



UNITED
BY OUR
DIFFERENCE



KINGS ROAD LINK ROAD

Outline Business Case - Additional Information
West Berkshire Council

11/11/2014

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	FINAL			
Date	11 November 2014			
Prepared by	Craig Drennan			
Signature				
Checked by	Various			
Signature				
Authorised by	Craig Drennan			
Signature				
Project number	70007329			
Report number				
File reference	\\ser01bas1uk.uk.wspgroup.com\projects\70007329 - Kings Road Link Road Business Case\C Documents\Reports\Kings Road Link Road - OBC - Additional Information.docx			

Kings Road Link Road

Outline Business Case - Additional Information

11/11/2014

Client

West Berkshire Council
Council Offices
Market Street
Newbury
Berkshire
RG14 5LD

Consultant

WSP UK Limited
Mountbatten House
Basing View
Basingstoke
RG21 4HJ
UK

Tel: +44 (0)12 5631 8750
Fax: +44 (0)12 5631 8700

www.wspgroup.co.uk

Registered Address

WSP UK Limited
01383511
WSP House, 70 Chancery Lane, London, WC2A 1AF

WSP Contacts

Craig Drennan – Technical Director
craig.drennan@wspgroup.com

Table of Contents

1	Introduction.....	5
2	Base transport model.....	7
3	SATURN assignments.....	10
4	TUBA economic assessment.....	13
5	Summary	19

Appendices

1 Introduction

1.1 Background

- 1.1.1 Following the devolution of major transport scheme funding from DfT, West Berkshire Council (WBC) as part of the Thames Valley Berkshire Local Enterprise Partnership (TVBLEP) (and the Berkshire Local Transport Body (BLTB) Berkshire Strategic Transport Forum (BSTF)) were asked to prepare a business case for the Kings Road Link Road scheme in Newbury. The scheme scored very well in the initial prioritisation exercise and was confirmed as the top scheme in the BLTB's agreed assessment. The scheme delivers a new link road identified in the Local Plan to improve the highway network and help to deliver growth. The scheme is well established in policy and land has been protected through the Local Plan for its delivery.
- 1.1.2 The TVBLEP brings together businesses, unitary authorities, education and the community sector to drive economic growth in the Thames Valley. The Thames Valley Berkshire Growth Deal will deliver growth by enhancing urban connectivity and addressing strategic infrastructure priorities across the LEP area. This will enable the delivery of essential housing at flagship sites in Newbury, Wokingham and Bracknell and improve access and reduce journey times across the LEP area.
- 1.1.3 West Berkshire Council (WBC) appointed WSP to undertake a business case looking at the strategic, economic and management impacts of the Kings Road Link Road. The Kings Road Link Road is a link road between the strategic road network, an area of housing delivery and a large employment area. It also supports the delivery of the Racecourse Strategic Development Location (SDL) which is one of two major housing sites in Newbury and unlocks land for a highly sustainable housing development.
- 1.1.4 The Kings Road Link Road includes the following highway changes:
- 7.3 metre two way single carriageway road approximately 160 metres long with a 30mph speed limit between the existing Sainsbury's roundabout to Kings Road at the Boundary Road / Hambridge Road junction. Traffic using the existing link between the Boundary Road / Hambridge Road junction at the access to the Sainsbury's Roundabout will be re-routing to this new link and is intended to provide the alternative route between these two points
 - The western end of the Kings Road Link will connect with the existing arm of the Sainsbury's roundabout while the eastern end will merge onto Kings Road
 - Access to the existing dwellings on Kings Road will be from the west and will be made two way. There will be no access from the east to the existing Kings Road
 - The road will have a roundabout access junction to allow for the proposed development traffic to enter and exit
 - Signalised junction at the B3421 Kings Road/B3421 Hambridge Road/Boundary Road junction
 - Proposed widening of the Boundary Road railway bridge to the south of the B3421 Kings Road/B3421 Hambridge Road/Boundary Road junction to allow two-way traffic and remove a traffic bottleneck

1.1.5 WYG were appointed to provide an independent review of the Kings Road Link Road Business Case submission on behalf of the Thames Valley Berkshire Local Enterprise Partnership. As part of their review WYG have raised three key issues which the review suggests should be taken into account when considering the overall benefits of the scheme. These issues could result in an overestimate of the economic benefits of the scheme and the issues relate to the modelling and TUBA appraisal of the scheme including:

- The base transport model used for the assessment of the scheme (and it is noted that the model is calibrated and validated on link flows only) assigns 717 more trips than observed in the PM peak on the Mill Lane approach at the adjacent A339/Bear Lane junction
- Specific sector to sector movements have been removed from the TUBA assessment. In turn this has led to large benefits and large disbenefits being omitted from the final benefit calculation, which highlights possible concerns regarding the reliability of the model
- The annualisation factors used in the TUBA assessment have been derived using peak hour to peak period factor rather than the method set out within TUBA guidance

1.1.6 The additional information contained within this document seeks to address those issues.

2 Base transport model

2.1.1 The WYG review of the highlighted that the PM peak assigns 717 more modelled trips than observed trips on Mill Lane. Further analysis was undertaken on the 2013 PM peak base model to provide an explanation of this. A select link analysis was undertaken on Mill Lane which is shown in figure 1.1.

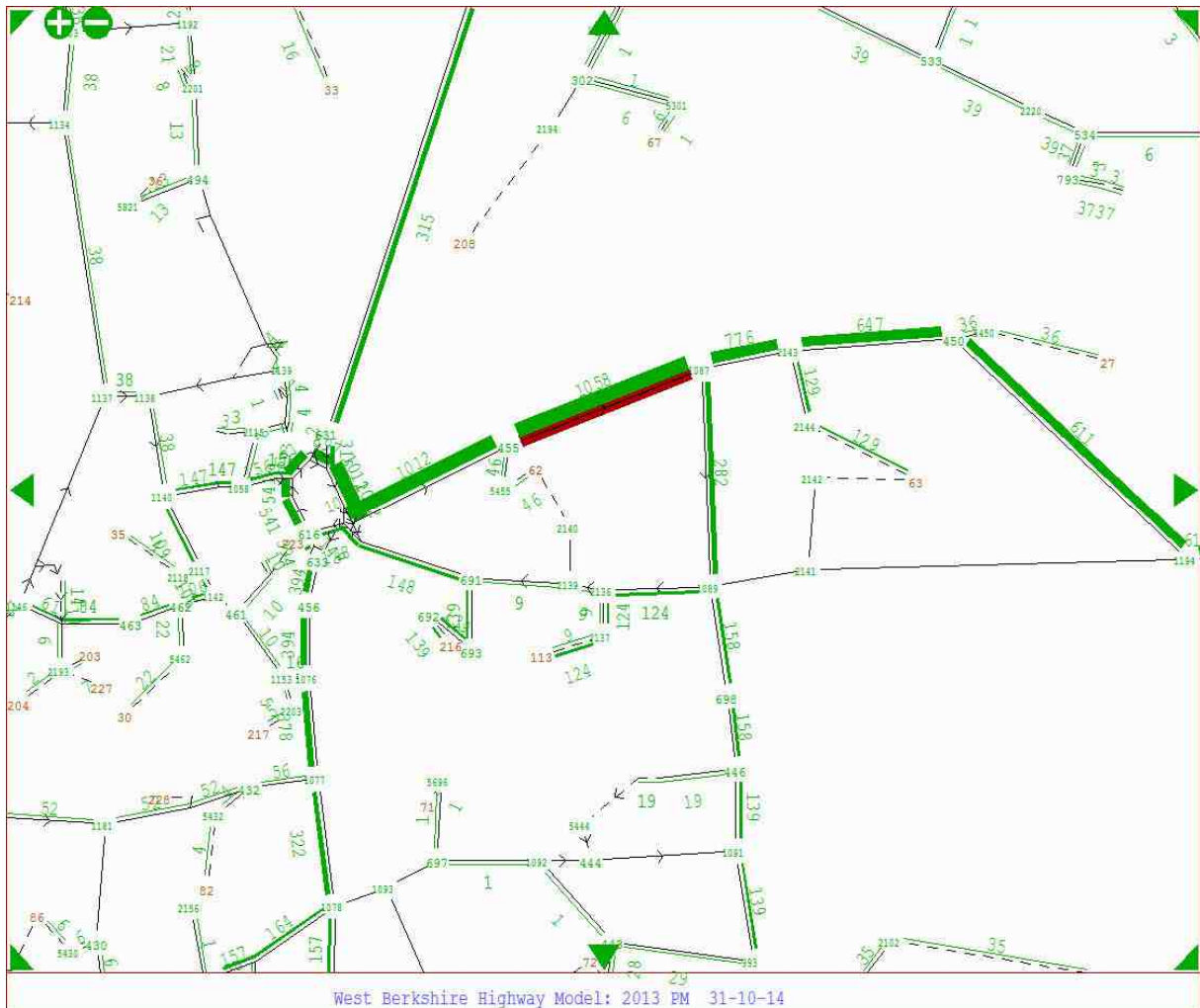


Figure 2.1: 2013 PM peak select link analysis on Mill Lane

2.1.2 Figure 1.1 shows that traffic:

- from the A339 (S) is using Mill Lane from the A339 (S) rather than using the Boundary Road junction due to the delays on the northern approach to the junction
- from the A339 (N) is using Mill Lane and Boundary Road rather than using the A339 and turning left at the St John's Road junction due to the southbound delays on the A339 approach to the St John's Road junction

2.1.3 Figure 1.2 shows that there is a delay on the:

- northbound approach to the B3421 Kings Road/B3421 Hambridge Road/Boundary Road priority junction of 191 seconds which is due to the narrow road crossing the railway line to the south of the junction
- southbound approach to the St John's Road roundabout of 213 seconds. This means that there is a localised re-routing of traffic to avoid junctions where there are large delays

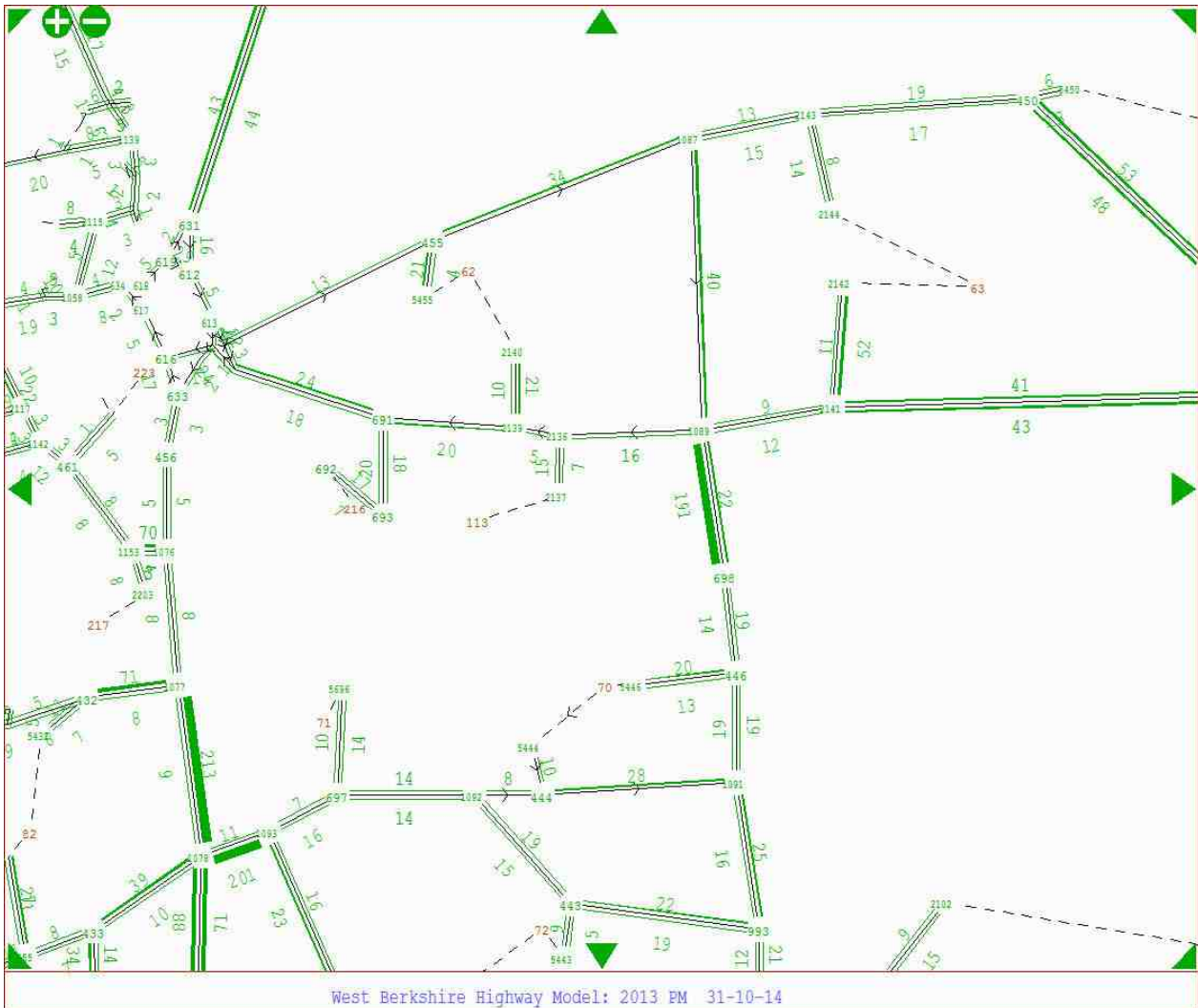


Figure 2.2: 2013 PM peak – total time plus queues on links

2.1.4 Figure 1.3 shows the select link analysis over a wider area and shows that modelled traffic from the A339 is using Mill Lane and the B3421 Hambridge Road to access the A4 at the A4 London Road/B3421 Hambridge Road junction to avoid the delays on the A4 London Road as shown in figure 1.4.

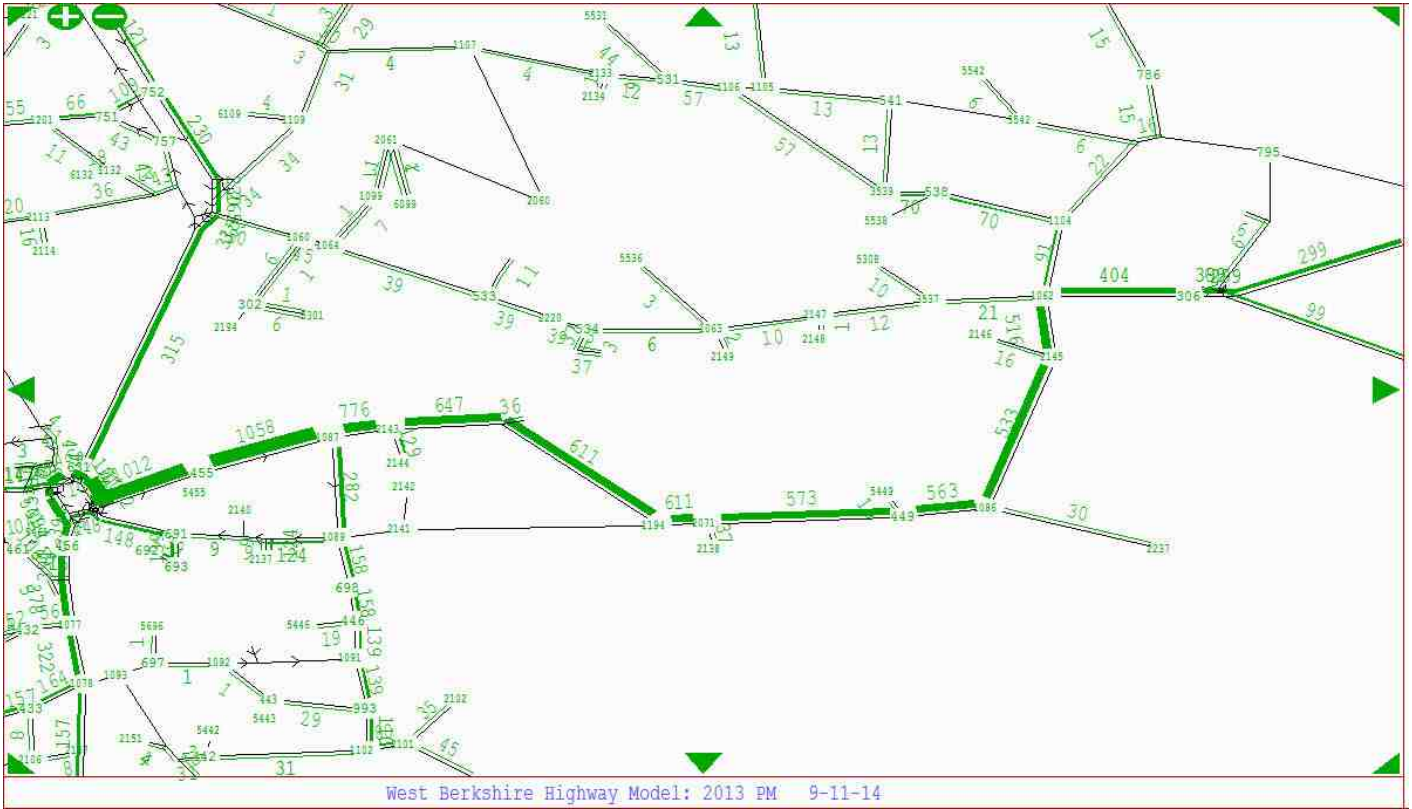


Figure 2.3: 2013 PM peak select link analysis on Mill Lane

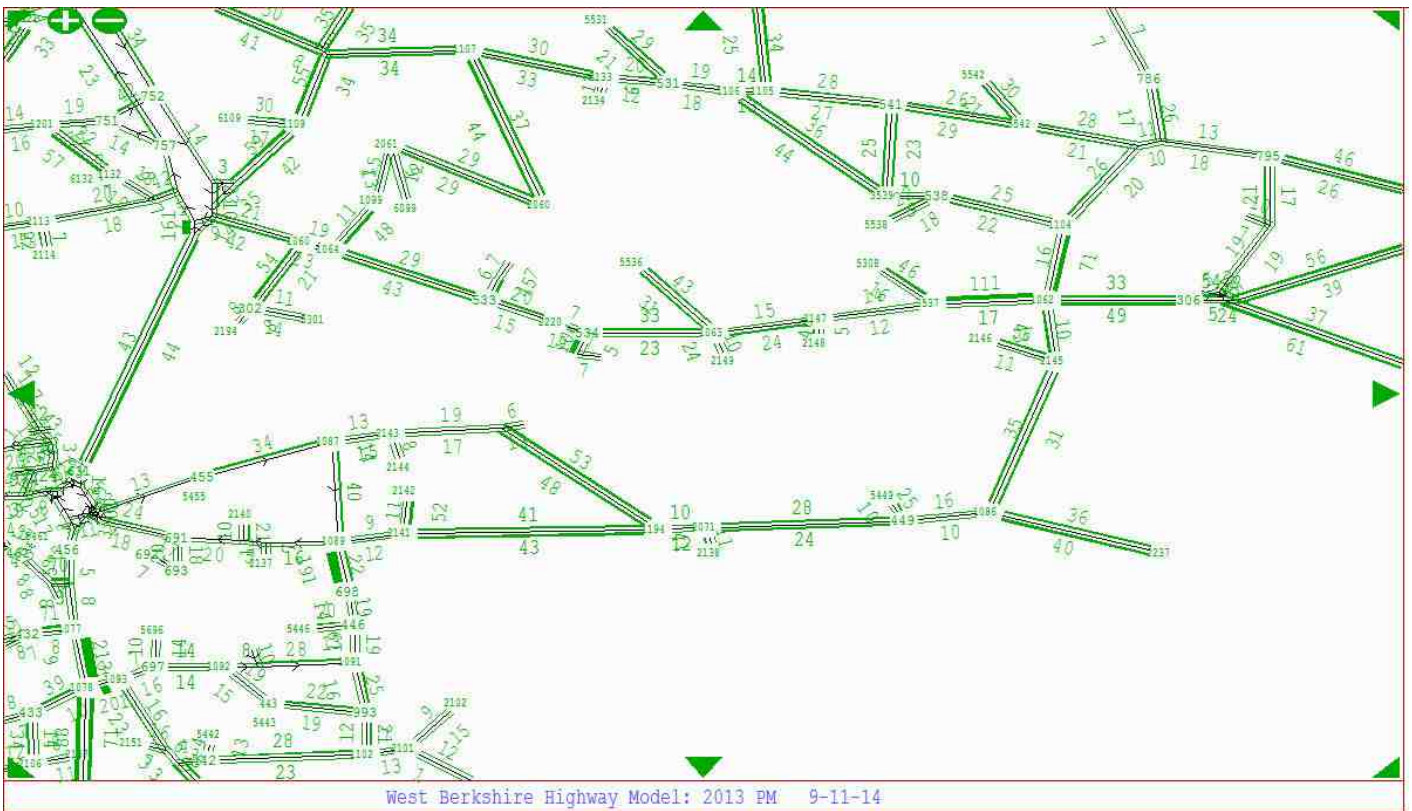


Figure 2.4: 2013 PM peak – total time plus queues on links

3 SATURN assignments

- 3.1.1 WYG have raised concerns that the TUBA assessment results included within the business case may highlight concerns regarding the reliability of the traffic model. The traffic assignments that have been used to output the required information for the TUBA assessment have used the following convergence criteria:
 - ISTOP (98%), STPGAP (0.1), UNCRTS (0.05) and AUTONA=T
- 3.1.2 These are in line with WebTAG guidance (WebTAG Unit M3.1 and WebTAG Unit M2) and are used to demonstrate that the whole model converges to a satisfactory degree and avoid model 'noise' as much as possible. The SATURN model assignments have been set up so that both these criteria have to be met before the traffic model converges.
- 3.1.3 However it could be argued that the current TUBA economic assessment is based on a traffic model where a certain level of model 'noise' is evident. With this in mind the assignment convergence parameters have been reviewed and changed to:
 - ISTOP (98%) and STPGAP (0.03), UNCRTS (0.02) and AUTONA=T
- 3.1.4 The SATURN assignments have been re-run using the much stricter convergence criteria detailed in paragraph 1.3.3 so that the traffic model results are as free from error and model 'noise' as possible.
- 3.1.5 Figure 1.5 and figure 1.6 show the impact in the 2026 forecast year for the AM peak and PM peak in terms of actual flow differences with anything less than a 10 passenger car unit (pcu) flow excluded when the Kings Road Link Road is included. The effect of the Kings Road Link Road is localised and restricted to the area of interest which would indicate that the traffic model is behaving as you would expect.

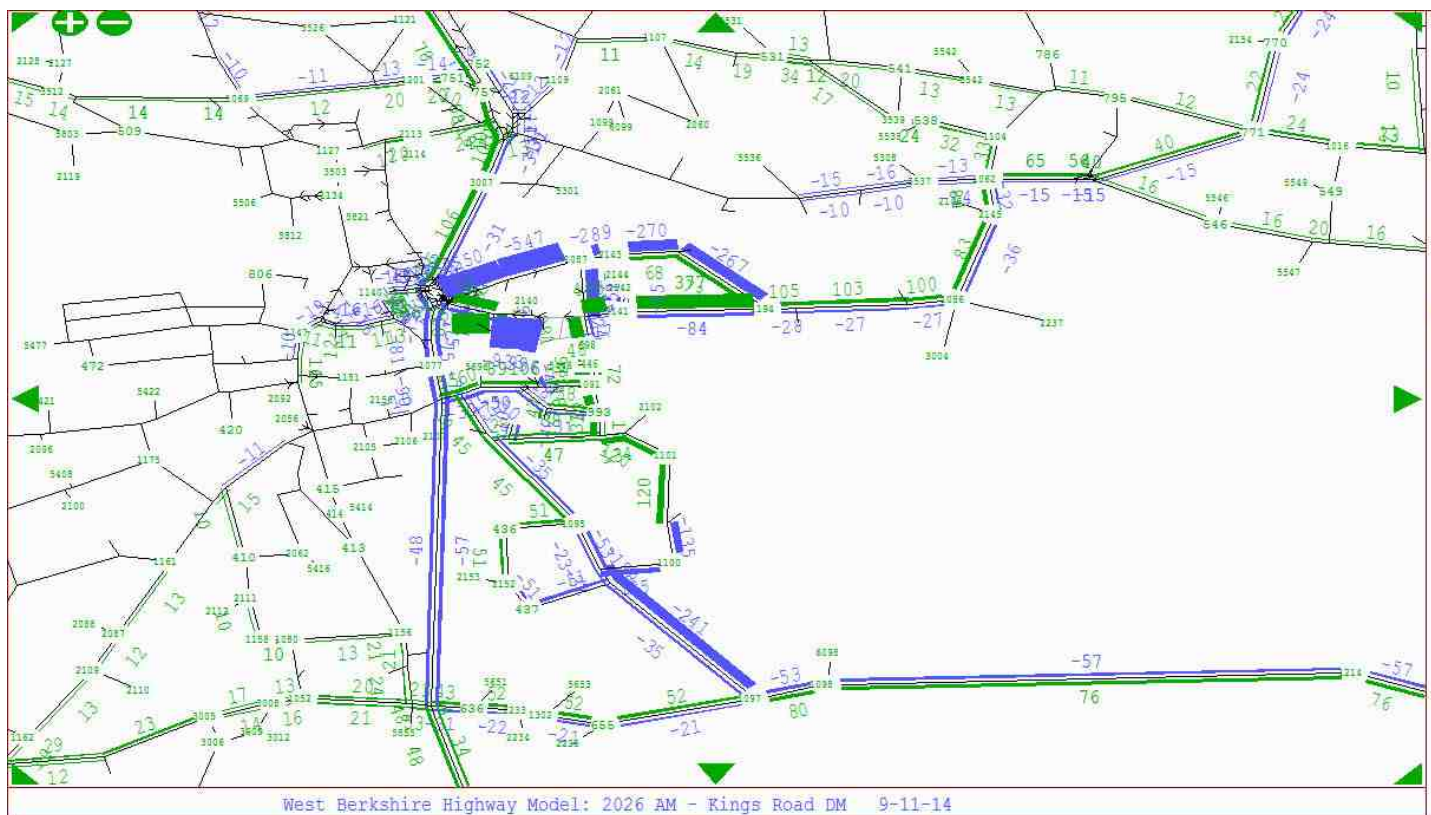


Figure 3.1: 2026 AM peak flow difference – with and without scheme

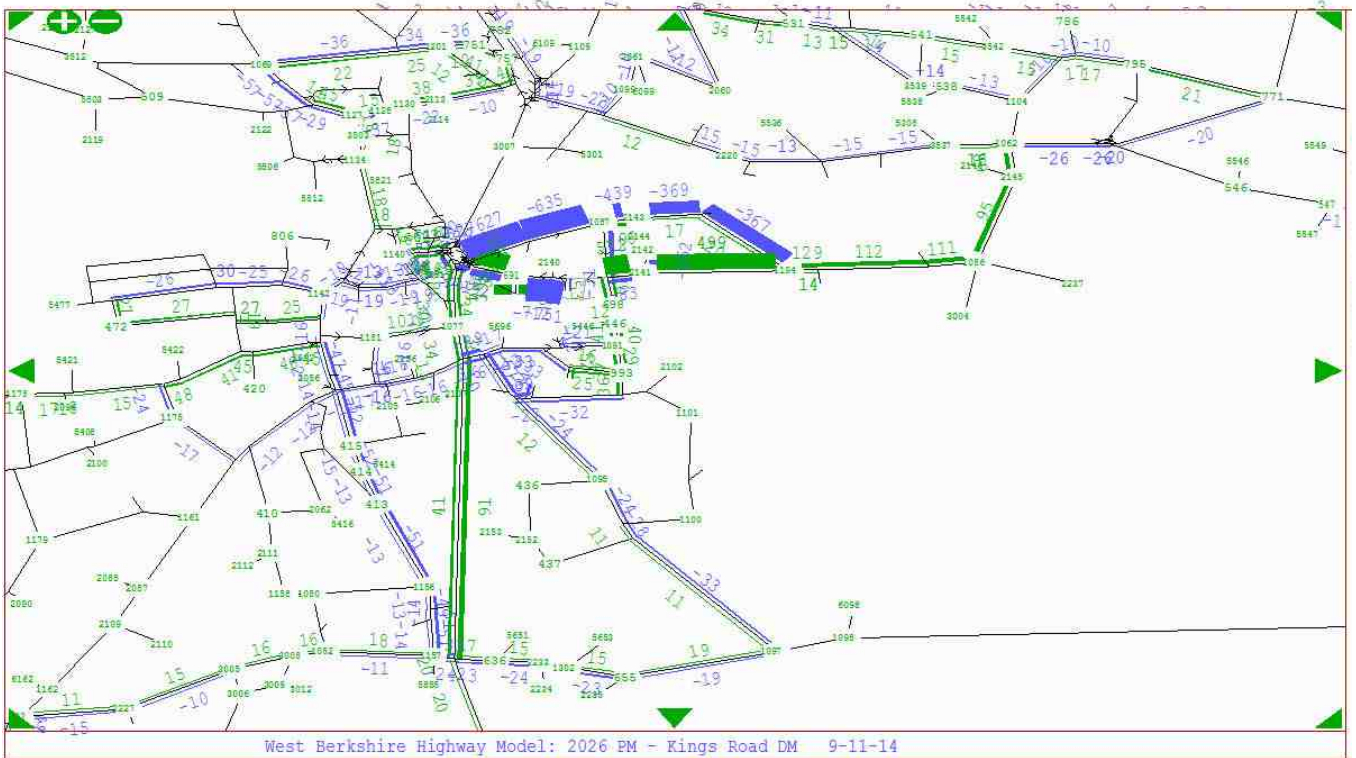


Figure 3.2: 2026 PM peak flow difference – with and without scheme (local area)

3.1.6 Figure 1.7 and figure 1.8 show the impact in the 2026 forecast year for the AM peak and PM peak in terms of actual flow differences with anything less than a 10 pcu flow excluded when the Kings Road Link Road is included on the wider road network.

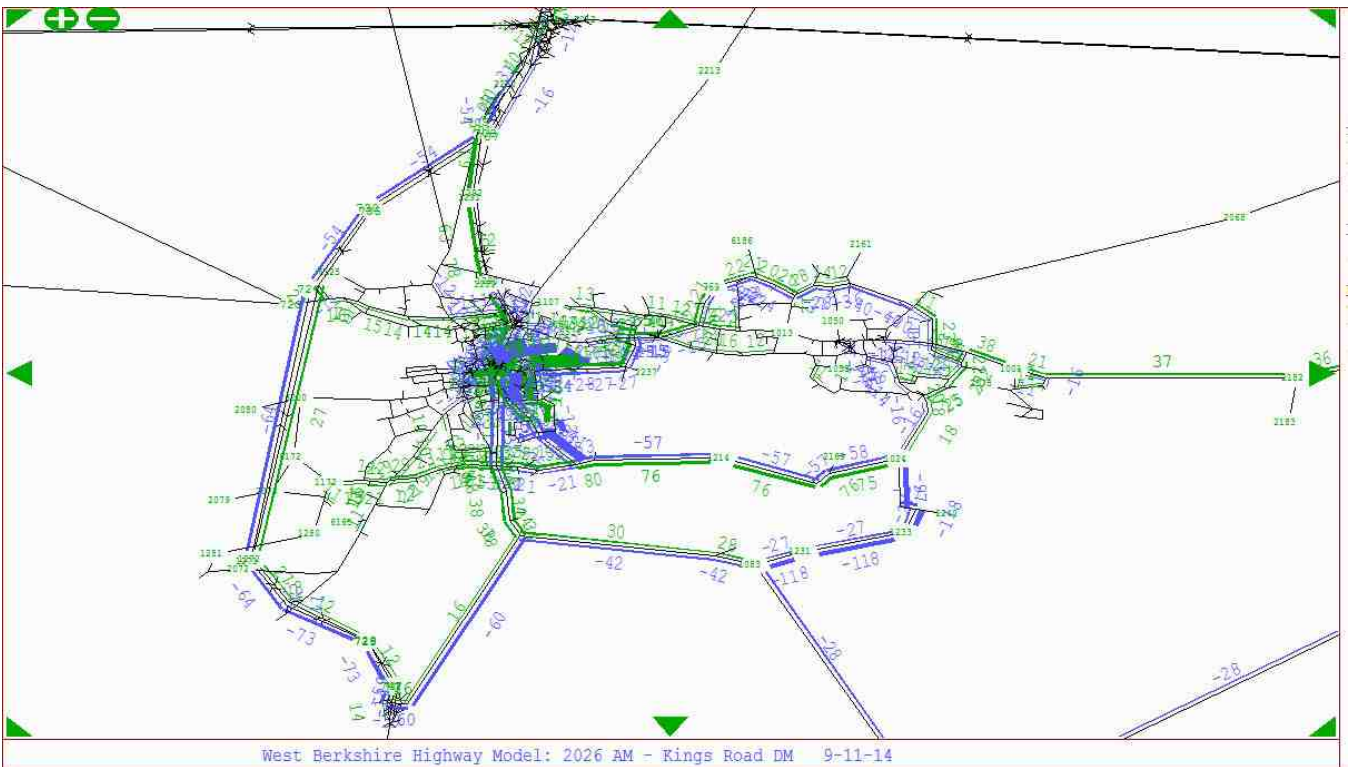


Figure 3.3: 2026 AM peak flow difference – with and without scheme (wider area)

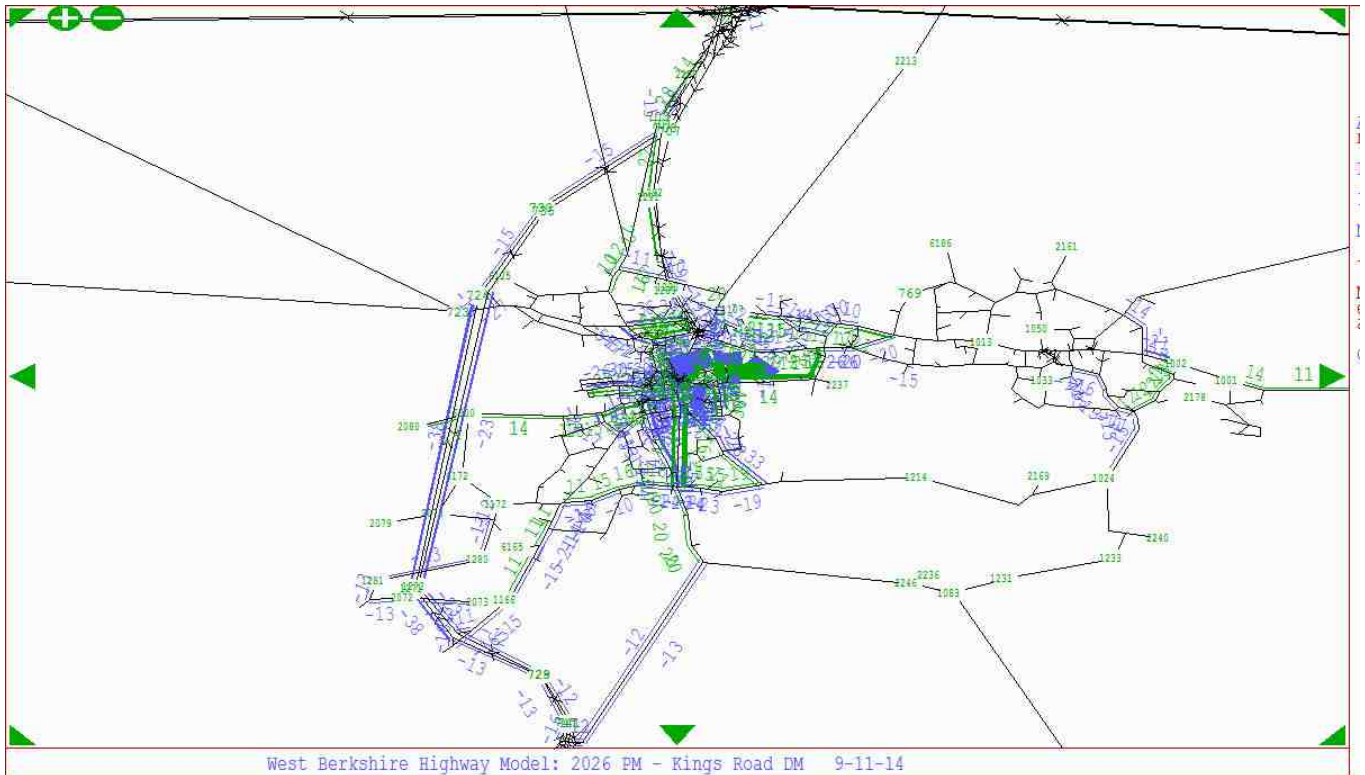


Figure 3.4: 2026 PM peak flow difference – with and without scheme (wider area)

- 3.1.7 The small difference in flows on the wider road network (figure 1.7 and figure 1.8) e.g. A34 and M4 show that the effect of the Kings Road Link Road is localised and restricted to the area of interest which would indicate that the traffic model is behaving as you would expect.
- 3.1.8 The required outputs (trip matrices, time matrices and distance matrices) have been extracted from the SATURN assignments for input into the TUBA economic assessment.

4 TUBA economic assessment

4.1.1 WYG have stated that the annualisation factors that have been used in the business case have not been created in accordance with TUBA guidance. The Highways Agency calculate annualisation factors in order to expand the modelled time periods to represent the full modelled year. These factors are applied to the user benefits calculated during each modelled period to produce the total benefits by the scheme throughout each of the appraisal years.

4.1.2 As an example the HA A45/A46 Tollbar End Improvement economic assessment report (March 2013) states that the:

“Tollbar model comprised three weekday time periods: AM peak hour, average inter-peak hour and PM peak hour. The modelled period benefits calculated by TUBA were converted into an estimate of annual benefits using annualisation factors.”

4.1.3 These annualisation factors were 683 for the AM peak period (07:00-10:00) and 683 for the PM peak period (16:00-19:00) with 2,277 representing the Inter peak (10:00-16:00) and the weekend.

4.1.4 Notwithstanding this the TUBA economic assessment for the Kings Road Link Road scheme has been re-run using annualisation factors of 253 hours for the AM peak hour, inter-peak hour and the PM peak hour.

Zone to sector analysis

4.1.5 There are 394 zones in the WBTM and the model zone system is sufficiently detailed so that all major trip movements within West Berkshire can be identified to a level consistent with existing transport models covering the study area, as well as inter-urban movements across the county and wider strategic movements. TUBA is able to output user benefits on a sector to sector basis and the zones have been aggregated in 18 sectors which are shown in figure 1.9 and figure 1.10.

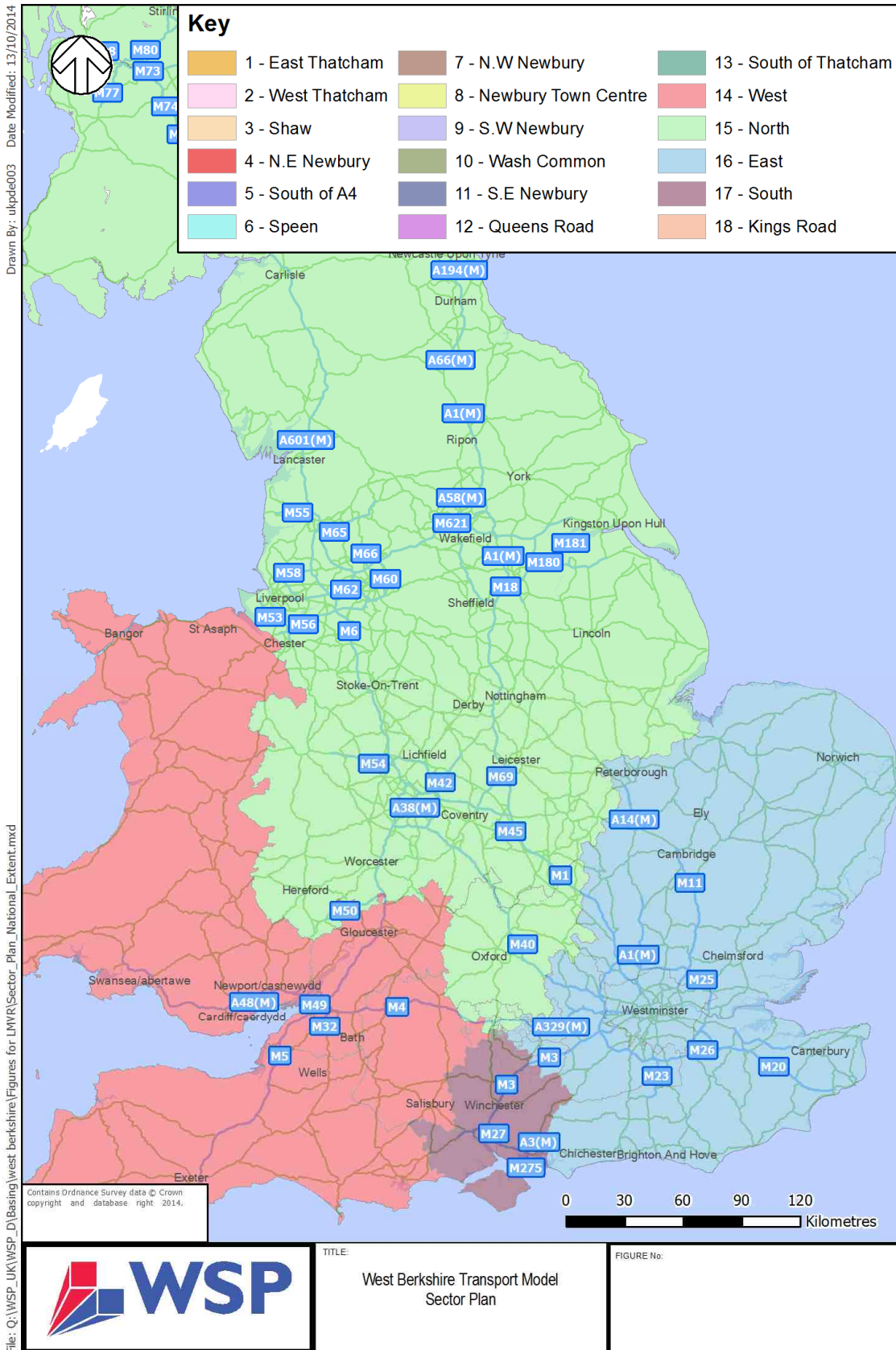


Figure 4.1: WBTM - UK sectors

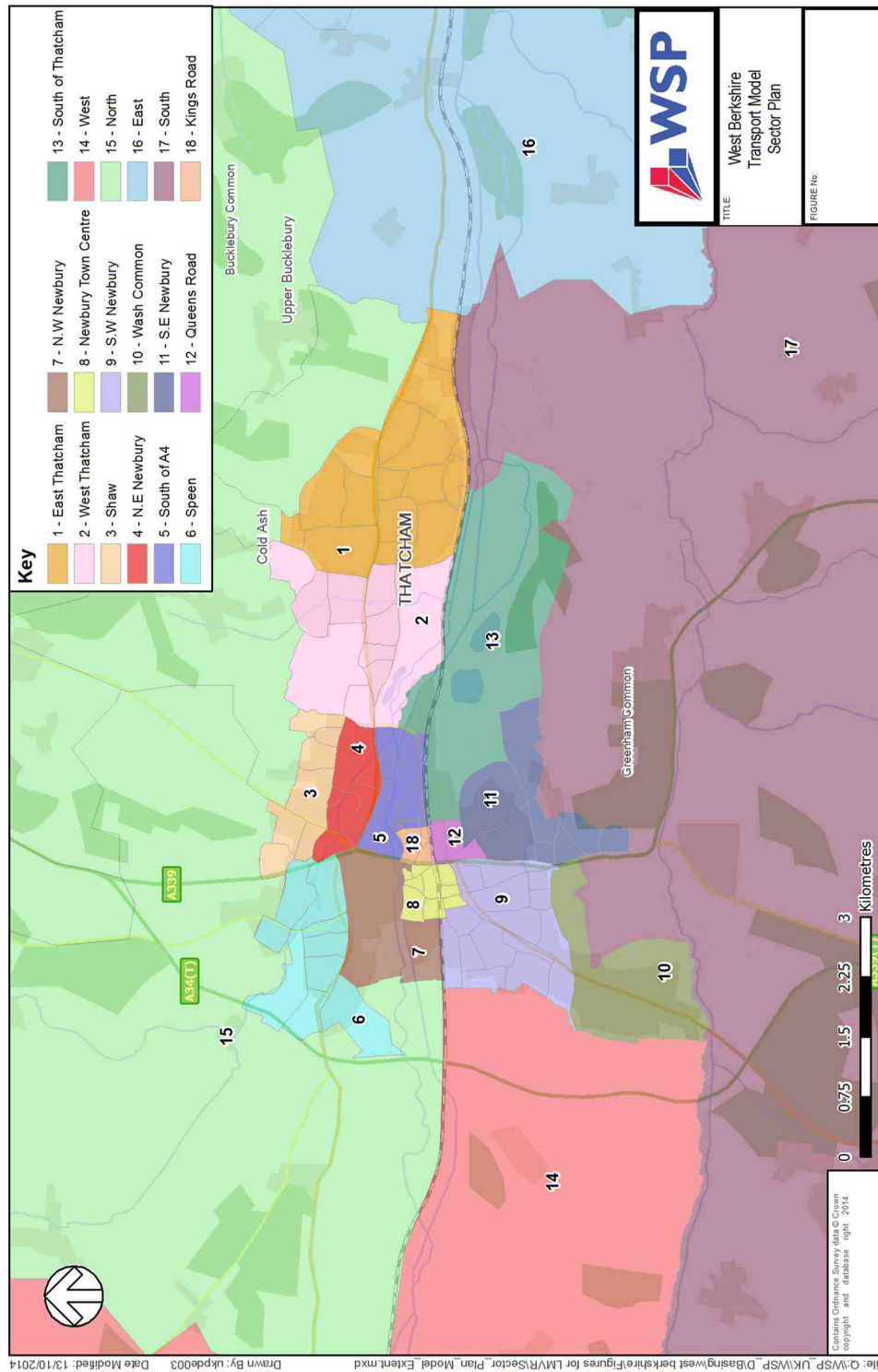


Figure 4.2: WBTM - West Berkshire Council sectors

4.1.6 Table 1.1 shows all benefits aggregated into 18 sectors. As a rule of thumb user benefits as a percentage of network costs should be at least 10 times the %Gap achieved in the without scheme and with scheme scenarios. The TUBA output shows that the total user benefits as a percentage of total DM user costs are 0.26% for the 2019 modelled year and 0.72% for the 2026 modelled year. Given that the %GAP used in the assignment process is 0.03% then the total user benefits are within the range recommended by WebTAG.

Table 4.1: Kings Road Link Road - Sector to sector benefits

Sectors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Grand Total
1	22429	14121	-14644	-2120	54315	-21612	-50124	-9462	55730	58988	-44309	-63974	-5097	-50070	-93497	-497711	-143183	-23779	-813999
2	-2014	3	-21741	-7980	-1369	-18598	-42933	-33714	-31199	-16615	17749	23566	7981	-42239	-59897	-211722	-32718	-11360	-484800
3	10472	6718	-2933	-3394	-56132	-5930	-19519	7804	-34633	-10653	2909	35294	26095	-59167	-63479	-108013	-43911	13100	-305372
4	49729	21028	-1793	-1143	-21782	-4902	-24916	-20100	-22007	9771	-2388	11218	7236	-43177	-8592	-52284	-50525	-6412	-161039
5	-299764	-105065	-106077	-39777	-158987	-36543	-63584	-22547	-88616	-33002	-36512	-38226	-79445	-180269	-500579	-156526	-78136	-315166	-2338821
6	25758	20698	25553	20296	-21156	1295	5679	-3886	2387	4150	12603	-2805	6364	1175	68828	-15768	13258	16538	180967
7	29819	16756	-22865	35335	-5787	309	-26158	-20414	2862	65489	203400	86564	57164	-59002	41132	294955	238400	111402	1049361
8	-40226	-53543	40323	34600	31028	-5709	18937	33715	52689	33927	27602	39432	290451	-26300	-3913	-1061	114742	227591	814285
9	203039	-10598	123305	159473	178505	39335	116214	36540	1739	-2519	3234	274015	123784	114446	421862	2800649	18584	552614	2634221
10	153074	1652	67332	137527	91847	19120	116515	31758	-19941	-4642	-10162	67218	29891	14805	317067	4435	3483	633118	1654097
11	294275	367844	604386	447454	537463	135327	329596	130481	366273	288265	4167	90119	218351	727304	852514	536805	622994	561204	7114822
12	312950	649189	844790	503079	1063726	266952	557968	124639	188306	111891	-4158	134023	807494	315977	1236390	362828	308246	402307	81866597
13	-36607	337019	743315	241881	484877	89916	191803	24626	185412	128297	15877	60069	151585	196316	415619	68010	235412	70829	3604256
14	307255	15919	103030	96795	9734	18579	128098	1892	354	-3086	-11101	122911	88600	-531	31750	-92682	16303	152323	986143
15	54500	25012	66967	29326	-125598	-9699	-23660	-3867	-2619	146136	-22140	30517	346	-22716	-12435	-325917	105389	55137	-35321
16	-75338	39979	165378	42718	-6984	15371	119478	77862	145327	140340	-74923	-34037	-20647	32327	-108972	-22860	167124	105516	707659
17	238550	44544	111352	221024	382117	162773	273928	141072	-14036	13733	-43477	206981	168397	69524	670615	144471	6275	472497	3270340
18	773315	263864	189825	149289	431822	25950	70966	105846	119892	54808	325147	528139	555835	155333	760122	132878	66485	43402	4752918
Grand Total	2021216	1655140	2915503	2064383	2867639	671934	1678288	602245	907920	985278	363518	1571024	2434385	1143736	3964535	340487	1568222	3060861	30816314

TUBA - warnings

- 4.1.7 TUBA displays warnings when e.g. the ratio of the without scheme (DM) scenario and with scheme (DS) scenario travel time is lower than the limit and there were 5,661 warning messages in total displayed. The data checks that TUBA undertakes are shown in table 1.2.

Table 4.2: TUBA – data checks

Value of r	Action
$r < A$ or $r > D$	Serious warning
$A < r < B$ or $C < r < D$	Warning
$B < r < C$	OK, no warning

- 4.1.8 The values of A, B, C and D are shown in table 1.3.

Table 4.3: TUBA - limit values

A	B	C	D
0.33	0.67	1.5	3.0

- 4.1.9 The 5,661 warnings are split as follows:

- Ratio of DM to DS travel time lower than the limit: 468 warnings with none serious
- Ratio of DM to DS travel time higher than the limit: 1,940 warnings with 108 serious with 50 of the serious warnings having a ratio of 3.5 or less which is just above the limit of 3.0
- Ratio of DM to DS travel distance lower than the limit: 310 warnings with none serious
- Ratio of DM to DS travel distance higher than the limit: 1,215 warnings with 85 have a ratio of 3.0 or greater which is higher than the limit

- 4.1.10 Table 1.4 shows the updated economic benefits using the revised convergence criteria and the 253 peak hour annualisation factors. All monetary values are in 2010 prices, discounted to 2010.

Table 4.4: Analysis of Monetised Costs and Benefits (AMCB)

Item	Value (£000s)
Greenhouse gasses	£0.413m
Economic Efficiency: Consumer Users (Commuting)	£9.108m
Economic Efficiency: Consumer Users (Other)	£9.967m
Economic Efficiency: Business Users and Providers	£12.307m
Wider Public Finances (Indirect Tax Revenues)	-£1.073m
Present Value of Benefits (PVB)	£30.722m
Broad Transport Budget	£2.467m
Present Value of Costs (PVC)	£2.467m
OVERALL IMPACTS	
Net Present Value (NPV)	£28.255m
Initial Benefit to Cost Ratio (BCR)	12.453

- 4.1.11 This information shows that the initial BCR of the scheme, based on standard monetised values, is **12.453**. This represents the benefits for the core elements of the scheme and includes all benefits and dis-benefits extracted from the WBTM.
- 4.1.12 Information on the monetised benefits by time saving has been extracted from the TUBA economic assessment output and has been analysed. Table 1.5 shows that £22.895m (79.76%) of the £28.706m time saving benefits are in the zero to five minute range.

Table 4.5: Kings Road Link Road – monetised benefits by time saving

	Net journey time changes		
	0 to two minutes	Two to five minutes	> five minutes
Business users	£1.886m	£6.369m	£3.039m
Commuting and other users	£5.798m	£8.842m	£2.772m
Total	£7.684m	£15.211m	£5.811m

- 4.1.13 There are £7.684m of time saving benefits in the zero to two minute range with £15.211m of time saving benefits in the two to five minute range which would indicate that the majority of the time saving benefits are local and short distance trips. This would lead to the conclusion that the traffic model is stable with a limited level of model ‘noise’ and that the benefits reflect the introduction of the Kings Road Link Road.

5 Summary

- 5.1.1 The information contained within this technical note has tried to address the concerns that WYG have raised regarding:
- The base transport model used for the assessment of the scheme (and it is noted that the model is calibrated and validated on link flows only) assigns 717 more trips than observed in the PM peak on the Mill Lane approach at the adjacent A339/Bear Lane junction
 - Specific sector to sector movements have been removed from the TUBA assessment. In turn this has led to large benefits and large disbenefits being omitted from the final benefit calculation, which highlights possible concerns regarding the reliability of the model
 - The annualisation factors used in the TUBA assessment have been derived using peak hour to peak period factor rather than the method set out within TUBA guidance
- 5.1.2 It has provided additional information on the 2013 PM peak base year model which shows that the additional modelled flow on Mill Lane is due to a localised re-routing of traffic to avoid the northbound approach to the B3421 Kings Road/B3421 Hambridge Road/Boundary Road priority junction due to the narrow road crossing the railway line to the south of the junction and the southbound approach to the St John's Road roundabout.
- 5.1.3 The SATURN assignments have been re-run using much stricter convergence criteria so that the traffic model results are as free from error and model 'noise' as possible and the TUBA assessment has used 253 peak hour annualisation factors as suggested by WYG.
- 5.1.4 The re-run TUBA economic assessment shows that the initial BCR of the scheme, based on standard monetised values, is **12.453**. This represents the benefits for the core elements of the scheme and is considered to be very high value for money.
- 5.1.5 The 5,661 TUBA warnings show that 193 have ratios which are above or below the limits allowed within TUBA. There are £7.684m of time saving benefits in the zero to two minute range with £15.211m of time saving benefits in the two to five minute range which would indicate that the majority of the time saving benefits are local and short distance trips. This would lead to the conclusion that the traffic model is stable with a limited level of model 'noise' and that the benefits reflect the introduction of the Kings Road Link Road.

Appendices

WSP UK Limited
Mountbatten House
Basing View
Basingstoke
RG21 4HJ
UK
Tel: +44 (0)12 5631 8750
Fax: +44 (0)12 5631 8700
www.wspgroup.co.uk

UNITED
BY OUR
DIFFERENCE

