

TW Local Plan Stage 3 Modal Shift Impact Reporting

22.09.2023

Final

Stage 3 – Outline of Mitigation Analysis Steps

1. Assess the change in car trips as result of sustainable transport measures:
 - Modal shift from car based on sustainable transport note provided by TWBC and subsequent spreadsheet analysis undertaken by Sweco to identify the associated reduction in vehicle trips to be adopted within the Stage 3 Part 1 model.
 - Appraise Stage 3 Part 1 model outputs to ascertain change in hotspots resulting from the reduction in car trips.
 - Identify areas where further mitigation will be required to be assessed in Stage 3 Part 2.
2. Additional scheme appraisal (following completion of Stage 3 Part 1)
 - Identify capacity enhancement schemes where residual congestion justifies need. This can include junction upgrades or new highway links – initially prioritise strategic road network junctions.
 - Feasibility and deliverability appraisals of highway mitigation, including junction modelling and preliminary design work as required for certain hotspots – work to take account of that undertaken for submitted Local Plan where appropriate.
 - Final strategic model run to confirm all mitigation schemes work collectively on strategic network.

KCC and NH sign off required prior to the commencement of the Stage 3 Part 2 mitigation analysis.

Hotspot Junctions – Summary (Recap)

Scenarios Reviewed

- **Local Plan Scenario 1 (adopted Local Plan scenario):**

- comprises the full quantum of development in the current proposed allocations spreadsheet provided – Includes all pre- and post-2034 housing allocations into a single “10 year post-adoption” model run.

The analysis of the LP modelling has identified junction capacity hotspots based on the following criteria:

- Initial sifting - any junction arm that has a volume over capacity (V/C) over 95% (approaching maximum capacity) is identified as a “hotspot”.
- Next stage sifting - Of these identified junction arms:
 - Those within a junction that at least 50 additional vehicles pass through in total, as a result of the Local Plan implementation, are categorised as being a **“Minor” LP Hotspot**.
 - Of the “minor” hotspots, any of the arms V/C in the LP scenario also 5% or greater than its Ref. Case equivalent are considered to be a **“Major” LP Hotspot**.
 - Those arms that see no significant change in V/C in the LP scenario compared to the Reference Case are marked as **“Same as Ref Case”**

Development of Modal Shift Scenarios

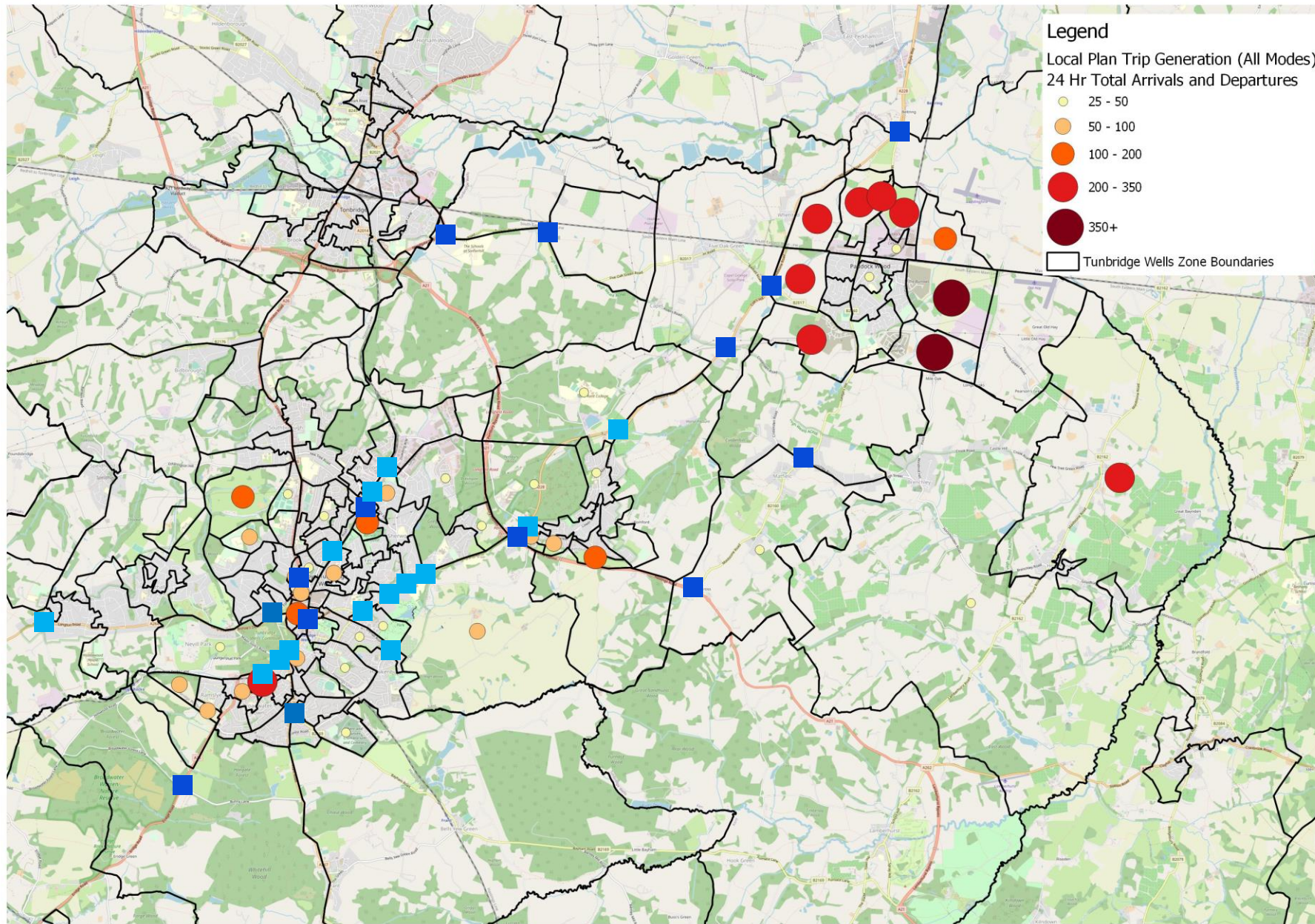
- Two demand scenarios have been developed and then tested for modelling in Stage 3 Part 1 (as outlined in the TN 'Stage 3 Part 1 TN Modal Shift Proposal Final 11.09.2023 Final' sent on 12th September 2023):
 - Low (L) – This scenario focusses on the minimum modal shift expected from the proposed sustainable transport interventions, with the main impact expected from the investment around Paddock Wood, with additional low level modal shift around Royal Tunbridge Wells and Pembury driven by changes in both bus and cycling infrastructure.
 - High (H) – This scenario assumes high levels of modal shift as a result of the sustainable transport measures being delivered as part of the plan. This particularly impacts Paddock Wood due the extent of measures proposed. There is also an expectation of agglomeration of bus, walking, and cycling schemes leading to increased benefits around Royal Tunbridge Wells and Pembury.
- Overall reduction of car trips, when comparing with Local Plan Scenario 1, in the High scenario in excess of 800 total trips in both the AM and PM peaks. The equivalent reductions in the Low scenario is in the order of 400 total trips.
- The overall impact of applying the modal shift on the total car trip generation for the area sees a reduction for Paddock Wood of 9% in the High scenario. The Low scenario results in a 4% level of reduction.

Hotspot Junctions - Summary

The data shows the AM Peak has more hotspots than the PM Peak.

- The main summary is:
 - reduction in total number of “hotspots” within the sustainable transport mitigation model runs
 - In comparison with no mitigation scenario:
 - Fall in the number of hotspots in the Local Plan Low Modal Shift Scenario sees a fall of 7 hotspots in the AM Peak and 6 hotspots in the PM Peak.
 - Fall in the number of hotspots in the Local Plan High Modal Shift Scenario sees a fall of 5 hotspots in the AM Peak and 12 hotspots in the PM Peak.
 - The difference between the High and Low Modal Shift scenarios is most evident in the overall reduction of “Minor LP hotspots” and “versus Ref Case” categories.

Local Plan Model Runs Local Plan Demand + RC Demand RC network (no mitigations for LP Development)	AM Peak				
	Ref Case	Local Plan			
	All	Total	Same as Ref Case	"Minor" LP Hotspot	"Major" LP Hotspot
Local Plan without mitigation	59	71	38	20	13
Local Plan mitigation (Low)	59	72	46	17	9
Local Plan mitigation (High)	59	69	41	19	9
	PM Peak				
	Ref Case	Local Plan			
	All	Total	Same as Ref Case	"Minor" LP Hotspot	"Major" LP Hotspot
Local Plan without mitigation	43	55	29	17	9
Local Plan mitigation (Low)	43	51	31	13	7
Local Plan mitigation (High)	43	46	32	8	6



Local Plan All Day

Local Plan Scenario 1

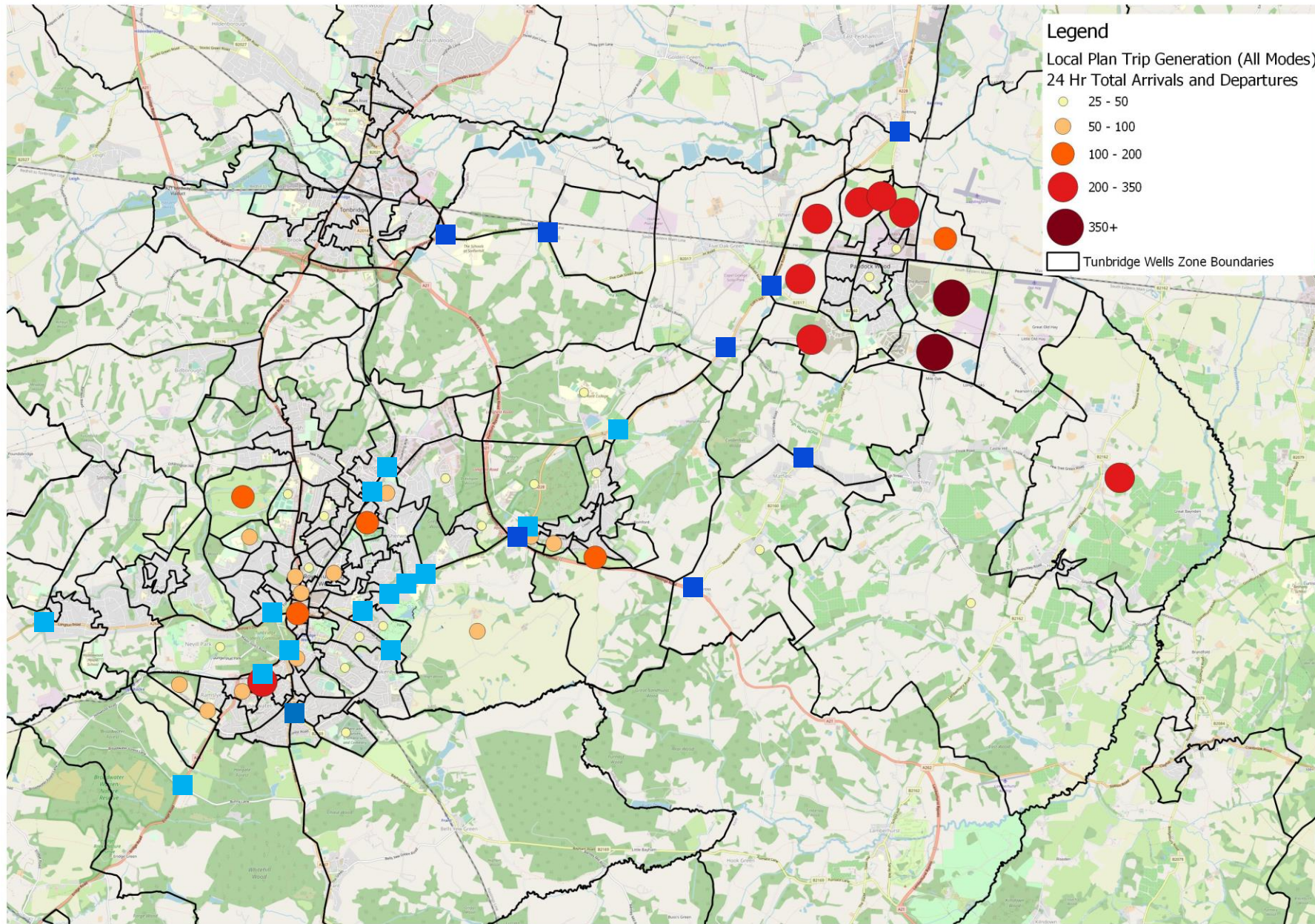
Junction key

“Major” Hotspots
 Increase in flow at junction (>50 vehicles) and at least one Junction arm V/C has increased by >5%



“Minor Hotspots
 Increase in flow at junction (>50 vehicles) only





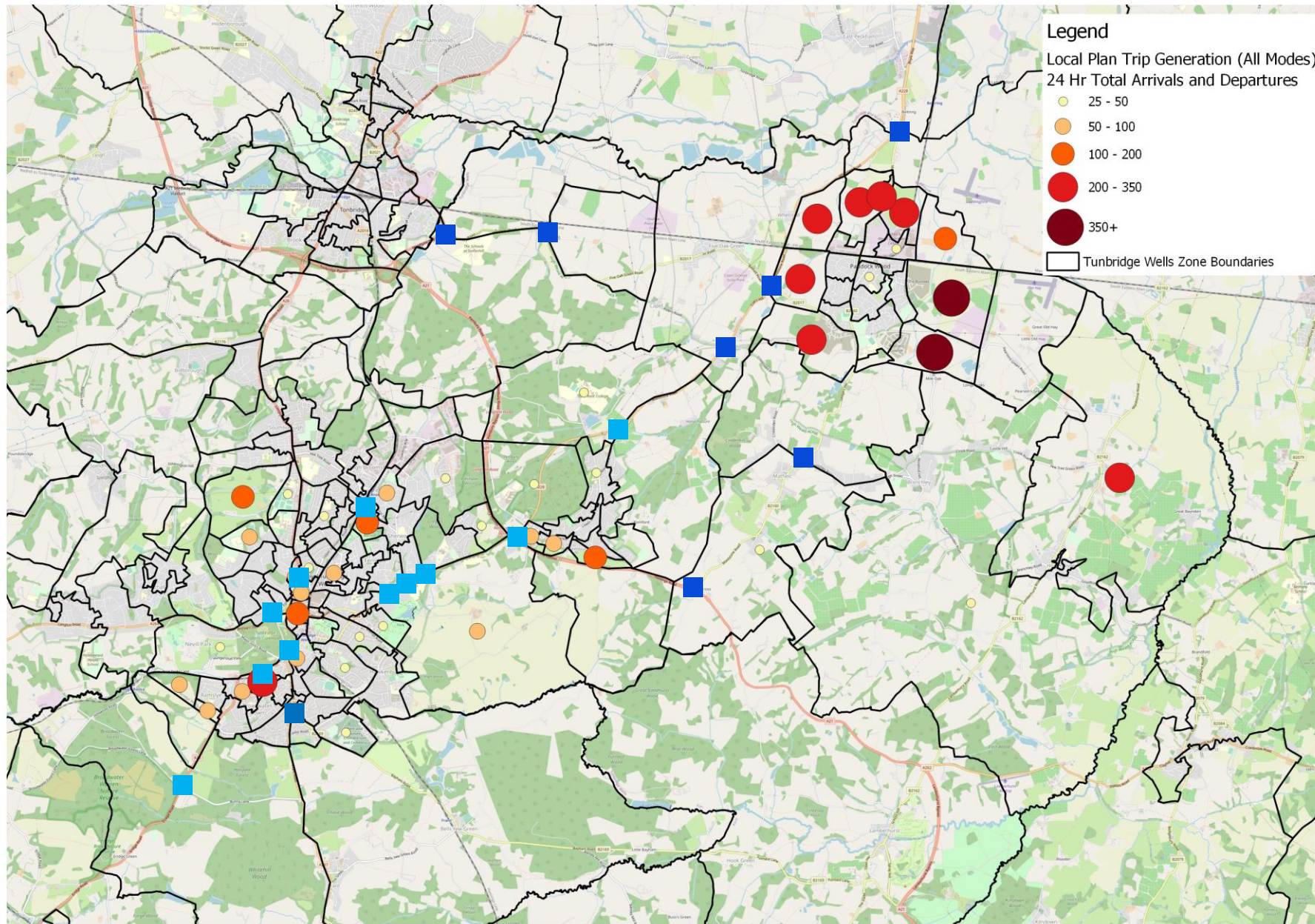
Local Plan All Day

Local Plan Scenario Low Mitigation

Junction key

“Major” Hotspots
Increase in flow
at junction (>50
vehicles) and at
least one
Junction arm V/C
has increased by
>5%

“Minor Hotspots
Increase in flow
at junction (>50
vehicles) only



Local Plan All Day

Local Plan Scenario High Mitigation

Junction key

“Major” Hotspots
Increase in flow
at junction (>50
vehicles) and at
least one
Junction arm V/C
has increased by
>5%

“Minor Hotspots
Increase in flow
at junction (>50
vehicles) only

Major “Hotspots” in more detail – changes between scenarios

IDJunction	Junction Location	LP no mitigation	LP Low MS	LP High MS
8	A26 / B2017	✓	✓	✓
12	A228 / B2160	✓	✓	✓
13	A228 / B2017	✓	✓	✓
14	A228 / Crittenden / Alders	✓	✓	✓
22	A228 / A264 / A21	✓	✓	
28	A264 / Mount Pleasant Road	✓		
33	High Brooms roundabout	✓		
35	Kippings Cross	✓	✓	✓
39	A26 / Bunny Lane / Broadwater Forest Lane	✓		
45	A26 / Grosvenor Road	✓		
70	A264 / Mount Ephraim	✓		
72	A267 / Bayham Road	✓	✓	✓
88	B2017 / Hartlake Road	✓	✓	✓
107	Matfield Crossroads B2160	✓	✓	✓

- The Modal Shift (MS) scenarios see five junctions fall off the “Major” Hotspot list. As can be seen on the maps these junctions are located in the Royal Tunbridge Wells area
- The High MS scenario sees the A228/A264 (Tesco Roundabout) also fall off the Major “Hotspot” list
- The residual Major “Hotspot” locations are driven by the key roads leading to and from Paddock Wood
 - A228
 - B2017
 - B2160
 - A21
- Though previous mitigations exist for junctions 8, 12, 13, 35 and 88, there is a need to review their suitability within the upcoming mitigation specification work

Major “Hotspots” in more detail – Key Data

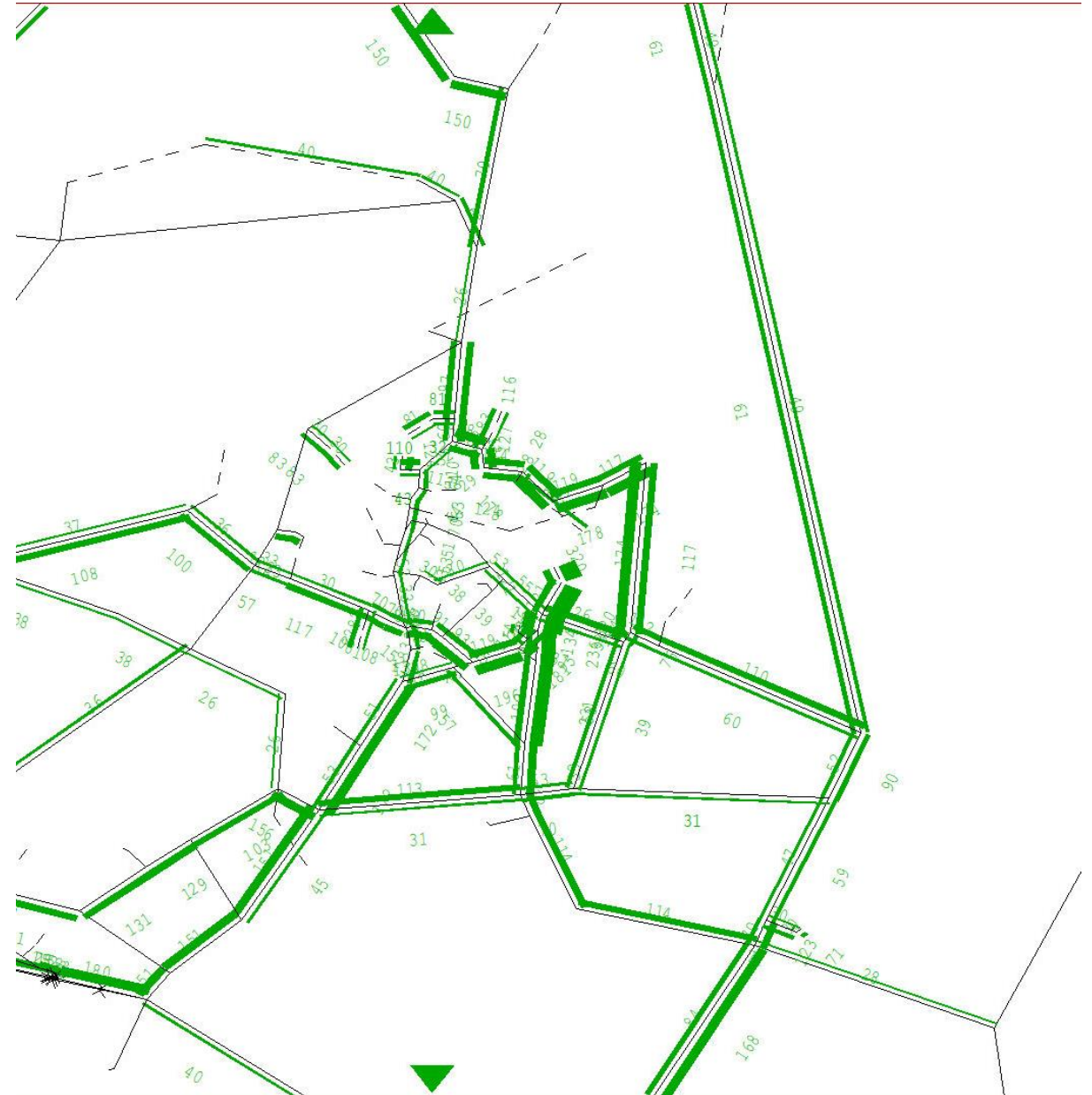
		AM Peak								PM Peak							
		V/C Max	Cumulative junction flow (pcu)	Change in flow with RC	Average Junction V/C	Cumulative Avg Q (pcu)	Cumulative Delays (sec)	Change in Avg Q with RC	Change in Delay with RC	V/C Max	Cumulative junction flow (pcu)	Change in flow with RC	Average Junction V/C	Cumulative Avg Q (pcu)	Cumulative Delays (sec)	Change in Avg Q with RC	Change in Delay with RC
Jct8 A228 / B2017	RC (BAA)	99	3,586		94	11	218			96	3,067		83	4	154		
	LP (BAC)	101	3,706	120	98	28	277	17	58	97	3,195	128	85	6	171	2	17
	LP Low MS (BAE)	101	3,698	111	97	26	270	14	52	97	3,171	104	84	5	165	1	11
	LP High MS (BAD)	101	3,690	104	97	25	266	13	48	96	3,161	95	84	5	160	1	6
Jct12 A228 / B2160	RC (BAA)	105	3,699		98	28	277			107	3,286		84	47	291		
	LP (BAC)	108	3,733	34	100	46	335	18	58	104	3,474	188	89	34	253	-13	-38
	LP Low MS (BAE)	107	3,742	43	100	46	331	18	54	104	3,474	188	89	36	258	-12	-33
	LP High MS (BAD)	107	3,751	52	100	44	326	16	49	105	3,471	185	89	36	260	-11	-31
Jct13 A228 / B2017	RC (BAA)	111	3,088		99	102	494			102	3,011		93	21	184		
	LP (BAC)	117	3,209	121	104	149	734	47	240	111	3,255	244	102	92	506	71	322
	LP Low MS (BAE)	117	3,199	111	104	148	724	46	230	110	3,237	226	101	86	478	65	294
	LP High MS (BAD)	116	3,195	107	104	148	721	46	227	110	3,228	218	101	84	467	63	283
Jct14 A228 / Crittenden Road / Alders Road	RC (BAA)	95	2,062		73	5	217			100	2,078		73	5	230		
	LP (BAC)	103	2,038	- 24	71	8	275	4	58	108	2,143	65	75	10	385	5	156
	LP Low MS (BAE)	102	2,033	- 29	71	8	264	3	47	108	2,140	63	75	10	384	5	154
	LP High MS (BAD)	102	2,020	- 42	71	8	250	3	34	108	2,135	57	75	9	369	4	139
Jct22 A21 / A228 / A264 / Tesco	RC (BAA)	101	2,351		76	10	115			103	2,908		94	15	168		
	LP (BAC)	101	2,454	103	79	11	125	1	9	103	3,063	155	99	17	194	1	26
	LP Low MS (BAE)	100	2,451	100	79	9	113	-1	-2	103	3,044	136	98	17	193	2	24
	LP High MS (BAD)	99	2,446	95	78	8	103	-2	-12	102	3,008	100	96	14	170	-1	1
Jct35 A21 / B2160 (Kippings Cross)	RC (BAA)	114	3,342		90	109	524			92	3,327		81	2	118		
	LP (BAC)	120	3,607	264	96	159	731	50	206	100	3,661	334	90	13	155	11	37
	LP Low MS (BAE)	119	3,594	251	95	152	702	43	178	100	3,664	337	90	10	151	8	33
	LP High MS (BAD)	118	3,580	238	94	146	675	38	150	100	3,634	308	89	7	144	5	26
Jct88 B2017 / Hartlake Road	RC (BAA)	111	1,804		67	23	283			72	1,454		58	0	33		
	LP (BAC)	119	1,975	171	72	30	457	7	174	78	1,619	165	63	1	42	0	9
	LP Low MS (BAE)	119	1,962	158	72	31	455	8	172	77	1,593	139	62	0	40	0	7
	LP High MS (BAD)	119	1,966	162	72	31	452	8	169	77	1,594	140	62	0	40	0	8
Jct107 B2160 / Chestnut Lane / Brenchley Road	RC (BAA)	70	1,508		44	1	54			42	1,155		32	0	50		
	LP (BAC)	101	1,961	453	65	9	151	8	97	86	1,733	578	56	2	87	2	37
	LP Low MS (BAE)	100	1,924	416	63	8	139	7	85	84	1,708	553	55	2	84	2	35
	LP High MS (BAD)	100	1,876	369	61	8	128	7	74	84	1,687	531	54	2	83	2	33

Critical Major “Hotspots”

- The data from the previous slides show that the critical junctions to fix are:
 - Jct8 A26 / B2017
 - Jct12 A228 / B2160
 - Jct13 A228 / B2017
 - Jct35 A21 / B2160 (Kippings Cross)
- These junctions already have significant flows of traffic on them and are acting as the main gateways to Paddock Wood from the north, south, east and west
- The level of mitigation required to fix these junctions are of a scale larger than what marginal adjustments of Modal Share targets can achieve.
- Incremental Local Plan specific solutions may be possible. However, they will be reliant on availability of land for highway changes and the level of additional capacity such increment changes to the junction can unlock.
- Given their high levels of saturation there may be a need for major sustainable transport or junction changes to take some of these junctions to a level where they can satisfactorily cover Local Plan issues. If such solutions are required, they are likely to need the support of KCC and/or NH to develop significant schemes for change
- Junction 13 ties into the northern end of the Colts Hill Bypass. Though the models are not showing specific Local Plan link capacity issues on the A228, there is a need to consider the emerging strategic case for the Colts Hill Bypass and associated safety improvements from the perspective of pushing more traffic from the B2160 onto the A228 and providing a safe reliable link for any proposed bus, walking, and cycling enhancements between Paddock Wood, Pembury, and Royal Tunbridge Wells.

Wider Flow Issues

- Looking at where there are increases in flows on highway links around Paddock Wood when comparing the Local Plan High Modal Shift scenario with the Reference Case scenario, notable increases are forecast at the following locations:
 - Foxhole Lane (Pembury)
 - Benchley Road
 - Railway crossings east of Paddock Wood
 - B2017 Five Oak Green
 - Links at Horsmonden
- Suggests the need for wider traffic management measures to ensure any additional traffic generated is primarily directed on to the strategic road network.



Next Steps

- Undertake an incremental mitigation approach:
 - Move away from testing further incremental modal shift scenarios.
 - Focus on developing and testing location specific mitigations for the following key junctions:
 - A228 / B2160
 - A26 / B2017
 - A228 / B2017
 - A21 / B2160
 - A model run should then be undertaken to understand the impact of unlocking these junctions on the remaining hotspots identified and if it opens up any further hotspots that would need to be considered.
 - Undertake further mitigation work for any remaining “hotspots” before undertaking a final model run to show the full mitigation package works.

Mitigation schemes from previous 2021 analysis that potentially remain applicable

ID	Scheme	Main modes	Reason
1	Colts Hill Bypass	New link - Primarily highway but benefits for walk/cycle/bus	Takes traffic from built up areas / collision hotspots whilst increasing accessible priority network for sustainable transport
2	Five Oak Green Bypass	New link - Primarily highway but benefits for walk/cycle/bus	Takes traffic from built up areas / collision hotspots whilst increasing accessible priority network for sustainable transport
3	A228 Maidstone Road / B2017 Badsell Road (Colts Hill) roundabout	Junction upgrade - Highway but also may require bus priority as well	Junction is identified from modelling as a "major" congestion hotspot
4	A26 Woodgate Way/B2017 Tudeley Rd roundabout	Junction upgrade - Highway but also may require bus priority as well	Junction is identified from modelling as a "major" congestion hotspot
5	A228 / B2160 Hop Farm roundabout	Junction upgrade - Highway	Junction is identified from modelling as a "major" congestion hotspot
6	A228 Pembury Northern Bypass / High Street / Tonbridge Road (Woodsgate Corner signals)	Junction upgrade - All modes	Key location for improving connectivity for non-car modes whilst also a need to relieve at as a "major" hotspot
7	T junction – A264 Pembury Road / Sandhurst Road	Junction upgrade - Primarily highway but benefits for walk/cycle/bus	Corridor is a "major" congestion hotspot and traffic needs to be managed to allow for priority for sustainable modes
8	T junction – A264 Pembury Road / Sandrock Road	Junction upgrade - Primarily highway but benefits for walk/cycle/bus	Corridor is a "major" congestion hotspot and traffic needs to be managed to allow for priority for sustainable modes
9	A21 Kippings Cross roundabout	Junction upgrade - Highway	Junction is identified from modelling as a "major" congestion hotspot
10	Bus services Paddock Wood - Pembury - Royal Tunbridge Wells	New bus service and bus corridor priority measures	Generate modal shift from car on high demand link. Needs associated bus priority mitigations
11	Bus services Paddock Wood - Tonbridge	New bus service and bus corridor priority measures	Generate modal shift from car on high demand link. Needs associated bus priority mitigations
12	Cycling corridor Paddock Wood - Pembury - Royal Tunbridge Wells	New Cycling Route	Generate modal shift from car on high demand link. Needs associated cycle priority mitigations