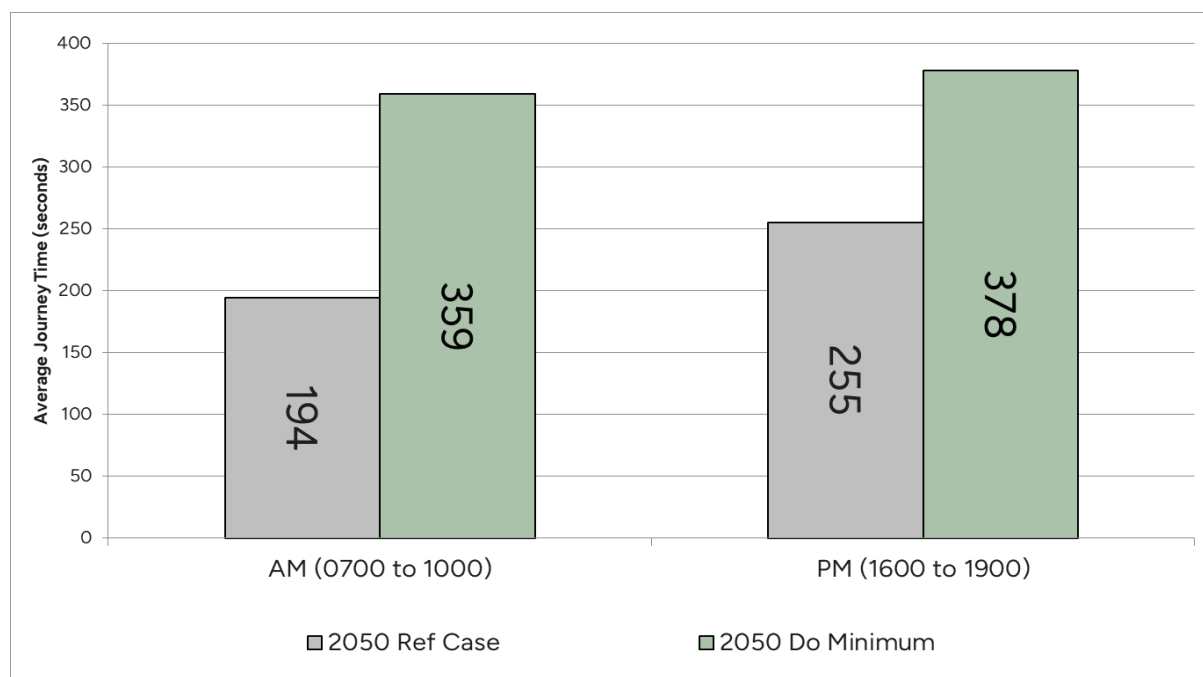


4.4 It should be noted that the instability within the model means that these outputs are not necessarily reliable but they do provide an initial indication of the effects of the SWLP site traffic demands to understand where the most significant issues are predicted to occur.

Strategic Level/Network Wide Impacts

4.5 The following figures report the strategic level impact on journey times within the 2050 Local Plan Do Minimum (mode shift) scenario, relative to the 2050 Reference Case (i.e. benchmark scenario).

Figure 8: Average Journey Times – Bidford LP Do Minimum (Mode Shift) Assessment



4.6 The results presented within the previous figure indicate the average journey time for each vehicle on the model network in the Reference Case and Local Plan Do Minimum (mode shift) scenarios.

4.7 With the inclusion of the mode shift, when considered alongside the Local Plan sites, the results indicate significant increases in average journey times, relative to the Reference Case. This is to be expected given the amount of additional traffic included in the network, generated by the STA sites, combined with the very low levels of mode shift likely to be achieved within Bidford. The average journey times are predicted to increase by 85% in the AM and 48% in the PM period, relative to the Reference Case.

4.8 The strategic level indicators presented within the previous figure indicate that with the STA trips included, with just the mode shift assumptions applied, there remains residual impacts within the model, which is continuing to result in significant constraints to the operation of the highway network.



Localised Queue Impacts

- 4.9 The following analysis presents a localised impact assessment, based upon changes in queues lengths across the model network. The previous figure has highlighted that residual impacts occur following the inclusion of the STA site demands, at strategic level. The following queue plots seek to outline the locations on the network that these issues are predicted to manifest. This analysis is presented within the following two figures for the AM and PM peak hours.

Figure 9: Bidford LP Do Minimum Queue Impacts – AM Peak Hour



Figure 10: Bidford LP Do Minimum Queue Impacts – PM Peak Hour



- 4.10 The queue results presented within the previous figures indicate the location and extent of changes in queue lengths in the Local Plan Do Minimum scenario, relative to the Reference Case. In line with the average journey time results, there remain notable impacts once the additional Local Plan sites (and mode shift) is accounted for within the modelling.
- 4.11 The plots indicate that significant queue impacts are predicted at the following locations within both the AM and PM period:
- B439 Tower Hill/Waterloo Road
 - Waterloo Road/Wellington Road
- 4.12 Significant queues form on the Waterloo Road southbound approach to the B439 Tower Hill/Waterloo Road junction during both the AM and PM periods. This is in part due to the large increases in traffic on Waterloo Road, generated by the SG20 site, but is also a result of higher traffic flows on the B439 which reduces gaps in traffic for traffic to exit Waterloo Road.
- 4.13 The result is significant queues forming from this junction which block back to the Waterloo Road/Wellington Road roundabout, having knock on impacts at this location. This impact occurs during the AM and PM periods and is demonstrated within the following model snapshot.



Figure 11 Waterloo Road Capacity Issues



- 4.14 In addition to this, because of the constraint to traffic travelling through the network at this location, it is not possible to fully understand the implications of the SG20 traffic on the Bidford Bridge, as a significant amount of traffic that will cross the bridge is held in the queue on Waterloo Road.
- 4.15 It is clear that the B439 Tower Hill/Waterloo Road junction is over-capacity within this scenario; however, it is also apparent that the fact that significant amounts of SG20 traffic is loading onto Waterloo Road is also likely to be a key constraint within this model network.
- 4.16 In addition to the above, further, less significant impacts are also modelled at the following locations:
- A46/Salford Road/Station Road roundabout – queue increases on the A46 S approach in the AM and A46 N approach in the PM
 - B4085/Tower Hill/Salford Road roundabout – queue increases on the B4085 S approach in the PM peak which block back from this roundabout to the bridge and beyond on Honeybourne Road

Do Minimum Scenario Summary

- 4.17 Based upon the analysis presented within this section, the inclusion of the SWLP sites, along with an allowance for mode shift changes, on top of the 2050 Reference Case conditions, results in a number of areas of impact across the model extent, which appears to be impacting on the model stability. These impacts are largely focused on the routes that traffic generated by the SG20 site take to reach the wider model network, via the Waterloo Road.



- 4.18 The next stage of this assessment focuses on options for mitigating these impacts, considering the locations identified through the assessment presented within this section of analysis.

5.0 Do Something Assessment

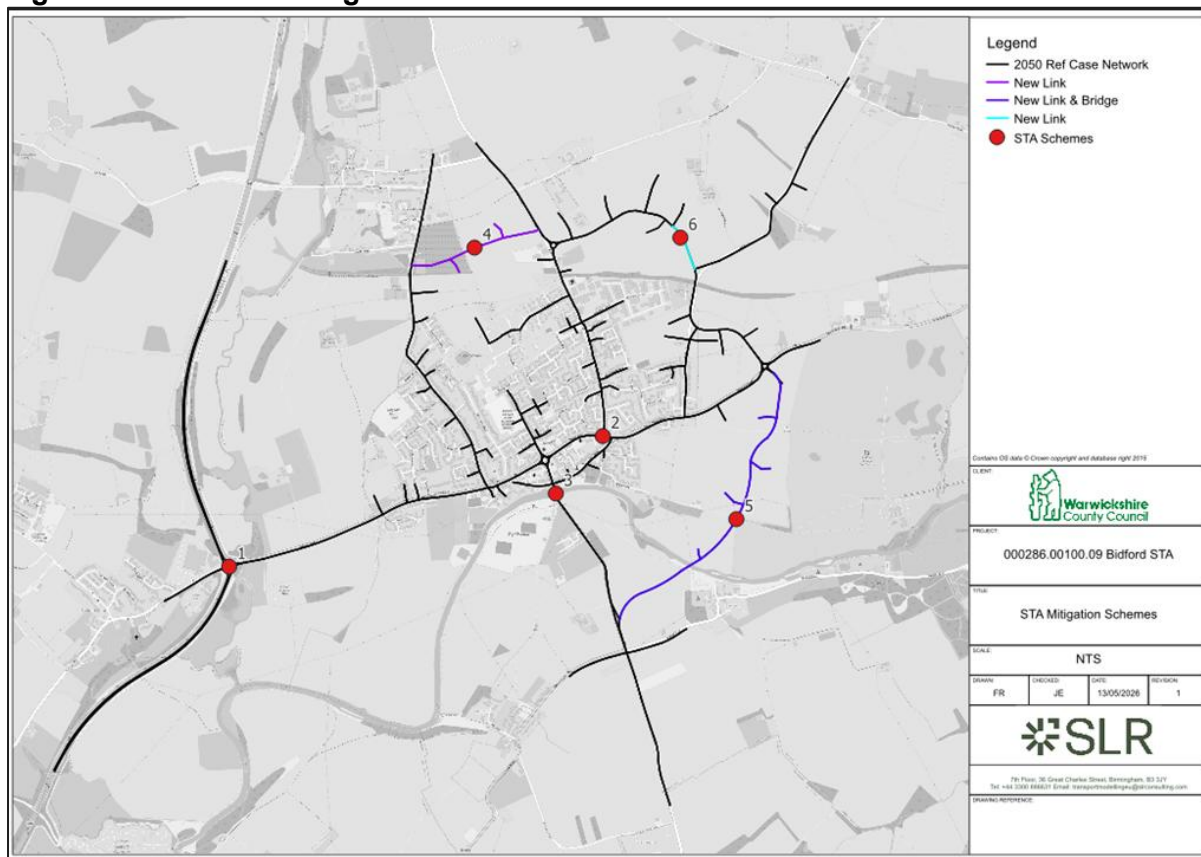
- 5.1 Further to the results presented for the Do Minimum scenarios, the following details the highway infrastructure schemes introduced to the Bidford model, to minimise the impact on the modelled network performance, once the SWLP site traffic demands are included. This forms the Do Something scenario.

Scheme Assumptions

- 5.2 As part of the assessment work, a series of mitigation proposals have been derived for inclusion within the model network. The starting point for this work was a Local Plan Do Nothing highway network with the Do Minimum demands (i.e. inclusive of mode shift). The process of identifying the infrastructure for inclusion within the model network was iterative, with measures being included in response to issues observed on the network and then subject to further optimisation as the effect on network operation, of the new schemes, was established.
- 5.3 The schemes proposed within the modelling have not been subject to any detailed design or safety review at this stage. Furthermore, it should not be assumed that the schemes recommended through this study are fixed and will be delivered in the exact form described within this report.
- 5.4 It is intended that the schemes proposed are outline schemes which may change through further optimisation and detailed design that will precede the final delivery. Thus, the concept and location of the schemes are considered fundamental rather than the precise form at this stage as it would be impractical to expect all schemes to be fully designed at this stage of the assessment, particularly given the extended time frame associated with the delivery of the Local Plan.
- 5.5 The following figure illustrates the location of each mitigation scheme across the Bidford network, with further details on each scheme provided within the following text.



Figure 12: Identified Mitigation Schemes in Bidford Network



Scheme 1 – A46/B439 Roundabout

5.6 The scheme involves the partial signalisation of the roundabout, with signals introduced on the A46 approaches from the north and south, and adjacent circulatory. The scheme is intended to better balance queues that are predicted to form across the roundabout.

Scheme 2 – B439/ Waterloo Road

5.7 The scheme at this location consists of signalising the existing T-junction. This scheme is intended to alleviate queues predicted to form on Waterloo Road where the existing layout requires vehicles to give way to traffic from B439 Tower Hill.

Scheme 3 – Bidford Bridge B4085

5.8 The scheme introduced on the Bidford Bridge is to enforce a traffic restriction whereby traffic is no longer permitted to cross the bridge in a northbound direction. The intention is to force the northbound traffic to make use of the new bridge proposed as part of Scheme 5, which has the additional benefit of reducing traffic routing through the middle of Bidford.



Scheme 4 – Bidford Road/ Waterloo Road

- 5.9 The scheme at this location consists of delivering a new link between the Bidford Road/Victoria Road and Waterloo Road. This link will route through the SG20 site, and will form part of the access into this site. The scheme is intended to enable traffic to avoid the centre of Bidford.

Scheme 5 – B439 Stratford Road/ B4085 Honeybourne Road.

- 5.10 The scheme at this location consists of the delivery of a new link between the B439 Stratford Road and Honeybourne Road, through the SG20 site. This link includes the provision of a new river crossing, over the River Avon, within the SG20 site. Delivering this link reduces traffic routing through Bidford town centre and over Bidford Bridge. This also will be used as a site access for part of SG20.

Scheme 6 – Grafton Lane/Waterloo Road.

- 5.11 The scheme at this location consists of delivering a new link between the Grafton Road and Waterloo Road. This link will route through the SG20 site, and will form part of the access into this site. As per Scheme 4, this scheme is intended to enable traffic to avoid the centre of Bidford.

Do Something Impact Analysis

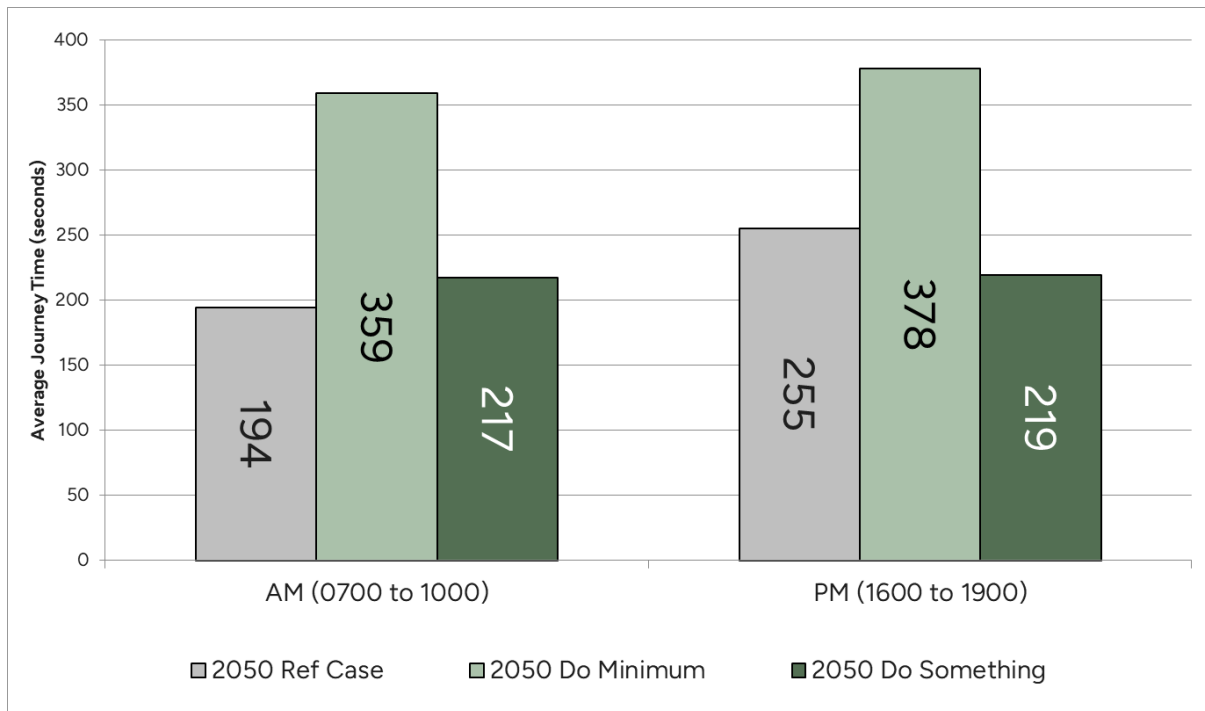
- 5.12 Following the inclusion of the above schemes within the models, this form the “2050 Do Something” scenario, the model has been run and the impacts reported. At this stage the mitigation has been included in the Do Something scenario inclusive of mode shift.

Strategic Level/Network Wide Impacts

- 5.13 The impact assessment initially focuses on the average journey time impacts, before providing a more localised assessment through queue length analysis. The following figure summarises the strategic level delay impacts within the 2050 Local Plan Do Something scenario, relative to the 2050 Reference Case and 2050 Local Plan Do Minimum (Mode Shift) scenario.



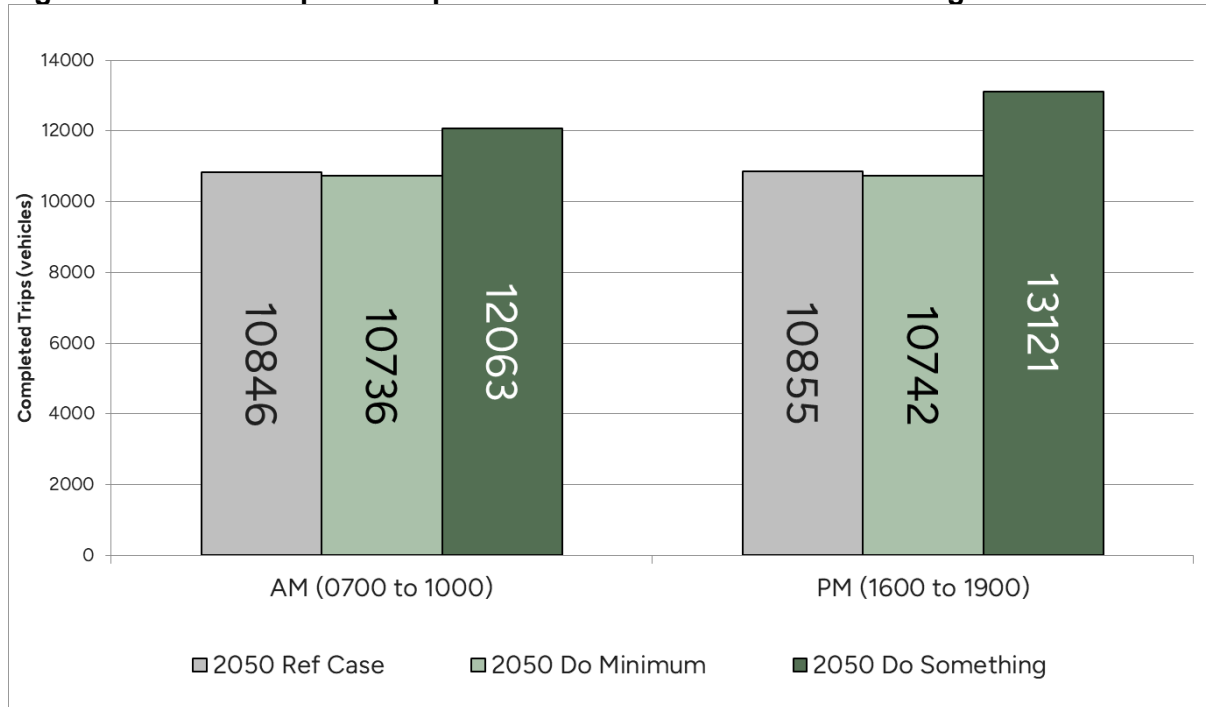
Figure 13: Average Journey Time Impacts – Bidford Local Plan Do Something Assessment



- 5.14 The results presented within the previous figure indicates that the introduction of the highway mitigation schemes reduces the average journey times for all vehicles on the network significantly compared with the previous Local Plan (Do Minimum) scenario.
- 5.15 The introduction of the mitigation schemes has a significant beneficial impact at a strategic level, with average journey times reducing by 40% in the AM period, and 42% in the PM period relative to the Local Plan Do Nothing scenario.
- 5.16 When compared with the Local Plan Reference Case, it is also notable that, at a strategic level, the SWLP sites, if accompanied by mode shift and mitigation identified, results in a level of delay that is higher than the benchmark scenario by 12% in the AM period, whilst in the PM period, there is a notable 14% reduction in average journey times.
- 5.17 Further to this, the total completed trips in the Do Something scenario have been compared to the Reference Case, and Local Plan Do Nothing and Do Minimum scenarios within the following figure.



Figure 14: Total Completed Trips – Bidford Local Plan Do Something Assessment



- 5.18 The total completed trips results indicate that the inclusion of the scheme enables the demands assigned to the 2050 Local Plan models to be completed, indicated by the higher number of completed trips when compared to the Local Plan Do Minimum scenarios, (within which the number of trips assigned is the same as the Do Something scenario).
- 5.19 The modelling indicates that the inclusion of the schemes identified, are critical to ensuring that the additional traffic demands assigned to the model network in the Local Plan scenarios can be accommodated.

Localised Queue Impacts

- 5.20 The following analysis presents a more localised impact assessment, based upon changes in queues lengths across the model network. This analysis is presented within the following two figures for the AM and PM peak hours respectively, focusing on the 2050 Local Plan Do Something relative to the 2050 Reference Case.



Figure 15: Bidford Do Something Scenario Queue Impacts – AM Peak Hour



Figure 16: Bidford Do Something Scenario Queue Impacts – PM Peak Hour



- 5.21 The queue results presented within the previous two figures indicate the location and extent of changes in queue lengths in the Local Plan Do Something scenario, relative to the Reference Case.
- 5.22 The AM queue plot indicates that, once the mitigation schemes are included on the network, very little impact on the network performance, relative to the Reference Case occurs, with one instance of queue reductions, and one instance of queue increases. Clearly the introduction of the new links at Scheme 4, 5 and 6 enables the SG20 traffic to route through the network without having the previously modelled significant impacts on Waterloo Road.
- 5.23 With the schemes delivered, queues are predicted to reduce at the northern end of the Bidford Bridge, which is a direct result of the introduction of the new link/bridge crossing resulting in lower flows across the existing bridge.
- 5.24 The one location of minor queue increases occurs on the Waterloo Road approach to the B439 Tower Hill /Waterloo Road junction, where some minor residual queues remain.
- 5.25 These results clearly indicate that the mitigation introduced is enabling the SWLP traffic to be accommodated on the network with minimal residual delays in the AM period.
- 5.26 During the PM, similar impacts are modelled, with the previously modelled significant impacts around Waterloo Road removed. Queue reductions are also modelled at the Bidford Bridge, achieved through the delivery of the new link/river crossing through the SG20 site. Residual impacts continue to occur at the B439/Waterloo Road junction, however the queue increases reported here are minor/manageable. It is also notable that during the PM period, with the scheme included at the A46/B439 roundabout that previously modelled queue impacts at this location are reduced.

Do Something Impact Summary

- 5.27 Based upon the analysis presented within this section, the inclusion of the identified highway schemes, results in a stable model network, in which the additional demands included within the models, related to the SWLP sites can be accommodated. Although an element of mode shift is accounted for within the modelling, given the location and size of Bidford, it is unlikely that this will form a significant part reducing queue impacts from the SG20 site in this model area.
- 5.28 The modelling indicates that the schemes that provide new links through the network enable the growth associated with the SGL sites in this area to be accommodated without detrimentally impacting upon Waterloo Road, the Bidford Bridge, and the centre of Bidford itself.
- 5.29 The modelling is indicating that minor residual impacts will remain at the B439/Waterloo Road junction, however, aside from this one instance, there is no further worsening of the network conditions relative to the Reference Case.



- 5.30 In summary, with the additional infrastructure as identified within this assessment, particularly the new link roads through the SG20 site identified (Schemes 4, 5 and 6) results in the network operating in a stable manner, and the resultant impacts on the highway network being manageable.

6.0 Summary and Conclusions

- 6.1 The purpose of this report is to provide an overview of the work that has been undertaken to appraise the implications, on the transport network, of the options for development identified through the SWLP, specifically within the Bidford area.
- 6.2 The expectation is that the outcomes of the modelling assessment which are presented within this Report will provide WDC/SDC and WCC with an understanding of how the operation of the transport network may be affected by the allocation of the proposed developments, as well as identifying areas where interventions may be considered essential in managing the traffic impacts and enabling the developments to come forward as the Plan is delivered.

Do Nothing/Do Minimum Assessment

- 6.3 The initial stage of assessment considers the impact of the predicted Local Plan traffic, in addition to the predicted 2050 traffic growth conditions. The traffic predicted to be generated by the SWLP sites has been included within the model, to form the “2050 Local Plan Do Nothing” scenario. The 2050 Local Plan Do Nothing scenario was run and the resultant model operation reviewed. It was quickly apparent that the model becomes gridlocked in a number of the model runs, and is unable to provide reliable results, whereby the volume of traffic on the network becomes such that the road network becomes fully congested, after which traffic movements effectively stop.
- 6.4 Following the reporting of the Do Nothing scenario, an element of mode shift has been captured within the modelling, to form the first stage of mitigation. The inclusion of the allowance for mode shift changes within the context of Bidford is small, and therefore the modelling continues to result in a number of areas of impact, which appears to be continuing to impact on the model stability.

Scheme Assumptions

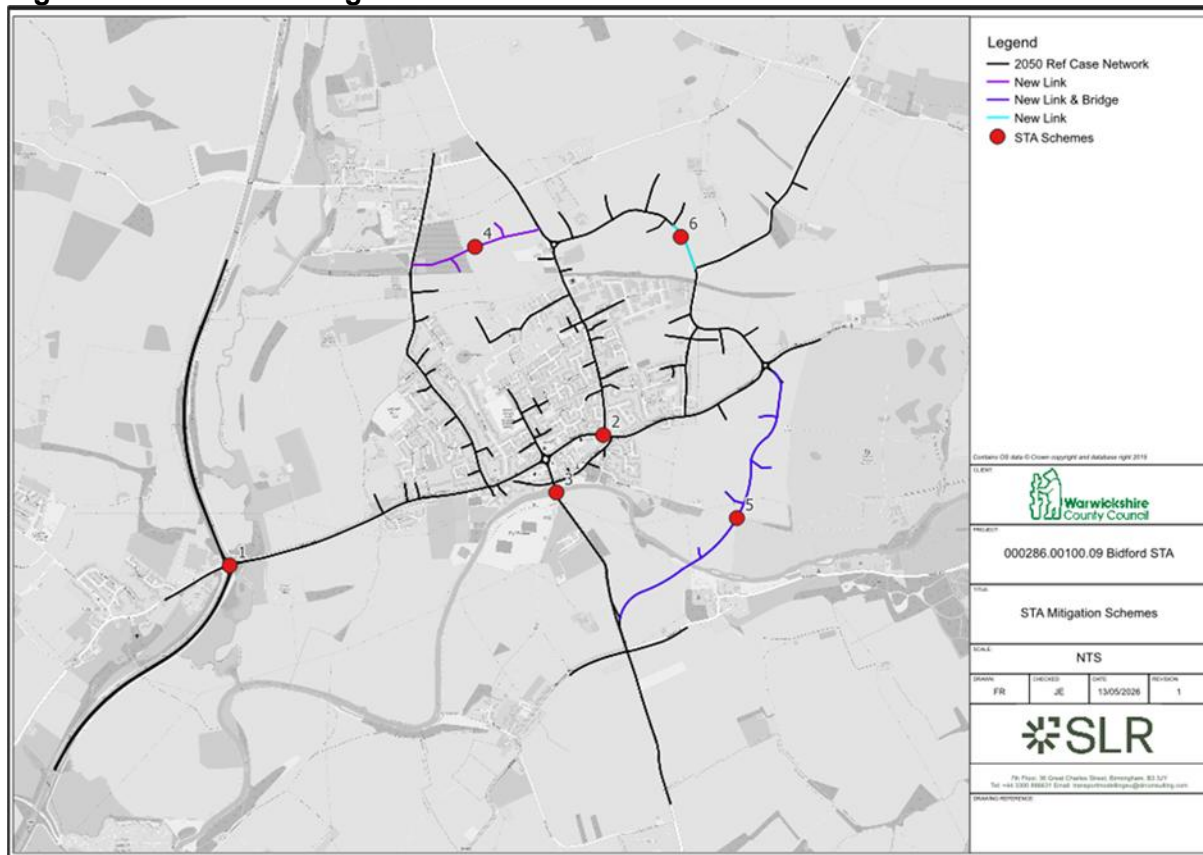
- 6.5 Following on from the Do Minimum assessment, a series of highway mitigation proposals have been derived for inclusion within the model network. The process of identifying the infrastructure for inclusion within the model network was iterative, with measures being included in response to issues observed on the network and then subject to further optimisation as the effect on network operation, of the new schemes, was established.
- 6.6 The schemes proposed within the modelling have not been subject to any detailed design or safety review at this stage. Furthermore, it should not be assumed that the schemes



recommended through this study are fixed and will be delivered in the exact form described within this report.

- 6.7 The following figure illustrates the location of each mitigation scheme across the Bidford network, with further details on each scheme provided within the body of the report.

Figure 17: Identified Mitigation Schemes in Bidford Network



Local Plan Sites Assessment

- 6.8 Based upon the analysis presented within this report, the inclusion of the identified highway schemes, alongside the mode shift, results in a stable model network, in which the additional demands included within the models related to the SWLP sites can be accommodated.
- 6.9 The modelling indicates that the schemes surrounding the town centre (Schemes 2 and 3) can manage the growth associated with the SGL sites in this area. Critically, the new links delivered as part of Scheme 4, 5 and 6 enable significant traffic volumes generated by the SG20 site to avoid Waterloo Road, the town centre, and the existing Bidford Bridge, which in turn significantly improves the reported levels of delay within the model.
- 6.10 In summary the schemes, with an element of mode shift applied, in the Local Plan Do Something have provided mitigation on key corridors and within the town centre, which has resulted in the network operating in a stable manner, and the resultant impacts on the highway network being manageable, and in some instances, improved over the benchmark scenario.



Conclusions

- 6.11 The modelling demonstrates that, without intervention, delivery of the South Warwickshire Local Plan would result in severe congestion in and around Bidford with model stability issues indicating the model becoming gridlocked.
- 6.12 Introducing an element of mode shift is of limited benefit, given the small number of short distance trips within Bidford, and higher propensity for longer distance trips either through the network, or to/from Bidford to nearby towns.
- 6.13 Accordingly, a comprehensive package of highway mitigation, alongside any mode shift, is considered essential. When this mitigation is applied, the network becomes stable and capable of accommodating Local Plan growth, with AM peak conditions close to the Reference Case, and improvements in network conditions achieved in the PM period. Key to this is the delivery of new link roads through the SG20 site, inclusive of the new river crossing between the B439 Stratford Road and Honeybourne Road.

Recommendations for Further Analysis

- 6.14 SLR would recommend that, once the core testing has been completed, and an understanding of 2050 network operation, inclusive of the SWLP development proposals, is obtained, it would be beneficial to consider the following:
- Further analysis pertaining to certain assumptions relating to the access and infrastructure assumptions required to support specific SGLs should be undertaken to establish the significance of assumed infrastructure and the effects of any suggested amendments to the proposed strategies.
 - Consideration of how effective the “optimistic” mode shift targets are at managing the residual impacts identified through the modelling completed to date and identify any further opportunities where this can be enhanced.
 - Updates to the modelling to address any design changes which are identified, associated with the interventions, as part of WCCs review of the identified proposals.
- 6.15 These are stages which would be beneficial in providing a better understanding of the network operation and potential influence of each of the schemes identified to date, however, the conclusions are unlikely to materially alter the findings presented to date and so are not essential in determining if the impacts of the SWLP proposals can be effectively managed through delivery of interventions which is set out within this assessment.



Appendix A Bidford Summary Information Pack



SLRCONSULTING.COM

Bidford-on-Avon 2050

May 2026





Contents

1. Site Infrastructure Assumptions
2. Assessment Scope and Development Inclusions
3. Ref Case vs Do Nothing/Do Minimum
4. Do Something Scenario Mitigation Schemes
5. Do Something Scenario Impacts

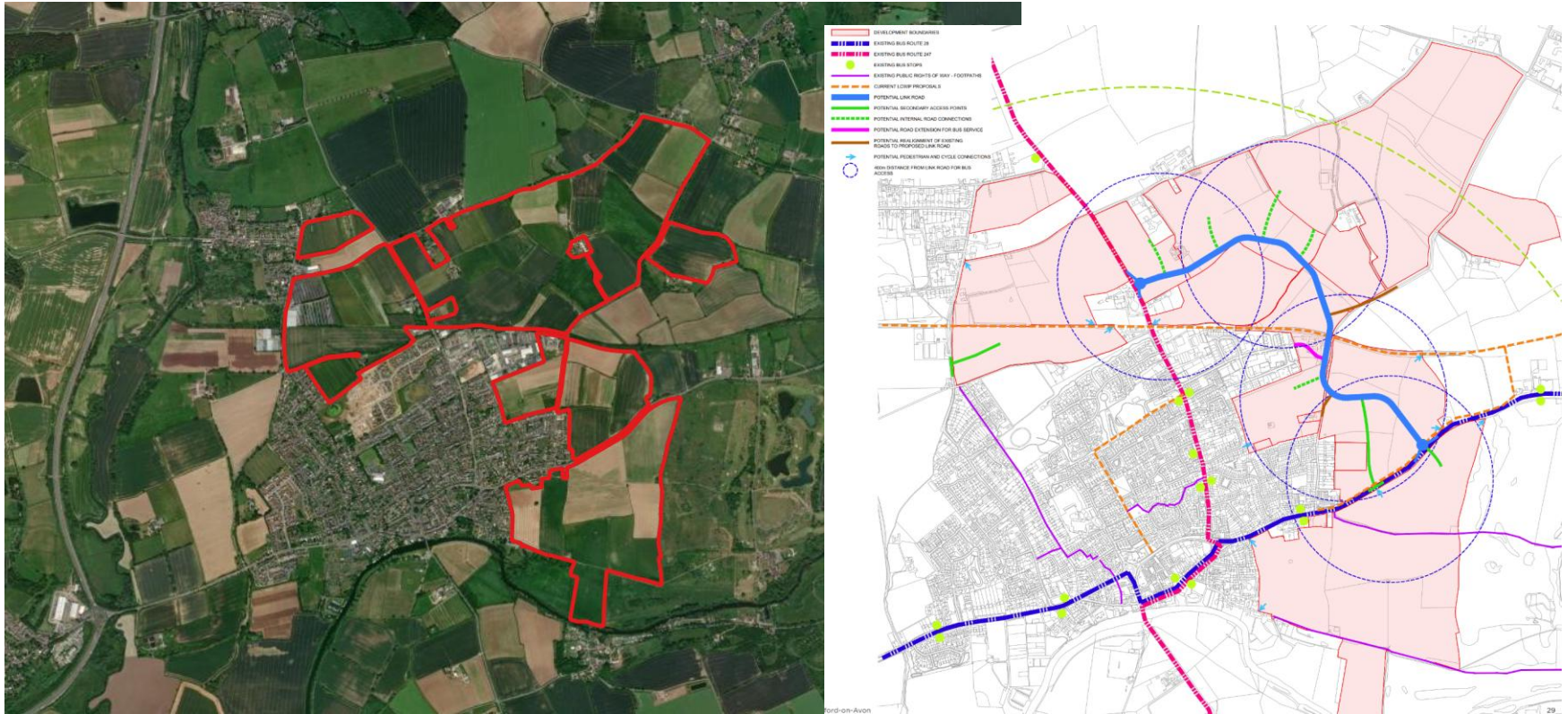


Site Infrastructure Assumptions





SG20 – Bidford On Avon





SG20 – Bidford On Avon



Issue 1. Link through development area likely to be essential to manage access across the network.

Issue 2. Very constrained narrow bridge, causes blocking back into town currently and would be significantly exacerbated by development proposals.

Note – if a new river crossing could be facilitated this would have very significant benefits. Existing crossing could be reconfigured to one way to prevent blocking into town.

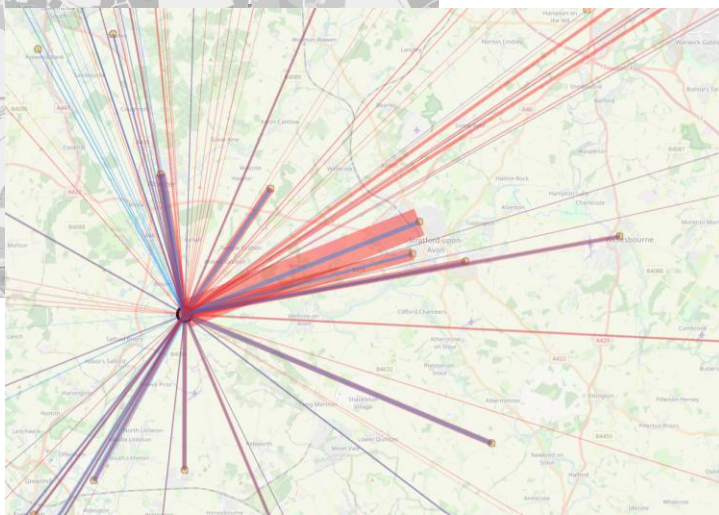
Scale of development may support this – could be a significant opportunity but would require additional land and would be challenging to deliver due to Flood Zone.



SG20 – Bidford On Avon



Issue 3. There is a strong draw East. Traffic travelling north of M40 seeks access to A46 via shortest route. This leads to a lot of issues already at the Billesley Crossroad.



SLR reviewing the extent to which a new relief road will reduce this issue but a safety scheme at Billesley Crossroads may be essential. Assignment through rural villages likely to be unattractive.



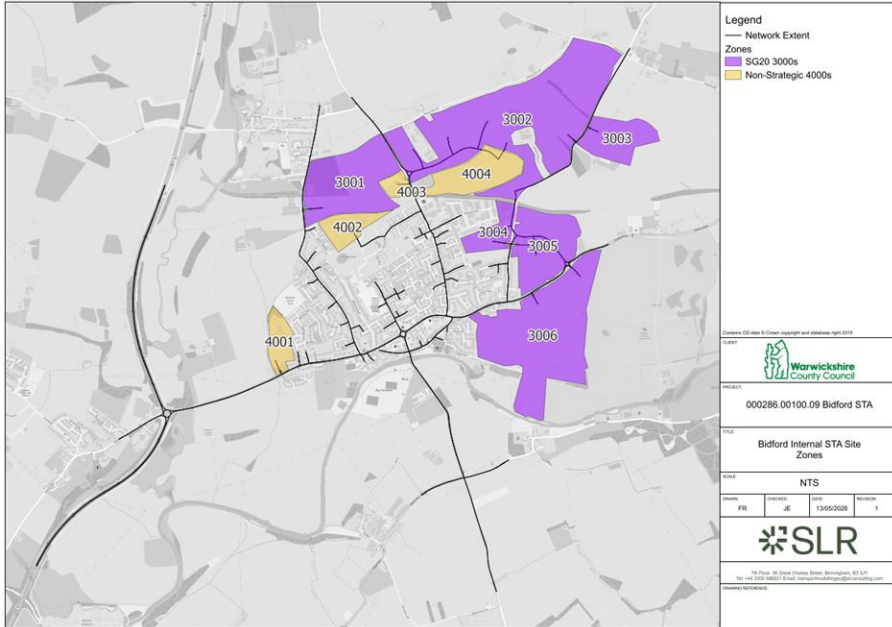
Assessment Scope and Development Inclusions

Background + SG20 + Non-strategic sites





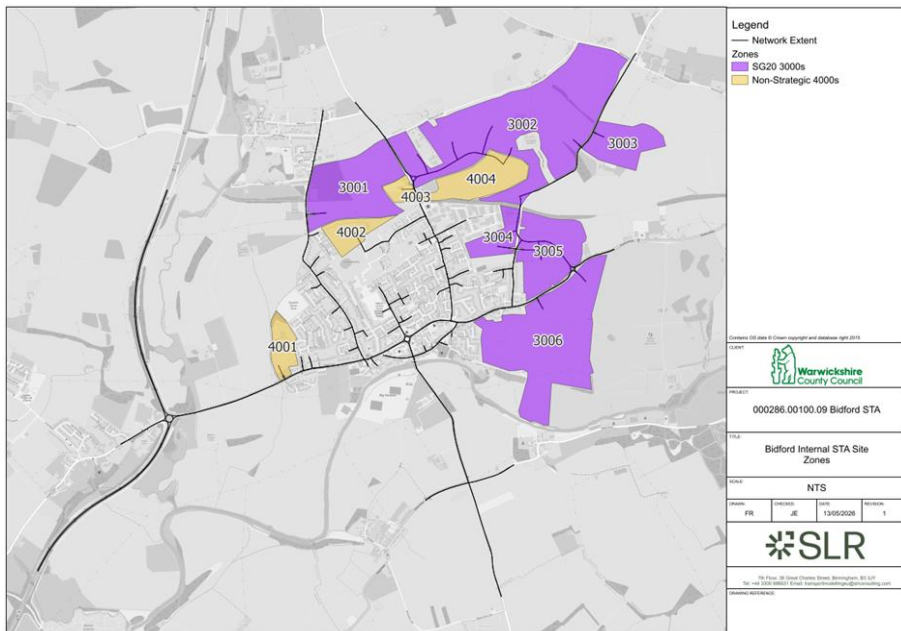
Assessment Scope - Background



- Bidford-on-Avon Model.
- 2050 Reference Case used as a benchmark for STA development testing.
- Proposed SWLP strategic sites within SG20 and the local Non-strategic sites assessed internally.
 - Details on following slides.



Assessment Scope – STA Sites



STA Sites	Build Out by 2050		Zone(s)
	Dwellings	Employment (ha)	
SG20	3,120	11	3001, 3002, 3003, 3004, 3005, 3006
NSGL-261	159	0	4001
NSGL-696	75	0	4003
NSGL-812	143	0	4002
NSGL-662	0	10.23	4004

- The above table shows the STA sites included as internal zones in the Bidford 2050 LP model.
- All other STA zones are included as external demands.



SG20 Trip Generation + Model Demands

SG12 Trips:	AM Peak (08-09)			PM Peak (17-18)			AM Period (07-10)			PM Period (16-19)		
	In	Out	Both	In	Out	Both	In	Out	Both	In	Out	Both
Residential	276	786	1,062	646	328	974	728	1,795	1795	1,708	978	2,686
Employment Lights	78	27	105	24	65	89	198	81	279	73	169	242
Total Lights	354	813	1,167	670	393	1,063	926	1,876	2,802	1,781	1,147	2,928
Employment HGVs	9	10	19	9	5	14	25	31	56	23	17	40

Matrix Level		AM Period			PM Period		
		07-08	08-09	09-10	16-17	17-18	18-19
1	Background Lights	2,246	2,663	2,128	2,828	3,071	2,167
2	Background + Growth Heavies	203	97	238	157	97	112
3	External Growth	557	582	440	597	617	465
4	Internal Dev Lights	1,230	1,514	880	1,283	1,371	1,090
5	External Dev Lights	230	299	181	303	324	246
6	Development HGVs	75	97	103	59	45	31
2050 Local Plan Demands		4,540	5,250	3,969	5,226	5,524	4,111



Scenarios Assessed – Demand Totals & Growth Levels

Scenarios		Description
1	2050 Reference Case	Benchmark Scenario – Initial Forecast Model, Inclusive of Consented Development and Infrastructure Only (+ Background Growth) – No SWLP Allocations
2	2050 Local Plan Do Nothing	With STA Development Sites (Inclusive of SG20) + Development Link Road/Access
3	2050 Local Plan Do Minimum	As per Scenario 2 + Mode Shift
4	2050 Local Plan Do Something	As per Scenario 3 + Inclusive of Schemes

Scenarios - Demand Totals & Growth Levels %	AM Period			PM Period		
	07-08	08-09	09-10	16-17	17-18	18-19
2025 Base	3,206	3,562	2,750	3,603	3,786	2,842
2050 Reference Case	3,710	4,129	3,167	4,201	4,417	3,312
Growth %	15.72%	15.92%	15.16%	16.60%	16.67%	16.54%
2050 Local Plan Do Nothing	4,113	4,641	3,560	4,727	4,977	3,715
Growth %	28.29%	30.27%	29.49%	31.19%	31.47%	30.74%
2050 Local Plan Do Minimum / Do Something (Mode Shift)	4,098	4,623	3,548	4,709	4,958	37,01
Growth %	27.91%	29.89%	29.13%	30.82%	31.09%	30.37%

TEMPro Factors	AM Period			PM Period		
	Origin	Destination	Average	Origin	Destination	Average
Internal (SuA012)	1.4804	1.1901	1.3353	1.2823	1.4653	1.3738
External (Warwickshire)			1.2489			1.2612



Effects of Capping

- Capping is applied to the Background Lights (matrix 1) demands within the 2025 model to reflect the redistribution of trips in response to the inclusion of consented and Local Plan STA developments, internally within Bidford.

Scenarios	AM Period			PM Period		
	07-08	08-09	09-10	16-17	17-18	18-19
2025 Base Background Lights (Matrix Level 1)	3,008	3,467	2,517	3,449	3,690	2,732
2050 Local Plan (STA) Difference – Growth to Adjust	-910	-1059	-567	-784	-800	-696
2050 Local Plan (STA) Background Lights (Matrix Level 1)	2,098	2,408	1,950	2,665	2,891	2,037



Effects of Mode Shift

Demands	AM Period			PM Period		
	07-08	08-09	09-10	16-17	17-18	18-19
Local Plan Total Demands						
Without Mode Shift	4,113	4,641	3,560	4,727	4,977	3,715
With Mode Shift	4098	4623	3548	4709	4958	3701
Traffic Demand Change from Mode Shift						
Difference	-16	-17	-13	-18	-19	-14
%	-0.38%	-0.38%	-0.36%	-0.37%	-0.38%	-0.37%

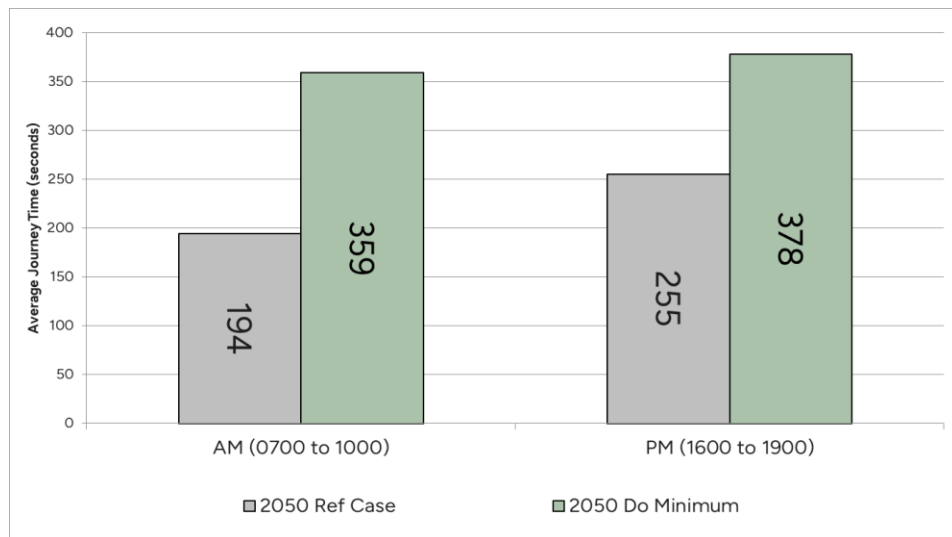


Ref Case vs Do Nothing/Do Minimum – Impacts





Network Statistics – Average Journey Times



- With the inclusion of the mode shift, when considered alongside the Local Plan sites, the results indicate significant increases in average journey times, relative to the Reference Case.
- This is to be expected given the amount of additional traffic included in the network, generated by the STA sites, combined with the very low levels of mode shift likely to be achieved within Bidford.
- The average journey times are predicted to increase by 85% in the AM and 48% in the PM period, relative to the Reference Case.



AM Queue Comparison – Ref vs Do Minimum



- The queue results presented within the previous figures indicate the location and extent of changes in queue lengths in the Local Plan Do Minimum scenario, relative to the Reference Case.
- The plots indicate that significant queue impacts are predicted at the B439 Tower Hill/Waterloo Road and Waterloo Road/Wellington Road junctions
- Significant queues form on the Waterloo Road southbound approach to the B439 Tower Hill/Waterloo Road junction. This is in part due to the large increases in traffic on Waterloo Road, generated by the SG20 site, but is also a result of higher traffic flows on the B439 which reduces gaps in traffic for traffic to exit Waterloo Road.
- The result is significant queues forming from this junction which block back to the Waterloo Road/Wellington Road roundabout, having knock on impacts at this location.



PM Queue Comparison – Ref vs Do Minimum

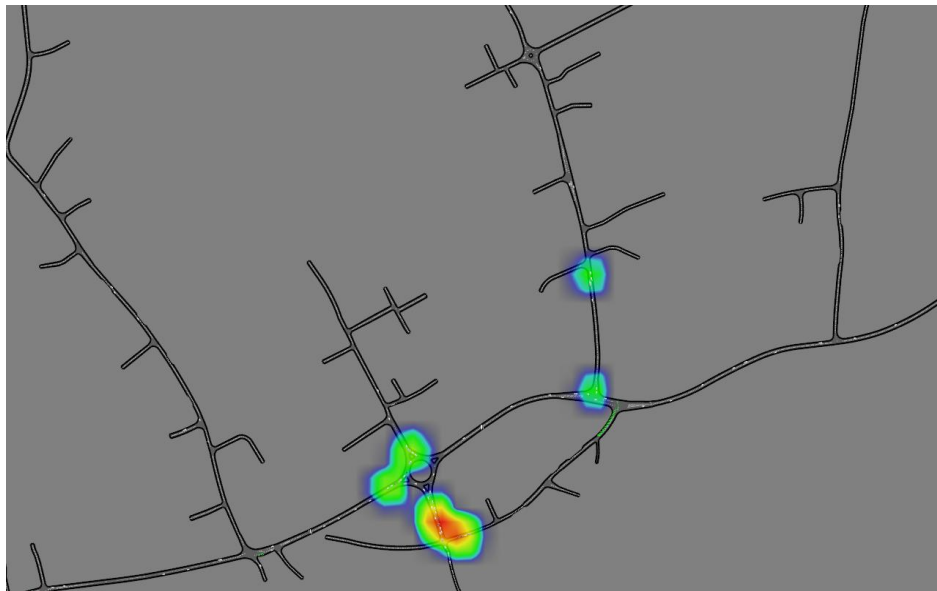


- The queue results presented within the previous figures indicate the location and extent of changes in queue lengths in the Local Plan Do Minimum scenario, relative to the Reference Case.
- As per the AM the plot indicate that significant queue impacts are predicted at the B439 Tower Hill/Waterloo Road and Waterloo Road/Wellington Road junctions
- In addition to the above, further, less significant impacts are also modelled at the A46/Salford Road/Station Road roundabout, and B4085/Tower Hill/Salford Road roundabout –



Ref Case vs Do Minimum 2050 – SWLP Impacts

2050 Ref Case



2050 Local Plan Do Minimum

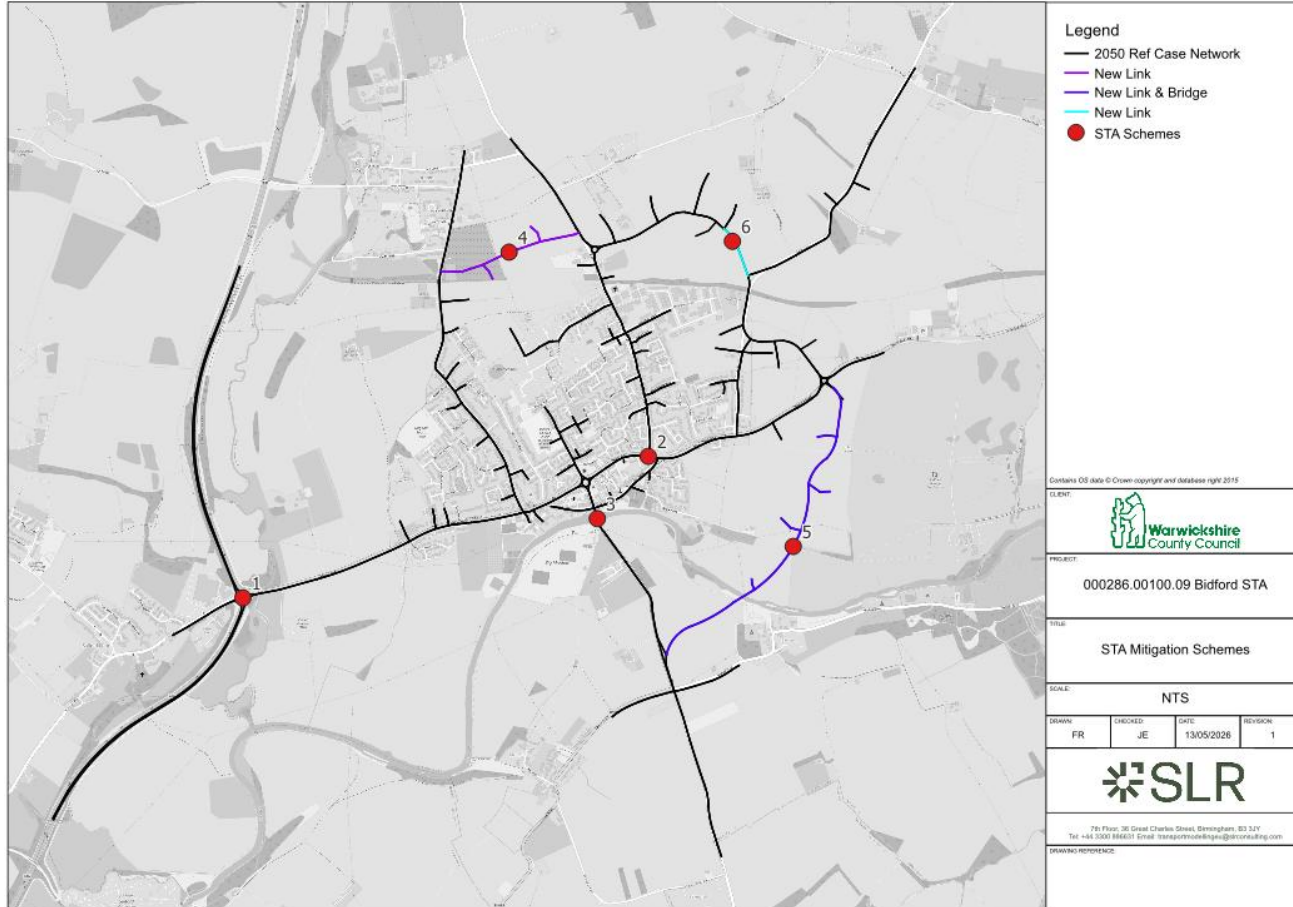




Do Something Scenario – Mitigation Schemes



Highway Mitigation Schemes (Do Something Scenario)



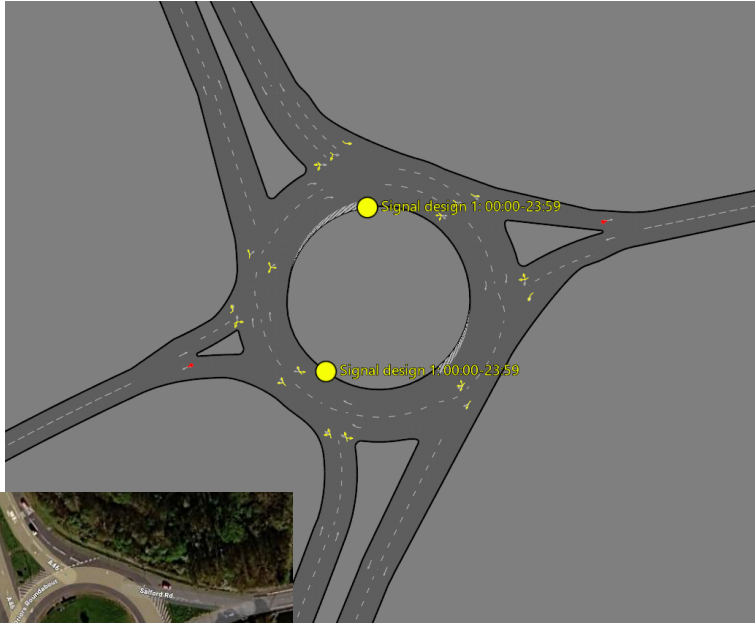
Highway Schemes



Ref	Junction/Location	Description
1	A46/ B439 Station Road Roundabout	Part Signalisation (A46 entry arms)
2	B439 Station Road/ Waterloo Road	Full Signalisation
3	Bidford Bridge B4085	Traffic restriction – traffic only permitted southbound
4	Bidford Road to Waterloo Road	New Link Road through SG20 site
5	B439 Stratford Road to Honeybourne Road	New Link Road and Bridge across River Avon (through SG20 site)
6	Grafton Road to Waterloo Road	New Link Road through SG20 site



A46/ B439 Roundabout Part Signalisation

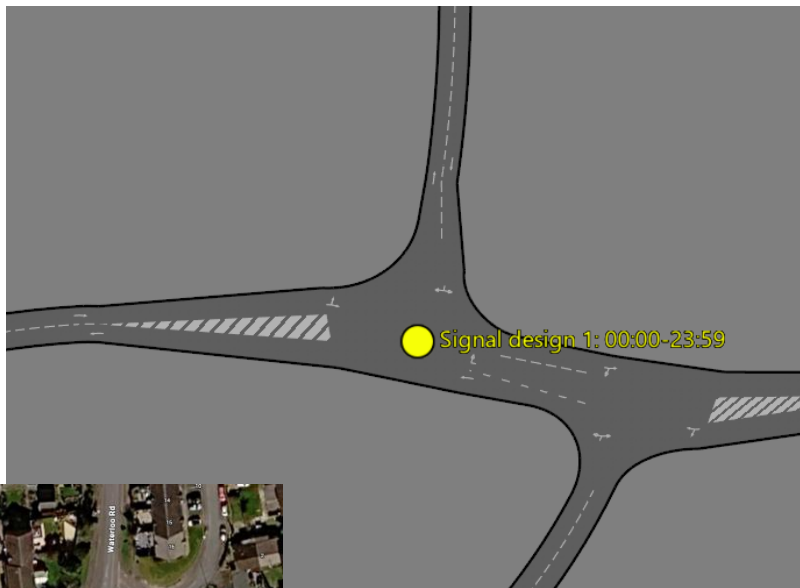


- Scheme at the A46/ B439 roundabout reports a reduction in queues in all periods.
- The northern and southern arms of the roundabout (Both the A46) will be signalised.





B439 Station Road/ Waterloo Road Signalisation

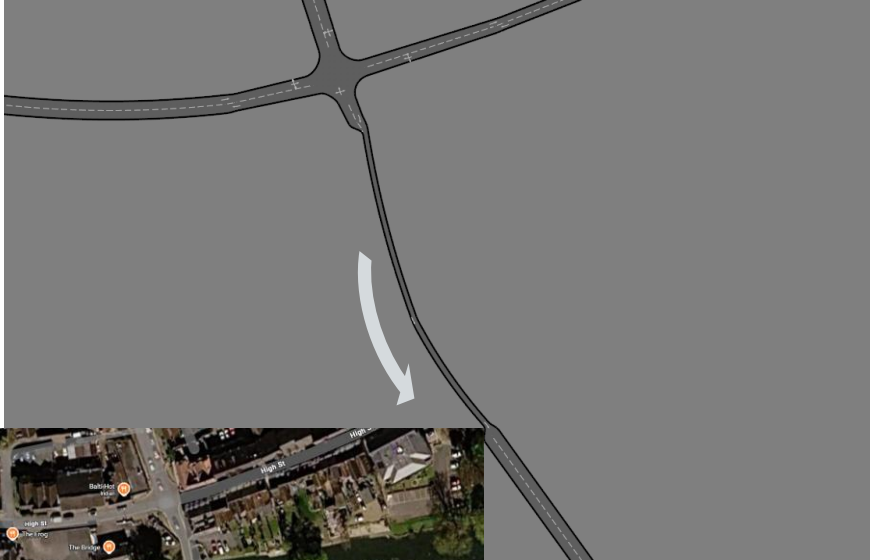


- Scheme at B439 Station Road/ Waterloo Road decreases queue lengths significantly from the western and northern arms.
- Queue lengths from the east increase but insignificantly in comparison to the other two arms.





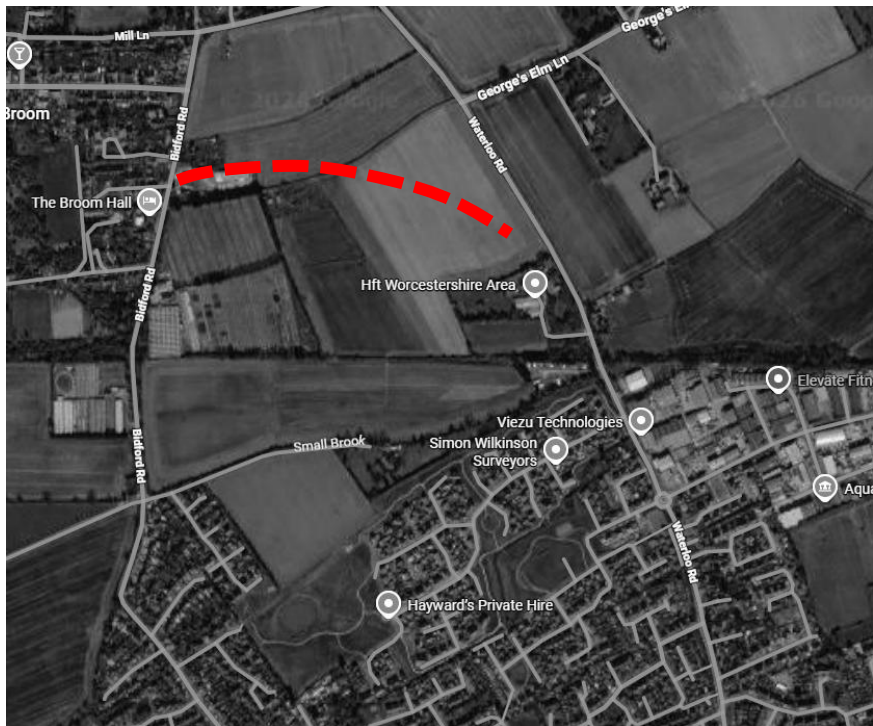
Bidford Bridge B4085 One Way



- Scheme at Bidford Bridge on the B4085 to make it one way southbound.
- Traffic from the south can use the new bridge and link road, avoiding Bidford town centre and reducing the demand on the B4085/ High St Signals.



Bidford Road to Waterloo Road Link Road



- Scheme consists of a link road through the SG20 site between Bidford Road and Waterloo Road.
- Provides opportunity for SG20 traffic (and background traffic) travelling north to east/east to north to avoid Bidford centre.
- This reduces the flow and hence queue lengths from Victoria Rd and Waterloo Rd onto the B439.
- Indicative alignment shown



B439 Stratford Road to Honeybourne Road Link Road and Bridge



- Scheme for a link road and bridge from the B439 to Honeybourne Road.
- Traffic from east of the model to south of the model avoids Bidford, reducing flow and queues on several junctions in Bidford.



Grafton Road to Waterloo Road Link



- Scheme consists of a link road through the SG20 site between Grafton Road and Waterloo Road.
- Provides opportunity for SG20 traffic (and background traffic) travelling north to east/east to north to avoid Bidford centre.
- Indicative alignment shown

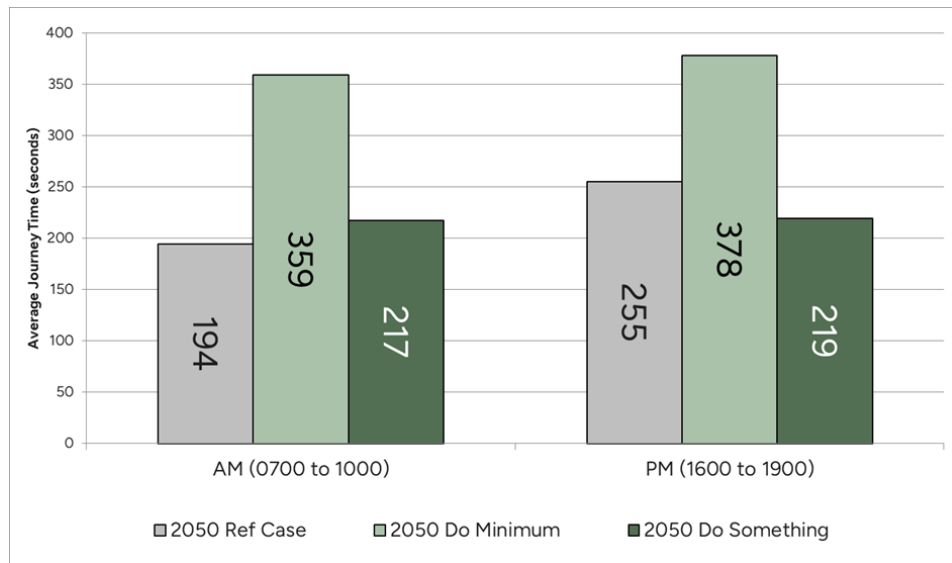


Ref Case vs Do Nothing/Do Something – Impacts





Network Statistics – Average Journey Times



- The introduction of the mitigation schemes has a significant beneficial impact at a strategic level, with average journey times reducing by 40% in the AM period, and 42% in the PM period relative to the Local Plan Do Nothing scenario.
- When compared with the Local Plan Reference Case, it is also notable that, at a strategic level, the SWLP sites, if accompanied by mode shift and mitigation identified, results in a level of delay that is higher than the benchmark scenario by 12% in the AM period, whilst in the PM period, there is a notable 14% reduction in average journey times.



AM Queue Comparison – Ref vs Do Something



- The AM queue plot indicates that, once the mitigation schemes are included on the network, very little impact on the network performance, relative to the Reference Case occurs, with one instance of queue reductions, and one instance of queue increases.
- Clearly the introduction of the new links at Scheme 4, 5 and 6 enables the SG20 traffic to route through the network without having the previously modelled significant impacts on Waterloo Road.
- The one location of minor queue increases occurs on the Waterloo Road approach to the B439 Tower Hill /Waterloo Road junction, where some minor residual queues remain.



Summary

- Based upon the analysis presented, the inclusion of the identified highway schemes, alongside the mode shift, results in a stable model network, in which the additional demands included within the models related to the SWLP sites can be accommodated.
- The modelling indicates that the schemes surrounding the town centre (Schemes 2 and 3) can manage the growth associated with the SGL sites in this area.
- Critically, the new links delivered as part of Scheme 4, 5 and 6 enable significant traffic volumes generated by the SG20 site to avoid Waterloo Road, the town centre, and the existing Bidford Bridge, which in turn significantly improves the reported levels of delay within the model.
- In summary the schemes, with an element of mode shift applied, in the Local Plan Do Something have provided mitigation on key corridors and within the town centre, which has resulted in the network operating in a stable manner, and the resultant impacts on the highway network being manageable, and in some instances, improved over the benchmark scenario.



Next Steps

- Assessing impacts on 2031 and 2040 to evaluate the effectiveness of each scheme in which to rank the priority order for schemes.
- Based on the issues in the analysis raised, opportunity to make further refinements in the Do Something scenario through signal optimisation and new schemes/upgrade at junctions where necessary to further mitigate the impacts from the growth and development traffic inclusions.
- Mitigation schemes to be outlined to WCC/EDS to provide cost estimates.

