

2021 INTERVENTIONS

SCHEMATIC DETAILS OF INTERVENTIONS

Intervention No. 1 not illustrated

2021 Interventions Locations



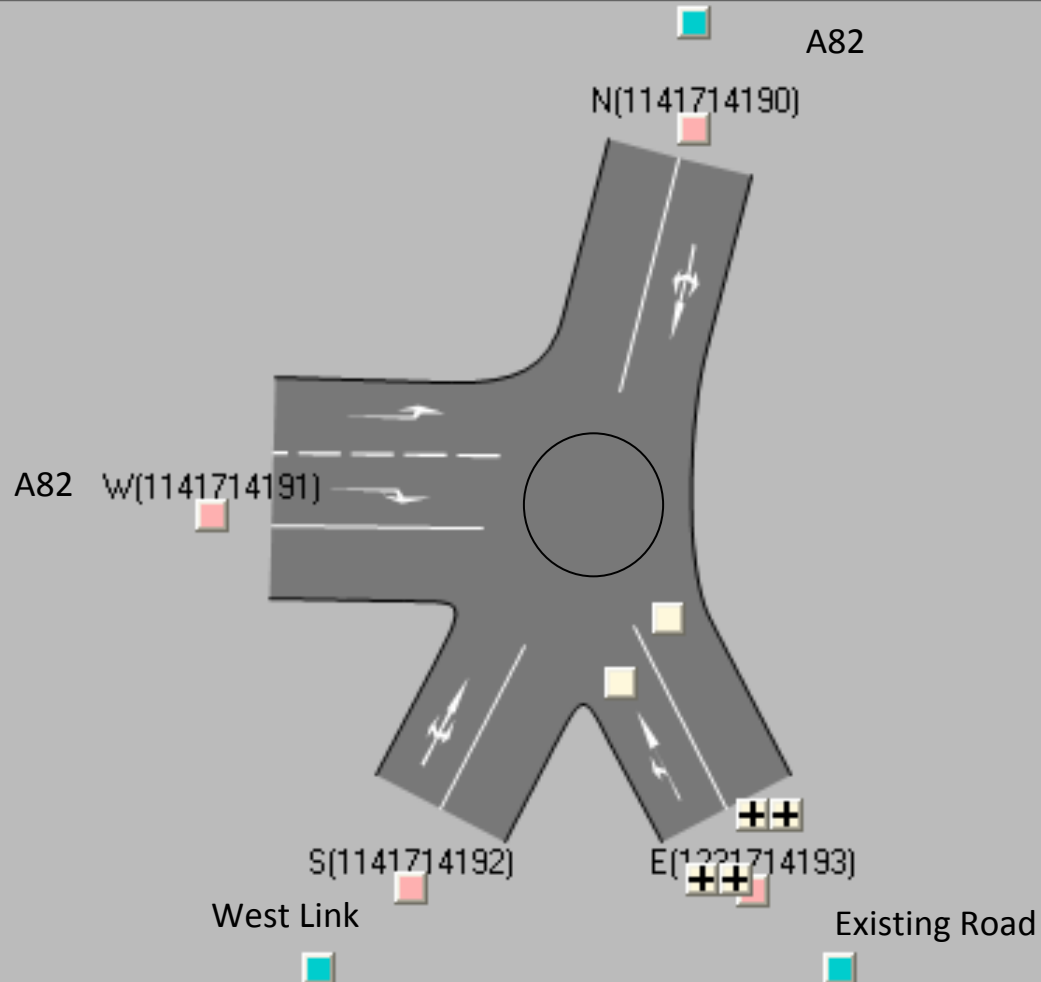
Intervention No. 2

Dores Road Roundabout

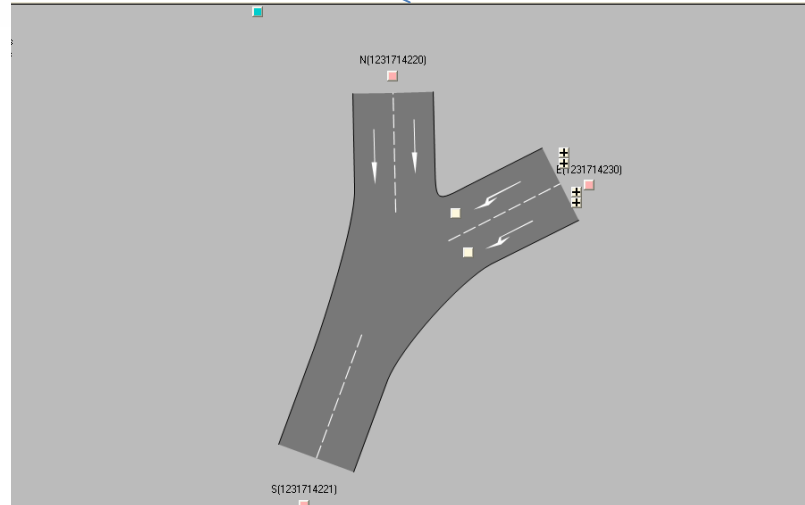
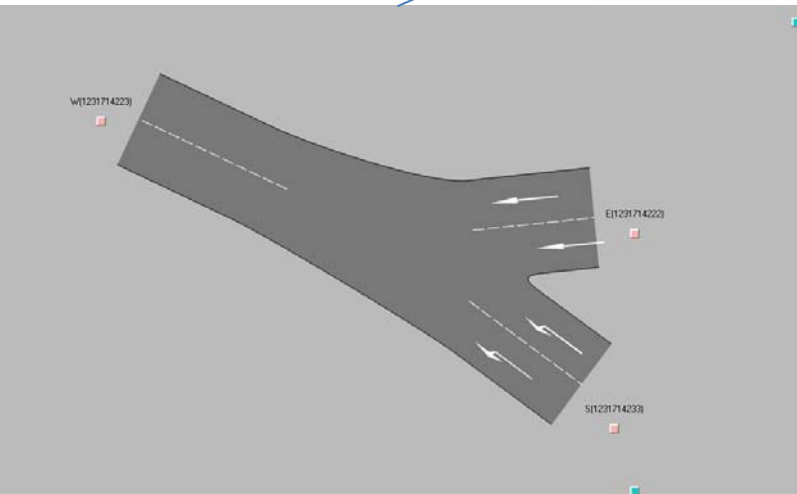
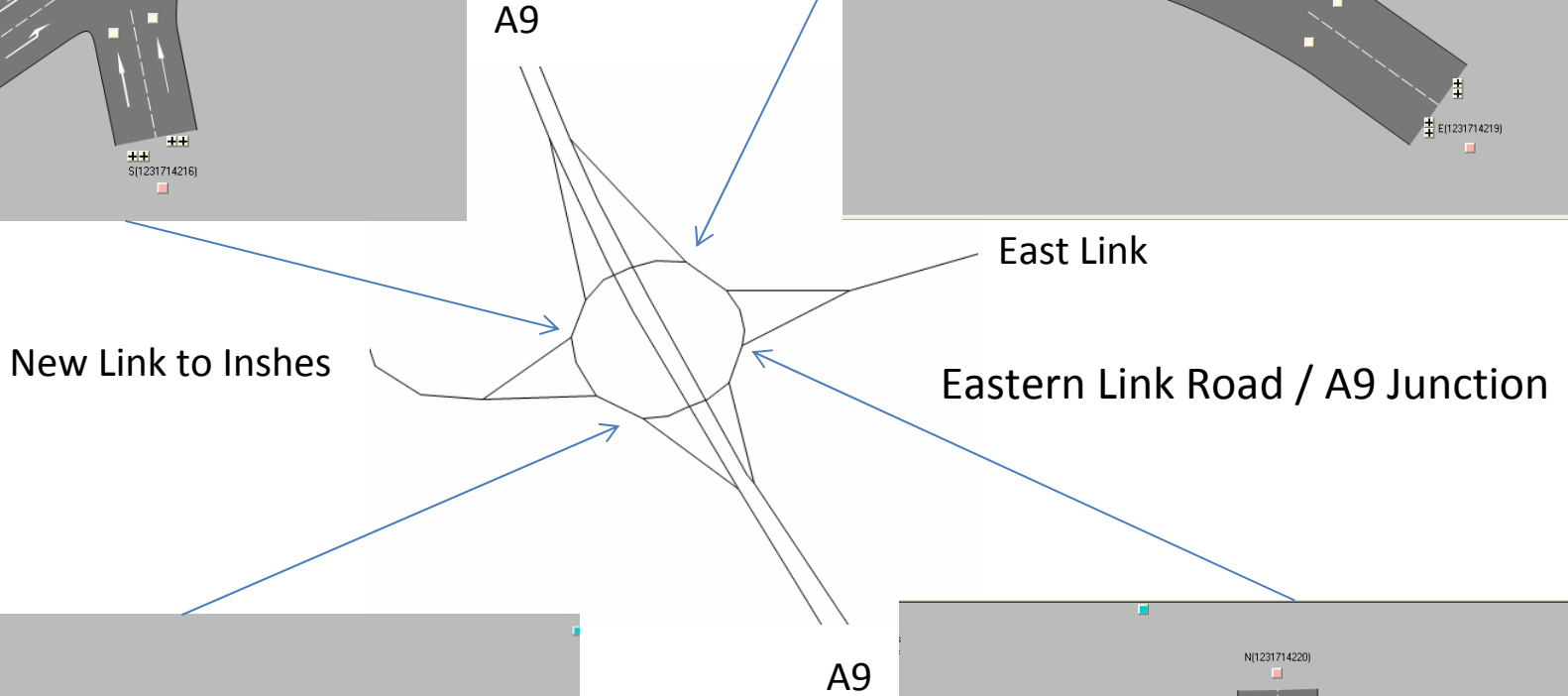
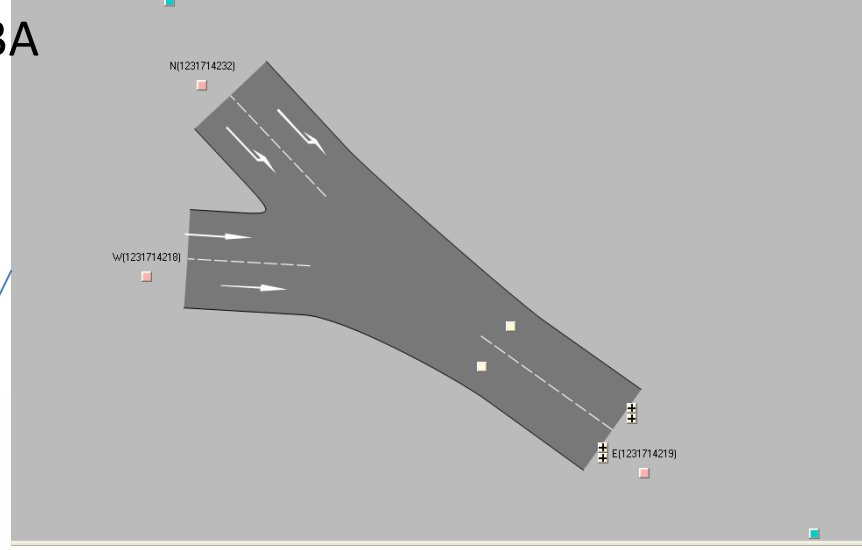
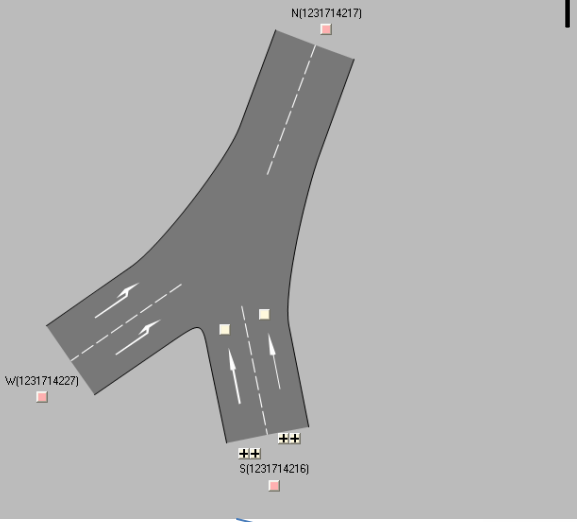


Intervention No. 2 (cont.)

A82 / Western Link Rd Roundabout

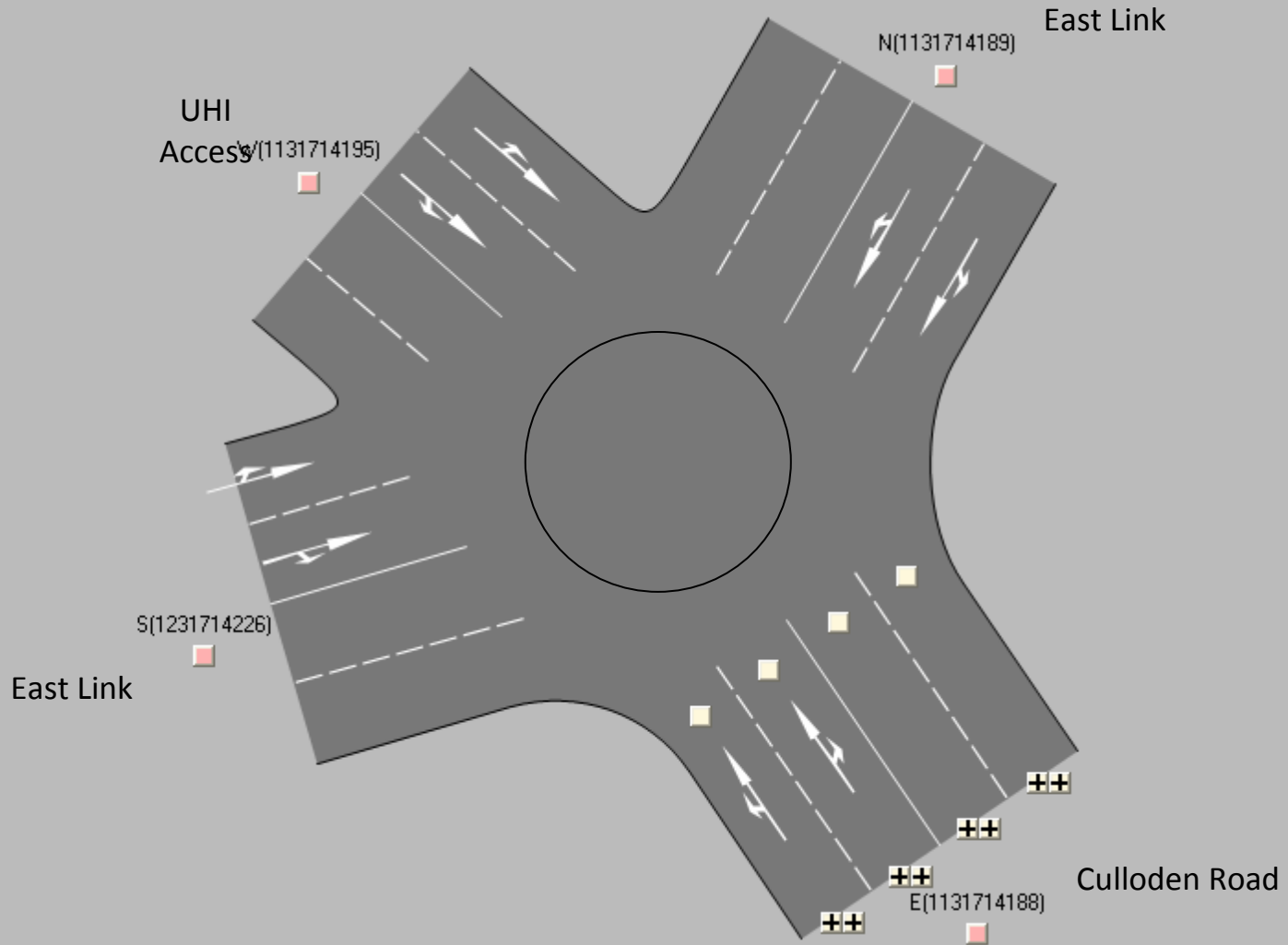


Intervention No. 3A

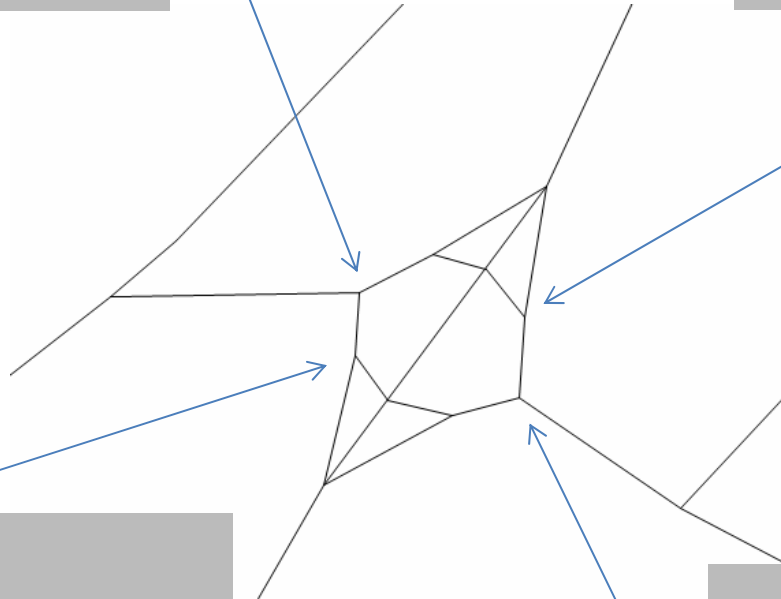
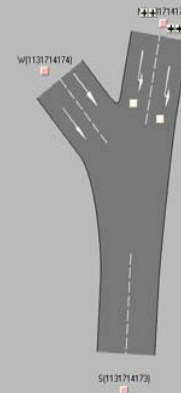
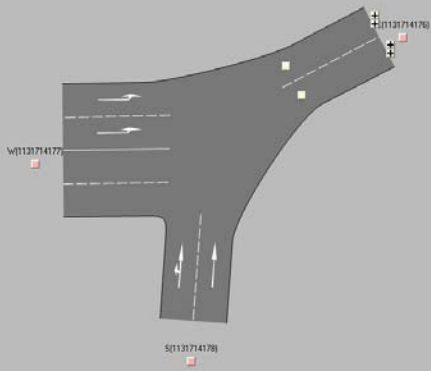


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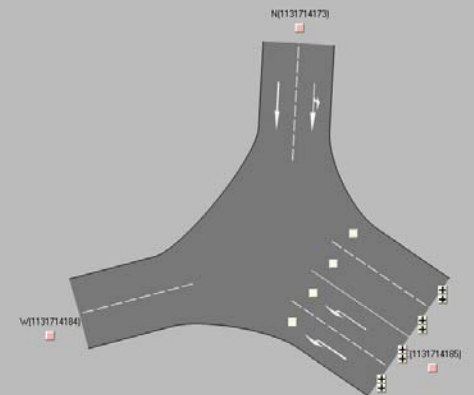
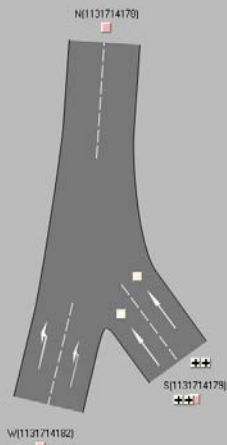
Eastern Link Road / Culloden Road Roundabout



Intervention No. 3A (cont.)

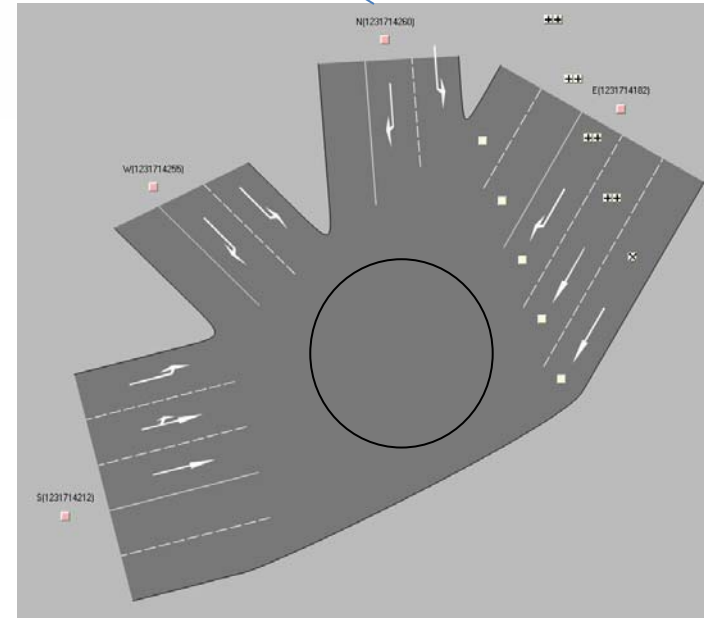
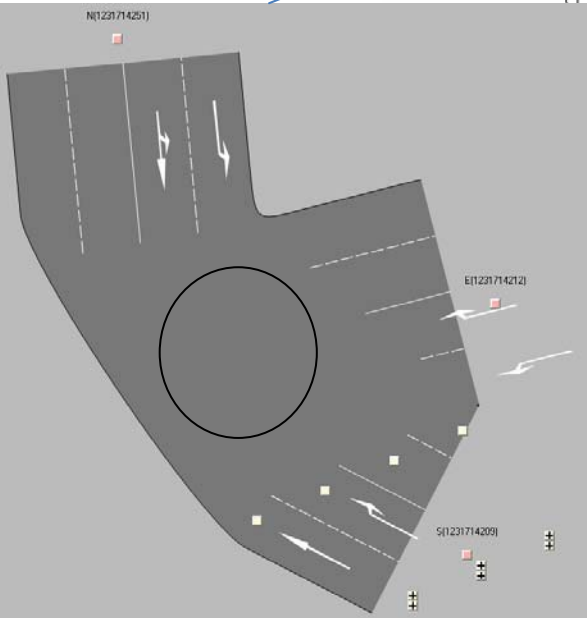
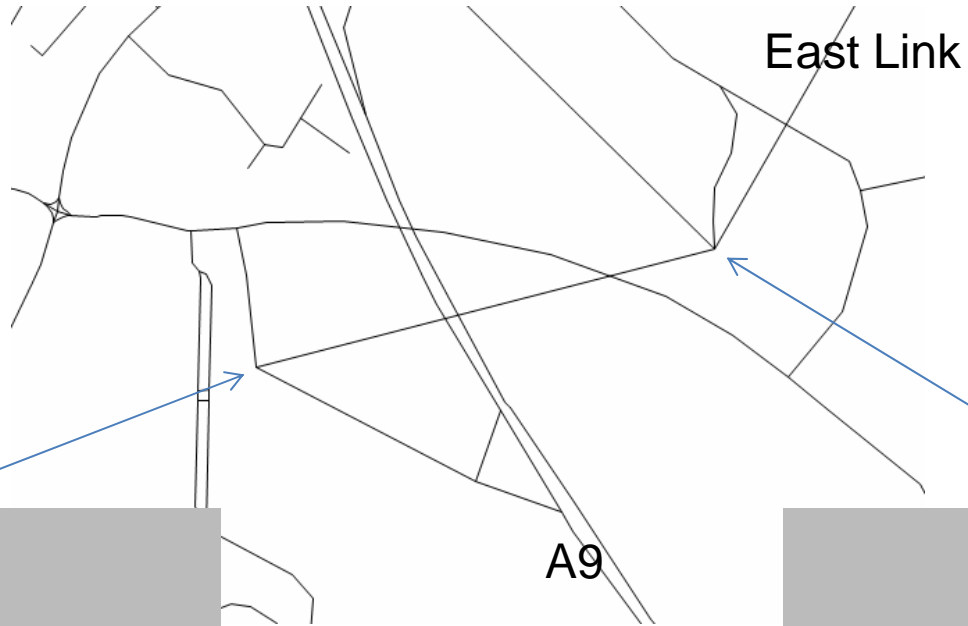


Eastern Link Road / Barn Church Road Junction



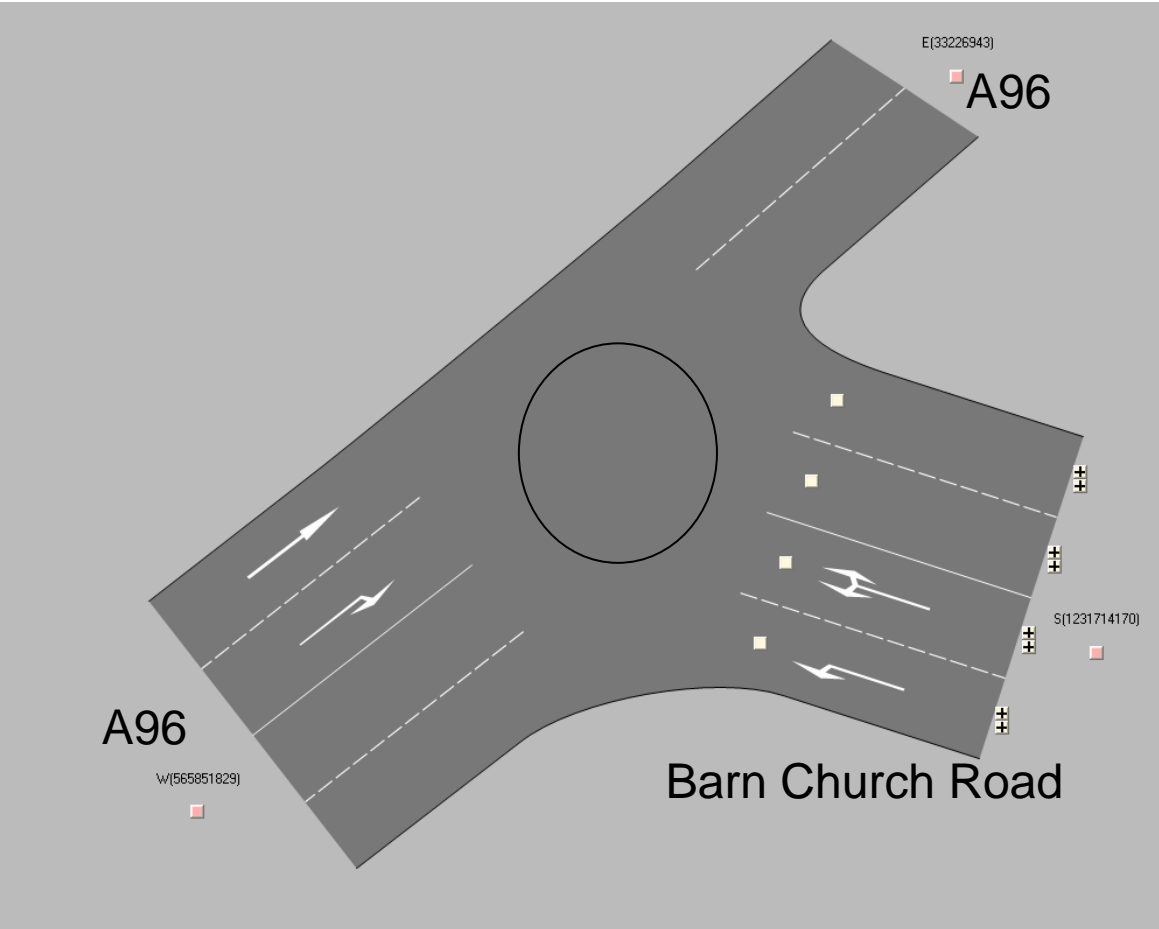
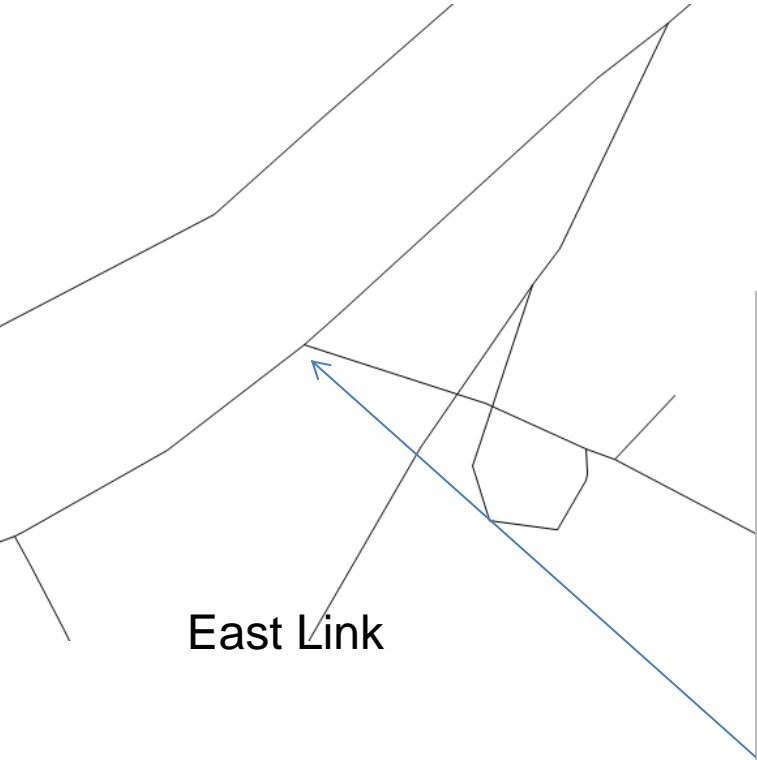
Intervention 3B

Eastern and Western 'Dumbbell' Roundabouts at A9



Intervention 3B (cont.)

Smithton Roundabout



5. Model Development Issues

Existing Inverness College Site

The existing college has not been removed from the site in the 2011 or 2016 projections, even though the new UHI site, incorporating a relocation of Inverness College, may be up and running by that time. The modelling work has assumed that the old college site would give way to another development, and that the new development would have the same flows with origin and destinations remaining the same.

Ness Bridge / Young Street traffic light controlled junction

The modelling work undertaken included an assessment against improvements to the traffic signals at this junction as significant traffic delays were recognised in the modelling reporting.

Modifications to 2021 new roundabouts / grade separated junctions

It should be noted that modifications to gap acceptance and follow up times from their default values have been made on all new junctions in 2021. The justification for these changes is to replicate the new junctions which would have improved characteristics such as visibility, which would in turn improve entry flows. Consistency is paramount therefore the 2021 3A and 3B interventions have had their gap acceptance and follow up time changed to the same values.

6. Transport Scotland Input to Proposed Interventions

The Interventions discussed in chapter 4 of this report were discussed with Transport Scotland. Transport Scotland subsequently reviewed these Interventions and advised that several of the Interventions highlighted by Highland Council could be delivered as their focus for 2016 and 2021 'Do-Something' scenarios, which at this stage they consider as potentially deliverable. However, a number of Interventions on the trunk road network which are highlighted in this report are not included in Transport Scotland's current proposals within this timescale.

7. Summary of Modelling Results - Impact of Interventions on the Network

2016

The modelling results using the Prime Indicator for the AM and PM periods are illustrated on the following plans for 2016.

Development

Housing and Employment is focused in Inverness, particularly at Inverness East and to the south of the city. Development is also progressing at Inverness Airport Business Park and also at the other Local Plan sites in Nairn and the smaller villages.

Change in Traffic Flows

The A96 trunk road and Culloden Road see an increase in traffic by around 300 to 400 vehicles with the 2016 interventions compared with 2009. We also see a general increase on the majority of the network, due to the release of traffic from the Kessock Bridge and the general traffic growth from increased developments between 2009 and 2016.

Level of Service

Improvements are seen in the AM peak most notably the on the A96 and Longman, however Culloden Road and the Inshes Area remain a problem. The PM peak indicates a displacement of poor level of service, with Junctions such as Longman and Smithton improving, while Kenneth Street junctions deteriorate. The main junction to benefit from the improvements is Longman, as the signalisation improves all the performance indicators related to this junction.

Queues

In the AM peak there are queues on the approach to Longman Roundabout and Raigmore. Inshes also indicates a lower level of queuing. Once interventions are introduced, queuing on the approach to Longman Roundabout and Raigmore have been removed. The PM peak also indicates major queuing on the approach to Raigmore and Smithton Roundabout, however this queuing clears once interventions are introduced.

Journey Times

The AM peak indicates that 6 out of the 8 requested journey routes improve, however the PM peak highlights more muted results, with only 3 out of the 8 showing any improvement and 2 indicating no real change.

Link Capacity

Without any major improvements to the actual road capacity, (with the exception of the A96 between Smithton and Inverness Retail Park) there is no real change in Volume/Capacity ratio. The AM peak highlights that Culloden Road link capacity around the

Inshes areas has the highest V/C ratio during this peak. The PM peak highlights higher V/C ratios than the AM peak, with Culloden Road, Longman Road and the A96 being the main areas of concern.

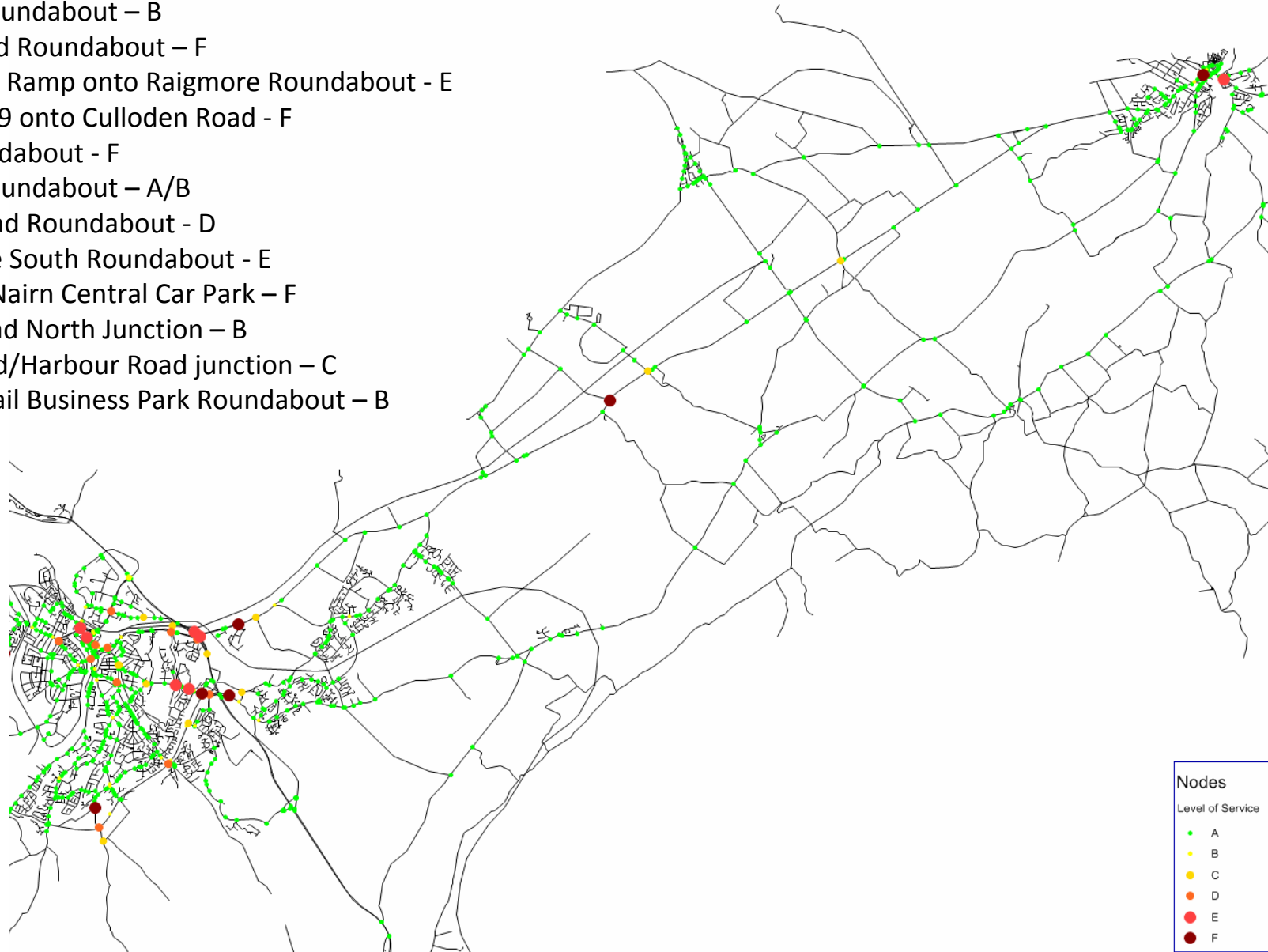
Summary

Interventions have a positive impact, with journey times improving, V/C rates reducing and queues receding. The AM peak benefits more from these improvements than the PM peak. All but one of the journey times in the AM peak show an improvement, whereas the PM peak only indicates 3 out of the 8 journey times improve. When considering the 12 junctions under review, we see a general betterment of Level of Service with the number of LOS F junctions dropping from 7 to 4 in the AM peak and from 6 to 2 in the PM peak.

The major beneficiary of the mitigation measures is the Longman roundabout which sees a substantial drop in queues across the Kessock Bridge, however this release of traffic results in greater flows in the city centre and the A96.

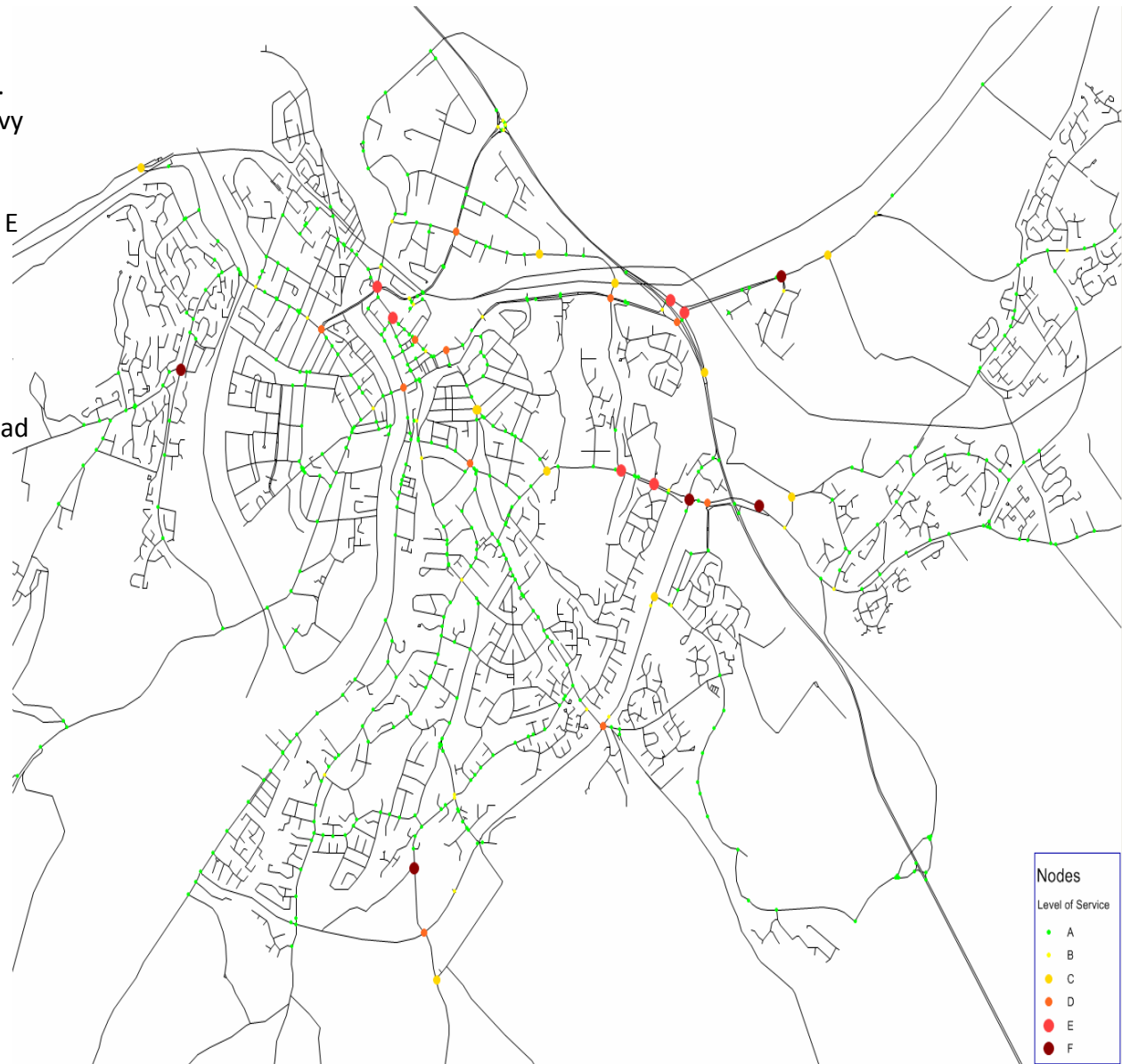
AM 2016 with Interventions introduced

- Smithton Roundabout – B
- West Seafield Roundabout – F
- Southbound Ramp onto Raigmore Roundabout - E
- A9 Slip off A9 onto Culloden Road - F
- Inshes Roundabout - F
- Longman Roundabout – A/B
- Harbour Road Roundabout - D
- Friars Bridge South Roundabout - E
- Junction in Nairn Central Car Park – F
- Caulfield Road North Junction – B
- Seafield Road/Harbour Road junction – C
- Muirton Retail Business Park Roundabout – B



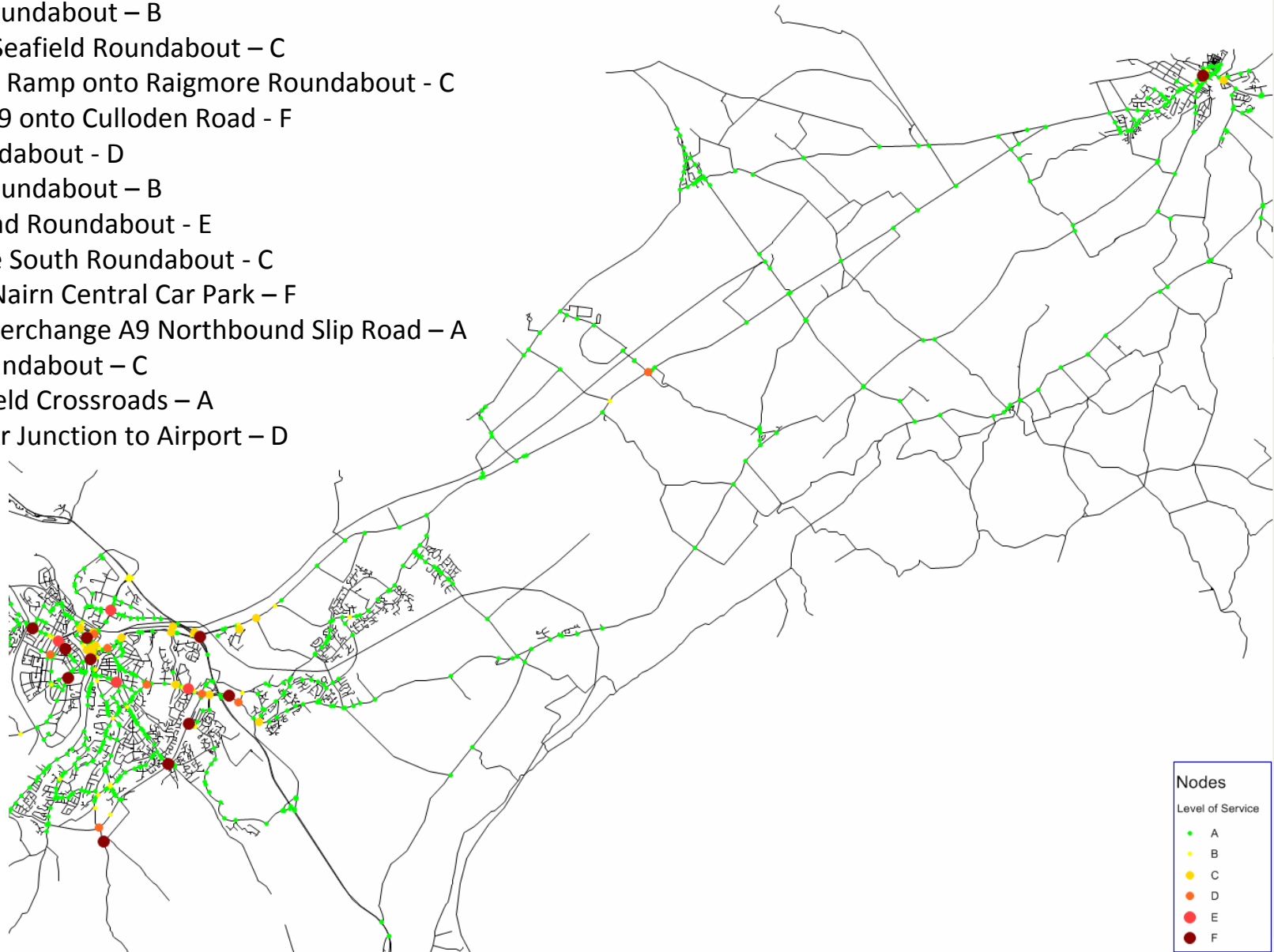
AM 2016 with Interventions in detail

- Smithton Roundabout – Operating satisfactorily.
- Tesco West Seafield Roundabout – F due to heavy eastbound movement ‘cutting’ westbound traffic causing delays.
- Southbound ramp onto Raigmore roundabout – E due to heavy movement from A9 onto Raigmore.
- A9 slip off A9 onto Culloden Road – F due to heavy movement from Culloden/A9 towards city centre.
- Inshes Roundabout – F due to the delay on Westbound traffic turning right from Culloden Road to Beechwood/A96.
- Longman roundabout – Operating satisfactorily.
- Harbour road roundabout – Operating satisfactorily.
- Shore Street roundabout – E due to delay on traffic turning right from Longman Road to Shore Street.
- Junction in Nairn at Central Car Park – F due to signal timings.
- Caulfield Road North Junction – Operating satisfactorily.
- A82 Seafield Road / Harbour Road Junction – Operating satisfactorily.
- Muirton Retail Business Park Roundabout – Operating satisfactorily.



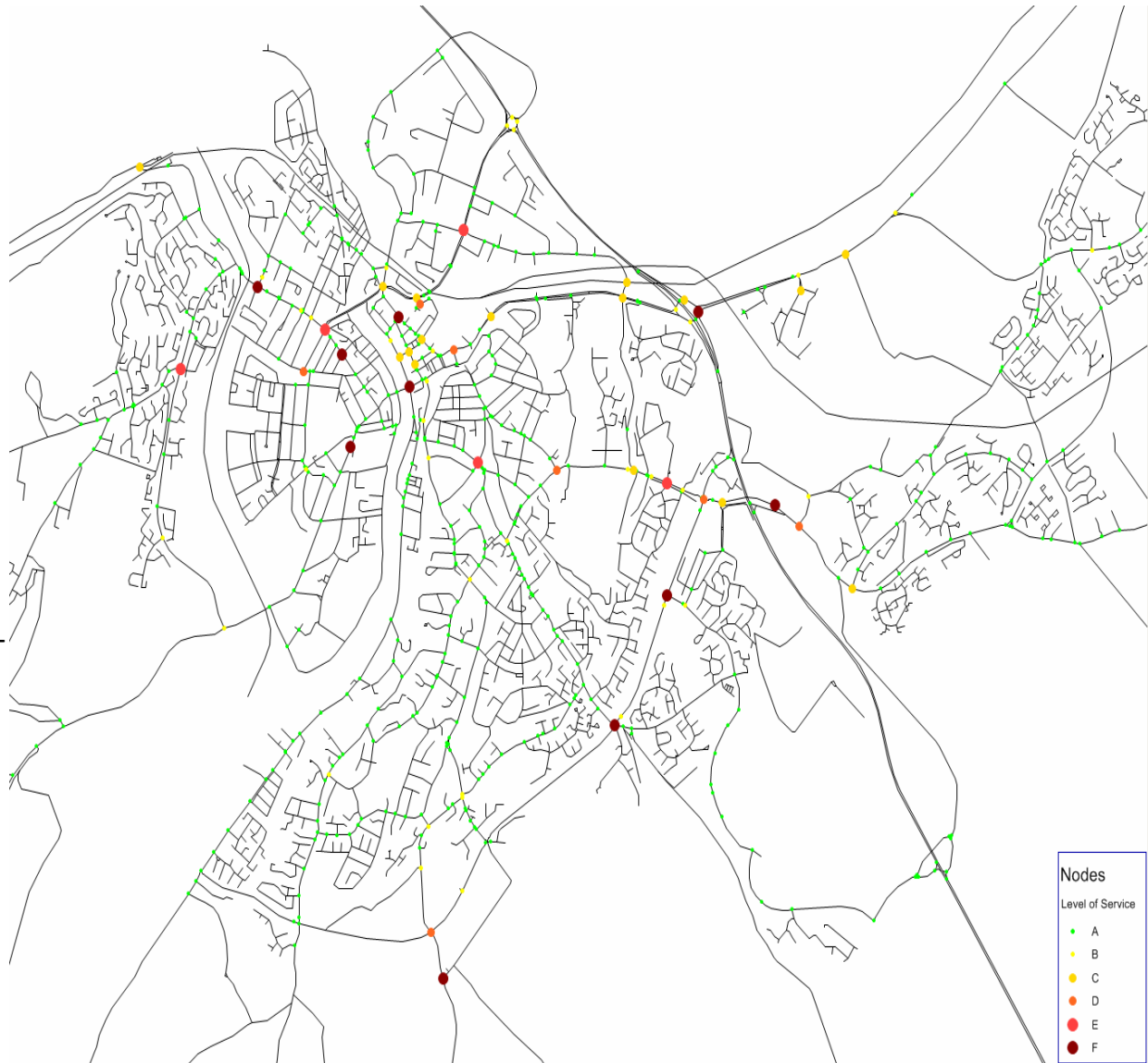
PM 2016 with Interventions introduced

- Smithton Roundabout – B
- Tesco West Seafield Roundabout – C
- Southbound Ramp onto Raigmore Roundabout - C
- A9 Slip off A9 onto Culloden Road - F
- Inshes Roundabout - D
- Longman Roundabout – B
- Harbour Road Roundabout - E
- Friars Bridge South Roundabout - C
- Junction in Nairn Central Car Park – F
- Raigmore Interchange A9 Northbound Slip Road – A
- Millburn Roundabout – C
- A96 Gollanfield Crossroads – A
- A96 Ardersier Junction to Airport – D



PM 2016 with Interventions in detail

- Smithton Roundabout - Operating satisfactorily.
- Tesco West Seafield Roundabout – Operating satisfactorily.
- Southbound ramp onto Raigmore roundabout - Operating satisfactorily.
- A9 slip off A9 onto Culloden Road - F due to limited capacity for westbound traffic.
- Inshes Roundabout – Operating satisfactorily.
- Longman roundabout - Operating satisfactorily.
- Harbour road roundabout - Operating satisfactorily.
- Shore Street roundabout – Operating satisfactorily.
- Junction in Nairn at Central Car Park – F due to signal timings.
- Raigmore Interchange A9 Northbound Slip Road – Operating satisfactorily.
- Millburn Roundabout – Operating satisfactorily.
- A96 Gollanfield Crossroads - Operating satisfactorily.
- A96 Ardersier Junction to Airport - Operating satisfactorily.



2021 Model results including Interventions 1, 2 & 3A

The modelling results using the Prime Indicator for the am and pm periods are illustrated on the following plans for 2021.

Development

Development has again largely been focussed in the city itself, although the Local Plan allocations to the south of the city are now close to being fully built out. The development focus has shifted to the east of the city, with progress now being made at Tornagrain, Whiteness, Nairn and the smaller villages.

Change in Traffic Flows

With the 2021 mitigation measures in place we see a major increase in traffic along the A96. This increase is partly due to increased traffic volumes, but also due to traffic migrating from Culloden road which sees a reduction in traffic, and on some sections traffic volumes revert back to 2009 levels. Similar to the AM peak the interventions have pulled traffic back to the A96 in the PM peak.

Level of Service

The 12 key junctions indicate a general improvement with LOS E and F reducing to C and Ds with the Interventions in place. The majority of improvements are located along Culloden Road due to the drop in traffic flows. The Eastern Link Road has resulted in quicker access to and from the Inshes area and the SDR which both suffer congestion as the preferred route. The PM peak also indicates problems along Kenneth Street, however this is mostly due to minor arm access issues.

Queues

Queuing on the approach to Longman Roundabout, Raigmore and Culloden Road, is removed by the interventions in both peaks. However the PM peak highlights major issues at the Eastern link / Culloden Road Roundabout. This junction has been highlighted as critical and should be examined in micro-simulation. It should be noted that the Eastern link / Culloden Road Roundabout has had gap and follow up times improved to increase saturation flows to replicate better visibility.

Journey Times

The AM peaks indicates an improvement in 7 out of the 8 journey routes, whereas the PM peak indicates improvement on 6 out of the 8 journey routes. It is clear that the interventions are working in both peaks.

Link Capacity

There are major improvements to link capacity for Culloden Road with the Eastern Link Road in place. With improved access, traffic is now able to access the SDR (AM peak) and the A96 (AM and PM peak) more easily, which results in a high V/C ratio. The A96 between Inverness Airport and Nairn indicates a higher ratio of V/C along the A96 due to this section remaining a single lane road.

Summary

Interventions are proving that they have a positive impact, with journey times improving, V/C rates reducing and queues receding. The 2021 mitigation measure indicate better results than those proposed in the 2016, however the PM peak remains an issue. With substantial infrastructure such as the Eastern and Western link road in place, improved access to south Inverness and drops in traffic flows on Culloden road are experienced. The major concern is the Eastern Link Road / Culloden Road proposed roundabout, which needs addressing if this were to be considered. It is noted that the two link roads are not used as a southern bypass, and are mainly a preferred route for accessing developments such as Slackbuie. **Overall the improvements seem to mitigate against the development in 2021.**