



TECHNICAL NOTE 1

DATE:	August 2023	CONFIDENTIALITY:	Internal
SUBJECT:	SWMWTM Base Year Model Updates		
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INTRODUCTION

Background

Hywel Dda University Health Board (HDdUHB) are proposing to construct a new Urgent and Planned Care Hospital as part of their estate strategy designed to support a future model of care based around a network of integrated health & wellbeing centres and community hospitals.

The new Urgent and Planned Care Hospital in the South of the region would be the main site for the network of hospitals providing urgent and planned care services across the Health Board catchment area, offer a more centralised model for all acute services and will also include specialist mental health facilities.

To facilitate the construction of the Urgent and Planned Care Hospital, HDdUHB are carrying out due diligence on a shortlist of sites across South-West Wales to allow the selection of the most appropriate site.

It is proposed to use the South-West and Mid-Wales Transport Model (SWMWTM) to assess the impacts of the planned Urgent and Planned Care Hospital on traffic and travel patterns. The SWMWTM is a regional, multi-modal transport model, and comprises: a highway assignment component representing travel by car (business, commute and other purposes), and road freight (light goods vehicles (LGVs) and heavy goods vehicles (HGVs)); a public transport assignment component including bus, rail and national coach services; and a variable demand model (VDM). It has a base year of 2019 and represents a neutral month of October.

This Technical Note documents an update of the South-West and Mid-Wales Transport Model (SWMWTM) focusing on the area around, and within the towns Whitland and St Clears associated with the delivery of three proposed sites, as shown in Figure 1. Both towns are located in the county of Carmarthenshire and are connected by the A40, which connects them to Carmarthen to the east, and Haverfordwest to the west. The update builds on the recommendations of SWMWTM Base Year Model review technical note¹.

¹ \\uk.wspgroup.com\central data\Projects\700553xx\70055354 - South West Wales Strategic Transport Model\03 WIP\13- Hywel Dda\Start File\SWMWTM Review TN v1.0.docx

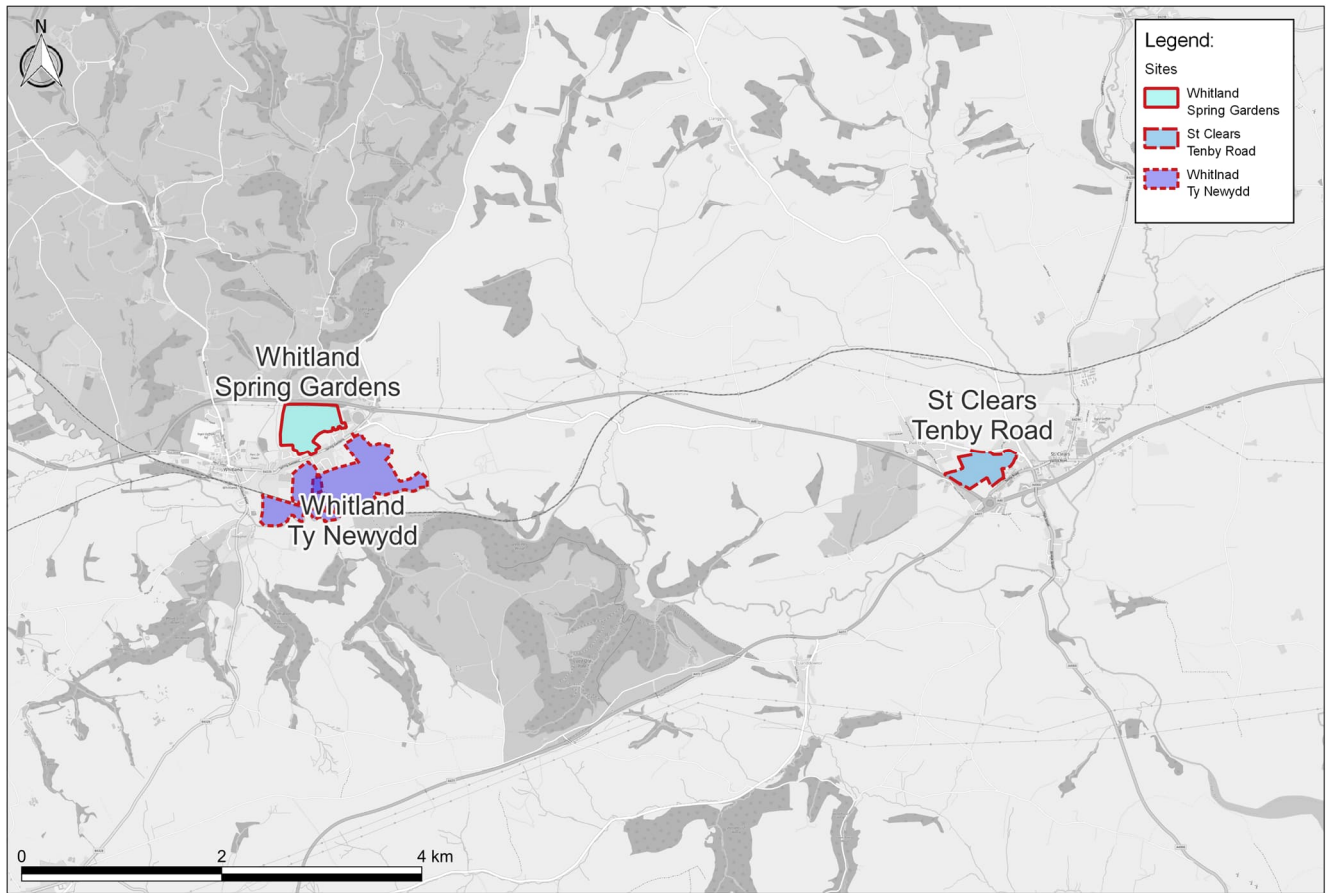


Figure 1 - Proposed site locations

ZONING UPDATES

Introduction

The current zones within Whitland and St. Clears area were reviewed in light of the expected development layout. The zones should usually be of suitable size to reflect the average times and costs for people to access different modes of public transport. This section summarises a review of the zone system (zone boundary and connector structure) and walk links to identify any local areas of deficiency as per the guidance set out by DfT.

Existing Model Zones

The SWMWTM contains 1,756 zones. The zones are consistent across the HAM, PTAM, and VDM and either represent geographical areas, or represent specific special generators or rail and large bus stations. Zones are connected to the assignment network via centroid connectors, which connect to the population-weighted centroid for the zone.

Whitland

Whitland, and the immediate surrounding area, is comprised of six zones, as shown in Figure 2. Zone 10316 (not marked) represents Whitland rail station, whilst the remaining five zones represent distinct geographic areas within the model.

Each zone is connected to the highway network with a single zone connector. These connectors allow highway traffic to and from a zone to access the network at the most appropriate point based on the land use within the zone. Each zone is also directly connected to Whitland rail station via a single walk connector, which represents passenger access to, and egress from, trains. Similarly, the three geographic zones within the main urban area of Whitland are connected to the nearest bus stop(s) via walk connectors. Zones 10095 and 10292 are not connected to any bus stops as there are none located within a 400m catchment area of the centroids.

Both proposed sites Whitland Spring Gardens (formally Site 12) and Whitland Ty Newydd (formally Site C) fall within the geographical boundary of zone 10232.

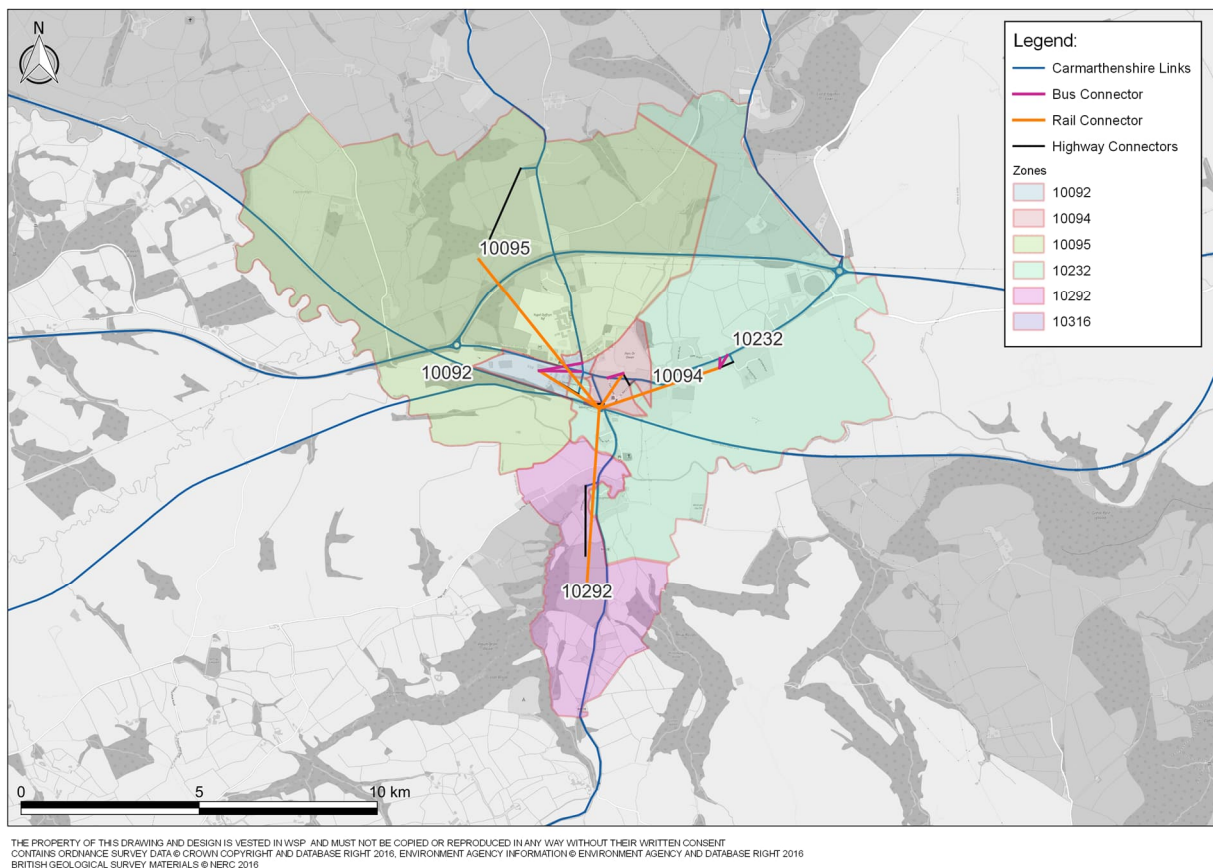


Figure 2: Zones around Whitland

St Clears

The area of St Clears is comprised of three zones, as shown in Figure 3. All three zones represent distinct geographic areas within the model. Each zone is connected to the highway network with a single zone connector. These connectors allow highway traffic to and from the zone to access the network at the most appropriate point based on the land use within the zone. Each zone is also connected to bus stop(s) within a 400m radius of the zone centroid via walk connectors.

The proposed site St Clears Tenby Road (formally Site 17) falls within the geographical boundary of two zones in the SWMWTM, which are 10236 and 10238.

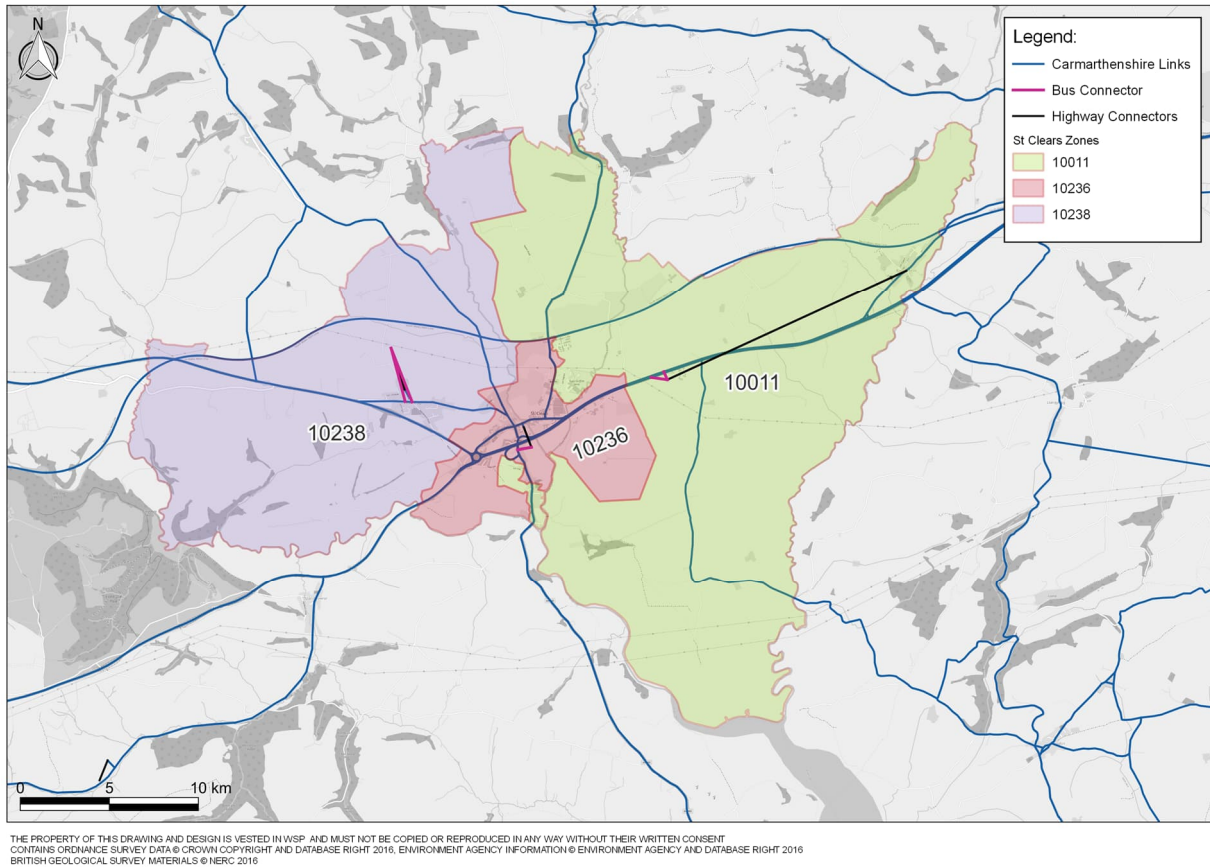
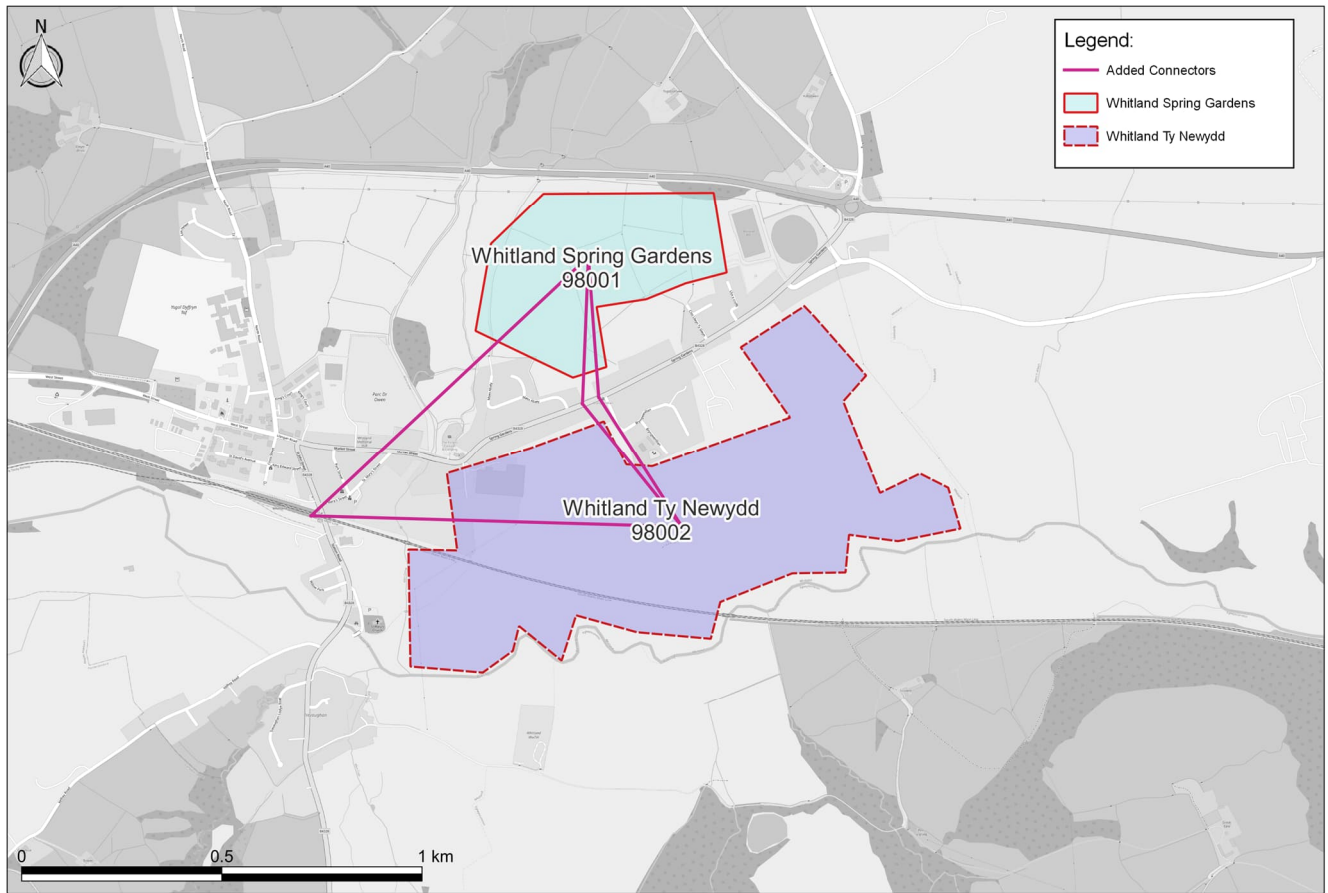


Figure 3: Zones around St Clears

It is pertinent to mention that none of the existing zones in either Whitland or St Clears have been modified or altered to incorporate the possible development site zones in the respective areas. The new zones that comply fairly with the development layouts have been nested within the existing zones of SWMTWM.

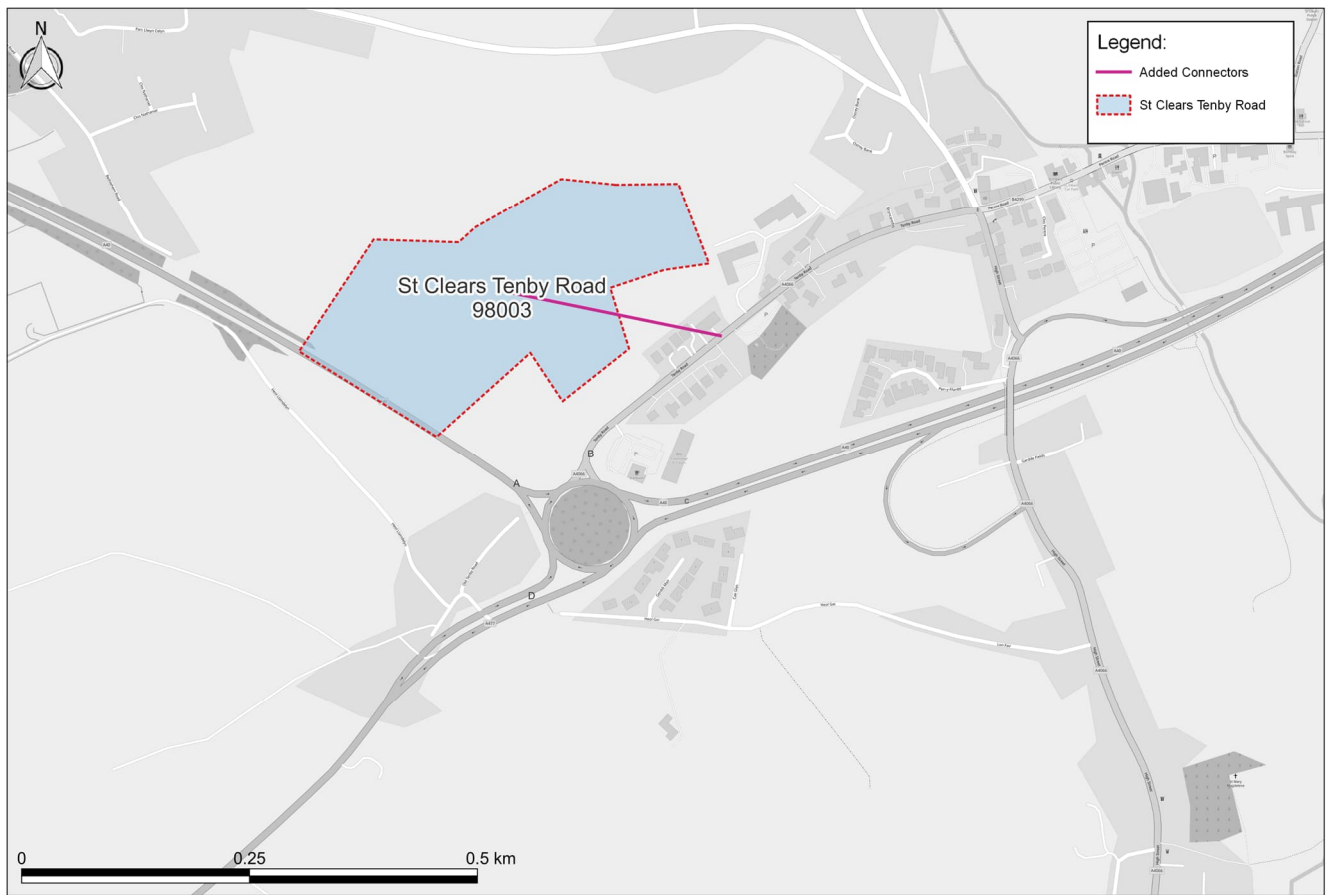
New Development Zones

There are three locations being considered for the new hospital: two in Whitland and one in St Clears. The sites are known as Whitland Spring Gardens (formally Site 12), Whitland Ty Newydd (formally Site C), and St Clears Tenby Road (formally Site 17). The three development zones are necessary to accurately reflect the access points for the proposed hospitals and understand the impact of the trips on the network. The sites in Whitland and St Clears are detailed in Figure 4 and Figure 5 respectively.



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Figure 4: Development Zones and Connectors Added in Whitland



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Figure 5: Development Zones and Connectors added in St Clears

These development zones were added to the base year networks to generate base year generalized costs of travel, which will be used to generate the forecast year matrices. The base year trip ends for these development zones have been set to zero since there will be no existing demand during the base year.

HIGHWAY ASSIGNMENT MODEL UPDATES

Network Updates

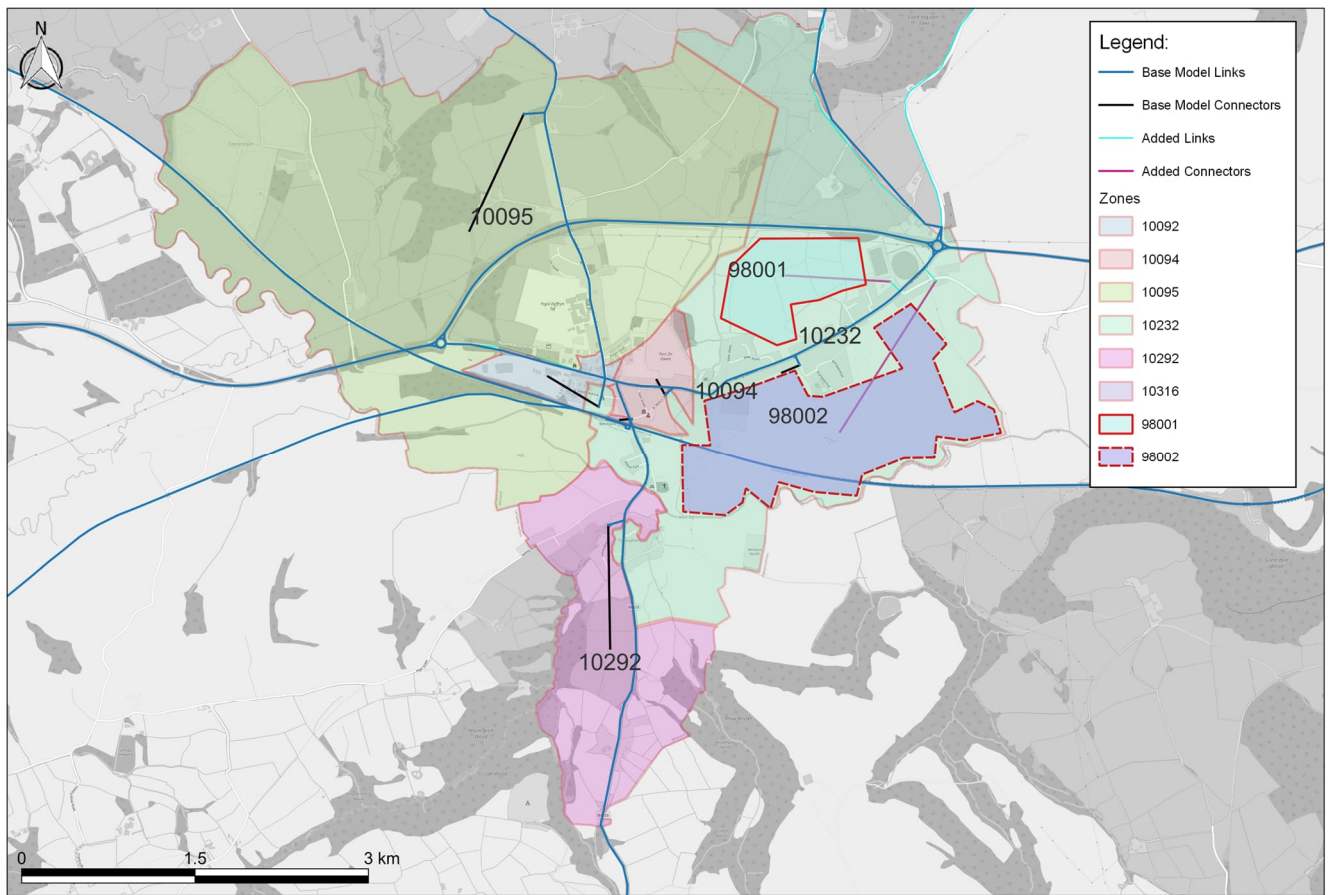
The changes and edits made to existing links within the base highway network are documented in full in Appendix 1. A link was added to connect Whitland and Llanboidy along the sign posted route, this was done as traffic is more likely to travel between the two settlements using the added links. Doing this meant adding in new links and nodes for the road that was being added and splitting the link which the added link will connect to creating a new node. These changes are shown below in Figure 6.



Figure 6: The link and junction added to the network to improve the connection between Llanboidy and Whitland

Zone Connectors

Zones have been added to the highway network as set out in the zoning updates chapter. The added zones then needed to be connected to the network access points were chosen based on the current mapping before the update. Figure 7 and Figure 8 below shows the zones and connectors in Whitland and St Clears from the highway model.



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Figure 7: Added connectors and links in Whitland

The connectors that were added to the network for the new zones do not exist in the existing highway network but have been added to generate the base generalised costs of each zone within the VDM despite there being no demand for the added zones. These costs will then be used in the foundation case to arrive at the forecast demand.

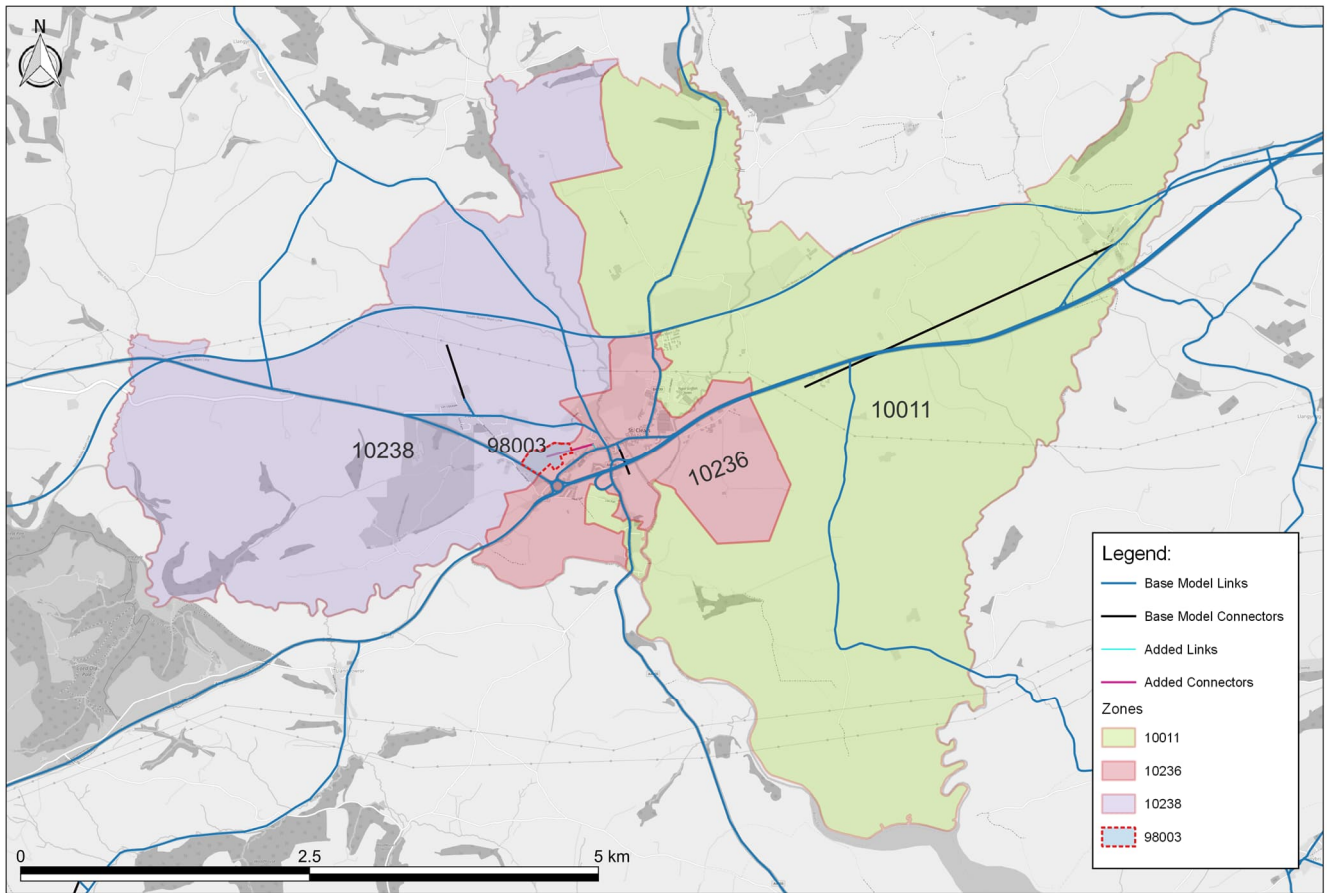
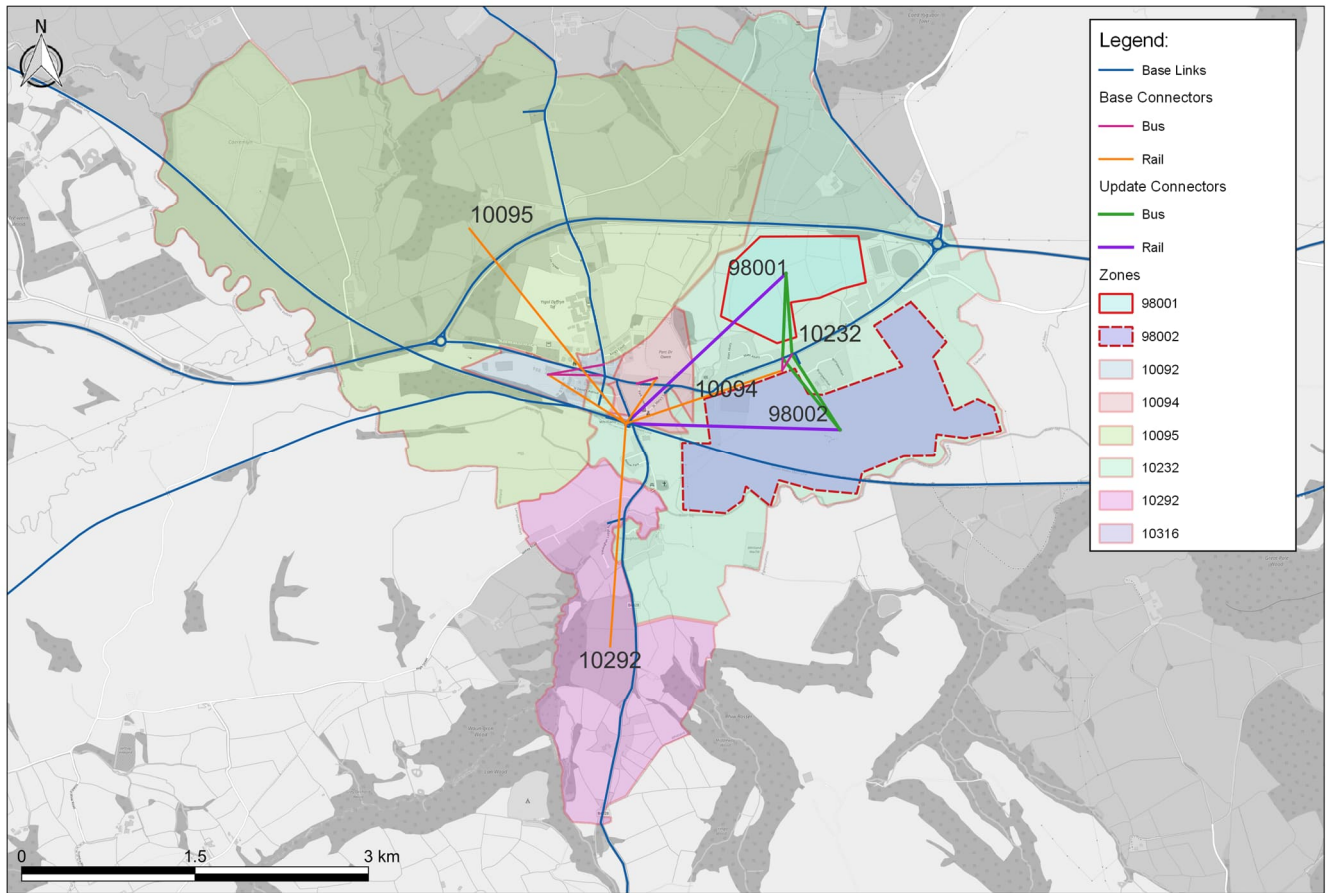


Figure 8: Added connectors and links in St Clears

PUBLIC TRANSPORT ASSIGNMENT MODEL UPDATES

Zone Connector Updates

The added zones detailed in the Zoning Updates chapter also needed to be connected to the public transport network. Connectors to base model zones to bus stops are added if the length is less than 1.2 kilometres, bus connectors are made to the nearest stops one for each side of the road. The zones in Whitland are connected to the railway station which is done as a single connector. All connectors are set as Walk connectors. The added zones are shown in Figure 9 and Figure 10.



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Figure 9: Public Transport Model Whitland added connectors and zones

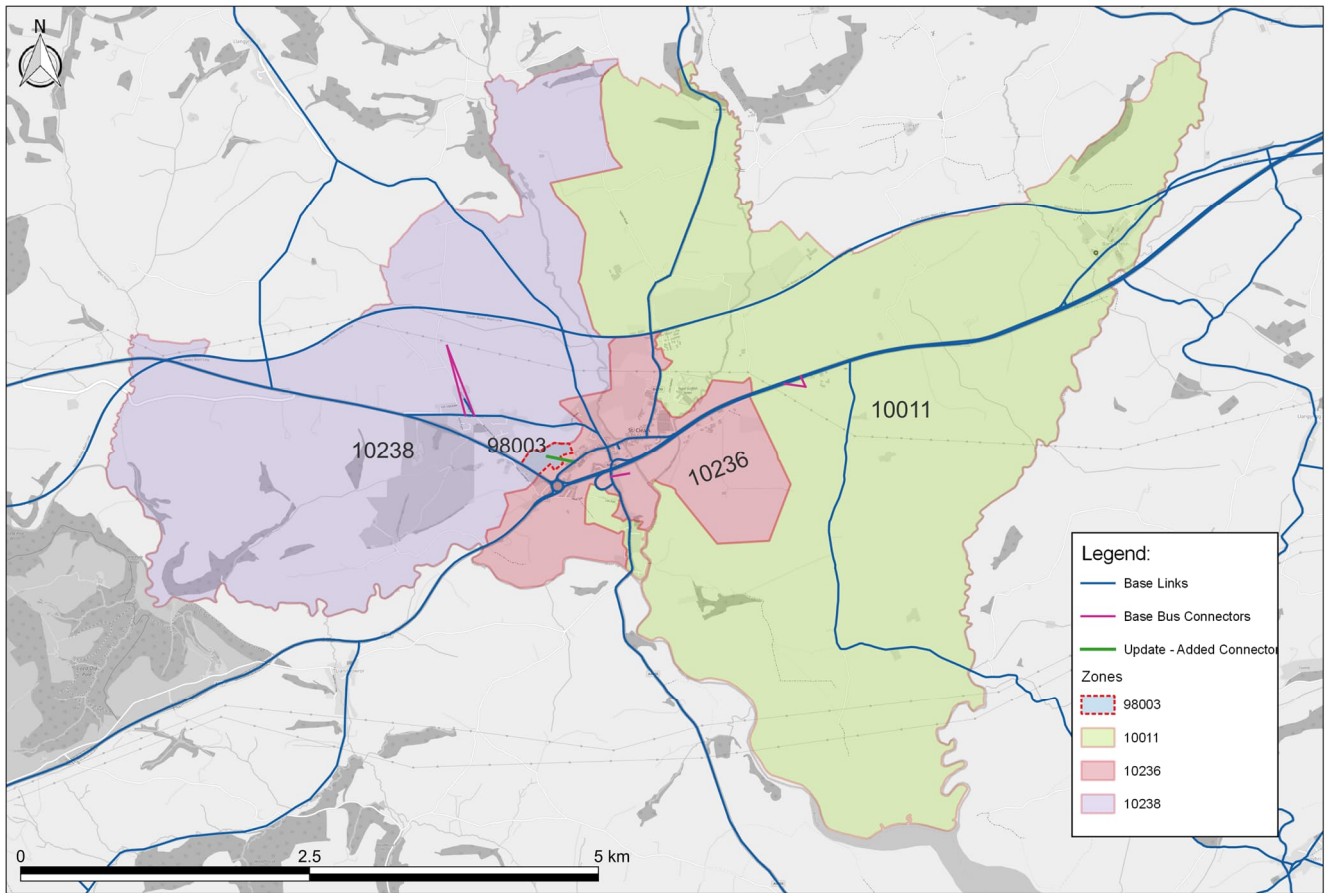


Figure 10: Public Transport added Model St Clears connectors and zones.

BASE YEAR CALIBRATION AND VALIDATION

Calibration and Validation Data

The base year model calibration (before updates) met TAG acceptability guidance, of 85% of links meeting either the GEH or flow criteria, in all time periods. In each of the three peaks around 90% of the links passed TAG criteria. In the area around Whitland and St Clears there are three calibration locations and five validation locations shown below in Figure 11. No new data has been used in the calibration and validation of the Base or Update models.

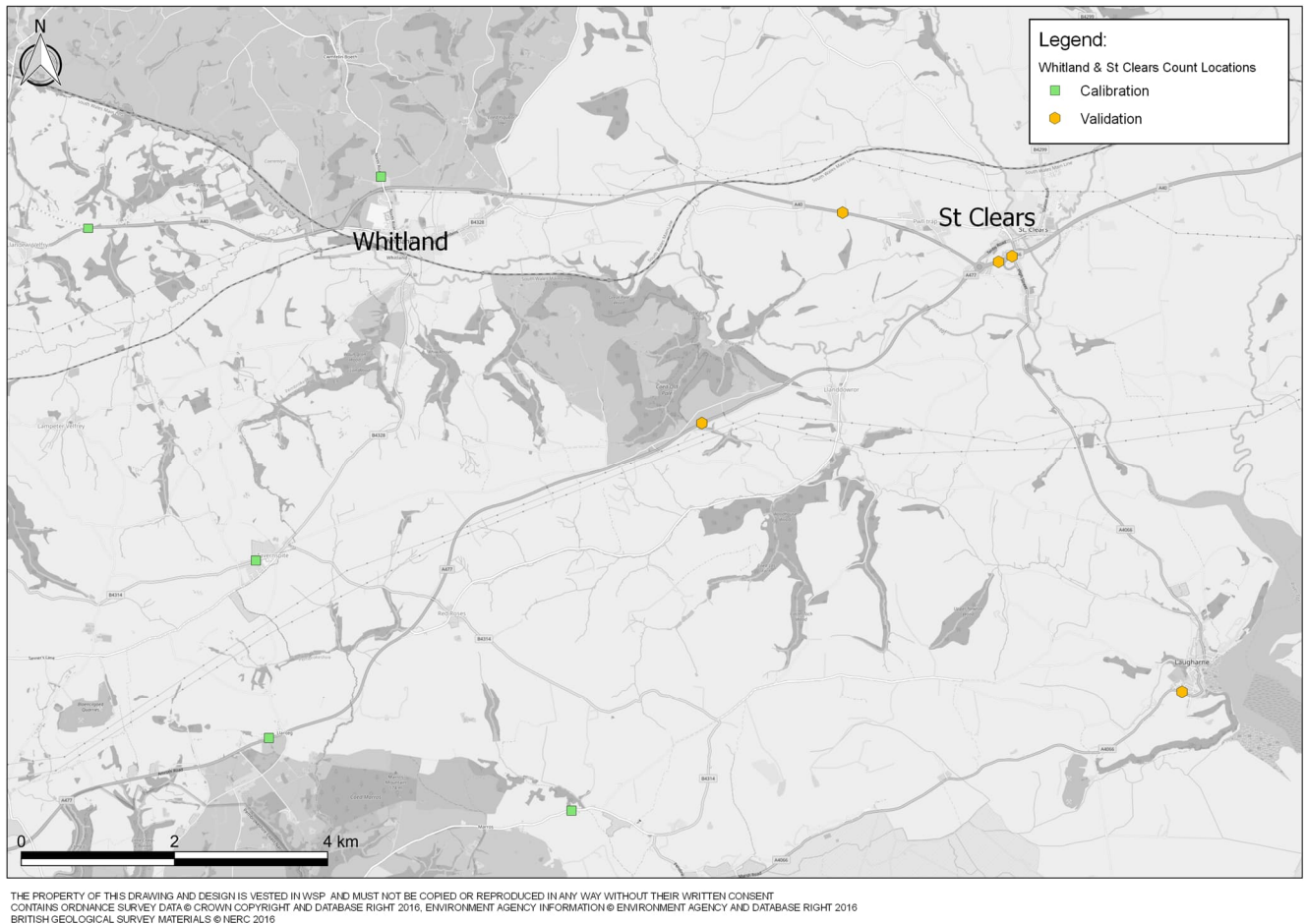


Figure 11: Calibration and validation sites around Whitland and St Clears

Highway Assignment Model Calibration

Matrix estimation has not been repeated following updates to the highway network and the base year highway assignment matrices have been retained.

Table 1 to Table 3 show the performance of calibration links in the area of focus that is around Whitland and St Clears. It shows that in both the Base and the Updated models that all of the calibration links meet the acceptability criteria, since absolute flow differences are less than 100 and GEH values are less than 5.0. The model's performance in the interpeak and the PM peaks is unaffected by the changes since the modelled flows are unchanged but, in the AM, peak the performance has had a small impact on the flows.

Table 1: Whitland and St Clears Calibration Link Flows from the Base and Updated Models, AM peak

Road Name	Count Location No	Count ID	Observed Flow	Base Flow	Updated Flow	Base Flow Diff	Update Flow Diff	Base GEH	Update GEH
AM									
North Road	744	ATC Site 164	54	54	60	0	7	0	1
	749	ATC Site 164	19	19	24	0	5	0	1
B4328	742	ATC Site 949	83	83	87	0	4	0	0
	747	ATC Site 949	72	72	78	0	6	0	1
A40 West of Whitland	743	ATC Whitland Site 1292	552	552	519	0	-33	0	1
	748	ATC Whitland Site 1292	582	582	550	0	-32	0	1

Table 2: Whitland and St Clears Calibration Link Flows from the Base and Updated Models, Interpeak

Road Name	Count Location No	Count ID	Observed Flow	Base Flow	Updated Flow	Base Flow Diff	Update Flow Diff	Base GEH	Update GEH
IP									
North Road	744	ATC Site 164	26	31	31	4	4	1	1
	749	ATC Site 164	26	25	25	-1	-1	0	0
B4328	742	ATC Site 949	35	41	41	5	5	1	1
	747	ATC Site 949	33	40	40	7	7	1	1
A40 West of Whitland	743	ATC Whitland Site 1292	413	427	427	14	14	1	1
	748	ATC Whitland Site 1292	369	374	374	5	5	1	1

Table 3: Whitland and St Clears Calibration Link Flows from the Base and Updated Models, PM peak

Road Name	Count Location No	Count ID	Observed Flow	Base Flow	Updated Flow	Base Flow Diff	Update Flow Diff	Base GEH	Update GEH
PM									
North Road	744	ATC Site 164	28	33	33	4	4	1	1
	749	ATC Site 164	40	44	44	4	4	1	1
B4328	742	ATC Site 949	46	53	53	7	7	1	1
	747	ATC Site 949	41	48	48	6	6	1	1
A40 West of Whitland	743	ATC Whitland Site 1292	476	471	471	-6	-6	0	0
	748	ATC Whitland Site 1292	489	469	469	-21	-21	1	1

Overall, the updates have had minimal effect on the calibration measures of the model, the overall model performance is mostly unchanged. For links in the area of focus around Whitland and St Clears all calibration links meet TAG guidance, with the AM peak seeing only a slight decrease in performance.

Highway Assignment Model Validation

To independently validate the post matrix estimation assignment validation counts have been used which were not used for any matrix building or adjustments. The model contains ten validation counts in the Whitland and St Clears area. The validation results in the AoF are given in Table 4 to Table 6.

Table 4: Whitland and St Clears validation links Base and Updated Model Comparison, AM peak

Road Name	Count Location No	Count ID	Observed Flow	Base Flow	Updated Flow	Base Flow Difference	Update Flow Difference	Base GEH	Update GEH
AM									
A40 West of St Clears	979	ATC Site 260_1	555	555	574	0	19	0	1
	980	ATC Site 260_2	577	577	520	0	-58	0	2
A40 St Clears	1025	ATC Site 341_1	841	841	996	0%	18%	0	5
	1026	ATC Site 341_2	704	704	803	0%	14%	0	4
A4066	1087	ATC Site 636_1	114	114	124	0	9	0	1
	1088	ATC Site 636_2	94	94	83	0	-11	0	1
B4299	1095	ATC Site 644_1	35	35	46	0	11	0	2
	1096	ATC Site 644_2	78	78	53	0	-25	0	3
A477	894	ATC Whitland Site 1284_1	479	479	416	0	-62	0	3
	895	ATC Whitland Site 1284_2	299	299	328	0	28	0	2

Table 5: Whitland and St Clears validation links Base and Updated Model Comparison, Interpeak

Road Name	Count Location No	Count ID	Observed Flow	Base Flow	Updated Flow	Base Flow Difference	Update Flow Difference	Base GEH	Update GEH
AM									
A40 West of St Clears	979	ATC Site 260_1	437	456	456	19	19	1	1
	980	ATC Site 260_2	390	384	384	-6	-6	0	0
A40 St Clears	1025	ATC Site 341_1	680	797	797	117	117	4	4
	1026	ATC Site 341_2	595	672	672	76	76	3	3
A4066	1087	ATC Site 636_1	83	85	85	2	2	0	0
	1088	ATC Site 636_2	83	78	78	-4	-4	0	0
B4299	1095	ATC Site 644_1	33	35	35	2	2	0	0
	1096	ATC Site 644_2	34	35	35	1	1	0	0
A477	894	ATC Whitland Site 1284_1	328	344	344	16	16	1	1
	895	ATC Whitland Site 1284_2	281	303	303	22	22	1	1



Table 6: Whitland and St Clears validation links Base and Updated Model Comparison, PM peak

Road Name	Count Location No	Count ID	Observed Flow	Base Flow	Updated Flow	Base Flow Difference	Update Flow Difference	Base GEH	Update GEH
AM									
A40 West of St Clears	979	ATC Site 260_1	551	482	482	-69	-69	3	3
	980	ATC Site 260_2	505	506	506	1	1	0	0
A40 St Clears	1025	ATC Site 341_1	685	783	783	98	98	4	4
	1026	ATC Site 341_2	768	892	892	16%	16%	4	4
A4066	1087	ATC Site 636_1	70	100	100	30	30	3	3
	1088	ATC Site 636_2	105	108	108	3	3	0	0
B4299	1095	ATC Site 644_1	52	45	45	-6	-6	1	1
	1096	ATC Site 644_2	41	50	50	9	9	1	1
A477	894	ATC Whitland Site 1284_1	307	328	328	21	21	1	1
	895	ATC Whitland Site 1284_2	413	402	402	-11	-11	1	1

Almost all the sites have values that meet the acceptability criteria, there is one site which does not meet the criteria. ATC Site 341_1 on the A40 in St Clears has a GEH value which is greater than 5.0 and the flow difference exceeds 15% in the AM period not meeting the acceptability criteria. Otherwise, the counts meet acceptability criteria, the performance of the AM peak Update model is slightly lower than the AM Base model but the interpeak and PM peaks are the same.

JOURNEY TIMES

Two journey time routes pass through the area of focus around Whitland and St Clears, these are the route along the A40 between Haverfordwest and Carmarthen and the route along the A477 between St Clears and Johnstown. Table 7 and Table 8 below shows the performance of the routes in both the Base and Updated model across the three time periods. The observed and modelled journey times are shown as well as the flow difference between the observed and modelled data, when the difference exceeds 60 seconds then a percentage difference measure is used following TAG guidance.

Table 7 below shows the Base and the Update model the A40 Haverfordwest to Carmarthen route passes validation in all three peaks as the absolute journey time difference is less than 15%. But in the Update Model journey time is faster than the observed journey time. This can also be seen in the sections individually where in most case the Update Model Journey time difference is lower than the observed, this occurs across the three periods and in both directions. There is an exception to this which is Section 6 in the eastbound direction where the journey time increases by 2s from the Base to the Update. The journey times have decreased because the free flow speed and capacity of sections of the A40 along the route have been increased.

Table 8 below shows the same analysis for Route 2 between St Clears and Johnstown, but for this route there is less difference between the Base and Update models. The journey time is mostly unaffected by the changes which mainly occur on the A40 road.

Table 7: Journey Times by Section for route 23 A40: Carmarthen – Haverford West

ID	Section Number	Observed Distance (m)	Modelled Distance (m)	AM					IP					PM				
				Observed Journey Time (s)	Base Journey Time (s)	Update Journey Time (s)	Base Flow Difference	Updated Flow Difference	Observed Journey Time (s)	Base Journey Time (s)	Update Journey Time (s)	Base Flow Difference	Updated Flow Difference	Observed Journey Time (s)	Base Journey Time (s)	Update Journey Time (s)	Base Flow Difference	Updated Flow Difference
A40: Carmarthen – Haverfordwest WB																		
157	1	710	704	61	48	48	-13	-13	50	46	46	-4	-4	58	47	47	-11	-11
158	2	2005	1977	88	90	64	3	-24	84	90	64	7	-20	89	91	64	2	-25
159	3	11883	11962	432	472	387	40	-45	431	470	385	39	-46	425	474	388	49	-37
160	4	15558	16240	741	786	728	45	-13	744	753	699	9	-46	728	771	708	43	-19
161	5	5864	5359	311	296	297	-15	-14	312	274	276	-37	-36	303	284	284	-19	-18
162	6	11089	11123	535	552	554	17	19	564	485	486	-14%	-14%	525	506	506	-19	-19
Total Route		47109	47366	2168	2245	2078	4%	-4%	2185	2119	1956	-3%	-10%	2127	2172	1997	2%	-6%
A40: Carmarthen – Haverfordwest EB																		
168	6	11082	11057	517	488	489	-29	-28	561	484	482	-14%	-14%	525	517	516	-8	-9
167	5	5865	5360	293	272	274	-20	-19	304	265	265	-39	-38	292	273	274	-20	-18
166	4	15510	16113	762	789	736	27	-26	785	766	707	-18	-10%	764	766	711	2	-52
165	3	13216	12086	492	493	429	1	-13%	502	487	424	-15	-16%	487	486	423	-2	-13%
164	2	1932	1886	108	91	91	-17	-17	109	90	90	-19	-19	101	90	90	-11	-11
163	1	680	800	78	60	60	-18	-18	79	61	61	-18	-18	83	64	64	-19	-19
Total Route		48285	47302	2249	2194	2080	-2%	-8%	2338	2152	2029	-8%	-13%	2253	2195	2078	-3%	-8%

Table 8: Journey Times by Section for route 2 A477: St Clears – Johnstown

ID	Section Number	Observed Distance (m)	Modelled Distance (m)	AM					IP					PM				
				Observed Journey Time (s)	Base Journey Time (s)	Update Journey Time (s)	Base Flow Difference	Updated Flow Difference	Observed Journey Time (s)	Base Journey Time (s)	Update Journey Time (s)	Base Flow Difference	Updated Flow Difference	Observed Journey Time (s)	Base Journey Time (s)	Update Journey Time (s)	Base Flow Difference	Updated Flow Difference
A477: St Clears – Johnstown																		
7	1	18982	19040	825	789	802	-36	-23	848	775	792	-9%	-56	814	796	811	-18	-3
8	2	9039	9079	438	436	437	-1	-1	456	422	424	-33	-32	441	434	440	-7	-1
9	3	2628	2653	143	147	147	4	4	152	139	139	-13	-14	141	145	146	4	5
10	4	4499	4529	269	235	235	-34	-34	288	222	221	-23%	-23%	298	230	229	-23%	-23%
11	5	9095	9133	530	491	491	-39	-39	548	472	469	-14%	-14%	552	528	524	-24	-29
Total Route		44243	44434	2205	2099	2112	-5%	-4%	2292	2031	2046	-11%	-11%	2247	2134	2150	-5%	-4%
16	5	8986	9067	516	489	488	-27	-27	528	465	462	-12%	-13%	537	484	480	-53	-57
15	4	4493	4458	236	226	226	-10	-10	250	223	222	-27	-28	247	242	239	-5	-8
14	3	2679	2698	143	159	159	16	16	156	154	153	-2	-3	147	164	166	17	19
13	2	9018	9121	449	443	443	-6	-7	468	433	436	-35	-32	448	444	451	-3	3
12	1	19004	19034	819	812	825	-7	6	863	792	808	-8%	-55	823	786	803	-37	-20
Total Route		44181	44379	2163	2129	2140	-2%	-1%	2265	2067	2081	-9%	-8%	2201	2120	2014	-4%	-9%

Public Transport Assignment Model Calibration and Validation

No changes were made to the original base year PTAM apart from the addition of the empty development zones, discussed later. The updated assigned link flows were then compared with the original base year PTAM and there was no change in the results.

In the area of focus there are two screenlines just west of Whitland one for passengers traveling westbound and one for those travelling eastbound. Table 9 below shows a comparison of the Base and Update PT model flows for each of the three peaks. In the Base model the screenlines generally have high percentage differences but low GEH values demonstrate that the absolute differences are small. The exception to this is the Westbound screenline in the AM peak which has both a high percentage difference and GEH value. In the Updated model the results are unchanged.

Table 9: Comparison of Base and Updated Model flows along the Carmarthen Screenline across all peaks

Name	Observed	Base	Update	Base % Difference	Update % Difference	Base GEH	Update GEH
AM							
Rail Screenline CMR EB	171	230	230	35%	35%	4.2	4.2
Rail Screenline CMR WB	60	168	168	180%	180%	10.1	10.1
IP							
Rail Screenline CMR EB	157	192	192	22%	22%	2.6	2.6
Rail Screenline CMR WB	166	179	179	8%	8%	1.0	1.0
PM							
Rail Screenline CMR EB	153	180	180	18%	18%	2.1	2.1
Rail Screenline CMR WB	159	132	132	-17%	-17%	2.2	2.2

Table 10 shows the boarding and alighting values for Whitland Rail Station in all peak periods, it demonstrates that the update has had no impact to these values. While the percentage difference are generally high the low GEH values demonstrate small absolute differences between modelled and observed data.

Table 10: Whitland Station boarding and alighting values.

Peak	Observed	Base	Update	Base % Diff	Update % Diff	Base GEH	Update GEH
Boarding							
AM	24	37	37	54%	54%	2.4	2.4
IP	39	28	28	-28%	-28%	1.9	1.9
PM	16	23	23	46%	46%	1.7	1.7
Alighting							
AM	23	33	33	46%	46%	2	2
IP	21	26	26	23%	23%	1	1
PM	14	18	18	33%	33%	1.1	1.1

The updates made to the public transport models have had a negligible effect on the calibration and validation of the public transport model across the different peaks.

SUMMARY

Summary of Updates

A limited number of additions were made to the model, in the Highway model links were added to improve the connectivity of Whitland to a nearby village which was not well represented in the model. This involved the addition of two links, two nodes and the splitting of an existing link to add a junction where the new link met the existing link. Other updates were made existing links, so they better represented the network, these changes were made in the area around Whitland and St Clears. These changes included adjusting the number of lanes, and free flow speeds of links; most of these changes are on the A40 in the area of focus, others were made on the A477 as well. In the Public Transport model, the only changes made were the additions of three empty development zones, one for each of the proposed sites. Connectors from these sites to the network were also added.

Updated Model Performance

The calibration of the whole model is unchanged in the update model compared to the base across all the peaks, the calibration exceeds the acceptability guidance of at least 85% of links meeting TAG guidance. In the area of focus there were six count sites at three different locations, in the base model all these sites met

TAG criteria. In the updated model the performance of the sites decreases slightly but still meets TAG guidance, the interpeak and PM peaks there is no change.

There are ten sites in the area of focus across five locations. Similar to the calibration sites the update model validation is slightly weaker in the AM peak but still meets TAG guidance but is unchanged in the interpeak and PM peaks which both meet the guidance.

Two journey time routes pass through the area of focus around Whitland and St Clears, the A40 route between Carmarthen and Haverfordwest and the A477 between St Clears and Johnstown. In the base model the A40 route met TAG criteria in both directions, in the update model the route still meets TAG criteria but the routes journey times are now shorter than the observed values. The A477 journey time route met TAG criteria in the base model across all peaks, in the updated model performance in the AM and interpeak periods is slightly stronger but is weaker in the PM peak.

The public transport model was not impacted by the updates made to the model. Screenline link flows and boarding, alighting values being unchanged in all peaks. This is seen both model wide and in the area of focus around Whitland and St Clears.

Recommendations

The base model is a robust base from which forecasting can be undertaken since the calibration and journey times across the model and in the area of focus meet TAG criteria. While validation does not quite meet the TAG criteria it is very close to meeting the criteria and the validation sites in the area of focus meet TAG criteria. The updates to the model have had little effect on the calibration and validation of the model having a small impact in the AM peak. The update model has impacted the A40 Carmarthen to Haverfordwest journey time route making the journey times faster.

Appendix A

Table 11: Additions made to the model

Type	Number	Base	Update Type
Node	107000		
Node	107001		
Link	1008000		87 Rural SC (50 mph)
Link	1008001	Split Link 1069977	17 Rural SC 6.5M (typical)
Link	1008002	Split Link 1069977	17 Rural SC 6.5M (typical)
Link	1008003		

Table 12: Node Positions Adjusted

Type	Number	Current
Node	103130	Moved Closer to node 911974
Node	102322	Moved further north



APPENDICES

Appendix A Link Types Updated

Type	Number	Base Link Type	Update Link Type
Lane Updated			
Link	1301135	08 D2AP - All purpose 2 lane	97 Rural SC (60 mph)
Link	1301134	08 D2AP - All purpose 2 lane	97 Rural SC (60 mph)
Link	1301133	08 D2AP - All purpose 2 lane	97 Rural SC (60 mph)
Link	1301133	08 D2AP - All purpose 2 lane	97 Rural SC (60 mph)
Link	1301132	08 D2AP - All purpose 2 lane	97 Rural SC (60 mph)
Link	1301132	08 D2AP - All purpose 2 lane	97 Rural SC (60 mph)
Link	1000087	72 Rural SC 10M (good) 2 lane	08 D2AP - All purpose 2 lane
Link	1000088	97 Rural SC (60 mph)	08 D2AP - All purpose 2 lane
Link	1009038	16 Rural SC 7.0M (typical)	08 D2AP - All purpose 2 lane
Link	1001958	97 Rural SC (60 mph)	08 D2AP - All purpose 2 lane
Link	1001957	97 Rural SC (60 mph)	08 D2AP - All purpose 2 lane
Link	1001956	97 Rural SC (60 mph)	08 D2AP - All purpose 2 lane
Link	1009037	97 Rural SC (60 mph)	08 D2AP - All purpose 2 lane
Free Flow Speed Updates			
Link	1003243	44 Suburb S1 (typical dev, 30mph)	97 Rural SC (60 mph)
Link	1003244	44 Suburb S1 (typical dev, 30mph)	87 Rural SC (50 mph)
Link	1002138	97 Rural SC (60 mph)	44 Suburb S1 (typical dev, 30mph)
Link	1002138	97 Rural SC (60 mph)	44 Suburb S1 (typical dev, 30mph)
Link	1002137	97 Rural SC (60 mph)	44 Suburb S1 (typical dev, 30mph)
Link	1002137	97 Rural SC (60 mph)	44 Suburb S1 (typical dev, 30mph)
Link	1000176	44 Suburb S1 (typical dev, 30mph)	91 Suburb D1 (typical dev, 20mph)
Link	1000176	44 Suburb S1 (typical dev, 30mph)	91 Suburb D1 (typical dev, 20mph)
Link	1002034	44 Suburb S1 (typical dev, 30mph)	91 Suburb D1 (typical dev, 20mph)
Link	1002034	44 Suburb S1 (typical dev, 30mph)	91 Suburb D1 (typical dev, 20mph)
Link	1003790	17 Rural SC 6.5M (typical)	97 Rural SC (60 mph)
Link	1003790	17 Rural SC 6.5M (typical)	97 Rural SC (60 mph)
Link	1001151	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1001151	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1001152	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1001152	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)

Type	Number	Base Link Type	Update Link Type
Link	1001153	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1001153	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1001154	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1001154	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1009039	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1009039	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1009038	16 Rural SC 7.0M (typical)	97 Rural SC (60 mph)
Link	1001003	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1001003	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1002048	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1002048	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1001559	97 Rural SC (60 mph)	87 Rural SC (50 mph)
Link	1001559	97 Rural SC (60 mph)	87 Rural SC (50 mph)
Link	1001558	97 Rural SC (60 mph)	87 Rural SC (50 mph)
Link	1001558	97 Rural SC (60 mph)	87 Rural SC (50 mph)
Link	1001557	97 Rural SC (60 mph)	87 Rural SC (50 mph)
Link	1001557	97 Rural SC (60 mph)	87 Rural SC (50 mph)
Link	1005162	97 Rural SC (60 mph)	87 Rural SC (50 mph)
Link	1005162	97 Rural SC (60 mph)	87 Rural SC (50 mph)
Link	1001289	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1001289	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1001954	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1001954	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1001955	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1001955	97 Rural SC (60 mph)	17 Rural SC 6.5M (typical)
Link	1002020	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001287	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001634	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006202	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006201	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001635	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1002000	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1000515	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)

Type	Number	Base Link Type	Update Link Type
Link	1000516	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001533	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006661	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006660	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001998	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001735	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001734	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001718	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001719	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006607	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006606	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001720	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006852	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006851	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1002021	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001531	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1002002	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1002003	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1005262	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1000078	76 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1000814	76 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001633	76 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001673	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001674	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006995	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1006996	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001689	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001892	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1002014	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1002301	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1002302	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1005279	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1005280	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)

Type	Number	Base Link Type	Update Link Type
Link	1002013	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1002012	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1004352	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1004353	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001893	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001728	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1001999	62 D2AP - All purpose 2 lane (40 mph)	68 D2AP - All purpose 2 lane (70 mph)
Link	1002061	62 D2AP - All purpose 2 lane (40 mph)	68 D2AP - All purpose 2 lane (70 mph)
Link	1001695	62 D2AP - All purpose 2 lane (40 mph)	68 D2AP - All purpose 2 lane (70 mph)
Link	1002011	62 D2AP - All purpose 2 lane (40 mph)	68 D2AP - All purpose 2 lane (70 mph)
Link	1005261	62 D2AP - All purpose 2 lane (40 mph)	76 D2AP - All purpose 2 lane (50 mph)
Link	101121	08 D2AP - All purpose 2 lane	68 D2AP - All purpose 2 lane (70 mph)
Link	1003891	44 Suburb S1 (typical dev, 30 mph)	97 Rural SC (60 mph)
Link	1003891	44 Suburb S1 (typical dev, 30 mph)	97 Rural SC (60 mph)
Link	1003922	58 Small town 60% development	17 Rural SC 6.5M (typical)
Link	1003922	58 Small town 60% development	17 Rural SC 6.5M (typical)