

Aberdeenshire Council Westhill 2016 Testing – Initial Findings S-Paramics Modelling

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1 2016 TESTING

1.1 Introduction

1.1.1 This Interim Note gives a brief summary of the initial 2016 testing. The tests carried out were:

- 2016 Ref Case
- Test 1 – 2016 Ref Case plus Arnhall Phase 3
- Test 2 - 2016 Ref Case plus 250 house extension at Broadshade
- Test 3 - 2016 Ref Case plus 500 house extension at Broadshade
- Test 4 – Test 2 plus Arnhall Phase 3

1.1.2 The 2016 Reference Case model is the 2012 Model with NRTF low growth applied to traffic travelling in both directions between the A944 and the B9119, plus the influence of the Aberdeen Western Peripheral Route (AWPR).

1.2 Development trips

1.2.1 Traffic demand totals for the three 2016 tests and the increase from the 2009 Base are shown in Table 1.1.



Table 1.1 : Matrix Totals

Matrix Totals	AM	PM
2009 Base	13,910	17,490
2012 Model	15,582	18,857
2016 Ref Case	15,595	18,871
Test 1 - 2016 Ref Case plus Arnhall Phase 3	16,551	19,673
increase from 2009 Base	2,641	2,182
increase from 2016 Ref Case	956	801
Test 2 - 2016 Ref Case plus 250 houses at Broadshade	15,993	19,384
increase from 2009 Base	2,083	1,894
increase from 2016 Ref Case	399	513
Test 3 - 2016 Ref Case plus 500 houses at Broadshade	16,343	19,836
increase from 2009 Base	2,433	2,346
increase from 2016 Ref Case	748	965
Test 4 - Test 2 plus Arnhall Phase 3	16,950	20,213
increase from 2009 Base	3,040	2,723
increase from 2016 Ref Case	1,355	1,342

1.3 Influence of the Aberdeen Western Peripheral Route

1.3.1 An adjustment has been made in the traffic demand matrices for all 2016 scenarios, based on ASAM3b data used in previous Westhill testing, to account for the possible impact of the Aberdeen Western Peripheral Route. **This data is not a full ASAM to S-Paramics trip analysis correlation**, but is based on link counts at three locations (north, south and east of Westhill). This has assumed trips which previously entered/exited Westhill from the north (Westhill Drive) and South (B979) would use the AWPR, so would enter/ exit Westhill from the east (A944).

1.3.2 The numbers of trips moved are detailed in Table 1.2.

Table 1.2 : AWPR Adjustment

Location	AM	PM
Westbound on A944	+527	+1015
Northbound on B979	-527	-502
Southbound on Westhill Dr		-513
Eastbound on A944	+175	+278
Southbound on B979	-175	-278

1.3.3 A more detailed sector analysis of a cordon matrix from ASAM4 would provide a more detailed trip pattern adjustment.

2 2016 TESTING

2.1 Introduction

2.1.1 The following observations are based on one S-Paramics model run. There are some queue length variations between model runs, but the location and general queue length is consistent between runs.



2.2 2016 Ref Case Model Observations

2.2.1 The following compares model observations of the 2016 Reference Case with the 2012 Model.

AM Peak:

- Queue length on the A944 southbound at Six Mile Fork Roundabout appears higher than the 2012 scenario, extending back through Arnhall Roundabout onto the A944 and Westhill Drive at several points throughout the AM peak. This did not occur in 2012.
- An increase in queue length was also observed on the A944 eastbound at the junction with the B979, from approximately 150m in 2012 to approximately 350m in 2016 at 07:30. All other queue lengths are similar to the 2012 scenario.

PM Peak:

- The 2016 Reference Case model showed an increase in congestion around the Arnhall/Six Mile Fork/Link Road triangle and queueing develops earlier than in the 2012 model. For example, by 17:00 a southbound queue of approximately 200m was observed on the A944 SB at Six Mile Fork and the queue from Arnhall on Endeavour Drive extends back into Tesco and onto the link road. This queue was observed to occur later in the 2012 PM peak period.
- By 17:30, queue lengths were higher than 2012 on all arms of the Six Mile Fork Roundabout. The queue on the B9119 eastbound extends back to the roundabout at the south of the link road (approximately 600m) compared with 300m in 2012. A queue of approximately 250m was observed northbound on the A944, which was not present in the 2012 scenario. A northbound queue was observed on the entire length of the link road from 17:30 to 17:55. The maximum number of unreleased vehicles in the Tesco zone was 170.
- Due to the congestion at Six Mile Fork, vehicles were observed to be re-routeing via Westhill Road in both the AM and PM peaks. Southbound in the AM peak there was an increase of approximately 100 vehicles using the route (was 293 in 2012, now 395), and northbound in the PM peak there was an increase of approximately 250 vehicles (was 232 in 2012, now 480).

2.3 Test 1 Observations

2.3.1 The following observations compare Test 1 with the 2016 Reference Case.

AM Peak:

- By 07:30, the southbound queue on the A944 from Six Mile Fork Roundabout appears slightly longer than in the 2016 Ref Case, extending back to Arnhall Roundabout, however, the difference between the two scenarios is minimal.
- Throughout the AM peak, queue lengths at Six Mile Fork (on the B9119 eastbound, A944 westbound and A944 southbound) and the A944 northbound and Westhill Drive southbound at Arnhall Roundabout appear slightly longer than the Ref Case, but the differences are minimal.

PM Peak:

- Queue length on the B9119 eastbound from Six Mile Fork was higher in Test 1 than the Ref Case, extending back past the southern end of the link road as far as the western access to the Arnhall Business Park Extension. This queue did not pass the southern end of the link road in the Ref Case.



- The northbound queue on the link road extends from Endeavour Drive, back onto the B9119 and onto the road through Arnhall Business Park. The entire route through Arnhall Business Park becomes queued and traffic cannot egress the development.
- Vehicles are queued into the Arnhall Phase 3 development due to congestion on the link road.
- Queues length on the B979 northbound is higher in Test 1 than the Ref Case, due to traffic re-routeing away from the congestion on the B9119/ Six Mile Fork area. By 17:55 the queue extends from the A944 at the north to the B9119 at the south.
- Traffic re-routeing via Westhill Road is higher than the 2016 Ref Case in both the AM and PM peak periods. Southbound in the AM peak, there was an increase of 75 vehicles from the 2016 Ref Case, and northbound in the PM peak, there was an increase of 135 vehicles. The increase in traffic turning right from the A944 through the back road to Westhill Road does not appear to impact on the main westbound A944 traffic.

2.4 Test 2 Observations

2.4.1 The following observations compare Test 2 with the 2016 Reference Case.

AM Peak:

- By 07:25, the southbound queue on the A944 from Six Mile Fork Roundabout appears slightly longer than in the 2016 Ref Case, extending back onto Westhill Drive. The difference between the two scenarios was minimal.
- Queue lengths on both the B9119 and A944 southbound from Six Mile Fork are slightly increased throughout the AM peak. Again, the differences are minimal.
- There does not appear to be any significant impact of the development on queue length in the immediate area to it (Old Skene Road/Broadstraik Road/Straik Road).

PM Peak:

- Queueing from Six Mile Fork Roundabout is slightly higher than the 2016 Ref Case on all arms at times throughout the PM peak, however the differences are minimal.
- Maximum number of unreleased vehicles in Tesco was approximately 200 vehicles compared to 170 in the 2016 Ref Case.
- Queue lengths on the A944 eastbound and B979 northbound were slightly longer than the Ref Case however the differences are minimal.
- Traffic re-routeing via Westhill Road was higher than the 2016 Ref Case in both the AM and PM peak periods. Southbound in the AM peak there was an increase of 127 vehicles from the 2016 Ref Case and northbound in the PM peak there was an increase of 112 vehicles. The increase in traffic turning right from the A944 through the back road to Westhill Road does not appear to impact on the main westbound A944 traffic.

2.5 Test 3 Observations

2.5.1 The following observations compare Test 3 with the 2016 Reference Case.

AM Peak:

- The southbound queue on the A944 from Six Mile Fork Roundabout appears longer and more prolonged than in the Ref Case, extending back past Arnhall Roundabout more frequently throughout the AM peak.



PM Peak:

- An increase in queueing was observed on the A944 eastbound at the junction with the B979, with the queue extending off the model network by 17:30 (approximately 1,000m). The maximum length of this queue in the 2016 Ref Case was approximately 100m.
- Queue length on the B979 northbound was also higher, extending to approximately 550m compared to approximately 250m in the 2016 Ref Case.
- Queueing around the Arnhall/Six Mile Fork/Link Road triangle was higher and more prolonged than in the 2016 Ref Case, with the maximum number of unreleased vehicles in the Tesco zone reaching approximately 370 vehicles
- Traffic re-routeing via Westhill Road was higher than the Ref Case in both the AM and PM peak periods. Southbound in the AM peak there was an increase of 256 vehicles from the 2016 Ref Case and northbound in the PM peak there was an increase of 294 vehicles. The increase in traffic turning right from the A944 through the back road to Westhill Road does not appear to impact on the main westbound A944 traffic.

2.6 Test 4 Observations

2.6.1 The following observations compare Test 4 with the 2016 Reference Case and Test 1.

AM Peak:

- The southbound queue on the A944 from Six Mile Fork Roundabout was higher than in the Ref Case and Test 1, extending past Arnhall Roundabout and onto Westhill Drive, reaching the roundabout at Westhill Road by 08:00.

PM Peak:

- Queueing around the Arnhall/ Six Mile Fork/ B9119/ link road area was very similar to Test 1 throughout the PM peak, however, the number of unreleased vehicles in the development zones in the area was higher. At 18:00 there were approximately 250 unreleased vehicles in Test 1 and approximately 330 in Test 4.
- The southbound queue on the B979 reaches Carnie Roundabout by 17:30 compared to 17:55 in Test 1, due to an increase in traffic routeing away from the congestion at the east of the model area. A westbound queue of approximately 400m was observed on the B9119 westbound at Carnie Roundabout at 18:00.
- The westbound queue on the A944 at the junction with the B979 reaches a maximum of approximately 400m compared to approximately 100m in Test 1.
- Traffic re-routeing via Westhill Road is higher than the 2016 Ref Case in both the AM and PM peak periods. Southbound in the AM peak, there was an increase of 228 vehicles from the 2016 Ref Case and northbound in the PM peak there was an increase of 238 vehicles. The increase in traffic turning right from the A944 through the back road to Westhill Road does not appear to impact on the main westbound A944 traffic.

3 QUEUE SUMMARY

3.1.1 As a general indicator of congestion in the model network, the average number of queued vehicles throughout the network has been compared for the five scenarios. This comparison gives an overview of the overall difference in queueing between the scenarios, more detailed queue comparisons at specific locations could be provided if required. The results shown are an average of five S-Paramics model runs. Figure 3.1 shows the queueing in the AM peak.



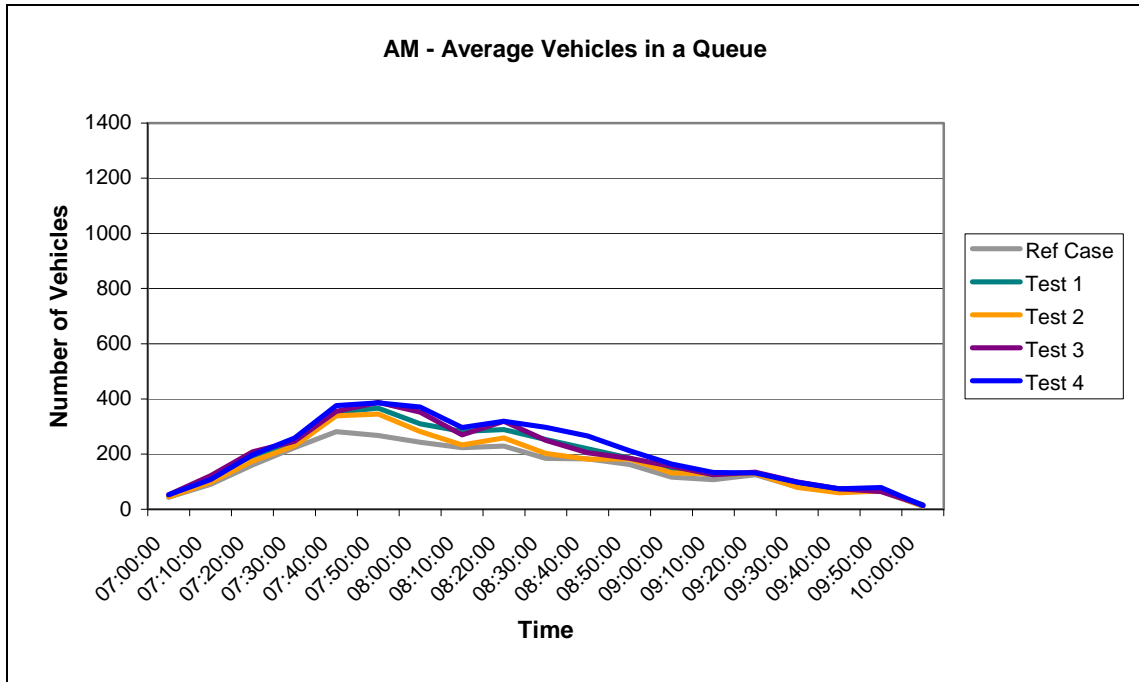


Figure 3.1 : AM Queueing

3.1.2 Figure 3.1 shows similar levels of queueing in all tests in the AM peak, with all reaching a peak of between 350 and 400 queued vehicles at approximately 7:50, compared to approximately 275 vehicles in the Ref Case.

3.1.3 Figure 3.2 shows the average number of queued vehicles in the PM peak period.

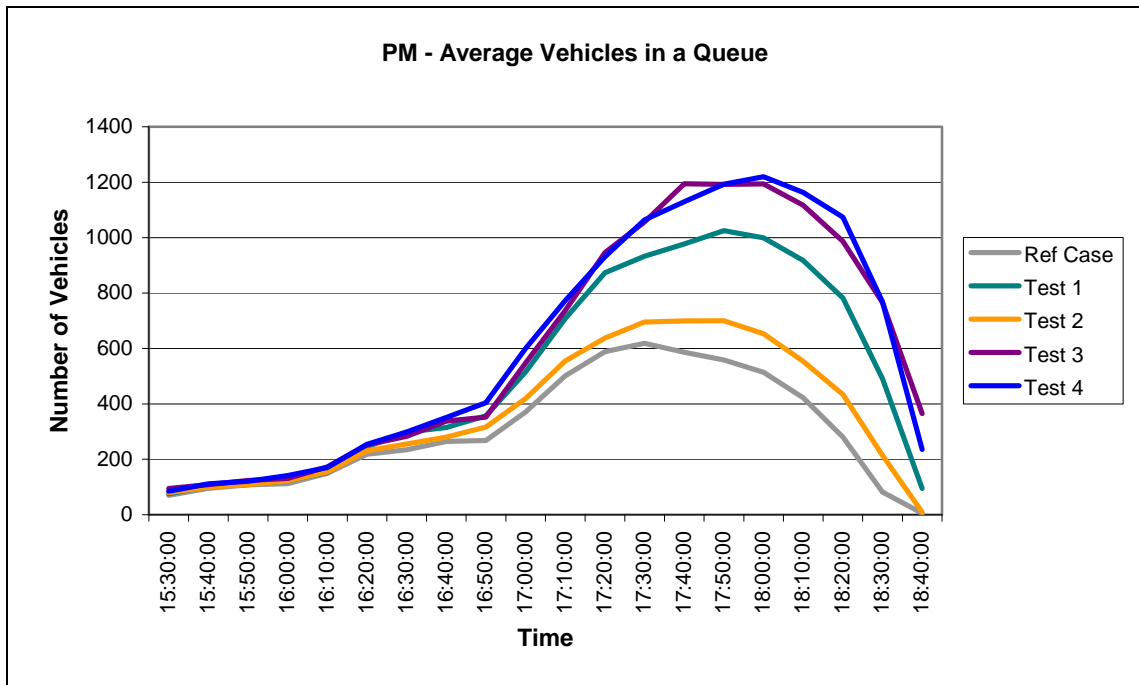


Figure 3.2 : PM Queueing

3.1.4 Figure 3.2 shows a higher number of queued vehicles in the PM peak than the AM, with Tests 3 and 4 reaching 1,200 queued vehicles at 18:00 compared to 600 in the Ref Case.



4 SUMMARY

- 4.1.1 In the 2016 Reference Case, the relocation of trips as a result of the effect of the AWPR has resulted in higher and more prolonged queueing at the Arnhall and Six Mile Fork roundabouts in both the AM and PM peaks. Queueing was also increased on Endeavour Drive and the link road resulting in further problems for traffic exiting Tesco.
- 4.1.2 A more detailed sector analysis of a cordon matrix from ASAM4 would provide a more detailed trip pattern adjustment.
- 4.1.3 Observation of Test 1 (the 2016 Ref Case plus Arnhall Phase 3) has shown an increase in queueing in the PM peak on the B9119 eastbound, the link road northbound, and throughout the Arnhall developments. This leads to traffic re-routeing via the B979 northbound and as a result queue lengths are also higher at this location.
- 4.1.4 Test 2 (the 2016 Ref Case plus addition of 250 houses at Broadshade) showed minimal increases in queue lengths compared to the 2016 Ref Case in both the AM and PM peaks. The number of vehicles re-routeing via Westhill Road was observed to increase from the 2016 Ref Case, by 127 vehicles southbound in the AM peak and 112 vehicles northbound in the PM peak.
- 4.1.5 Test 3 (the 2016 Ref Case plus addition of 500 houses at Broadshade) showed queueing around the Arnhall/Six Mile Fork/Link Road triangle was higher than in Test 2, with significant volumes of traffic unable to exit Tesco (max approximately 370 vehicles compared to 200 in Test 2 and 170 in the Ref Case). Queueing was also higher on the A944 approaching the town from the west.
- 4.1.6 Observation of Test 4 (the 2016 Ref Case plus addition of 250 houses at Broadshade and Arnhall Phase 3) showed a longer southbound queue on the A944 from Six Mile Fork in the AM peak, extending up Westhill Drive. In the PM peak, queueing around the Six Mile Fork/Arnhall area was similar to Test 1, but there was an increase in traffic re-routeing via the B979 northbound and Westhill Road.
- 4.1.7 Due to the congestion at Six Mile Fork and Arnhall Roundabouts, vehicles were observed to reroute via Westhill Road.

