

Local Plan Panel Meeting	
Meeting Date	17 October 2019
Report Title	Swale Borough Local Plan Review: Transport Modelling Evidence
Cabinet Member	Cllr Mike Baldock Cabinet Member for Planning
SMT Lead	Emma Wiggins
Head of Service	James Freeman
Lead Officer	James Freeman
Key Decision	No
Classification	Open
Recommendations	<ol style="list-style-type: none"> 1. Note the strategic transport modelling results at Appendix I and II; 2. Recommend to Cabinet that this work be part of the body of evidence used to inform the Issues and Alternative Options stage of the Local Plan Review; 3. Agree additional modelling runs be undertaken for scenarios 1, 2 and 3 to test the impacts of lower housing numbers as explained in paragraph 3.37.

1 Purpose of Report and Executive Summary

- 1.1 This report sets out the results of the strategic transport modelling which has been undertaken as part of the Local Plan Review. The work has been jointly undertaken with Kent County Council Highways. The modelling at this stage is highways focused and intended to give a broad overview of how the network will perform with the level of development the Local Plan Review needs to address. Four alternative future scenarios with different ways of distributing the development and levels of transport improvement have been tested at this stage, plus a Future Reference case. A summary presentation of the findings will be made at the Panel meeting with a Kent County Council Highways Officer.
- 1.2 The findings of the work at this point indicate that there are significant challenges to overcome in addressing the traffic problems along the A2 corridor and the strategic road network and the junctions which link them. Altering the balance of distribution of future development around the Borough does not in itself release sufficient capacity in the network to meet the development requirements beyond 2022. Therefore, in progressing the Local Plan Review, it will be necessary to identify further highway improvements and secure significant commitments towards improving non-car based transportation improvements in order to accommodate the expected development growth needs over the plan period. It

should be noted that the Local Plan review drafting will run parallel to the drafting of the Local Transport Strategy led by Kent County Council.

- 1.3 This technical work will be part of the evidence base needed to inform the generation of reasonable alternative development strategies for consideration in the Issues and Options stage of the Local Plan Review. Further and more detailed modelling work will be undertaken to support the development strategy to be pursued in the submission draft of the Local Plan Review and the Local Transport Strategy which will support it. The results will also feed into work on Air Quality which will also form part of the evidence base for the Local Plan Review. The modelling work will also be an important piece of evidence for public funding bids for transport infrastructure as well as justification for seeking developer contributions.
- 1.4 Members are asked to note the report and recommend to Cabinet that it be used to inform the next stages of Local Plan preparation, along with the information that would be forthcoming should Members agree to the two additional modelling runs for lower housing numbers.

2 Background

Policy Context

- 2.1 The National Planning Policy Framework (NPPF 2019) para 102 requires that transport issues should be considered from the earliest stages of plan making. Key issues to be considered are:
 - The potential impacts of development on transport networks;
 - Opportunities from existing or proposed transport infrastructure are realised in relation to the scale location or density of development which can be accommodated;
 - Opportunities to promote walking cycling and public transport are identified and pursued;
 - The environmental impacts of traffic and transport infrastructure are identified, assessed and taken into account including opportunities for avoiding and mitigating any adverse effects and for net environmental gains;
 - Patterns of movement, streets, parking and other transport considerations are integral to the design of development schemes.
- 2.2 Para 102 of the NPPF goes on to state

'The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine mode of transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan making and decision – making'

- 2.3 The Council is still at the earliest stages of plan making and therefore looking at the potential impacts of development on the transport network is also in the early stages. As the preferred development strategy and supporting site allocations become clearer, additional work will be needed at both the strategic and at a more detailed site level to establish a package of highways, public transport and other modes to support the local plan review. This part of the work is therefore high level and being used to help generate and test possible development strategies for further consideration.
- 2.4 Swale's geography means that the transport network is focused west /east along the A2/ M2 corridor (plus the North Kent railway), whilst the main north south routes are the A249 and the A251. The limitations of the existing network and key junctions between the local and the strategic highway network at peak hours are already apparent. Improvements to the network are already being pursued through both public funding bids and developer (S.106 and S.278 contributions) to support existing development commitments and adopted Local Plan allocations. These are listed at Appendix I (pages 13-14 of consultants' report) and it has been assumed that these will go ahead in all of the future scenarios modelling reported here.

What modelling has been undertaken?

- 2.5 The Swale base model which was developed in partnership between Kent County Council Highways, Swale Borough Council and Quinn Estates. This base model seeks to replicate reality on the network at the base year (2017), which can then be used for modelling future alternative scenarios. This part of the work has been validated as meeting the WebTAG technical standards of The Department for Transport by Highways England and Kent Highways.
- 2.6 To date the modelling undertaken is focused on a strategic highways SATURN modelling. This tests the basic impact of additional development on the highway network across a large study area (map at page 30 of consultants' report at Appendix I) which extends to include part of the M20 corridor. Different distributions of development and additional improvements to the network can be tested through alternative future scenarios. The Swale model has been developed to test the period from 2017 – 2037. The outputs from the model can then be used to help evaluate (along with the other elements of the Local Plan evidence base) potential alternative development strategies; the impact of possible major new pieces of infrastructure and highlight any potential 'showstoppers'. Model outputs are also likely be used to develop more detailed modelling for a particular scenario, including modal shifts; detailed junction modelling; and feed into other work such as Air Quality testing.

Future Reference Case

- 2.7 A Future Reference case scenario has also been jointly undertaken with Quinn Estates as part of the basic model development work. This assumes that all development allocated in the Adopted Swale Local Plan (2017) builds out at the

rate expected in the Swale housing land supply report; and that all currently committed transport improvements are provided as per Appendix I (page 13-14).

- 2.8 Beyond 2022, an additional amount of development is added each year to reflect the uplift in development targets required by the NPPF (2018). The model has distributed this additional development in proportions similar to Bearing Fruit development strategy (83:17 Sittingbourne and Sheppey : Faversham). It therefore a theoretical future scenario (rather than being based on new actual sites). No further transport improvements were added to the model.
- 2.9 This approximates what would be happen if we address the increased development targets without any change to our development strategy and there is no further improvement to the transport network. As expected, without additional mitigation, the local highway network is put under significant stress with many junctions overloaded. The largest differences in delays are seen on Sheppey; the M2 junctions and Faversham town centre. M2 traffic is held up due to junctions operating over capacity. Flows westbound on the A2 decrease as congestion encourages people to re-route onto the M2. Traffic is unable to get through the network, which indicates that continuing with our present development strategy and no further highway improvements is not a tenable position.

Future Scenarios Testing

- 2.10 Four Future Scenario modelling runs have been developed by Swale BC and KCCH only. The assumptions and inputs to each of these are summarised at Appendix I (pages 15-19 of the consultants' report; with development inputs for each scenario summarised at pages 20-23).
- 2.11 The Future Scenarios have been selected to test a range of potential alternative development distributions and different levels of improvement to the highway network. The model study area is split into zones (defined by the modellers page 30 of Appendix I) and future scenarios are tested by allocating different amounts and types of development to the zones. The development assumptions for post 2022 have been informed by site submissions to the Strategic Housing Land Availability Assessment and the Garden Communities Prospectus work undertaken in 2018. Use of real site information for modelling at this point in time **in no way** endorses their suitability for allocation in the Local Plan Review – it is simply a necessity to get the model to work in a realistic way to inform our choices.
- 2.12 Each scenario test has reflected the uplift in housing numbers required by the NPPF from 2022 (to 1050 dwellings per annum); and the employment needs indicated by the Employment Land Review reported to Panel at the September 2018 meeting (224,000 sq metres for the local plan review period). The quantum of development has been held constant for each future scenario test to 2037, but it has been distributed in different ways around the Borough; and different transport interventions applied. In this way we can demonstrate a sound approach to the early stages of plan making required by the NPPF and set out in

para 2.1 above. Transport issues will nevertheless need to be further refined as the plan develops.

- 2.13 The results are set out in the consultants' report at Appendix I to this item (Section 8 and Appendices C and D). This item summarises the headlines and these are drawn from reporting for the morning peak results and generally represent the worst case scenarios in terms of impact on the network.

Future Scenario 1

- 2.14 As Appendix I indicates, Scenario 1 assumes that all adopted Local Plan (2017) development and committed highway improvements build out. This still has quite a strong influence on the modelling results and overall distribution of development. From 2022, it then assumes that **new** development allocations made through the Local Plan Review would have slightly more emphasis on the Faversham end of the Borough, than in the adopted Local Plan although still with approximately 60% Sittingbourne and Sheppey to 40% Faversham split. No additional transport improvements are assumed in Scenario 1 beyond those already committed. This is testing what happens if we shift the emphasis of new allocations slightly to the eastern end of the Borough and whether any capacity is released in the network as a result.
- 2.15 Vehicle trips are expected to increase by some 25% between 2017 and 2037 in the morning peak under Scenario 1. Network performance issues under this scenario indicate an increase in vehicle over capacity queueing hours of some 4727 hours. Overall travel time within the network would also indicate an increase of some 43%. (see Appendix I, consultants report page 104). These were the worst network performance results of the four scenarios tested.
- 2.16 The results for Scenario 1 indicate specifically
- M2/J5 (with proposed improvement) remains within capacity;
 - A249 is overloaded
 - Sittingbourne town centre congestion is significantly worse
 - A2 west of Bapchild is overloaded
 - Lower westbound flows on A2 through Ospringe as traffic re-routes to avoid the A2 west congestion between Teynham and Key Street junction,
 - Congestion at the A251 and on the A2 at Faversham;
 - Congestion problems at Minster Road and Halfway.
- 2.17 This solution therefore indicates that even with a slight shift in emphasis to allocating more development at the Eastern end of the Borough, there is very little capacity left in the network under Scenario 1. It would be overloaded by the end of the plan period in the absence of any further improvements, or modal shift.

Future Scenario 2

- 2.18 Scenario 2 assumes the same development distribution as Scenario 1 and adds completion of the Sittingbourne Northern Relief Road (SNRR) to the A2; and improvements to M2/J7 Brenley Corner. This allows consideration of whether any additional capacity can be released at Sittingbourne, as a result of relieving the town centre; and also looks at whether the SNRR road link would worsen the situation along the A2 between Faversham and Sittingbourne. This also provides a perspective on what happens to the Faversham part of the network with moderately increased development and a major M2/J7 improvement.
- 3.19 Vehicle trips increase by the same amount as for Scenario 1 (25%). Network performance indicates an increase in vehicle over capacity queuing hours of 4283. Overall travel time within the network increases by 41%. Scenario 2 is therefore slightly more efficient in terms of overall network efficiency than Scenario 1, as a result of the introduction of SNRR and M2 J7 improvements.
- 3.20 The results indicate, that despite some localised improvements, there are still significant issues with Scenario 2;
- Traffic re-assigns to Swale Way (SNRR) away from the A249;
 - A2 flows through Sittingbourne benefit from the SNRR which results in similar flows to the 2017 base year;
 - Housing increases remove any benefit for area west of Sittingbourne town centre and A249 has worst flow results of all the scenarios tested;
 - Significant increases in flows on A2 through Teynham, as a result of SNRR rerouting traffic;
 - Significant increases in flows on A2 through Faversham;
 - Other than the A2, Scenario 2 impacts less on the remainder of Faversham.
- 3.21 Scenario 2 therefore indicates that even with the introduction of the SNRR and improvement to M2/J7, there is little benefit or additional capacity freed up. Congestion is instead shifted to other points on the network.

Future Scenario 3

- 3.22 Scenario 3 assumes a 35:65 split of new development allocations in the post 2022 period between the Sittingbourne / Sheppey and Faversham ends of the Borough, so shifting significantly more emphasis to Faversham to meet the Borough's additional development needs. The transport mitigations assumed remain as per Scenario 2, namely Sittingbourne Northern Relief Road and M2/J7 Brenley Corner. Scenario 3 therefore tests whether a significant additional share of development could go to the Faversham area with the M2/J7 improvement in place and relieving some development pressure on the western end of the Borough.
- 3.23 Vehicle trips also increase by 25% in Scenario 3, similar to Scenarios 1 and 2. Network performance indicates vehicle over capacity queuing hours of 3947 in 2037, which although still a substantial increase on the 2017 base year, is slightly

better than Scenarios 1 and 2 and may be explained by a reduction in pressure on Sittingbourne Town Centre. Overall travel time within the network still shows a substantial increase of 40%, but this is slightly less than Scenarios 1 and 2.

- 3.24 The results of Scenario 3 also show more localised benefits and disbenefits;
- The Faversham part of the network is overloaded, with particular issues through the town centre, the A2 and A251;
 - A2/ A251 flows are overloaded which also impact on Ashford Borough;
 - Some benefits are seen in Sittingbourne compared to other scenarios as a result of less housing being assumed on this option.
- 3.25 The results indicate severe overloading of the network in the Faversham area, and overloading on the A251. The Faversham network is particularly difficult to mitigate due to historic townscape constraint. An increase in flows on the M2 is also noted, resulting in some reassignment onto the A2.

Future Scenario 4

- 3.26 This scenario tests the transport impact of a more radical development strategy approach. Again all Adopted Local Plan and committed transport improvements are assumed to build out. Post 2022, most potential new development allocations are located in new settlements at South East Sittingbourne and South East Faversham for this scenario, with 0% additional development allocations at Sheppey post 2022. The split of new development allocations would therefore be 74% at Sittingbourne and 26% at Faversham). The new settlement sites have more development capacity than counted for modelling purposes to 2037 and would continue to build out beyond the model horizon date of 2037 if pursued (and indeed beyond the horizon date of this Local Plan Review). Scenario 4 has therefore been tested for its impact at 2042 as well. The additional transport interventions tested with this scenario are Sittingbourne Northern Relief Road; Sittingbourne Southern Relief Road; a new M2/J5A; and M2/J7 improvement.
- 3.27 This scenario is creating 'new' geography and supporting highway infrastructure which is unlikely to be achievable with other development scenarios. The purpose here is to see if it would be capable of dealing with local plan review levels of development, as well as relieving pressure on other parts of the network; and whether they would generate sufficient 'spare' transport capacity for the longer term (ie indicating some spare capacity remaining in the network at 2037 to allow for longer term build out of new settlements).
- 3.28 This scenario also tested in strategic transport terms, the impact of the then extant Council resolution 151 of 26 July 2017 which was:

'With the Government proposing to allocate some of the £6 billion a year raised from Vehicle Excise into upgrading our A road system, this Council welcomes the MPs for Sittingbourne and Sheppey and Faversham and Mid Kent pressing Government and KCC to secure funding to the strategic highway network across Swale including the completion of the Northern Relief Road and Southern Link,

Brenley Corner, and A249 improvements to the M2 thus significantly improving air quality and traffic flows’.

It is noted that Council resolution 11 B of 26 June 2019 states that this is **not** now a strategic objective for the Council, but the research is still valid as a complementary part of a robust transport evidence base.

3.29 Vehicle trips increase by 25% throughout the network by 2037 which is consistent with the other scenarios tested. By 2042 trips increase by 30%. Over capacity queuing hours are 2814 at 2037, which although still a considerable increase on the base year, is marginally less bad than all of the other scenarios tested. Similarly, overall travel time within the network shows a 37% increase to 2037, which is marginally less worse than the other three scenarios tested. At 2042 (Appendix I page 106) though, congestion is building again, with over capacity queuing hours rising to 4060 in the morning peak.

3.30 The results indicate specifically

- Scenario 4 has the least impact on westbound movements on the A2;
- Re-assignment of traffic onto Swale Way and away from the A249;
- Significant increases in flows in the A2 through Teynham and Faversham
- A2 flows through Sittingbourne Town Centre benefit considerably, from the SNRR/SRRR addition, resulting in flows similar to the 2017 base year;
- Least impact on the A2/A251 junction;
- M2/J5 remains within capacity for the first part of the plan of the plan period, but would show overloading on the south bound A249 arm of the junction by 2037.
- M2/J5A could potentially overload by 2037 in the evening peak and could also be exceeding capacity threshold in the am peak as well by 2042 in the absence of any modal shift.

3.31 This scenario includes land which could deliver significant additional infrastructure and offers the best option for Sittingbourne and Sheppey as a result of housing locations and infrastructure. Issues remain on the A2 through Teynham and Ospringe however, as eastbound traffic diverts via the SNRR.

Summary and Conclusions

3.32 All Scenarios indicate major increases in the overall amount of traffic and indicate that even with currently planned improvements, congestion will increase and the network will be over capacity at the morning and evening peaks and at some points under stress even in inter peak periods. At this stage the results are not suggesting that anything should be ruled out, but it is clear that significant further mitigation and modal shift will be needed. The following table summarises the results for each scenario up to 2037/38.

Table 1: Summary results for each scenario up to 2037/38.

	<i>Scenario 1</i>	<i>Scenario 2</i>	<i>Scenario 3</i>	<i>Scenario 4</i>
Vehicle trips	+25%	+25%	+25%	+25%
Overall travel time within the network	+43%	+41%	+40%	+37%
Increase in vehicle overcapacity hours	4727	4283	3947	2814

- 3.33 The trip rates added in the testing are similar to those applied to the current suburban expansions of development allocated via the Bearing Fruits Local Plan. Any major strategic site or town centre brownfield site uses would be expected to have significantly lower trip generation rates than those applied to this testing. Such locations would also have more propensity to increase use of public transport and the creation of walking/cycling friendly environments
- 3.34 The four new settlements tested in the various scenarios have had no internalisation deductions applied that would occur in more detailed modelling. In particular those developments containing significant employment, schools and amenities will have reductions applied to future testing.”
- 3.35 Key overall findings are:
- The SNRR by itself does not confer significant benefits, other than shifting some congestion away from Sittingbourne Town Centre;
 - Improvement at Sittingbourne Town Centre is greater under Scenario 3, but the A2 between Bapchild and Faversham is worsened;
 - Key Street / A249 junction has limited scope for further improvement beyond that already planned for;
 - The A249 benefits from the SNRR and the SSRR. Scenarios 3 and 4 retain some capacity at 2037, with Scenario 4 offering the greatest benefit;
 - Scenario 1 has issues for the A249, Sheppey, Sittingbourne and the A251;
 - Scenario 3 has issues for Faversham and the A2 east of Bapchild;
 - Scenario 4 has issues for south Sittingbourne and A2 east of Bapchild;
 - A2 flows through Newington are affected by M2 capacity;
 - A2 flows east of Bapchild would require mitigation;
 - Faversham is challenging in all scenarios
 - Sheppey is challenging in all scenarios even with zero or little additional development post 2022, due to background traffic growth. Some modest additional development could provide the opportunity for further highway improvements;
 - With the Lower Road improvements, Sheppey could cope with Scenarios 3 and 4;

- Junctions throughout the network will come under considerable stress and some have limited capacity for mitigation, although the number of over capacity junctions should be expected to reduce in scenarios which allow greater potential for modal shift;
- The results suggest that the M2 requires widening to three lanes between Junction 4-7 in all scenarios (without any allowance in Swale modelling having been made for the Lower Thames Crossing impact) and such improvement for the M2 is not yet in any Highways England programme.

Next Steps

- 3.36 The outputs from this stage of the model are challenging and raise issues for the wider strategic network, and cross boundary issues with our neighbouring districts. Early discussion with Highways England and Kent County Highways and Transportation has resulted in advice from them that due to the uncertainty of any improvements to Brenley Corner (M2 J7) this scheme should be removed from future testing.
- 3.37 Additionally, given the Council's concerns about the highway networks ability to accommodate the expected standard housing calculation, increasing housing numbers from 776 dwellings per annum to 1050 dwellings per annum from 2022 onwards, it is proposed that two further runs of each of the future scenarios 1, 2 and 3 are undertaken with lower housing numbers from 2022 onwards of 550 and 776 dwellings per annum continued to 2037. This should provide an indication as to whether the highway network at significantly lower housing numbers is able to cope with the development proposed.
- 3.38 There will need to be discussion with Highways England and neighbouring authorities (as part of the Duty to Cooperate on cross boundary issues) to share the results so far and establish a way forward. The results are nevertheless likely to have implications for the delivery of the Swale and potentially neighbouring local plan reviews.
- 3.39 It is also important to re-assert that this stage of the transport modelling work is at a high level and confined to highways impacts, although it will inform further work on generating reasonable alternative development strategies for the local plan review Issue and Options stage. Further and more detailed transport modelling work incorporating potentially more localised improvements and modal shift will be essential to support the local plan as it progresses to the later stages of drafting and submission. The Council will need to work closely with the highway authorities, transport providers and developers to ensure that this research and appropriate and timely supporting transport infrastructure is in place to support the required levels of development.
- 3.40 The outputs from this transport work will also be used as direct inputs to generating an Air Quality Assessment perspective on alternative development scenarios.

- 3.41 Members are also reminded that there is also a significant body of other technical evidence which will need to be taken into account alongside transport work in identifying reasonable alternative development strategies.
- 3.42 Additionally, the development of the Issues and Options consultation document will be informed by the Sustainability Appraisal Framework which has already been established for the Local Plan Review. A full SA/HRA assessment document will accompany the Issues and Options consultation document and show how alternatives perform against the various social economic and environmental measures identified.

Proposals

- 3.1 This transport modelling is part of the evidence base which will inform generation of alternative development strategies for testing through the Issues and Options stage of the Local Plan Review process. The recommendations are therefore to:
- i. Note the strategic transport modelling results at Appendix I and II;
 - ii. Recommend to Cabinet that this work be part of the body of evidence to inform the Issues and Alternative Options stage of the Local Plan Review;
 - iii. Agree additional modelling runs be undertaken for scenarios 1, 2 and 3 to test the impacts of lower housing numbers as explained in paragraph 3.37.

4 Alternative Options

- 4.1 Transport modelling is a fundamental part of the evidence base for informing the local plan review. It is a requirement of the NPPF and provides essential information that feeds into other evidence, such as air quality evidence. The method for preparing the transport model is standard across Kent and the rest of the country. For Swale Borough, the transport modelling tested a range of potential development scenarios and highways transport mitigation measures to assist with generating reasonable alternative development strategies for the next stage of the local plan review process.
- 4.2 Members could choose to disregard the content of the two annexed reports and the recommendations of this report. However, the purpose of evidence is to set out the information from which the local plan review can be justified. The local plan review cannot progress or be found 'sound' by a local plan inspector without it. To choose to reject the reports and the recommendations would undermine and significantly delay the preparation of the Local Plan Review, which is one of the Council's statutory functions.

5 Consultation Undertaken or Proposed

- 5.1 The Local Plan review process is subject to several stages of public consultation. The technical evidence reported here will be used along with other technical work to draft the Issues and Options and Preferred Option draft of the local Plan Review.

6 Implications

Issue	Implications
Corporate Plan	Supports the Council's corporate priorities for delivering regeneration and delivering improved quality of life.
Financial, Resource and Property	Work undertaken within existing Local Plan project budget. Base model development costs and Future Reference case costs shared with Kent County Council Highways and Quinn Estates. Future Scenario Modelling costs shared with KCCH only.
Legal, Statutory and Procurement	The Local Plan is prepared under the Planning and Compulsory Purchase Act 2004 (as amended); and in accordance with the Town and Country Planning (Local Planning) (England) Regulations 2012 (Statutory Instrument 2012 No.767) (as amended by SI 1244, Dec 2017).
Crime and Disorder	Non identified at this stage
Environment and Sustainability	The transport modelling is one element of the Local Plan Review evidence base. A Sustainability Appraisal / Habitats Regulation Assessment Framework has already been established for the Local Plan Review process. The transport modelling data will be used as an input for generating Air Quality evidence. The Issues and Options / Preferred Option Consultation Document will be accompanied by a Sustainability Appraisal / HRA document and subsequent key stages of the process will also be subject to SA/HRA.
Health and Wellbeing	Non identified at this stage
Risk Management and Health and Safety	Non identified at this stage
Equality and Diversity	The Local Plan process will be subject to a Community Impact Assessments at appropriate points.
Privacy and Data Protection	Non identified at this stage

7 Appendices

7.1 The following documents are to be published with this report and form part of the report:

- Appendix I: Swale Highway Model: Local Plan Future Scenario Testing Report.
- Appendix II: Swale Highway Model; Local Model Validation Report

8 Background Papers

None