

**January 2018**

**POSITION STATEMENT Five:**

**Plymouth and South West Devon Joint Local Plan Transport  
Strategy Working Group**

This position statement represents the agreed position regarding the performance of key junctions / corridors connecting the local and strategic road network in the Plymouth Policy Area<sup>1</sup> of the Plymouth and South West Devon Joint Local Plan of:-

**PLYMOUTH CITY COUNCIL**

**DEVON COUNTY COUNCIL and**

**HIGHWAYS ENGLAND**

**At the time of the Examination of the Plan**

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<sup>1</sup> The Plymouth Policy Area is Plymouth's administrative area and the urban fringe within South Hams.

## 1.0 Background

This position statement builds on Position Statement four which set out that, at the time of the Examination:-

- The proposed JLP transport interventions (as described in the B4H scenario) achieve a highway network which, overall, performs better than the network in 2034 which assumes only background growth and not the development proposed within the Joint Local Plan (scenario A1).
- However, there were three locations where the need for further intervention was identified but the precise detail of the intervention was still under investigation. These locations were:-
  - Marsh Mills - junction being assessed using a separate model
  - Manadon Circulatory at A386 southbound entry point (Node 648)
  - A386 northbound approach to Boniface Lane (Node 1235)

To inform this position statement the B4 model has gone through a further iteration; B4HR. This is a refinement of the B4H scenario. The interventions tested in each of the B4 scenarios are described in section three of this position statement.

**Table One: HAM 2 model summaries**

Development Scenario	Modelled Networks				
	Baseline		Mitigated		
	<i>With committed physical transport interventions (1)</i>	<i>With committed physical transport interventions and sustainable transport measures (2)</i>	<i>With committed physical transport interventions, sustainable transport measures and non-committed (pipeline transport interventions) (3)</i>	<i>With committed physical transport interventions, sustainable transport measures and non-committed (pipeline) transport interventions and revised housing supply figures and site allocations (3a)</i>	<i>With committed physical transport interventions and sustainable transport measures and non-committed (pipeline) transport interventions, revised housing supply figures and site allocations, plus additional interventions / sustainable transport measures identified / agreed by TSWG (4)</i>
<b>A<sup>2</sup></b>	<b>A1</b>	<b>A2</b>			
<b>B<sup>3</sup></b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B3a</b>	<b>B4</b>

<sup>2</sup> 'Core' (control scenario) – with non-JLP growth (background growth only).

<sup>3</sup> All JLP allocations, including Woolwell.

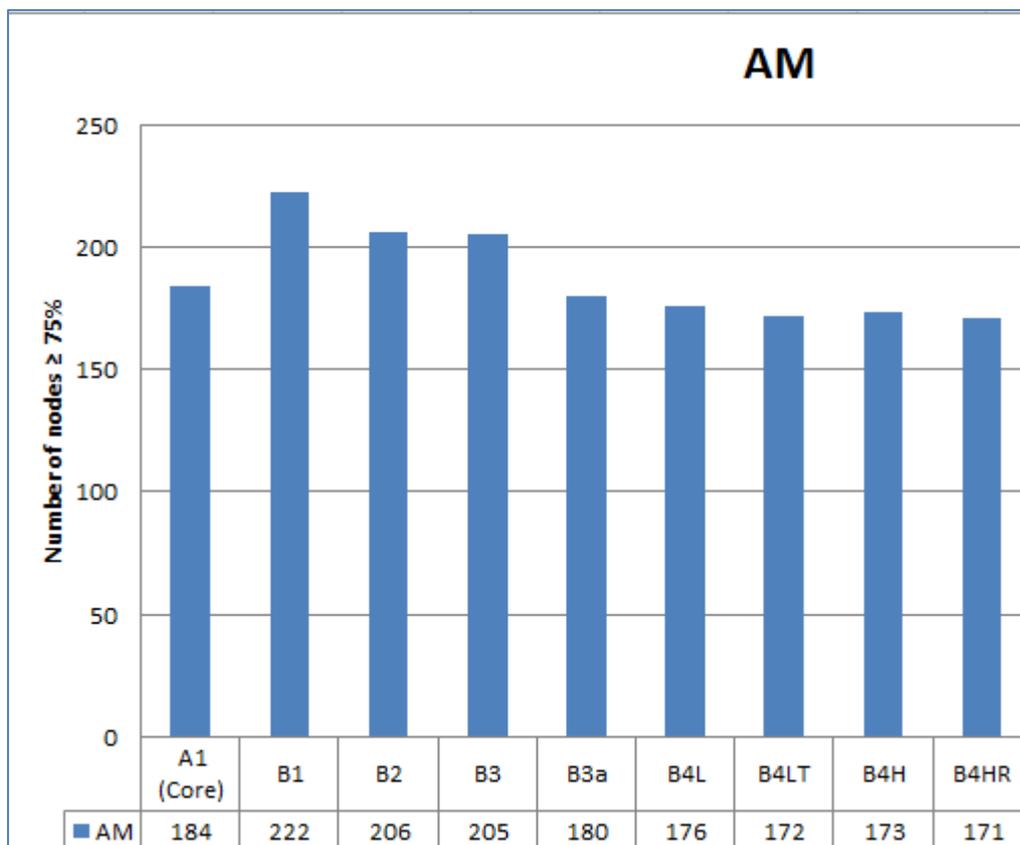
As agreed in Position Statement Four this position statement reports the results of the ongoing work to resolve the issues at these locations.

## 2.0 Global network performance – as reported in the B4 Scenario

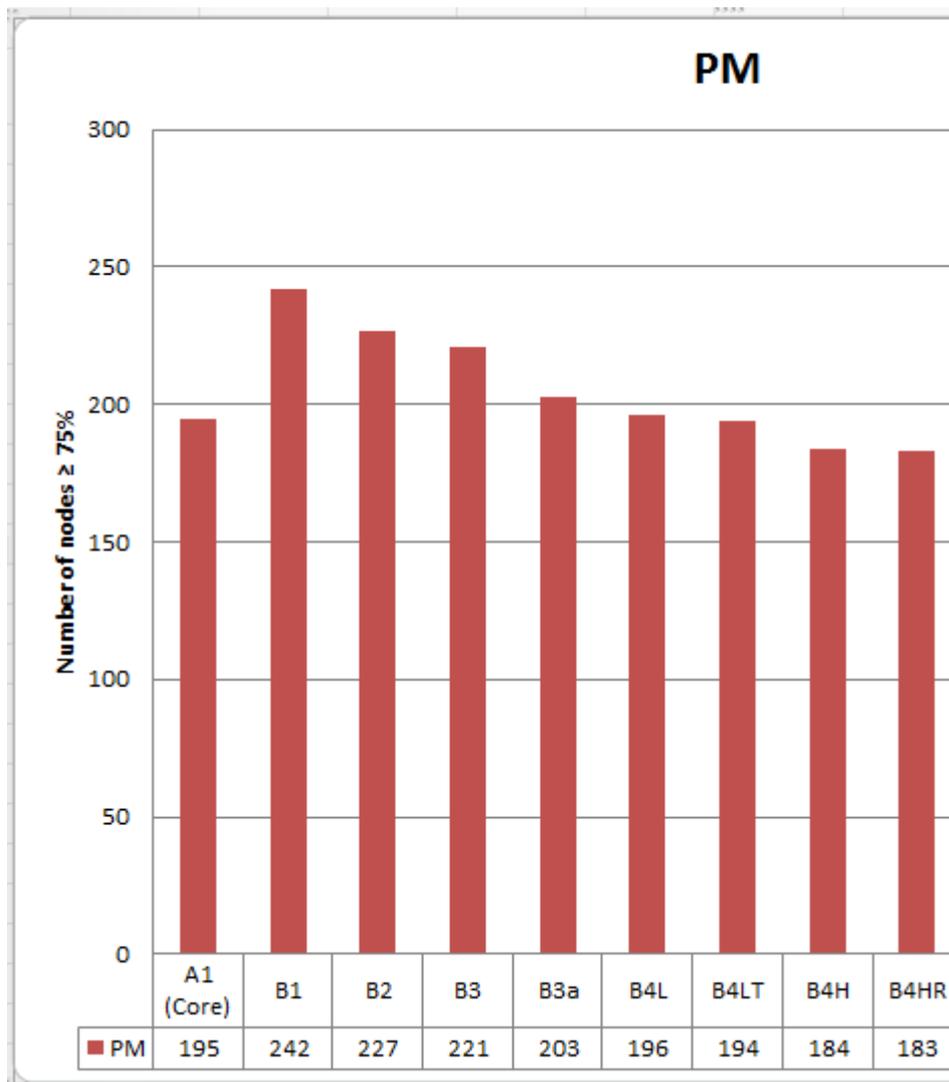
Position Statement Five principally concerns the locations where interventions were identified as required in Position Statement Four. However, because changes at one location can have implications for others the global performance of the PPA highway network is also an important metric by which to assess the impact of the Plymouth and South West Devon Joint Local Plan. This data is therefore reported below.

Firstly, Figures One and Two report the overall number of congested nodes (RFC  $\geq$ 75%) for the AM and PM periods in each model scenario run so far (Table One); the B4HR scenario sees a reduction in the number of congested nodes of 13 in the AM peak and 12 in the PM, with reference to the A1 (core) scenario.

**Figure One: AM – Number of congested nodes**



**Figure Two: PM – Number of congested nodes<sup>4</sup>**



The improved network performance is further corroborated by the data in Tables Two and Three which show key performance indicators for the 2034 HAM2 network in the B4HR scenario, compared to A1.

<sup>4</sup> Please note that the number of congested nodes in the PM in the B4L, B4LT and B4H results reported in this position statement are different than as reported in Position Statement Four and the accompanying Forecast SATURN model results summary report. In each case the number of congested nodes reported in this position statement is 1 greater than that reported previously. A congested node on the local road network was omitted in error in the earlier reports. The PM A1-B3a results are unaffected. The numbers reported in this position statement, and the accompanying Forecast SATURN model results summary report are the definitive results.

**Table One: Comparison of the A1 and B4HR AM model scenarios**

Scenario	A1 AM	B4HR AM	Difference	Commentary
Total Trips (PCUs)	62954	66114	3160	The number of trips increases in the B4HR, compared to the A1, scenario
Average Speed (KPH)	28.9	30.8	1.9	Increase in average speed in B4HR
Total Travel Times (PCU Hr)	13255.8	13692.5	436.7	Increase in total travel time in B4HR. However, this is because there are more vehicles
Per Vehicle Travel Time (Minutes and seconds)	12:38	12:26	-0:12	Decrease in travel time per vehicle in B4HR compared to the A1 scenario

**Table Two: Comparison of the A1 and B4HR PM model scenarios**

Scenario	A1 PM	B4HR PM	Difference	Commentary
Total Trips (PCUs)	60393	61299	906	The number of trips increases in the B4HR, compared to the A1, scenario
Average Speed (KPH)	27	28.6	1.6	Increase in average speed in B4HR
Total Travel Times (PCU Hr)	14930.5	14790.2	-140.3	Decrease in total travel time in B4HR, compared to the A1 scenario
Per Vehicle Travel Time (Minutes and seconds)	14:50	14:29	-0:21	Decrease in travel time per vehicle in B4HR compared to the A1 scenario

**3.0 Corridor / route performance – SATURN HAM2**

The outputs of each iteration of the HAM2 model have been assessed in relation to the performance of strategic routes. The performance of the A38 through Plymouth has been

the primary focus of this exercise. The ability of traffic to safely and efficiently move along the A38 and to leave the A38 at the five Plymouth junctions<sup>5</sup> is a key concern for the TSWG.

A total of 124 key nodes were identified, by Highways England, for assessing the impact of the growth included in the plan on the operation of the A38. Of these, 22 failed the acceptability criteria<sup>6</sup> in the AM peak and 11 failed in the PM peak in scenario B1. The failure of the nodes was as a direct result of the additional traffic likely to arise as a result of the growth included in the JLP. Each iteration of the strategic transport model has sought to resolve the congestion reported in the previous iteration. The number of nodes failing the acceptability criteria for each scenario is shown below:-

**Table Three: Number of nodes failing the acceptability criteria**

Scenario	AM Peak	PM Peak
B1	22	11
B2	13	9
B3	15	6
B3a	17	10
B4L	18	15
B4LT	17	14
B4H	14	10
B4HR	15	10

In each case, the effect of the reported congestion in terms of road safety and overall customer experience was considered as part of the decision making process regarding whether additional mitigation options needed to be tested in future model scenarios.

The performance of the B4HR scenario is reported below. It is the agreed position of the TSWG that B4HR is the best of the B4 scenarios assessed, in terms of the performance of the A38 strategic corridor, because it is the only scenario of those tested, to contain measures which adequately offset the unacceptable traffic related impacts of the development included within the JLP as identified through the highway assessment process.

<sup>5</sup> Victoria, Weston Mill, Manadon, Forder Valley and Marsh Mills.

<sup>6</sup> A volume / capacity figure of 75% is used as the capacity threshold in the HAM 2 model. The volume / capacity figure achieved at a particular node in scenario A1 is also a relevant comparator as that is the level of performance that a particular node would achieve in the absence of the plan. The acceptability criterion is therefore 75% or the A1 figure whichever is the greatest. This has been used to guide decisions on where further physical transport interventions and/ or sustainable transport measures might be required to support the efficient operation of both the local and strategic highway network.

### 3.1 Infrastructure interventions considered in the B4 model scenarios.

This section of the position statement records the schemes which were modelled in the B4 scenarios.

#### 3.1.1 Northern Corridor (A386 between the junction of Outland Road and Peverell Park Road and Derriford Roundabout, including Manadon Junction).

Scheme	Modelled in scenario:-			
	B4L	B4LT	B4H	B4HR
Additional eastbound off-slip lane from the A38 at Manadon Junction	Yes	Yes	Yes	Yes
Signalise the northbound slip from Manadon and A386	Yes	Yes		
Additional northbound lane on the A386 from Manadon (relocation of the footbridge) to Boniface Lane			Yes	Yes
Lain gain with ghost island merge (Manadon Hill)			Yes	Yes
Two lanes northbound A386 Flyover and northbound exit from Manadon	Yes	Yes	Yes	Yes
Boniface Lane Junction Signal Timings - Prioritise A386	Yes	Yes	Yes	Yes
Assign A386 southbound at Manadon to 'ahead' and 'ahead and left'	Yes	Yes	Yes	
Re-assigned A386 southbound at Manadon to 'ahead' and 'left'				Yes
Additional lane on A386 southbound slip to Manadon				Yes
A38 Westbound off slip at Manadon widened to three lanes			Yes	Yes
A38 widened to three lanes between Manadon and Forder Valley eastbound and westbound			Yes	Yes
Widened and signalised southbound exit slip onto Outland Road and introduce two lanes on slip road	Yes	Yes	Yes	Yes
Frobisher Approach Bus Gate opened to general traffic northbound only				Yes
Northbound ahead added from Meavy Way to Budshead Way.		Yes	Yes	Yes

**3.1.2 A38 Eastern Corridor (Manadon Junction, Forder Valley Interchange, Marsh Mills, Deep Lane, Forder Valley Link Road and Coypool Road).**

Scheme	Modelled in scenario:-			
	B4L	B4LT	B4H	B4HR
<b>Marsh Mills:</b> Widen circulatory of inner roundabout to avoid impacts on intergreens	Yes	Yes	Yes	Yes
Longbridge Road Junction - Run on a give-way to reduce signal timings	Yes	Yes	Yes	Yes
Double cycle time for Node 652 in the AM with Sainsbury's running every other cycle		Yes	Yes	Yes
Double cycle time for Node 652 in the PM with Sainsbury's running every other cycle.		Yes	Yes	Yes
Marsh Mills overbridge - remove merge marker due to lane gain <sup>7</sup>			Yes	Yes

**3.1.3 A38 Western Corridor (St Budeaux Interchange and Weston Mill including the interface between the SRN and Crownhill Road).**

Scheme	Modelled in scenario:-			
	B4L	B4LT	B4H	B4HR
<b>St Budeaux:</b> Change the junction to a 'Dog Bone' arrangement - I.e. Remove the right turn (signalise)	Yes	Yes	Yes	Yes
<b>St Budeaux:</b> Rebalance stage timings at node 634 to balance V/C across each arm.		Yes	Yes	Yes
<b>St Budeaux:</b> Increase capacity at node 632 to reflect signal capacity instead of the give way capacities.		Yes	Yes	Yes
Extra lane eastbound on the A38 between Tamar Bridge and St Budeaux			Yes	Yes
Extra lane eastbound on the A38 between St Budeaux and Weston Mill			Yes	Yes
<b>Weston Mill:</b> Give priority to the slip road i.e. make on-slip traffic give way to off slip traffic	Yes	Yes	Yes	Yes
<b>Weston Mill:</b> South side review give-way arrangement. Change lane allocations from 'give way' to 'merge' so there are now two southbound lanes and one northbound lane.		Yes	Yes	Yes
<b>Weston Mill:</b> Reduce time to stage 3 at node 214 and reassign to stages 1 and 2 (favouring stage 2).		Yes	Yes	Yes

<sup>7</sup> Modelling amendment – no scheme required.

### 3.2 Results: HAM2 Model

The table below provides an update on the locations which Position Statement Four identified as unresolved strategic nodes in the B4H scenario, which were not on the A38 (Section Four) mainline or being looked at with other models (e.g., Coypool Road).

Node	Name / Location description	Time of day	RFC		Change required to bring it back to A1 (or 75%, whichever is more) <sup>8</sup>	Decision of the TSWG informed by B4H results	B4HR Update; where required
			A1	B4HR			
214	Weston Mill Drive - southbound approach to Ferndale Road/Carlton Terrace	AM	94	100	6%	<p>This is primarily a Local Road Network issue which is unlikely to impact on the A38. This conclusion is based on available traffic count data which indicates that the HAM2 is overestimating<sup>9</sup> the flow of traffic leaving the A38 at this location and hence the queue reported in HAM2 is expected to be less in reality.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>	
253	Outland Road –	PM	81	91	10%	This is a location which has	

<sup>8</sup> The figure reported is the absolute percentage point change required, not the actual percentage capacity increase required. This is consistent with previous position statements.

<sup>9</sup> Please see section four of PoS4 for more information.

	southbound approach to Peverell Park Road					<p>benefitted from the Northern Corridor Junction Improvements. MOVA has been installed on the corridor and the signal controls updated. This allows PCC greater ability to control / manage this junction to meet the requirements of the network. Therefore, should congestion occur to an extent that queues propagate back to the A38 mainline, the traffic signal timings can be adjusted to further prioritise the A386 traffic.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>	
314	Crownhill Road - eastbound approach to Budshead Road/Dunstone Road	AM	91	97	6%	<p>The TSWG acknowledge that the potential for congestion to queue back onto the A38 is likely to be exaggerated in HAM2 at this location because:</p> <p>(1) HAM2 over-estimates the amount of traffic leaving the A38 at this location by circa 20% (hence the queue will be shorter than estimated in the model)</p> <p>(2) The eastbound queue at node 314 consists of traffic from multiple</p>	
		PM	79	97	18%		

						<p>directions and therefore it will not all propagate down the A38 slip road.</p> <p>(3) Development impact is quite small (23 pcu's per hour (3%) in the AM peak, but the problem is exacerbated however by traffic signal timing adjustments which have been made in order to accommodate traffic flow increases on other approaches to the junction. Therefore, should congestion occur to an extent that queues propagate back to the A38 mainline, the traffic signal timings can be re-adjusted to further prioritise the Crownhill Road traffic.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>	
321	A386 northbound exit at Crownhill	PM	95	100	5%	<p>This location benefits from a gap creation scheme, which isn't / can't be modelled in HAM2, which is designed to prevent traffic queuing on the A386 by favouring traffic exiting the A386 over traffic exiting Budshead Road in the PM. The</p>	<p>The performance of this node has now been resolved by the changes within the B4HR scenario. It is consider that the changes at Boniface Lane and the Frobisher Approach bus gate being opened to general traffic (northbound) – as per Section 3.1.1 –</p>

						<p>model reports that the junction would be congested in both peaks in the absence of the plan but the traffic increases due to the plan growth does not make the junction significantly worse in B4H.</p> <p>It is therefore agreed that no further mitigation is necessary in terms of scenario B4H. However, as B4H (R) seeks to remove downstream A386 constraints the implications of not improving this node may need to be re-considered when the B4H (R) scenario outputs are available.</p>	<p>are particularly significant and have led to traffic re-routing within the model</p>
367	<p>Mannamead Road - Southbound approach to Torr Lane</p>	AM	70	80	5%	<p>This is a location which will benefit from the Northern Corridor Junction Improvements. MOVA will be installed on the corridor and the signal controls updated. This will allow PCC greater ability to control / manage this junction to meet the requirements of the network. While this scheme is included in all B3 scenarios, the flexibility of control that the scheme offers cannot be replicated in HAM2.</p> <p>It is therefore agreed that no further mitigation needs to be identified by</p>	

						TSWG.	
648	Manadon Circulatory at the A386 southbound entry point.	AM	64	91	16%	<p>This result is thought to be due to the change on the A386 southbound, to the junction from an ahead and left lane to an ahead and ahead and left lane – it has attracted more traffic to the route which has caused an issue on the circulatory.</p> <p>It is the agreed position of the TSWG that a scheme for Manadon will be developed which will consider all issues.</p> <p>In the interim it is agreed that changing the coding in HAM2 back to one ahead lane and one left lane will be tested in the B4H (R) scenario.</p>	<p>The performance of this node has been resolved by removing the highway scheme introduced in B3a and the introduction of an additional lane on A386 southbound slip to Manadon.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>
		PM	95	101	6%		
652	Marsh Mills westbound off slip	AM	77	84	7%		<p>While the off slip from the A38 is over capacity, a consideration of the traffic flow, traffic capacity and storage space for queued vehicles shows that queues are unlikely to back up onto the A38 mainline.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>
		PM	71	81	6%		

656	Forder Valley Interchange eastbound off-slip	AM	76	82	6%		<p>This issue has arisen due the removal of an upstream constraint at node 1676 making routes through the eastbound off-slip more attractive than was previously the case.</p> <p>The change at node 1676 has been introduced in B4HR as a correction to previous models due to that fact that part of PCC's Forder Valley Interchange scheme (an increase in SAT flow in the model, to reflect the changes being introduced by the scheme) had not previously been included.</p> <p>While the off slip from the A38 is over capacity, a consideration of the traffic flow, traffic capacity and storage space for queued vehicles shows that queues are unlikely to back up onto the A38 mainline.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>
821/ 823	A386 Northbound –	AM	62	97	22%	This is a location which will benefit from the Derriford Transport	The B4HR model results shows that the removal of the downstream traffic

	approach to William Prance Road					<p>Scheme. MOVA will be installed on the corridor and the signal controls updated. This will allow PCC greater ability to control / manage this junction to meet the requirements of the network.</p> <p>It is therefore agreed that no further improvement will be included in B4H (R). However, as B4H (R) seeks to remove downstream A386 constraints the implications of not improving this node may need to be re-considered when the B4H (R) scenario outputs are available.</p>	<p>flow constraint at Boniface Lane has no implications for the operation of this node.</p> <p>A consideration of traffic flow, traffic capacity and distance of the junction from the A38 shows that, while the node is over capacity, queues are unlikely to impact on the operation of the A38 mainline.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>
1235	A386 – Northbound approach to Boniface Lane.	AM	74	87	12%	<p>It was agreed that the performance of this junction would be reviewed in LINSIG (by PCC) and SATURN (by Highways England) in order to identify and test possible intervention options. A preferred option will be included in the B4H (R) scenario. This node represents a significant constraint to traffic movement from Manadon Junction.</p>	<p>The performance of this node has been resolved by adjusting the signal timings of the Tavistock Road / Boniface Lane junction. The AM peak signal green phasing has changed from 63 sec for the ahead movements and 17 sec for Boniface Lane to 98 sec for the ahead movements and 12 sec for Boniface Lane. The reduction of green time at Boniface Lane can be achieved as there is now an alternative way out of the zone for trips, principally along Frobisher Approach. PCC as highway authority</p>

						<p>have agreed that the necessary changes to traffic regulation orders and associated physical works are acceptable and could be implemented.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>
1685	Forder Valley Road, northbound from Forder Valley Interchange.	AM	82	100	18	<p>This issue has arisen due to the removal of a downstream constraint at node 1676. The change at node 1676 has been introduced in B4HR as a correction to previous models due to that fact that part of PCC's Forder Valley Interchange scheme (an increase in SAT flow in the model, to reflect the changes being introduced by the scheme) had not previously been included.</p> <p>Unfortunately, this change causes Forder Valley Road to appear worse in B4HR than it does in B4H. The performance of Forder Valley Road in B4H was acceptable. On the basis that it would clearly be nonsensical to improve the route (back to B4H) by re-introducing the constraint, it is</p>
		PM	82	100	18	

							agreed that no further mitigation needs to be identified by TSWG.	
4078	A386 Northbound approach to Sendall's Way diverge	– to Way	AM	52	92	17%	<p>This is a location which will benefit from the Derriford Transport Scheme. MOVA will be installed on the corridor and the signal controls updated. This will allow PCC greater ability to control / manage this junction to meet the requirements of the network.</p> <p>It is therefore agreed that no further improvement will be included in B4H (R). However, as B4H (R) seeks to remove downstream A386 constraints, the implications of not improving this node may need to be re-considered when the B4H (R) scenario outputs are available.</p>	<p>The B4HR model results shows that the removal of the downstream traffic flow constraint at Boniface Lane has no implications for the operation of this node.</p> <p>A consideration of traffic flow, traffic capacity and distance of the junction from the A38 shows that, while the node is over capacity, queues are unlikely to impact on the operation of the A38 mainline.</p> <p>It is therefore agreed that no further mitigation needs to be identified by TSWG.</p>

### **3.3 Results: Alternative Models**

The performance of the B3416 Plymouth Road has been assessed through a LinSIG model.

The interventions proposed for Plymouth Road are being delivered as part of the Eastern Corridor Junction Improvements programme. The objectives of the scheme are to: reduce traffic delays, improve road safety by upgrading pedestrian crossings and provide new cycle facilities. An important outcome is improving both journey times for motorists and service reliability for buses on this busy route helping to discourage rat-running through Woodford.

The preferred scheme includes the replacement of the traffic signal equipment with modern more efficient traffic signals, an increase to the length of the right turn lane from Plymouth Road to Cot Hill to prevent the overspill of the queue wanting to turn right that often blocks traffic heading east towards Plympton, the scheme also includes improved cycling and pedestrian facilities.

The operation of the traffic signal junctions was reviewed to identify how they could work together more efficiently, with yellow box markings proposed to encourage gaps for turning traffic. The proposals also include options to improve the junction at the top of Cot Hill where it meets Merafield Road where, during peak times, traffic queues back down Cot Hill towards Plymouth Road.

Full details of the scheme are available at: - [www.plymouth.gov.uk/ecjip](http://www.plymouth.gov.uk/ecjip).

The scheme as designed has been assessed by the TSWG as being sufficient for the purposes of adequately offsetting the unacceptable traffic related impacts of the development included within the JLP as identified through the highway assessment process.

### **4.0 Conclusions**

At the time of the Examination the TSWG agree that the results of the B4HR scenario demonstrate that the highway network overall performs better than in the A1 scenario and that all nodes identified as locations needing further investigation / mitigation are now resolved either mathematically or through acceptance of the residual effects which are apparent from a comparison of the B4HR and A1 scenario's.

Therefore, in accordance with Paragraph 9 of DfT Circular 02/2013, the JLP development proposals, within the PPA, are acceptable because they can be accommodated within the existing capacity of a section (link or junction) of the strategic road network, or they do not increase demand to an unacceptable degree for use of a section that is already operating at over-capacity levels, taking account of the travel plan, traffic management and/or capacity enhancement measures [set out in the B4HR model]. The residual cumulative impacts of the JLP development are therefore not severe.

Name: Philip Heseltine, Head of Transport, Infrastructure and Investment



Signed:

Date: 15.01.18

For Plymouth City Council and Chair of the Transport Strategy Working Group

Name: Rachel Sandy , Spatial Planning Manager (South West)



Signed:

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For Highways England

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Signed:

Date: 23.01.18

For Devon County Council