North Yorkshire County Council

Business and Environmental Services

Executive Members

14 December 2022

Slingsby Walk Crossing

Report of the Assistant Director Highways and Transportation

1.0 Purpose of Report

1.1 The purpose of this report is to:

i. Advise the Corporate Director Business and Environmental Services (BES) and the Executive Member for Highways and Transportation on work that has been carried out to assess the feasibility of a proposed signalised crossing of Wetherby Road at Slingsby Walk in Harrogate; and

ii. Seek approval for its introduction, subject to the outcomes of the appropriate design and safety considerations.

2.0 Background

Historically, there have been desires to install a formal crossing at Slingsby Walk on Wetherby Road, which were discounted on grounds of concerns over adding to an already existing congestion problem

2.1 Following a request from the Harrogate District Cycle Action (HDCA) group to reconsider providing a crossing at Wetherby Road, officers committed to investigate further. In addition, funding is available from Harrogate Borough Council to implement the scheme and due to the Local Cycling and Walking Infrastructure Plan (LCWIP) work in Harrogate, this crossing location has a strategic purpose and could unlock potential suppressed cycle demand. In December 2021 we commissioned WSP to undertake a preliminary assessment of the operational impacts of providing signalised Toucan crossings on Oatlands Road and the A661 in Harrogate (Appendix A).

3.0 Renewed investigation into a Crossing at Wetherby Road

3.1 A preliminary traffic assessment of upgrading the existing uncontrolled crossing facilities at Slingsby Walk was carried out. This assessment was carried out using the 2023 Visum model flows due to the lack of existing traffic flows at these locations. Visum is a multimodal modelling tool that integrates all relevant modes into one consistent model. The validation of the Visum model at these locations was not to WebTAG, the DfT's transport appraisal process, standards and therefore it was recommended that if progressed to detailed design, then new traffic flows are collected to re-assess the traffic impact of upgrading these crossings. The modelling exercise carried out at this stage though was considered to be sufficient to gain an understanding of the likely traffic impacts.

3.2 The 2023 Visum model was used to assess the wider network traffic impacts of the scheme. The model predicted that even in the worst case, with the toucan crossings being activated every minute, the impacts of the scheme into the rest of the network are likely to be minimal.

3.3 The flows from the Visum model were used to build a traffic signals model of the two crossings, which predicted that even in the worst case the crossings are expected to operate within capacity with minimal delays and queues.

3.4 Following the Stage 1 report, which was focused solely on the Wetherby Road/Slingsby Walk crossing, more recent traffic survey data (April 28, 2022) was obtained, and the crossing was re-evaluated in Stage 2 (Appendix B).

3.5 The Stage 2 report concluded that the analysis undertaken as part of the study showed that a signalised crossing can operate within capacity in both the AM and PM Peak with a crossing demand once every 60 seconds through the peak hour (on average).

3.6 On a fixed time basis, local junction modelling also showed that in the 2038 AM Peak scenario the crossing could operate on a 38 second cycle time (approximately 95 demands an hour) and that the 2038 PM Peak scenario could operate on a 34 second cycle time (approximately 105 demands an hour). The local junction modelling results set out the operational impact of the proposed signalised crossings based on a range of assumptions and should be considered alongside the benefits provided by the safe provision of an additional crossing facility in this location.

3.7 In summary, the WSP report concludes that the local junction modelling shows that the proposals will not adversely impact network operation. A signalised crossing has been put forward as the preferred option to give pedestrians and cyclists, particularly those with mobility or visual impairment, a safer crossing space. Unsignalised crossings, such as zebra crossings are best suited to areas with low traffic volumes.

4.0 Officer discussion

4.1 Although the model does not indicate that the network is over capacity at this location, there are officer concerns regarding existing traffic congestion on this section of Wetherby Road, e.g. there is already a notable peak time capacity issue and generally considered to be already over capacity, that the modelling does not confirm. It is clear that any additional crossing will place extra pressure on the network but that this needs to be weighed up against the benefit that it will give to pedestrians and cyclists that already use this crossing location and those that would if there was a formal crossing.

4.2 The existing crossing at the hospital access and the potential impact of operating a second closely associated crossing acting independently has been modelled. The modelling indicated that within 10 years the queue length at the proposed crossing at Slingsby Walk would extend through the existing crossing. Additionally, the opposing queue extending back toward the Prince of Wales roundabout could have a significant and strategic impact on its operation and subsequently the wider network. There is already a strong direction of travel towards encouraging sustainable transport, which over the next 10 years is only likely to increase with the transition towards net zero and this may mean that traffic growth is less than current predictions.

4.3 Officers have been working on a series of zone plans produced in conjunction with HDCA. These zone plans have been worked on by officers across all of the relevant disciplines, but they have not been submitted to BES Executive members for approval. The need for a crossing of Wetherby Road at Slingsby Walk is included in these documents. A prioritisation methodology agreed by BES Executive Members in May 2022 has been used to assess the priority of the potential schemes within the zone maps.

4.4 Slingsby Walk ranks 30th out of 160 in terms of expected cycle growth and zone 4, which includes Slingsby Walk, is third out of 24 in terms of potential for cycle growth. Slingsby Walk is therefore, considered to be strategically important due to its location near to a hospital, schools and as an off road link with routes to the town centre, stray and train station. Slingsby Walk shows a potential to have more than double the amount of cyclists from the existing baseline of users under the government target for increased cycle use in the Propensity to Cycle Tool (PCT). The permanent cycle count on Slingsby Walk shows that on a single day in 2021, 84 cyclists were counted; given the route's geography, it is highly likely that most of these cyclists reached the A661 at the proposed crossing point location. The proposed crossing is thought to satisfy a key desire line for present and future cyclists.

5.0 Conclusion

5.1 In conclusion, any additional crossing of the A661 Wetherby Road will likely cause further delays for people travelling on the road. It is felt, however, that the signalised crossing would be of benefit to pedestrians and cyclists and the safety and movement of vulnerable road users should be prioritised in this location in order to achieve a better balance between travel modes. The implementation of the crossing will be subject to a satisfactory detailed design and safety audit.

6.0 Equalities

6.1 The approval to proceed with detailed design and a safety audit will not have any impact on equalities. If a crossing is implemented this will have a positive impact on particular protected characteristics as a signalised crossing will be of most benefit to users with a mobility or visual impairment. See Appendix C.

7.0 Legal

7.1 Consideration has been given to any legal implications in delivering a signalised crossing and there are no requirements at this stage.

8.0 Climate Change

8.1 Implementation of a signalised crossing could have a positive impact on climate change if its introduction encourages more people to walk and cycle. See Appendix D.

9.0 Finance

9.1 Funding of £75,000 from Harrogate Borough Council's sustainable transport budget has been approved to fund the works on Wetherby Road at Slingsby Walk. Should this scheme be approved, the next steps would be to undertake feasibility work and design, which will help inform whether £75,000 will be sufficient. Following design work, should the estimated costs exceed current budget availability, a value for money consideration would be made at the time, as part of the usual governance process for and management of the LTP capital works programme to inform a decision of whether to go ahead or not, as the Local Transport Plan (LTP) capital allocation would need to cover any gap in funding or potential overspend.

10.0 Recommendations

10.1 It is recommended that the Corporate Director Business and Environmental Services (BES) and the BES Executive Member for Highways and Transportation approves a controlled crossing of Wetherby Road at Slingsby Walk subject to the appropriate design and safety audit requirements being met and sufficient funding being in place.

BARRIE MASON
Assistant Director – Highways and Transportation

Author: Louise Neale

Background documents: None

TECHNICAL NOTE 1

DATE:	07 February 2022	**CONFIDENTIALITY:**	Restricted
SUBJECT:	Slingsby Walk Toucan Crossings – Preliminary Traffic Assessment		
PROJECT:	70090992	**AUTHOR:**	IG
CHECKED:	AF	**APPROVED:**	CD

INTRODUCTION

North Yorkshire County Council has requested WSP to undertake a preliminary assessment of the operational impacts of providing signalised Toucan crossings on Oatlands Road and the A661 in Harrogate. The location of these potential crossings is shown below.

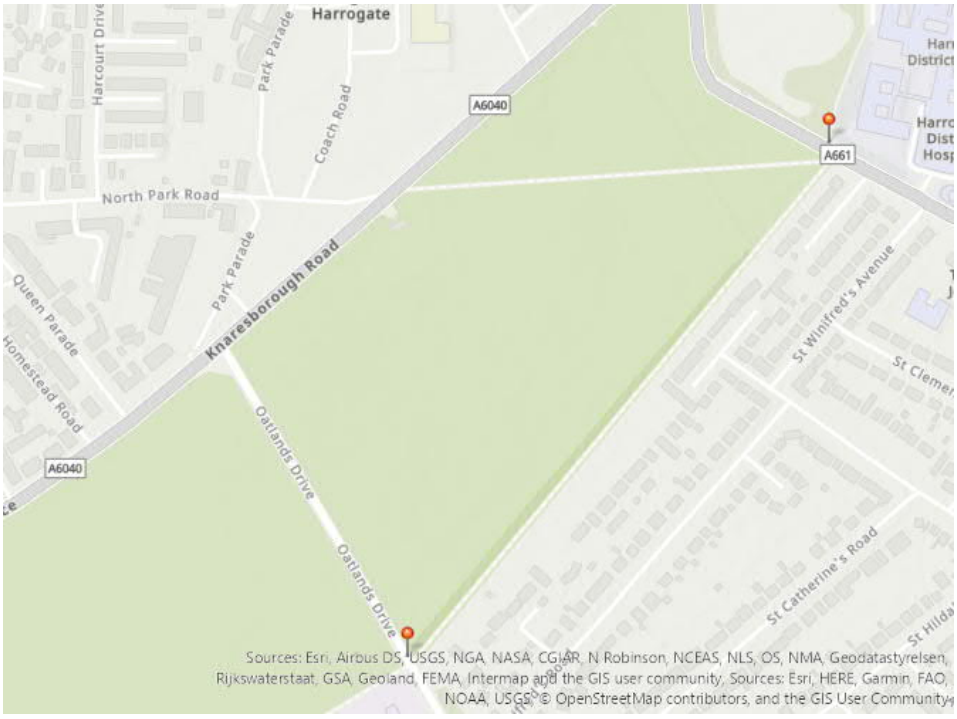


Figure 1 Potential Locations of the Toucan Crossings

METHODOLOGY

There are several existing transport models of Harrogate, including:

- Microsimulation Paramics Discovery model
- Strategic Visum model

The Paramics Discovery model would be the best tool to assess the operational performance of the crossings and the wider impact of the proposed crossings. However, these crossings are located outside the modelled area of the Paramics Discovery model. Therefore, it is proposed that the Visum model be used to assess the wider impacts of the proposed crossings and a new LinSig model be used to assess the operational performance of the scheme.

It is acknowledged that the Visum model does not validate well in the study area and therefore the traffic flows may not be an accurate representation of reality. To mitigate this risk of using lower flows, it is recommended that the 2023 Visum model is used for the assessment.

The wider network traffic impacts have been assessed using the 2023 Visum model, with the Station Gateway TCF scheme in place. For consistency, the new LinSig model has been calibrated using the traffic flows from the Visum model.

There is insufficient pedestrian flow data to estimate the frequency of the crossings and the duration that traffic would be held on red. For this reason, a sensitivity test has been carried out to assess the traffic impact of the crossings with a cycle time of 1min, 2 mins and 3 mins. This methodology allows identification of the possible traffic impacts of the scheme in various situations.

WIDER NETWORK IMPACTS

The 2023 Visum model with the Station Gateway TCF scheme in place has been used to assess the possible network impacts of upgrading the existing uncontrolled crossing facilities to a Toucan Crossing of Slingsby Walk at the A661 and Oatlands Drive.

Fixed signal times have been modelled with the following times:

- Cycle time: 3 tests with 60 sec, 120 sec and 180 sec.
- Traffic to pedestrians intergreen: 6 secs.
- Pedestrians to traffic intergreen: 9 secs.
- Minimum pedestrians green time: 5 secs.

Plans showing the traffic flow differences for the 3 scenarios for both AM and PM periods are in Appendix A. These plans show that traffic reassignment from Oatlands Drive is likely to be minimal in all 3 scenarios. Traffic reassignment from the A661 Wetherby Road is also likely to be minimal, except in the worst case that the crossing is activated every minute. In this case, the additional delays are likely to cause that around 30 vehicles will reassign to a different route, being the A59 the most attractive route. This reassignment is likely to cause a negligible impact on the alternative routes.

OPERATIONAL PERFORMANCE

The traffic flows from the 2023 Visum model with the Station Gateway TCF scheme have been used to develop a new LinSig model of the two new proposed Toucan Crossings. The same signal time assumptions described above have been applied to the LinSig model. Full details of this model can be found in Appendix B.

A summary of the model results (Degree of Saturation, Delays and Mean Maximum Queues) can be found in Tables 1 and 2 for the AM and PM respectively.

Table 1 LinSig summary results (AM)

	60 sec			120 sec			180 sec		
ROAD	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)
Oatlands Dr WB	7.4%	4.8	0.5	6.0%	2.8	0.5	5.7%	2.2	0.5
Oatlands Dr EB	18.0%	5.2	1.4	14.6%	3.1	1.4	13.7%	2.4	1.4
A661 WB	52.1%	7.7	5.7	42.3%	4.4	5.5	39.8%	3.4	5.5
A661 EB	72.7%	11.3	10.5	59.0%	5.9	9.9	55.5%	4.5	9.8

Table 2 LinSig summary results (PM)

	60 sec			120 sec			180 sec		
ROAD	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)
Oatlands Dr WB	6.9%	4.7	0.5	5.6%	2.8	0.5	5.3%	2.2	0.5
Oatlands Dr EB	31.0%	5.9	2.8	25.1%	3.5	2.7	23.7%	2.7	2.7
A661 WB	68.3%	10.2	9.2	55.4%	5.5	8.8	52.2%	4.2	8.7
A661 EB	57.0%	8.3	6.7	46.3%	4.7	6.5	43.5%	3.6	6.4

The LinSig model results show that the Toucan crossing on Oatlands Drive is likely to have negligible impacts on traffic even if the crossing is activated once every cycle. The crossing on the A661 is likely to have bigger traffic impacts than the other one, but it is still likely to operate with spare capacity and the average delays and queues are likely to be manageable.

SUMMARY

A preliminary traffic assessment of upgrading the existing uncontrolled crossing facilities at Slingsby Walk (see Figure 1) has been carried out. This assessment has been carried out using the 2023 Visum model flows due to the lack of existing traffic flows at these locations. The validation of the Visum model at these locations is not to WebTAG standards and therefore it is recommended that if progressed to detailed design, then new traffic flows are collected to re-assess the traffic impact of upgrading these crossings. However, the modelling exercise carried out at this stage is considered to be sufficient to gain an understanding of the likely traffic impacts.

The 2023 Visum model has been used to assess the wider network traffic impacts of the scheme. The model predicts that even in the worst case, with the toucan crossings being activated every minute, the impacts of the scheme into the rest of the network are likely to be minimal.

The flows from the Visum model have been used to build a LinSig model of the two crossings. The LinSig model predicts that even in the worst case the crossings are expected to operate within capacity with minimal delays and queues.

APPENDIX A: TRAFFIC FLOW DIFFERENCES

Figure 2 Traffic flow differences with 60 sec cycle time (AM)

Figure 3 Traffic flow differences with 60 sec cycle time (PM)

Figure 4 Traffic flow differences with 120 sec cycle time (AM)

Figure 5 Traffic flow differences with 120 sec cycle time (PM)

Figure 6 Traffic flow differences with 180 sec cycle time (AM)

Figure 7 Traffic flow differences with 180 sec cycle time (PM)

APPENDIX B: LINSIG MODEL RESULTS

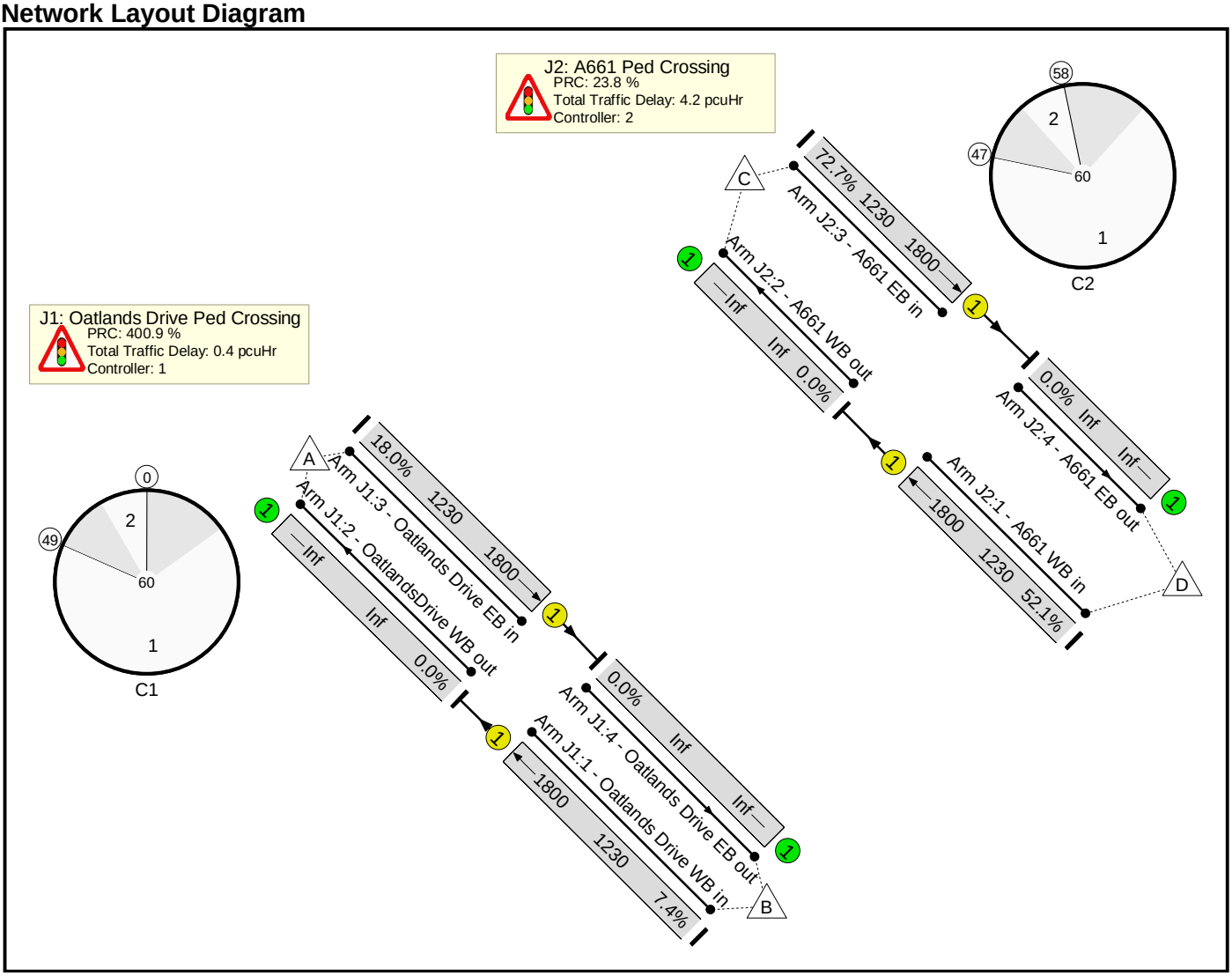
Basic Results Summary

User and Project Details

Project:	**70090992**
Title:	**Slingsby Walk Toucan Crossings**
Location:	Harrogate
Additional detail:	
File name:	Slingsby Walk.lsg3x
Author:	IG
Company:	WSP
Address:	

Scenario 1: '2023 AM 60 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

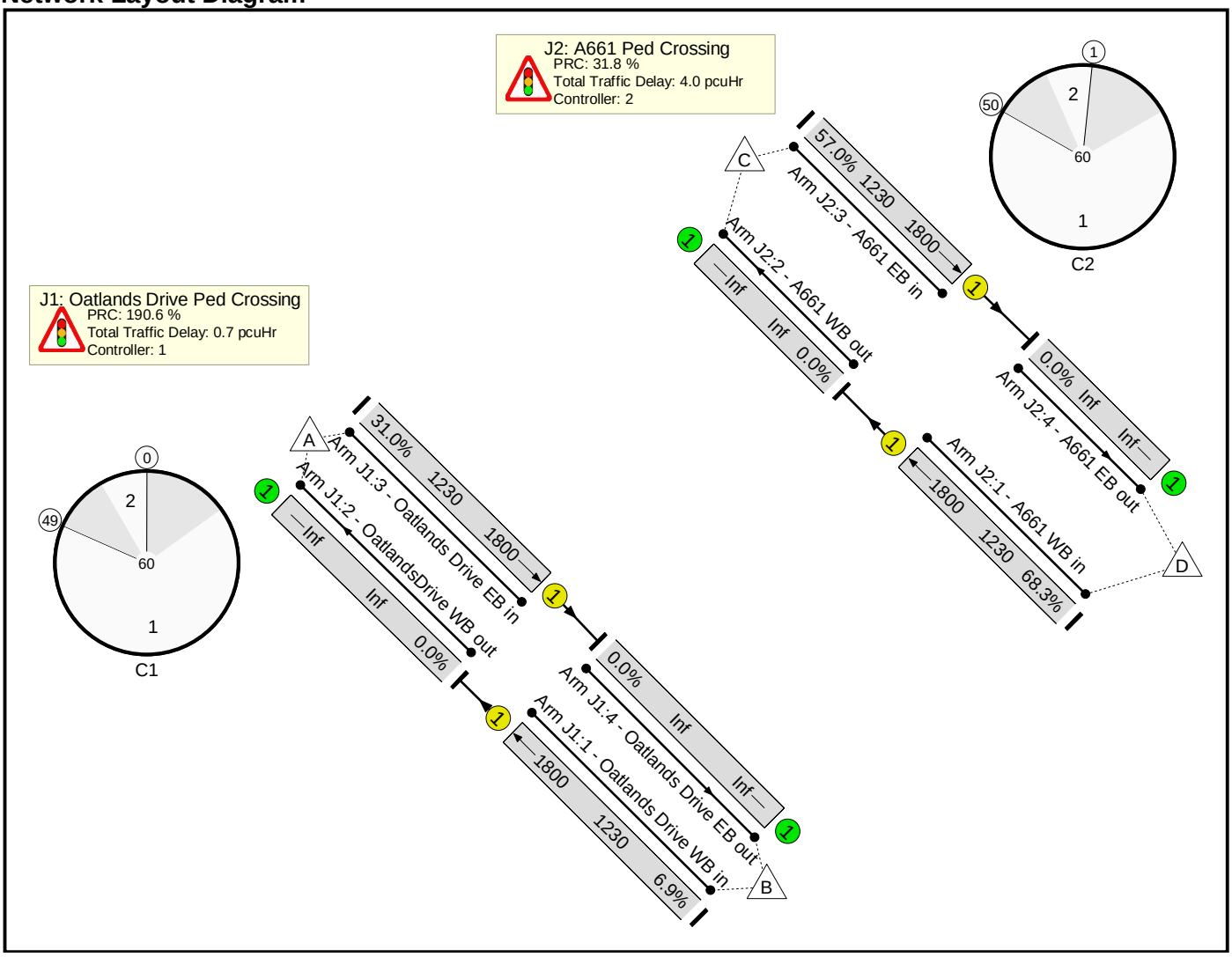
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**72.7%**	**0**	**0**	**0**	**4.6**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**18.0%**	**0**	**0**	**0**	**0.4**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	40	-	91	1800	1230	7.4%	-	-	-	0.1	4.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	40	-	221	1800	1230	18.0%	-	-	-	0.3	5.2	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**72.7%**	**0**	**0**	**0**	**4.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	40	-	641	1800	1230	52.1%	-	-	-	1.4	7.7	5.7
3/1	A661 EB in Ahead	U	C2:A		1	40	-	894	1800	1230	72.7%	-	-	-	2.8	11.3	10.5

C1	PRC for Signalled Lanes (%):	400.9	Total Delay for Signalled Lanes (pcuHr):	0.44	Cycle Time (s): 60
C2	PRC for Signalled Lanes (%):	23.8	Total Delay for Signalled Lanes (pcuHr):	4.18	Cycle Time (s): 60
	PRC Over All Lanes (%):	23.8	Total Delay Over All Lanes(pcuHr):	4.62	

Basic Results Summary

Scenario 2: '2023 PM 60 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

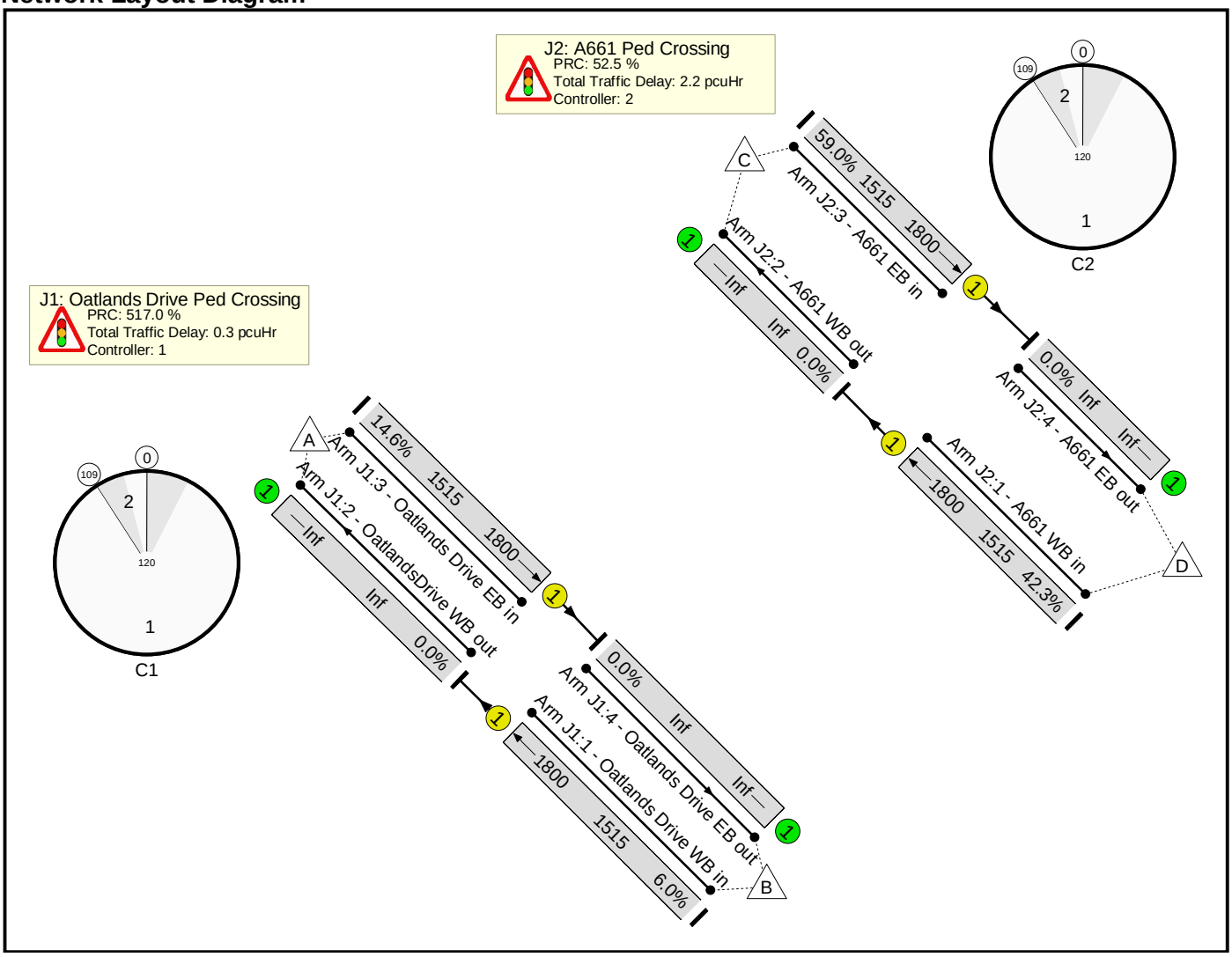
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**68.3%**	**0**	**0**	**0**	**4.7**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**31.0%**	**0**	**0**	**0**	**0.7**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	40	-	85	1800	1230	6.9%	-	-	-	0.1	4.7	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	40	-	381	1800	1230	31.0%	-	-	-	0.6	5.9	2.8
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**68.3%**	**0**	**0**	**0**	**4.0**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	40	-	840	1800	1230	68.3%	-	-	-	2.4	10.2	9.2
3/1	A661 EB in Ahead	U	C2:A		1	40	-	701	1800	1230	57.0%	-	-	-	1.6	8.3	6.7

C1	PRC for Signalled Lanes (%):	190.6	Total Delay for Signalled Lanes (pcuHr):	0.74	Cycle Time (s): 60
C2	PRC for Signalled Lanes (%):	31.8	Total Delay for Signalled Lanes (pcuHr):	4.01	Cycle Time (s): 60
	PRC Over All Lanes (%):	31.8	Total Delay Over All Lanes(pcuHr):	4.75	

Basic Results Summary

Scenario 3: '2023 AM 120 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

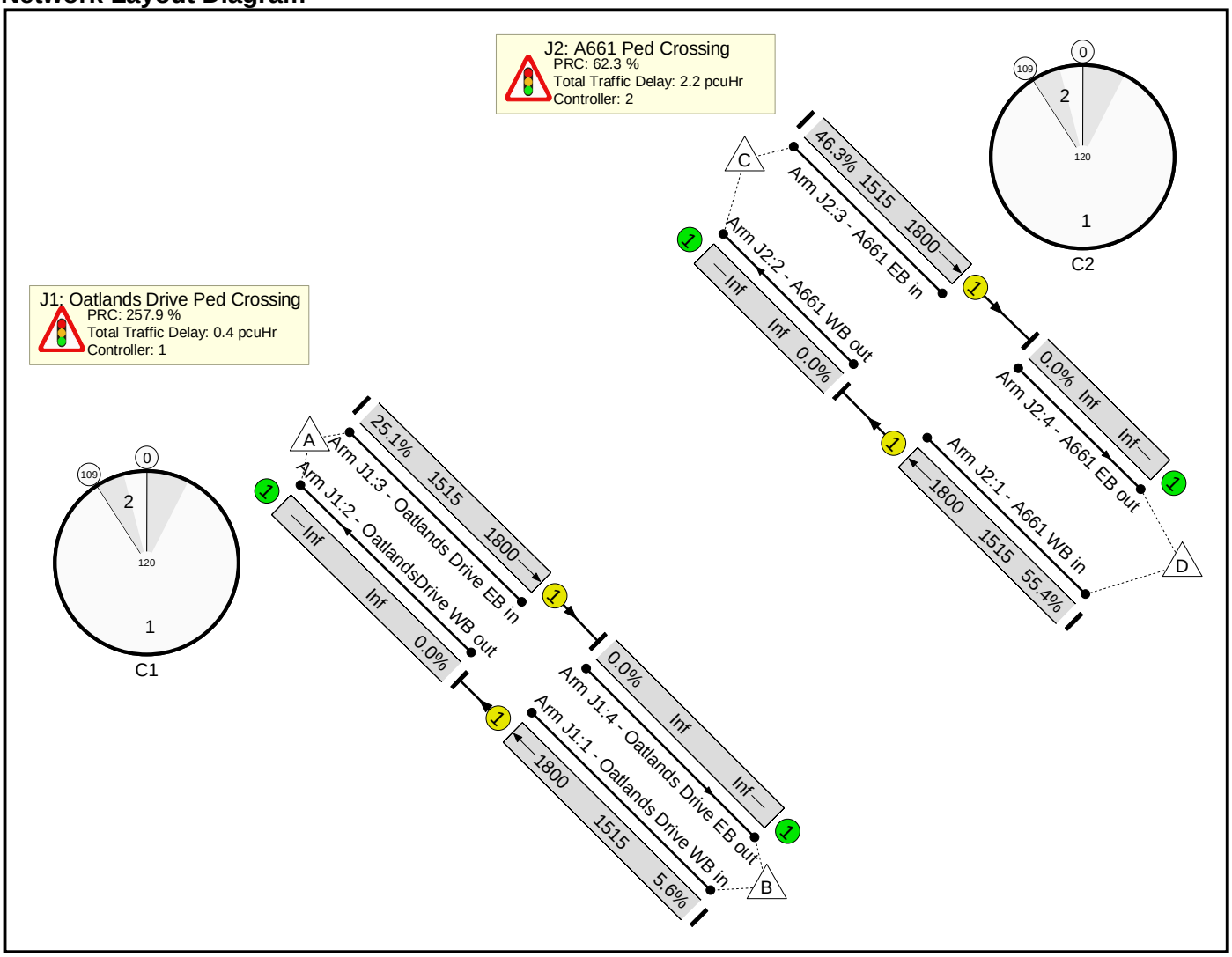
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**59.0%**	**0**	**0**	**0**	**2.5**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**14.6%**	**0**	**0**	**0**	**0.3**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	100	-	91	1800	1515	6.0%	-	-	-	0.1	2.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	100	-	221	1800	1515	14.6%	-	-	-	0.2	3.1	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**59.0%**	**0**	**0**	**0**	**2.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	100	-	641	1800	1515	42.3%	-	-	-	0.8	4.4	5.5
3/1	A661 EB in Ahead	U	C2:A		1	100	-	894	1800	1515	59.0%	-	-	-	1.5	5.9	9.9

C1	PRC for Signalled Lanes (%):	517.0	Total Delay for Signalled Lanes (pcuHr):	0.26	Cycle Time (s): 120
C2	PRC for Signalled Lanes (%):	52.5	Total Delay for Signalled Lanes (pcuHr):	2.24	Cycle Time (s): 120
	PRC Over All Lanes (%):	52.5	Total Delay Over All Lanes(pcuHr):	2.51	

Basic Results Summary

Scenario 4: '2023 PM 120 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

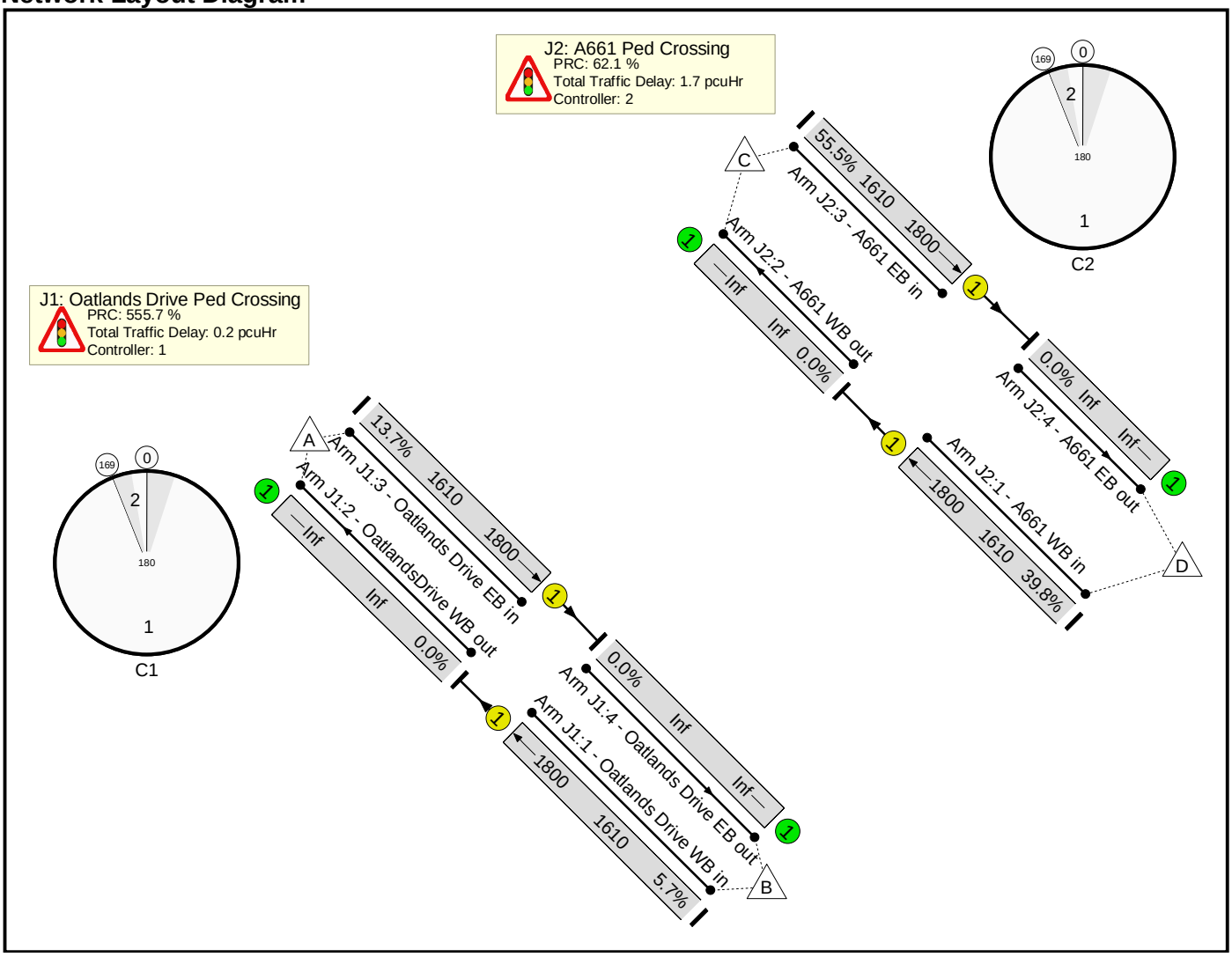
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**55.4%**	**0**	**0**	**0**	**2.6**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**25.1%**	**0**	**0**	**0**	**0.4**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	100	-	85	1800	1515	5.6%	-	-	-	0.1	2.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	100	-	381	1800	1515	25.1%	-	-	-	0.4	3.5	2.7
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**55.4%**	**0**	**0**	**0**	**2.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	100	-	840	1800	1515	55.4%	-	-	-	1.3	5.5	8.8
3/1	A661 EB in Ahead	U	C2:A		1	100	-	701	1800	1515	46.3%	-	-	-	0.9	4.7	6.5

C1	PRC for Signalled Lanes (%):	257.9	Total Delay for Signalled Lanes (pcuHr):	0.44	Cycle Time (s): 120
C2	PRC for Signalled Lanes (%):	62.3	Total Delay for Signalled Lanes (pcuHr):	2.19	Cycle Time (s): 120
	PRC Over All Lanes (%):	62.3	Total Delay Over All Lanes(pcuHr):	2.63	

Basic Results Summary

Scenario 5: '2023 AM 180 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

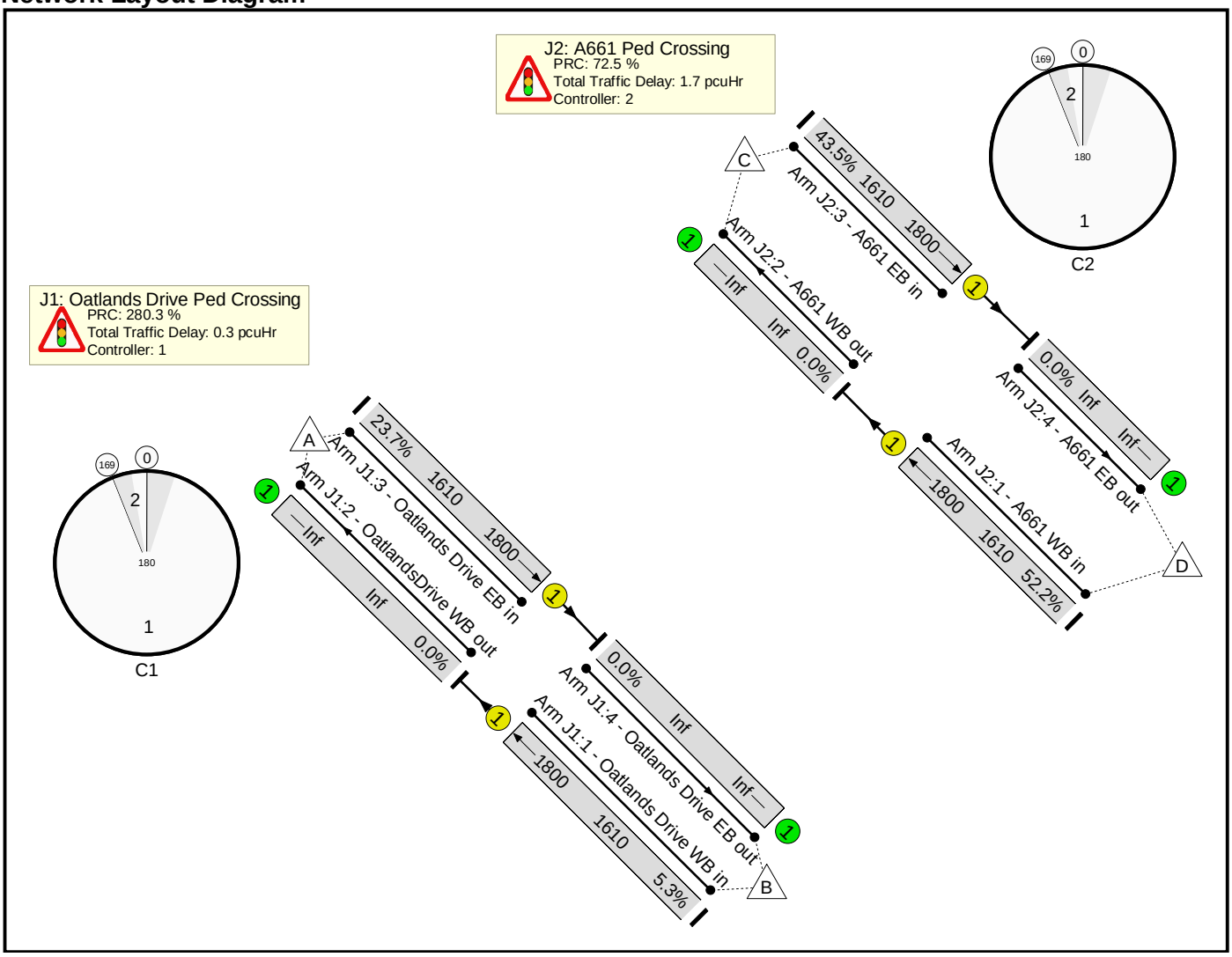
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**55.5%**	**0**	**0**	**0**	**1.9**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**13.7%**	**0**	**0**	**0**	**0.2**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	160	-	91	1800	1610	5.7%	-	-	-	0.1	2.2	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	160	-	221	1800	1610	13.7%	-	-	-	0.1	2.4	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**55.5%**	**0**	**0**	**0**	**1.7**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	160	-	641	1800	1610	39.8%	-	-	-	0.6	3.4	5.5
3/1	A661 EB in Ahead	U	C2:A		1	160	-	894	1800	1610	55.5%	-	-	-	1.1	4.5	9.8

C1	PRC for Signalled Lanes (%):	555.7	Total Delay for Signalled Lanes (pcuHr):	0.21	Cycle Time (s): 180
C2	PRC for Signalled Lanes (%):	62.1	Total Delay for Signalled Lanes (pcuHr):	1.73	Cycle Time (s): 180
	PRC Over All Lanes (%):	62.1	Total Delay Over All Lanes(pcuHr):	1.93	

Basic Results Summary

Scenario 6: '2023 PM 180 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**52.2%**	**0**	**0**	**0**	**2.0**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**23.7%**	**0**	**0**	**0**	**0.3**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	160	-	85	1800	1610	5.3%	-	-	-	0.1	2.2	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	160	-	381	1800	1610	23.7%	-	-	-	0.3	2.7	2.7
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**52.2%**	**0**	**0**	**0**	**1.7**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	160	-	840	1800	1610	52.2%	-	-	-	1.0	4.2	8.7
3/1	A661 EB in Ahead	U	C2:A		1	160	-	701	1800	1610	43.5%	-	-	-	0.7	3.6	6.4

C1	PRC for Signalled Lanes (%):	280.3	Total Delay for Signalled Lanes (pcuHr):	0.34	Cycle Time (s): 180
C2	PRC for Signalled Lanes (%):	72.5	Total Delay for Signalled Lanes (pcuHr):	1.69	Cycle Time (s): 180
	PRC Over All Lanes (%):	72.5	Total Delay Over All Lanes(pcuHr):	2.03	

Slingsby Walk Toucan Crossing – Traffic Assessment

DATE:	17 June 2022	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Slingsby Walk – Traffic Signal Controlled Crossing – Preliminary Traffic Assessment – Stage 2		
PROJECT:	70090992	**AUTHOR:**	Inaki Gaspar-Erburu
CHECKED:	Ben Preston	**APPROVED:**	Chris Davies

INTRODUCTION

WSP has been commissioned by North Yorkshire County Council (NYCC) to undertake a preliminary assessment of the operational impacts of implementing a signalised crossing on the A661 Wetherby Road in Harrogate.

The network impact of the crossing, and a similar one on Oatlands Drive, was assessed as part of stage 1 of this study using traffic data from a strategic Visum model of the area and LinSig V3 software. Since the stage 1 assessment, more recent traffic survey data (April 28, 2022) has been obtained, and the crossing has been re-evaluated in stage 2.

The proposed crossing on the A661 Wetherby Road is approximately 100 metres north-west of an existing signalised crossing outside Harrogate District hospital, which is on a key desire line from The Stray via Slingsby Walk. Due to the proximity of the crossings, the interaction between these two signalised crossings has been considered. The proposed crossing location is shown in Figure 1 below.

Figure 1 Potential Location of the Toucan Crossing

METHODOLOGY

During stage 1 of the project, traffic data from a strategic (Visum) model WSP produced for Harrogate was used to create a local junction model using LinSig V3.

The traffic flows derived using the above model were deemed insufficient to provide NYCC with the confidence and clarity needed to assess the operational impacts of a new signalised crossing on the A661 Wetherby Road in this location. As a result, new surveyed traffic counts commissioned and collected as part of another study in April 2022 have been used to update the assessment. The LinSig V3 model from stage 1 was calibrated using the newly collected traffic flows as part of stage 2.

Table 1 below shows a comparison of the two sets of traffic data.

Table 1 Traffic movements comparison in PCUs

Direction	Stage 1 - Visum 2023 flows (vehs)		Stage 2 - April 2022 Survey (vehs)		Difference (vehs)	
	AM	PM	AM	PM	AM	PM
A661 westbound	653	861	686	690	33	-171
A661 eastbound	925	715	777	656	-148	-59

The above table shows the strategic model to have larger traffic flows across three of the four movements by time of day. A small increase was recorded between data sources in the AM Peak, A661 westbound movement.

Future year testing has also been carried out to ensure a thorough assessment. Forecast traffic growth factors for the local area were calculated using TEMPro 7.2, anticipating growth from the base year of 2022 to a future forecast year of 2038.

Growth factors for Harrogate are shown below in Table 2.

Table 2 2022-2038 TEMPro growth factors

Period	Growth Factor
AM	1.0916
PM	1.0891

Growth factors for traffic flows in Harrogate are based on a 16-year forecast and are predicted to be approximately 9% for both the AM and PM Peak hours.

To appraise the signalised crossing expected usage figures of active travel modes are required, however existing data sources in the area are limited. This data demonstrates the frequency at which the crossing is expected be used and allows a cycle time to be calculated in the local junction modelling software. The available data sources in the local area include a pedestrian survey (April 2022) and permanent cycle count locations, which are shown in Figure 2.

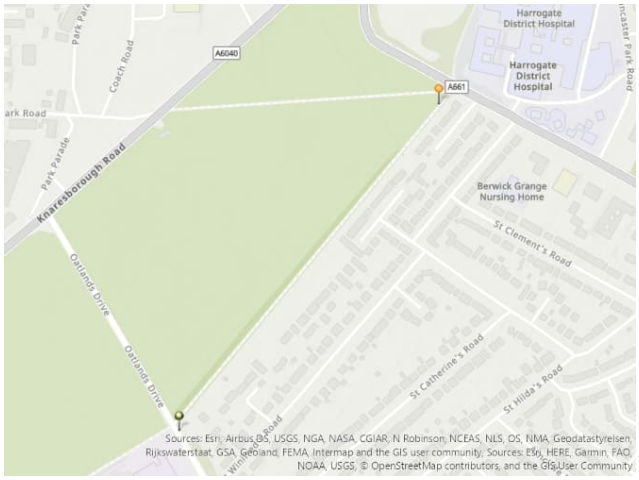


Figure 2 Location of the closest permanent cycle counts (yellow) and pedestrian (green) counts to the scheme

The permanent cycle count on Slingsby Walk shows that on a single day in 2021, 84 cyclists were counted; given the route's geography, it's highly likely that most of these cyclists reached the A661 at the proposed crossing. The proposed crossing is thought to satisfy a key desire line for present and future cyclists.

Analysis of the data showed that during the peak hours, a range of between 8 and 12 cyclists per hour may cross the A661 at this location.

On Oatlands Drive, a pedestrian survey in April 2022 recorded a total of 507 pedestrians during the AM peak hour and 594 pedestrians during the PM peak hour. Further analysis of the data revealed that 75% of the pedestrians were adolescents, indicating that their journeys were most likely related with travelling to and from school. On Oatlands Drive, there is a secondary school, which is anticipated to be a major draw for this group of users. On the A661, there is an elementary school, which will have a much lower attendance than the secondary school. As a result, while the proposed crossing would have some journeys related with the secondary school, it is estimated that the number of pedestrians expected to be on the A661 will be substantially smaller by comparison due to the schools' proximity.

Based on the above analysis, a pedestrian / cycle crossing frequency of 60 times per hour (or a cycle duration of 60 seconds) for a signalised crossing on the A661 is thought to be a realistic assumption for testing the crossing. It is anticipated that the crossing will be used more frequently for short periods of time during certain times of the day (school commuting hours), so a sensitivity test has been conducted to reduce the cycle time as much as possible to determine when the crossing may cause congestion on the network.

Only fixed signal timings can be assessed and presented using local junction modelling tools. The following assumptions were used to represent the signal timings in the LinSig V3 software:

- Frequency of the pedestrian crossing:
  - Proposed scheme: with 60 seconds cycle time
  - Proposed scheme (sensitivity test): with the lowest possible cycle time whilst maintaining a positive network Practical Reserve Capacity (PRC) value.
- Traffic to pedestrians intergreen: 5 seconds.
- Pedestrians to traffic intergreen: 9 seconds, based on an $8m$ crossing length, a $1.2ms^{-1}$ walking speed and the assumption that on-crossing detection will be used. The calculated Puffin Timings Period VI maximum extendible period has been halved, to approximate an average clearance time.
- Pedestrian Stage duration: 5 secs, based on the dimensions of the crossing.

OPERATIONAL PERFORMANCE

A summary of the model results (Degree of Saturation, Delays and Mean Maximum Queues) is shown below in Table 3 for the proposed scheme with a 60 second cycle time and Table 4 for the proposed scheme sensitivity test.

Table 3 LinSig summary results for the proposed scheme with a 60 sec cycle time.

Peak Period	Approach	2022			2038		
		DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)
AM	A661 WB	54.4	6.1	7.5	59.4	7.0	8.1
	A661 EB	61.7	7.5	8.5	67.3	9.0	9.5
PM	A661 WB	54.8	6.2	7.5	59.6	7.0	8.2
	A661 EB	52.1	5.6	7.2	56.7	6.4	7.8

Table 4 LinSig summary results for the proposed scheme (sensitivity test) with lowest cycle time.

Peak Period	Approach	2022				2038			
		Cycle Time (s)	DoS (%)	Delay (s)	MMQ (pcu)	Cycle Time (s)	DoS (%)	Delay (s)	MMQ (pcu)
AM	A661 WB	35	78.5	7.3	16.9	38	79.1	8.1	16.2
	A661 EB		88.9	10.4	25.3		89.5	12.0	24.8
PM	A661 WB	32	87.6	8.9	25.5	34	88.7	9.9	25.6
	A661 EB		83.3	7.5	21.2		84.3	8.3	20.9

The A661 Wetherby Road is expected to operate within capacity if both pedestrian crossings are called every 60 seconds, or if there are 60 demands during peak hour, as shown in Table 3. This is consistent with future year growth, as the 2038 is likewise operating within capacity. Average vehicle delays are expected to be minimal, and queues along the A661 Wetherby Road are not expected to have an influence on neighbouring junctions.

Table 4 demonstrates that the crossings can continue to operate within capacity at substantially shorter cycle lengths than 60 seconds, indicating that the junctions may handle increasing usage above 60 demands per hour. Cycle times between 30 and 40 seconds have been demonstrated to work successfully. These cycle times were calculated by utilising the LinSig V3 in-built cycle time optimiser to identify when Practical Reserve Capacity (PRC) reaches a negative number and then selecting the shortest cycle time that generates a positive PRC value.

The sensitivity test in the AM Peak scenario indicates no queues reaching or impacting other junctions along the A661 Wetherby Road, which is consistent with the proposed scheme results. In the sensitivity test, the A661 westbound queues in the 2036 PM Peak scenario are estimated to be 147 metres long at this minimum cycle time, which would extend beyond the hospital's signalised crossing.

SUMMARY

The impact of upgrading an existing uncontrolled crossing facility where Slingsby Walk meets the A661 Wetherby Road has been assessed in a preliminary traffic study. LinSig V3 was used to undertake this analysis, using 2022 observed traffic data and 2038 forecast traffic data derived using TEMPro 7.2 growth factors.

The analysis undertaken as part of this study has shown that a signalised crossing can operate within capacity in both the AM and PM Peak with a crossing demand once every 60 seconds through the peak hour (on average).

On a fixed time basis, local junction modelling has also shown that in the 2038 AM Peak scenario could operate on a 38 second cycle time (approximately 95 demands an hour) and that the 2038 PM Peak scenario could operate on a 34 second cycle time (approximately 105 demands an hour).

Cycle times for signalised pedestrian crossings are unlikely to be fixed and are dependent on a number of factors as set out above. Therefore, the local junction modelling results above set out the operational impact of the proposed signalised crossings based on a range of assumptions and should be considered against the benefits provided by the safe provision of an additional crossing facility in this location.

In summary, it is considered that the local junction modelling set out above, in combination with the below recommendations, will provide North Yorkshire County Council (NYCC) with sufficient information and confidence that the proposals will not adversely impact network operation.

RECOMMENDATIONS

Following a preliminary assessment of the operational impacts, WSP recommends the installation of a signal-controlled crossing on the A661 Wetherby Road in Harrogate.

It is recommended that the crossing operate under Microprocessor Optimised Vehicle Actuation (MOVA) control to mitigate any negative impacts on vehicle traffic. This will enable the crossing to make optimal end-of-green decisions, reducing both pedestrian and vehicle delays. The benefits of an adaptive control system are expected to be greater than those of fixed time modelling outputs and will allow NYCC to adjust vehicle or pedestrian prioritisation based on current policy.

It is also suggested that on-crossing and kerbside detectors be incorporated into the design to further improve efficiency and safety.

APPENDIX A: LINSIG MODEL RESULTS

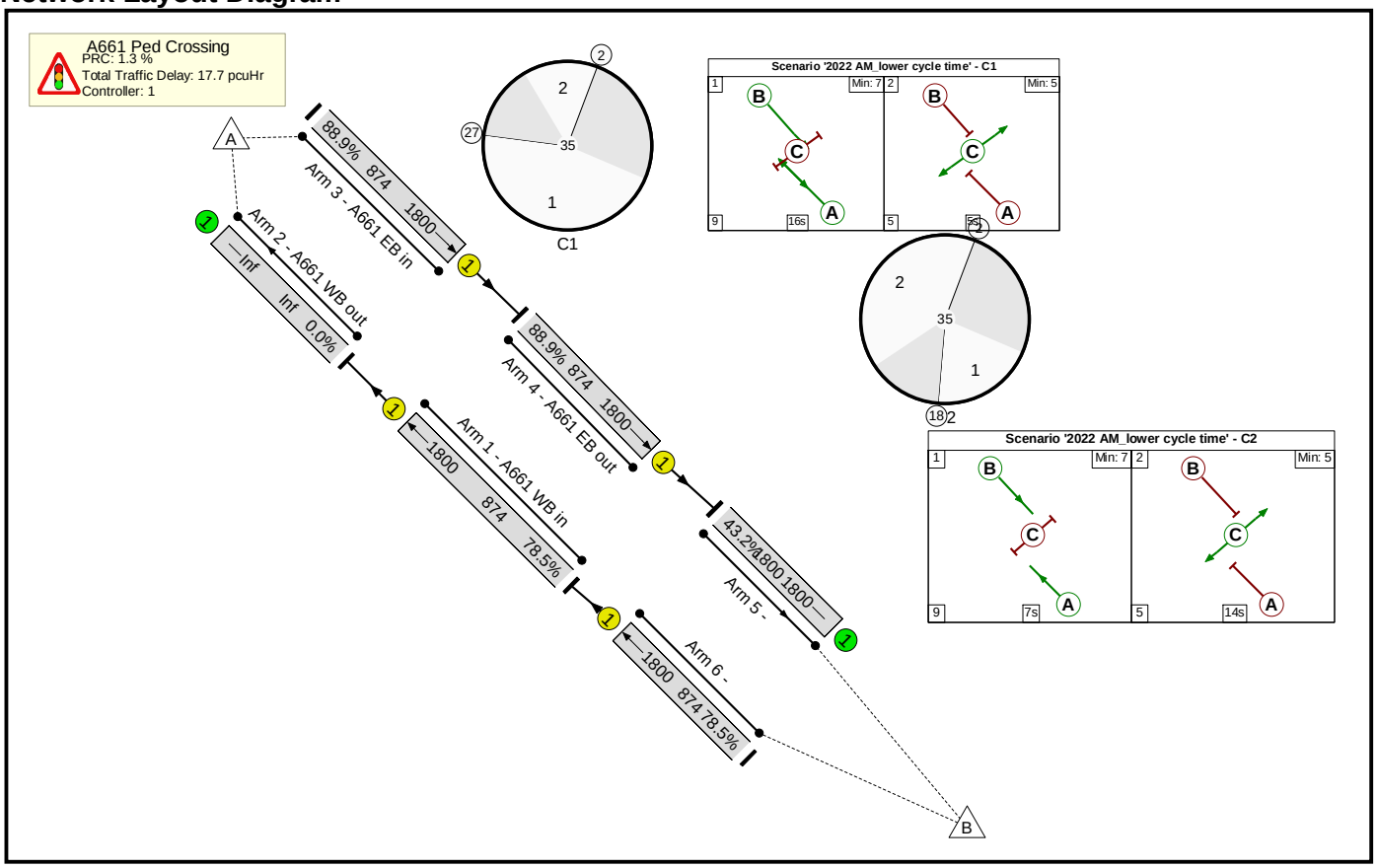
Basic Results Summary

User and Project Details

Project:	**70090992**
Title:	**Slingsby Walk – Preliminary traffic assessment**
Location:	
Additional detail:	
File name:	Slingsby Walk_v2.lsg3x
Author:	IG
Company:	WSP
Address:	

Scenario 1: '2022 AM_lower cycle time' (FG1: '2022 AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



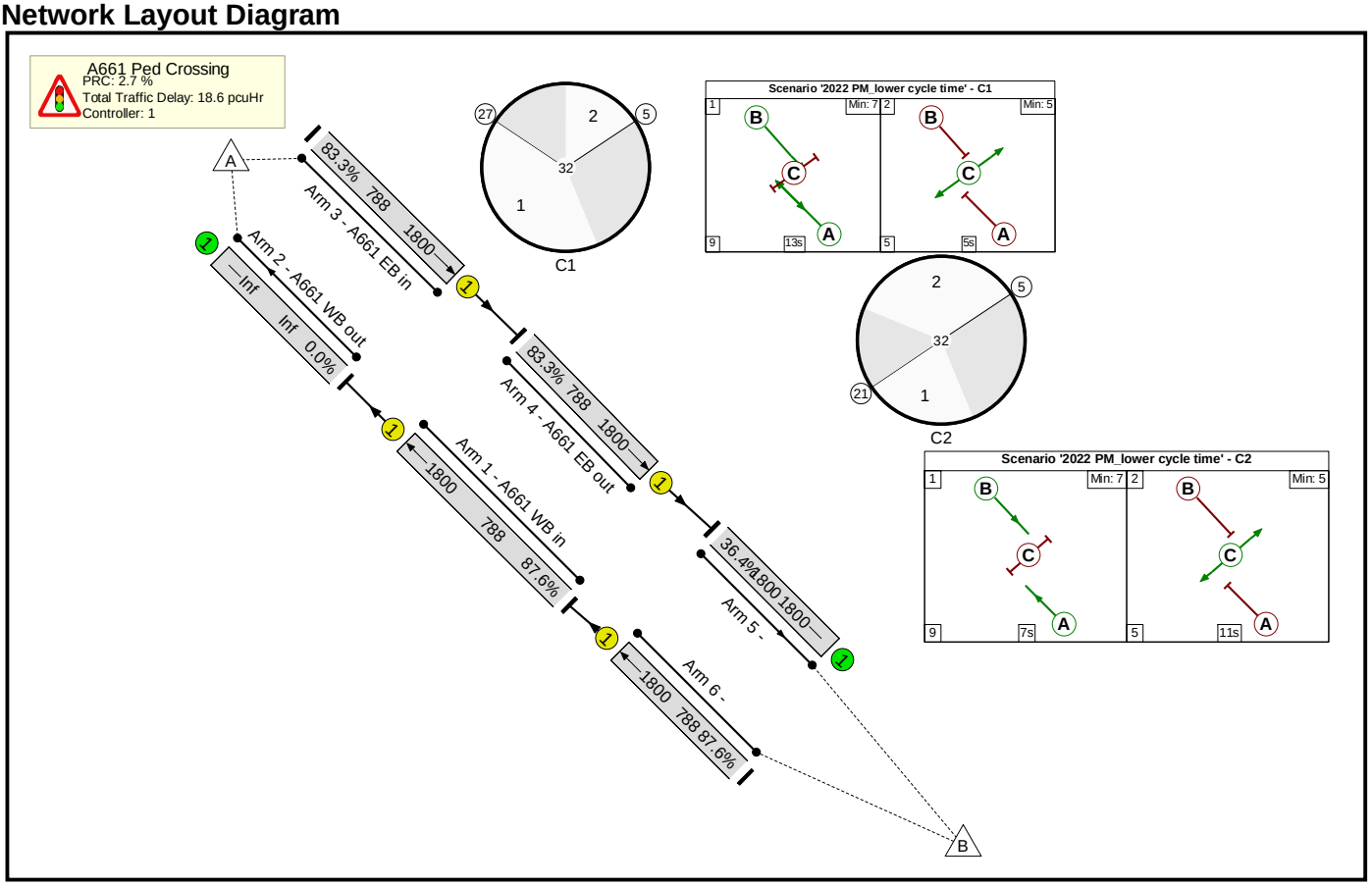
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**88.9%**	**0**	**0**	**0**	**17.7**	-	-
A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**88.9%**	**0**	**0**	**0**	**17.7**	-	-
1/1	A661 WB in Ahead	U	C1:A		1	16	-	686	1800	874	78.5%	-	-	-	3.1	16.4	4.6
3/1	A661 EB in Ahead	U	C1:A		1	16	-	777	1800	874	88.9%	-	-	-	5.5	25.3	10.4
4/1	A661 EB out Ahead	U	C1:B		1	16	-	777	1800	874	88.9%	-	-	-	5.5	25.7	7.4
5/1		U	-		-	-	-	777	1800	1800	43.2%	-	-	-	0.4	1.8	0.4
6/1	Ahead	U	C1:A		1	16	-	686	1800	874	78.5%	-	-	-	3.2	16.9	7.3

C1	PRC for Signalled Lanes (%):	1.3	Total Delay for Signalled Lanes (pcuHr):	17.37	Cycle Time (s): 35
C2	PRC for Signalled Lanes (%):	0.0	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s): 35
	PRC Over All Lanes (%):	1.3	Total Delay Over All Lanes(pcuHr):	17.75	

Scenario 2: '2022 PM_lower cycle time' (FG2: '2022 PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



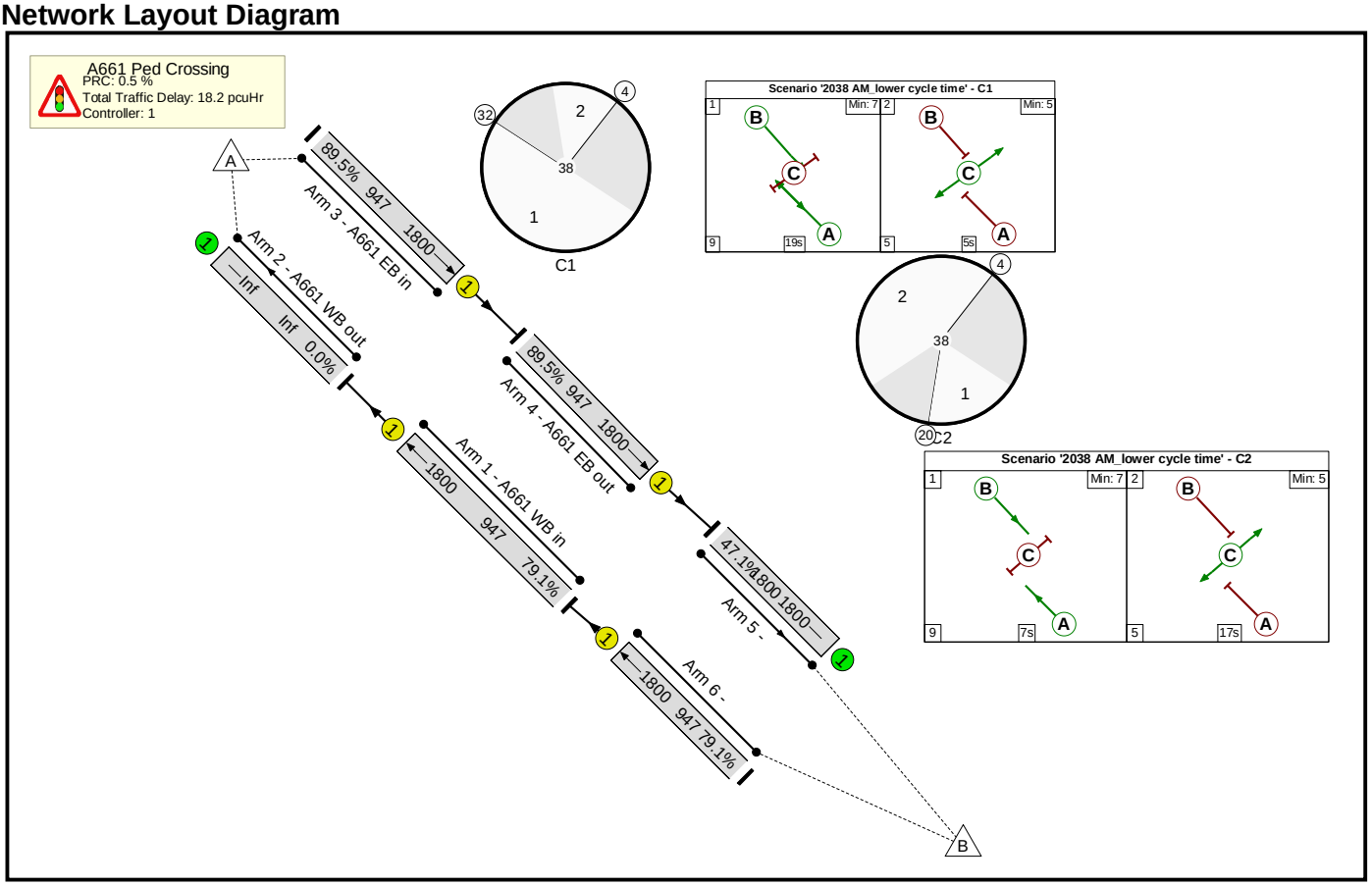
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**87.6%**	**0**	**0**	**0**	**18.6**	-	-
A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**87.6%**	**0**	**0**	**0**	**18.6**	-	-
1/1	A661 WB in Ahead	U	C1:A		1	13	-	690	1800	788	87.6%	-	-	-	5.3	27.8	7.1
3/1	A661 EB in Ahead	U	C1:A		1	13	-	656	1800	788	83.3%	-	-	-	3.9	21.2	7.5
4/1	A661 EB out Ahead	U	C1:B		1	13	-	656	1800	788	83.3%	-	-	-	4.2	23.3	5.8
5/1		U	-		-	-	-	656	1800	1800	36.4%	-	-	-	0.3	1.6	0.3
6/1	Ahead	U	C1:A		1	13	-	690	1800	788	87.6%	-	-	-	4.9	25.5	8.9

C1	PRC for Signalled Lanes (%):	2.7	Total Delay for Signalled Lanes (pcuHr):	18.31	Cycle Time (s): 32
C2	PRC for Signalled Lanes (%):	0.0	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s): 32
	PRC Over All Lanes (%):	2.7	Total Delay Over All Lanes(pcuHr):	18.60	

Scenario 3: '2038 AM_lower cycle time' (FG3: '2038 AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



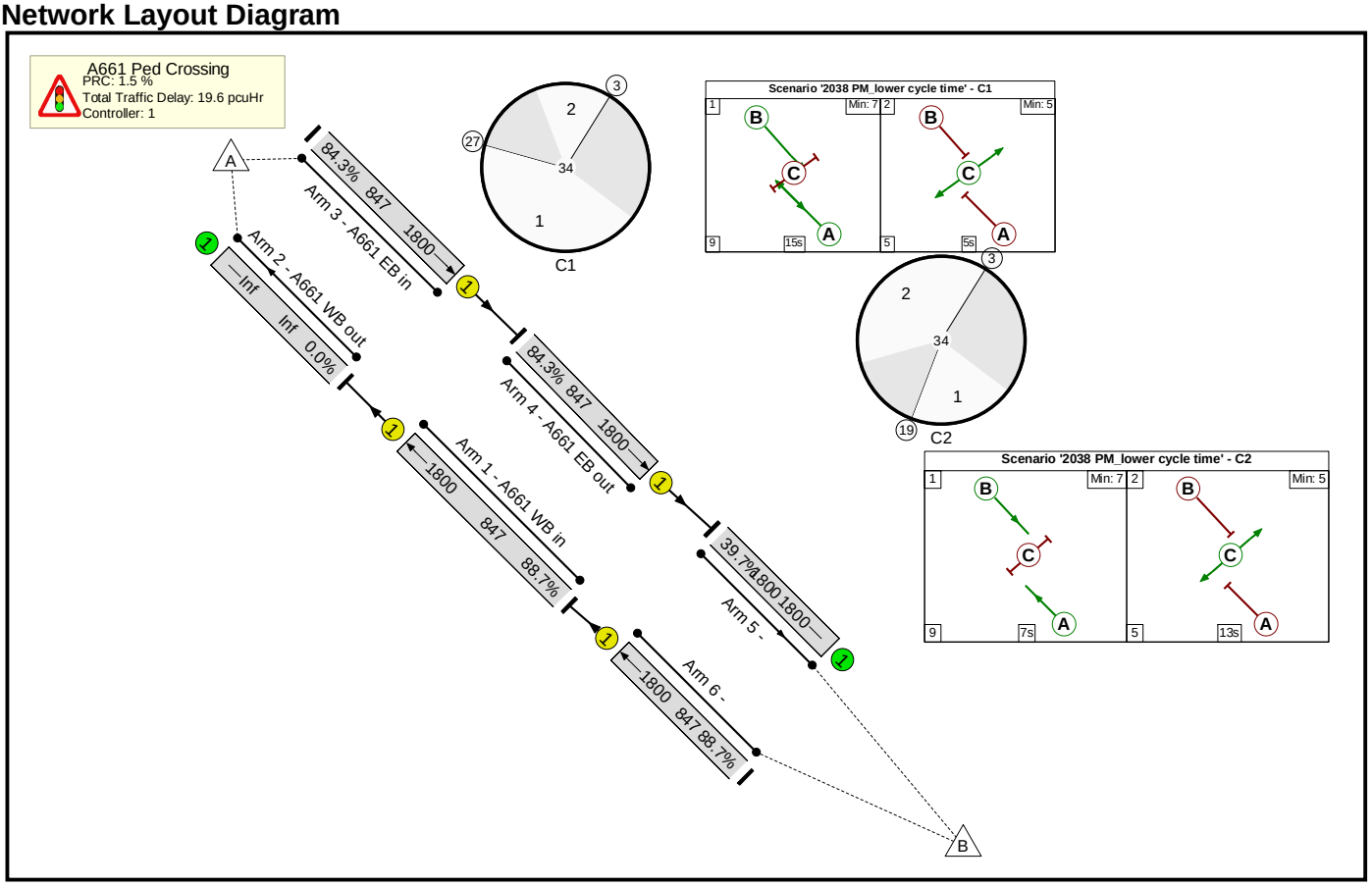
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**89.5%**	**0**	**0**	**0**	**18.2**	-	-
A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**89.5%**	**0**	**0**	**0**	**18.2**	-	-
1/1	A661 WB in Ahead	U	C1:A		1	19	-	749	1800	947	79.1%	-	-	-	3.0	14.2	4.5
3/1	A661 EB in Ahead	U	C1:A		1	19	-	848	1800	947	89.5%	-	-	-	5.9	24.8	12.0
4/1	A661 EB out Ahead	U	C1:B		1	19	-	848	1800	947	89.5%	-	-	-	5.6	23.8	7.6
5/1		U	-		-	-	-	848	1800	1800	47.1%	-	-	-	0.4	1.9	0.4
6/1	Ahead	U	C1:A		1	19	-	749	1800	947	79.1%	-	-	-	3.4	16.2	8.1

C1	PRC for Signalled Lanes (%):	0.5	Total Delay for Signalled Lanes (pcuHr):	17.79	Cycle Time (s): 38
C2	PRC for Signalled Lanes (%):	0.0	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s): 38
	PRC Over All Lanes (%):	0.5	Total Delay Over All Lanes(pcuHr):	18.24	

Scenario 4: '2038 PM_lower cycle time' (FG4: '2038 PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



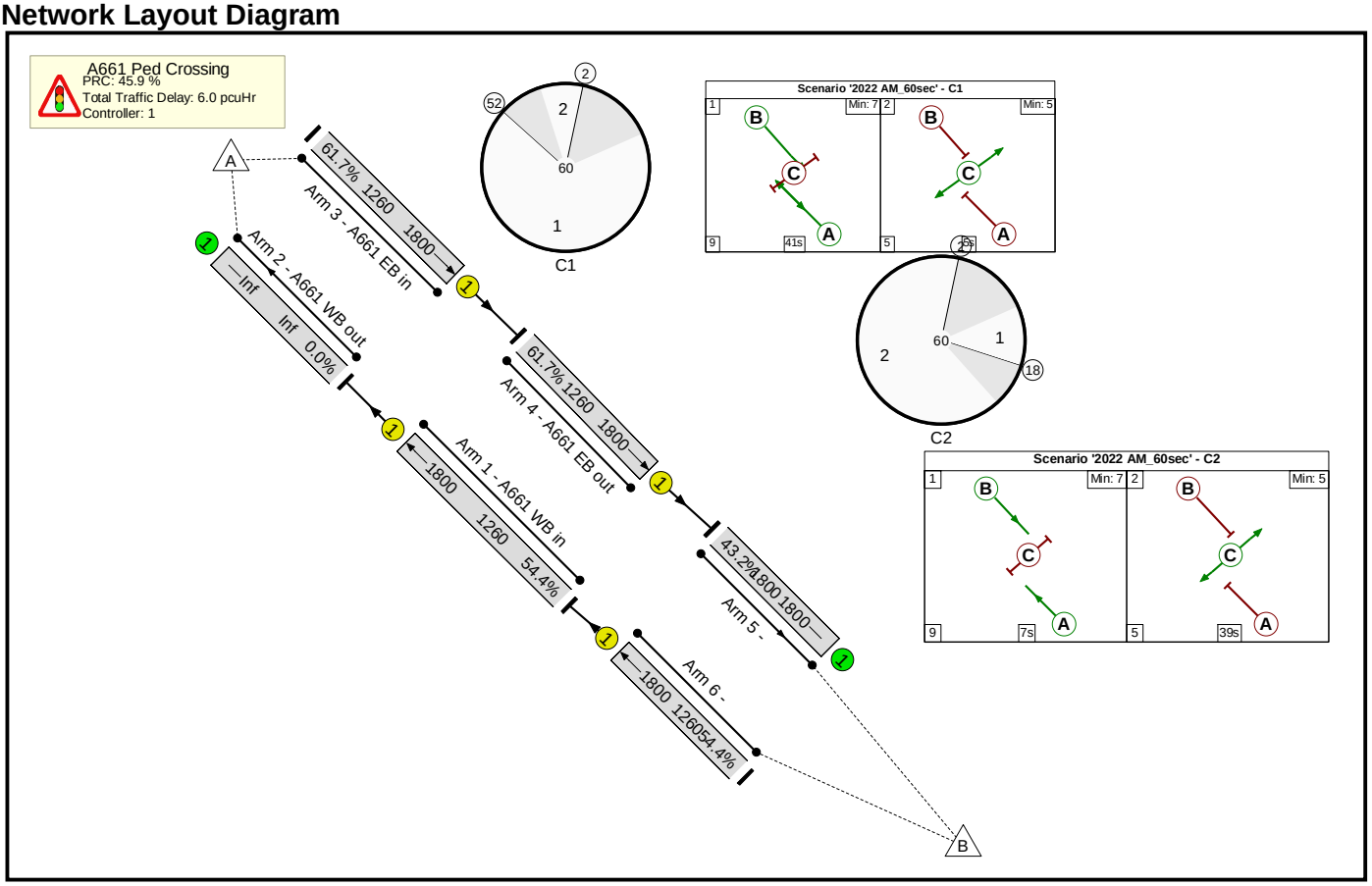
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**88.7%**	**0**	**0**	**0**	**19.6**	-	-
A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**88.7%**	**0**	**0**	**0**	**19.6**	-	-
1/1	A661 WB in Ahead	U	C1:A		1	15	-	751	1800	847	88.7%	-	-	-	5.5	26.6	7.4
3/1	A661 EB in Ahead	U	C1:A		1	15	-	714	1800	847	84.3%	-	-	-	4.1	20.9	8.3
4/1	A661 EB out Ahead	U	C1:B		1	15	-	714	1800	847	84.3%	-	-	-	4.3	21.6	6.0
5/1		U	-		-	-	-	714	1800	1800	39.7%	-	-	-	0.3	1.7	0.3
6/1	Ahead	U	C1:A		1	15	-	751	1800	847	88.7%	-	-	-	5.3	25.6	9.9

C1	PRC for Signalled Lanes (%):	1.5	Total Delay for Signalled Lanes (pcuHr):	19.32	Cycle Time (s): 34
C2	PRC for Signalled Lanes (%):	0.0	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s): 34
	PRC Over All Lanes (%):	1.5	Total Delay Over All Lanes(pcuHr):	19.65	

Scenario 5: '2022 AM_60sec' (FG1: '2022 AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



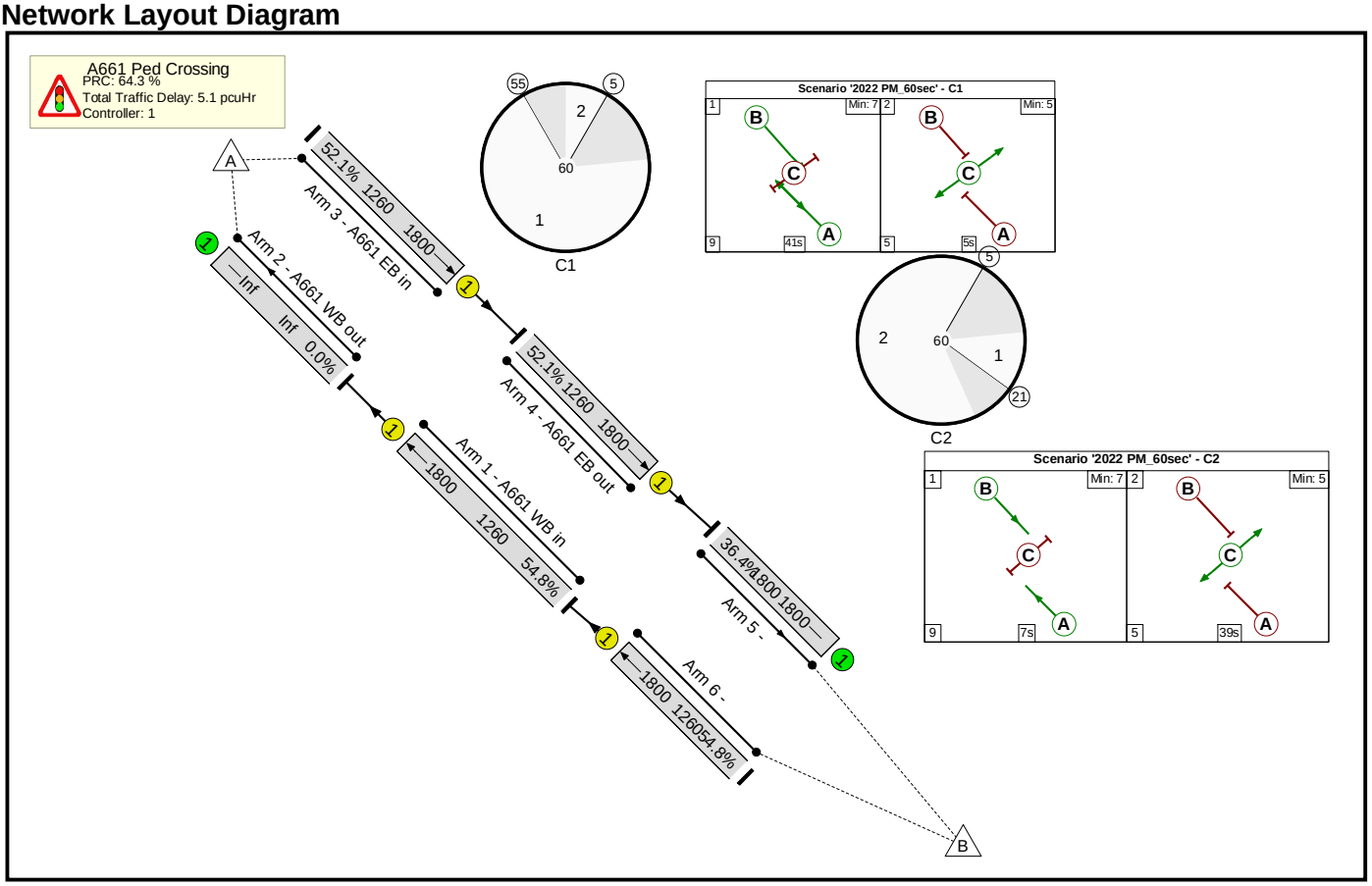
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**61.7%**	**0**	**0**	**0**	**6.0**	-	-
A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**61.7%**	**0**	**0**	**0**	**6.0**	-	-
1/1	A661 WB in Ahead	U	C1:A		1	41	-	686	1800	1260	54.4%	-	-	-	1.0	5.4	2.4
3/1	A661 EB in Ahead	U	C1:A		1	41	-	777	1800	1260	61.7%	-	-	-	1.8	8.5	7.5
4/1	A661 EB out Ahead	U	C1:B		1	41	-	777	1800	1260	61.7%	-	-	-	1.3	6.1	2.8
5/1		U	-		-	-	-	777	1800	1800	43.2%	-	-	-	0.4	1.8	0.4
6/1	Ahead	U	C1:A		1	41	-	686	1800	1260	54.4%	-	-	-	1.4	7.5	6.1

C1	PRC for Signalled Lanes (%):	45.9	Total Delay for Signalled Lanes (pcuHr):	5.60	Cycle Time (s): 60
C2	PRC for Signalled Lanes (%):	0.0	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s): 60
	PRC Over All Lanes (%):	45.9	Total Delay Over All Lanes(pcuHr):	5.98	

Scenario 6: '2022 PM_60sec' (FG2: '2022 PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



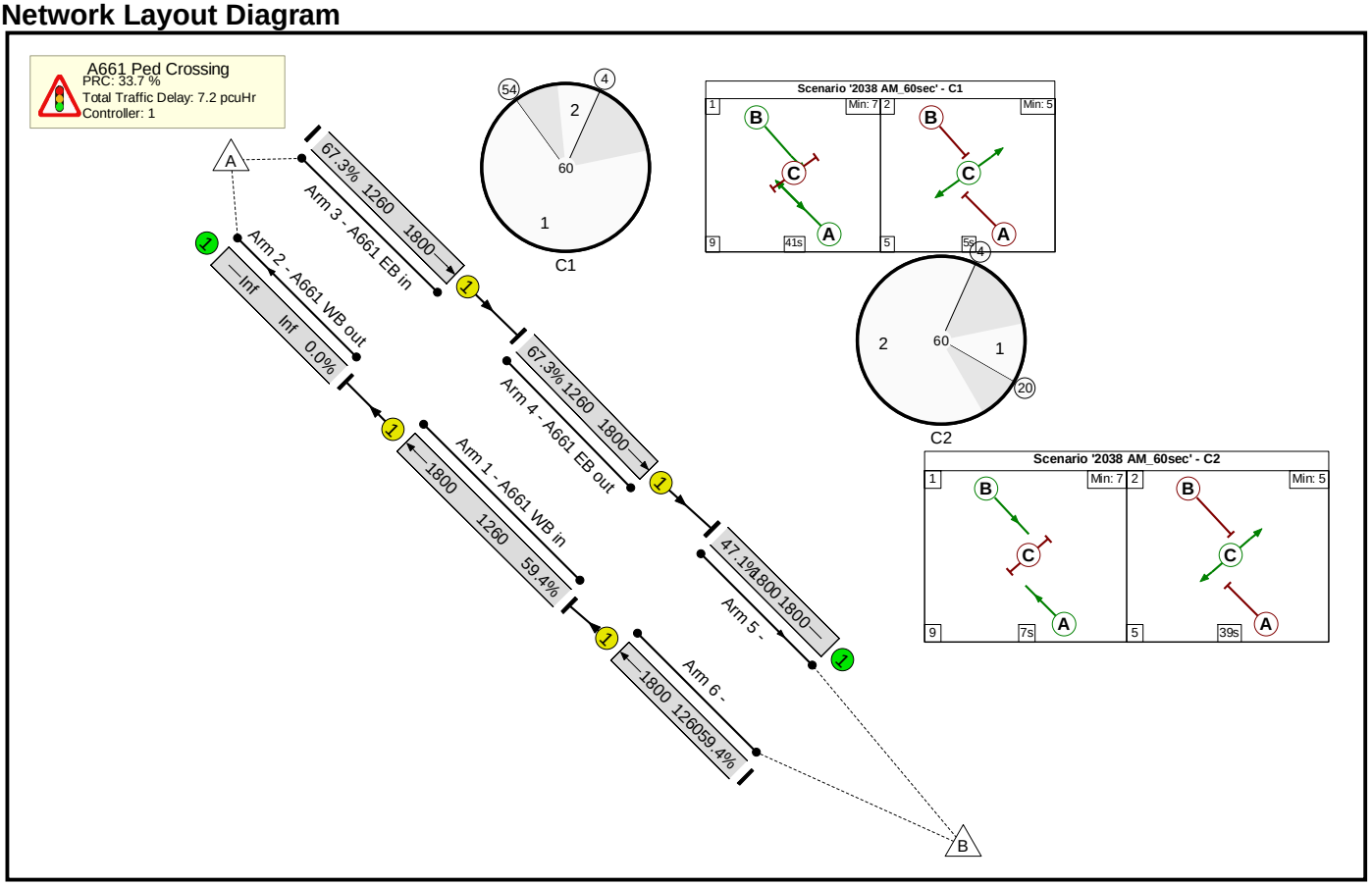
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**54.8%**	**0**	**0**	**0**	**5.1**	**-**	**-**
A661 Ped Crossing	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**54.8%**	**0**	**0**	**0**	**5.1**	**-**	**-**
1/1	A661 WB in Ahead	U	C1:A		1	41	-	690	1800	1260	54.8%	-	-	-	1.0	5.5	2.4
3/1	A661 EB in Ahead	U	C1:A		1	41	-	656	1800	1260	52.1%	-	-	-	1.3	7.2	5.6
4/1	A661 EB out Ahead	U	C1:B		1	41	-	656	1800	1260	52.1%	-	-	-	1.0	5.3	2.3
5/1		U	-		-	-	-	656	1800	1800	36.4%	-	-	-	0.3	1.6	0.3
6/1	Ahead	U	C1:A		1	41	-	690	1800	1260	54.8%	-	-	-	1.4	7.5	6.2

C1	PRC for Signalled Lanes (%):	64.3	Total Delay for Signalled Lanes (pcuHr):	4.77	Cycle Time (s): 60
C2	PRC for Signalled Lanes (%):	0.0	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s): 60
	PRC Over All Lanes (%):	64.3	Total Delay Over All Lanes(pcuHr):	5.05	

Scenario 7: '2038 AM_60sec' (FG3: '2038 AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



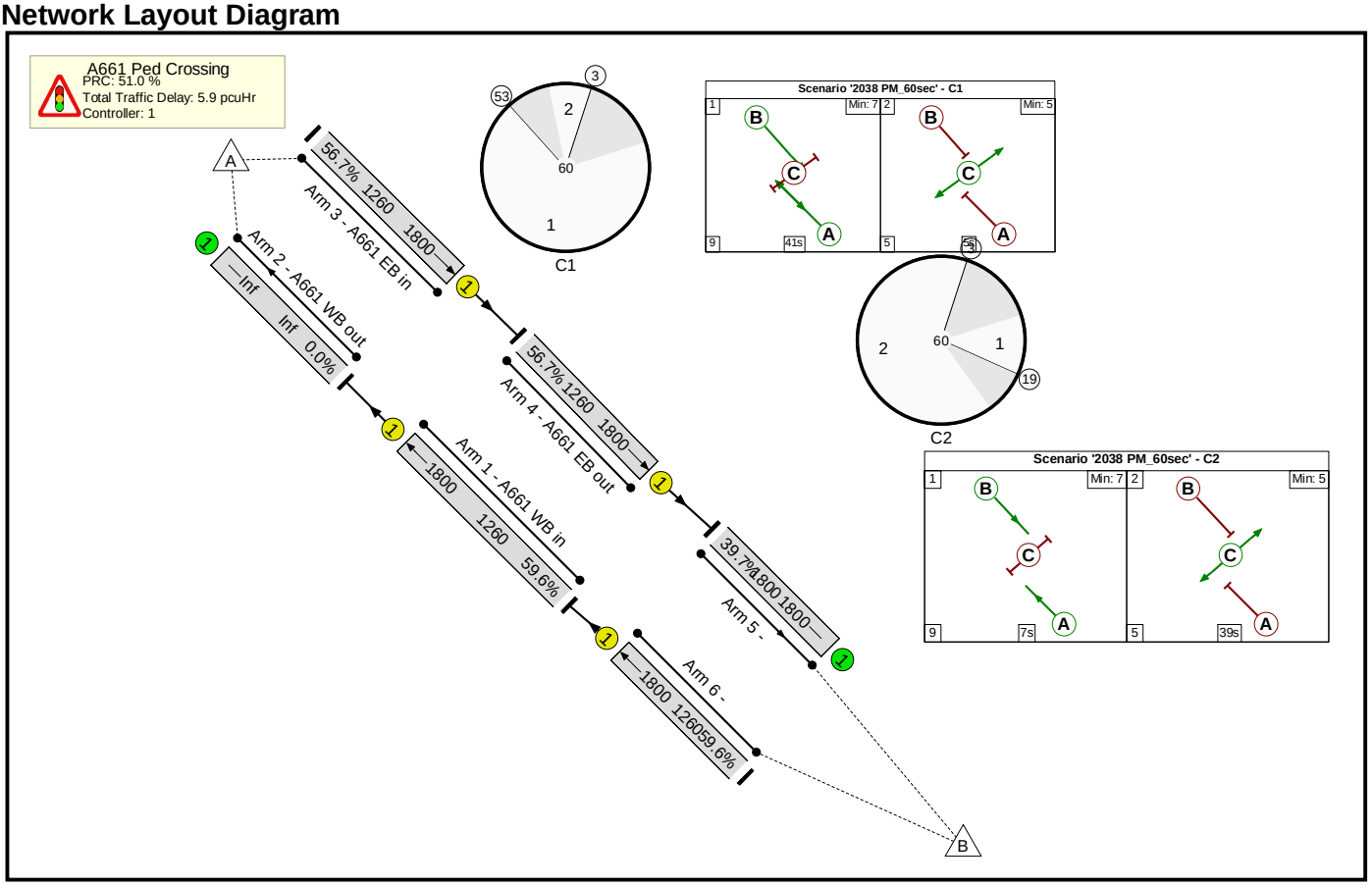
Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**67.3%**	**0**	**0**	**0**	**7.2**	**-**	**-**
A661 Ped Crossing	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**67.3%**	**0**	**0**	**0**	**7.2**	**-**	**-**
1/1	A661 WB in Ahead	U	C1:A		1	41	-	749	1800	1260	59.4%	-	-	-	1.2	5.8	2.7
3/1	A661 EB in Ahead	U	C1:A		1	41	-	848	1800	1260	67.3%	-	-	-	2.2	9.5	9.0
4/1	A661 EB out Ahead	U	C1:B		1	41	-	848	1800	1260	67.3%	-	-	-	1.6	6.7	3.2
5/1		U	-		-	-	-	848	1800	1800	47.1%	-	-	-	0.4	1.9	0.4
6/1	Ahead	U	C1:A		1	41	-	749	1800	1260	59.4%	-	-	-	1.7	8.1	7.0

C1	PRC for Signalled Lanes (%):	33.7	Total Delay for Signalled Lanes (pcuHr):	6.72	Cycle Time (s):	60
C2	PRC for Signalled Lanes (%):	0.0	Total Delay for Signalled Lanes (pcuHr):	0.00	Cycle Time (s):	60
	PRC Over All Lanes (%):	33.7	Total Delay Over All Lanes(pcuHr):	7.16		

Scenario 8: '2038 PM_60sec' (FG4: '2038 PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/ Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcu Hr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.6 %**	**0**	**0**	**0**	**5.9**	**-**	**-**
A661 Ped Crossing	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.6 %**	**0**	**0**	**0**	**5.9**	**-**	**-**
1/1	A661 WB in Ahead	U	C1: A		1	41	-	751	1800	1260	59.6 %	-	-	-	1.2	5.9	2.7
3/1	A661 EB in Ahead	U	C1: A		1	41	-	714	1800	1260	56.7 %	-	-	-	1.5	7.8	6.4
4/1	A661 EB out Ahead	U	C1: B		1	41	-	714	1800	1260	56.7 %	-	-	-	1.1	5.6	2.5
5/1		U	-		-	-	-	714	1800	1800	39.7 %	-	-	-	0.3	1.7	0.3
6/1	Ahead	U	C1: A		1	41	-	751	1800	1260	59.6 %	-	-	-	1.7	8.2	7.0

C1 PRC for Signalled Lanes (%): 51.0 Total Delay for Signalled Lanes (pcuHr): 5.58
Cycle Time (s): 60
C2 PRC for Signalled Lanes (%): 0.0 Total Delay for Signalled Lanes (pcuHr): 0.00
Cycle Time (s): 60
PRC Over All Lanes (%): 51.0 Total Delay Over All Lanes(pcuHr): 5.91

Initial equality impact assessment screening form

This form records an equality screening process to determine the relevance of equality to a proposal, and a decision whether or not a full EIA would be appropriate or proportionate.

Directorate	BES
Service area	H&T
Proposal being screened	Slingsby Walk crossing
Officer(s) carrying out screening	Louise Neale
What are you proposing to do?	Carry out detailed design and safety audit to provide a crossing of Wetherby Road at Slingsby Walk. Subject to satisfactory design implement a crossing.
Why are you proposing this? What are the desired outcomes?	To improve the experience of pedestrians and cyclists and improve the cycle network in Harrogate
Does the proposal involve a significant commitment or removal of resources? Please give details.	No

Impact on people with any of the following protected characteristics as defined by the Equality Act 2010, or NYCC's additional agreed characteristics

As part of this assessment, please consider the following questions:

- To what extent is this service used by particular groups of people with protected characteristics?
- Does the proposal relate to functions that previous consultation has identified as important?
- Do different groups have different needs or experiences in the area the proposal relates to?

If for any characteristic it is considered that there is likely to be an adverse impact or you have ticked 'Don't know/no info available', then a full EIA should be carried out where this is proportionate. You are advised to speak to your Equality rep for advice if you are in any doubt.

Protected characteristic	**Potential for adverse impact**		**Don't know/No info available**
	Yes	**No**	
Age		X	
Disability		X	
Sex		X	
Race		X	
Sexual orientation		X	
Gender reassignment		X	
Religion or belief		X	
Pregnancy or maternity		X	
Marriage or civil partnership		X	
NYCC additional characteristics			
People in rural areas		X	
People on a low income		X	
Carer (unpaid family or friend)		X	

Does the proposal relate to an area where there are known inequalities/probable impacts (e.g. disabled people's access to public transport)? Please give details.	No.			
Will the proposal have a significant effect on how other organisations operate? (e.g. partners, funding criteria, etc.). Do any of these organisations support people with protected characteristics? Please explain why you have reached this conclusion.	No			
Decision (Please tick one option)	EIA not relevant or proportionate:	✓	Continue to full EIA:	
Reason for decision	The scheme being developed should enhance, not inhibit, people's ability to access travel options and opportunities. This includes people with reduced mobility.			
Signed (Assistant Director or equivalent)	Barrie Mason			
Date	16/11/2022			

Climate change impact assessment

The purpose of this assessment is to help us understand the likely impacts of our decisions on the environment of North Yorkshire and on our aspiration to achieve net carbon neutrality by 2030, or as close to that date as possible. The intention is to mitigate negative effects and identify projects which will have positive effects.

This document should be completed in consultation with the supporting guidance. The final document will be published as part of the decision making process and should be written in Plain English.

If you have any additional queries which are not covered by the guidance please email climatechange@northyorks.gov.uk

Please note: You may not need to undertake this assessment if your proposal will be subject to any of the following:
Planning Permission
Environmental Impact Assessment
Strategic Environmental Assessment

However, you will still need to summarise your findings in in the summary section of the form below.

Please contact climatechange@northyorks.gov.uk for advice.

Title of proposal	**Slingsby Walk crossing**
Brief description of proposal	**Carry out detailed design and safety audit to provide a crossing of Wetherby Road at Slingsby Walk. Subject to satisfactory design implement a crossing.**
Directorate	**BES**
Service area	**Highways and Transportation**
Lead officer	**Louise Neale**
Names and roles of other people involved in carrying out the impact assessment	
Date impact assessment started	**11/11/2022**

Options appraisal Were any other options considered in trying to achieve the aim of this project? If so, please give brief details and explain why alternative options were not progressed.
What impact will this proposal have on council budgets? Will it be cost neutral, have increased cost or reduce costs? Please explain briefly why this will be the result, detailing estimated savings or costs where this is possible. Funding is being offered by Harrogate Borough Council to implement this project

How will this proposal impact on the environment? **N.B. There may be short term negative impact and longer term positive impact. Please include all potential impacts over the lifetime of a project and provide an explanation.**		**Positive impact** (Place a X in the box below where relevant)	**No impact** (Place a X in the box below where relevant)	**Negative impact** (Place a X in the box below where relevant)	**Explain why will it have this effect and over what timescale?** **Where possible/relevant please include:** • **Changes over and above business as usual** • **Evidence or measurement of effect** • **Figures for CO_2e** • **Links to relevant documents**	**Explain how you plan to mitigate any negative impacts.**	**Explain how you plan to improve any positive outcomes as far as possible.**
Minimise **greenhouse gas emissions** e.g. reducing emissions from travel, increasing energy efficiencies etc.	Emissions from travel	*			**This area of Harrogate has a good propensity for cycling. By providing a safe crossing point this should encourage more people to walk and cycle.**		
	Emissions from construction			*	The scheme will be quite small but any construction emissions should be outweighed by the increase in walking and cycling		
	Emissions from running of buildings		*				
	Other		*				
Minimise **waste:** Reduce, reuse, recycle and compost e.g. reducing use of single use plastic			*				
Reduce **water** consumption			*				

How will this proposal impact on the environment? **N.B. There may be short term negative impact and longer term positive impact. Please include all potential impacts over the lifetime of a project and provide an explanation.**	**Positive impact** (Place a X in the box below where relevant)	**No impact** (Place a X in the box below where relevant)	**Negative impact** (Place a X in the box below where relevant)	**Explain why will it have this effect and over what timescale?** **Where possible/relevant please include:** • **Changes over and above business as usual** • **Evidence or measurement of effect** • **Figures for CO_2e** • **Links to relevant documents**	**Explain how you plan to mitigate any negative impacts.**	**Explain how you plan to improve any positive outcomes as far as possible.**
Minimise **pollution** (including air, land, water, light and noise)		*				
Ensure **resilience** to the effects of climate change e.g. reducing flood risk, mitigating effects of drier, hotter summers		*				
Enhance **conservation** and wildlife		*				
Safeguard the distinctive characteristics, features and special qualities of **North Yorkshire's landscape**		*				
Other (please state below)		*				

Are there any recognised good practice environmental standards in relation to this proposal? If so, please detail how this proposal meets those standards.
N/A

Summary Summarise the findings of your impact assessment, including impacts, the recommendation in relation to addressing impacts, including any legal advice, and next steps. This summary should be used as part of the report to the decision maker.
Overall, the introduction of a new crossing should have a positive impact on climate change issues

Sign off section

This climate change impact assessment was completed by:

Name	**Louise Neale**
Job title	**Transport Planning Team Leader**
Service area	**Highways and Transportation**
Directorate	**BES**
Signature	**L Neale**
Completion date	**11/11/2022**

Authorised by relevant Assistant Director (signature): Barrie Mason

Date: 16/11/2022

TECHNICAL NOTE 1

DATE:	07 February 2022	**CONFIDENTIALITY:**	Restricted
SUBJECT:	Slingsby Walk Toucan Crossings – Preliminary Traffic Assessment		
PROJECT:	70090992	**AUTHOR:**	IG
CHECKED:	AF	**APPROVED:**	CD

INTRODUCTION

North Yorkshire County Council has requested WSP to undertake a preliminary assessment of the operational impacts of providing signalised Toucan crossings on Oatlands Road and the A661 in Harrogate. The location of these potential crossings is shown below.

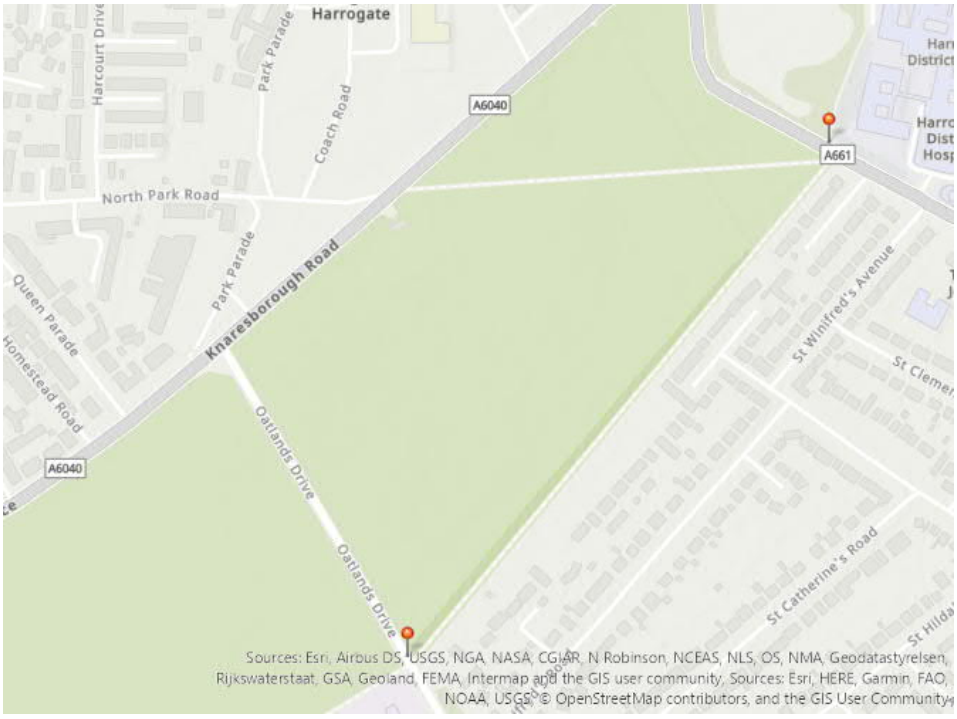


Figure 1 Potential Locations of the Toucan Crossings

METHODOLOGY

There are several existing transport models of Harrogate, including:

- Microsimulation Paramics Discovery model
- Strategic Visum model

The Paramics Discovery model would be the best tool to assess the operational performance of the crossings and the wider impact of the proposed crossings. However, these crossings are located outside the modelled area of the Paramics Discovery model. Therefore, it is proposed that the Visum model be used to assess the wider impacts of the proposed crossings and a new LinSig model be used to assess the operational performance of the scheme.

It is acknowledged that the Visum model does not validate well in the study area and therefore the traffic flows may not be an accurate representation of reality. To mitigate this risk of using lower flows, it is recommended that the 2023 Visum model is used for the assessment.

The wider network traffic impacts have been assessed using the 2023 Visum model, with the Station Gateway TCF scheme in place. For consistency, the new LinSig model has been calibrated using the traffic flows from the Visum model.

There is insufficient pedestrian flow data to estimate the frequency of the crossings and the duration that traffic would be held on red. For this reason, a sensitivity test has been carried out to assess the traffic impact of the crossings with a cycle time of 1min, 2 mins and 3 mins. This methodology allows identification of the possible traffic impacts of the scheme in various situations.

WIDER NETWORK IMPACTS

The 2023 Visum model with the Station Gateway TCF scheme in place has been used to assess the possible network impacts of upgrading the existing uncontrolled crossing facilities to a Toucan Crossing of Slingsby Walk at the A661 and Oatlands Drive.

Fixed signal times have been modelled with the following times:

- Cycle time: 3 tests with 60 sec, 120 sec and 180 sec.
- Traffic to pedestrians intergreen: 6 secs.
- Pedestrians to traffic intergreen: 9 secs.
- Minimum pedestrians green time: 5 secs.

Plans showing the traffic flow differences for the 3 scenarios for both AM and PM periods are in Appendix A. These plans show that traffic reassignment from Oatlands Drive is likely to be minimal in all 3 scenarios. Traffic reassignment from the A661 Wetherby Road is also likely to be minimal, except in the worst case that the crossing is activated every minute. In this case, the additional delays are likely to cause that around 30 vehicles will reassign to a different route, being the A59 the most attractive route. This reassignment is likely to cause a negligible impact on the alternative routes.

OPERATIONAL PERFORMANCE

The traffic flows from the 2023 Visum model with the Station Gateway TCF scheme have been used to develop a new LinSig model of the two new proposed Toucan Crossings. The same signal time assumptions described above have been applied to the LinSig model. Full details of this model can be found in Appendix B.

A summary of the model results (Degree of Saturation, Delays and Mean Maximum Queues) can be found in Tables 1 and 2 for the AM and PM respectively.

Table 1 LinSig summary results (AM)

	60 sec			120 sec			180 sec		
ROAD	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)
Oatlands Dr WB	7.4%	4.8	0.5	6.0%	2.8	0.5	5.7%	2.2	0.5
Oatlands Dr EB	18.0%	5.2	1.4	14.6%	3.1	1.4	13.7%	2.4	1.4
A661 WB	52.1%	7.7	5.7	42.3%	4.4	5.5	39.8%	3.4	5.5
A661 EB	72.7%	11.3	10.5	59.0%	5.9	9.9	55.5%	4.5	9.8

Table 2 LinSig summary results (PM)

	60 sec			120 sec			180 sec		
ROAD	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)
Oatlands Dr WB	6.9%	4.7	0.5	5.6%	2.8	0.5	5.3%	2.2	0.5
Oatlands Dr EB	31.0%	5.9	2.8	25.1%	3.5	2.7	23.7%	2.7	2.7
A661 WB	68.3%	10.2	9.2	55.4%	5.5	8.8	52.2%	4.2	8.7
A661 EB	57.0%	8.3	6.7	46.3%	4.7	6.5	43.5%	3.6	6.4

The LinSig model results show that the Toucan crossing on Oatlands Drive is likely to have negligible impacts on traffic even if the crossing is activated once every cycle. The crossing on the A661 is likely to have bigger traffic impacts than the other one, but it is still likely to operate with spare capacity and the average delays and queues are likely to be manageable.

SUMMARY

A preliminary traffic assessment of upgrading the existing uncontrolled crossing facilities at Slingsby Walk (see Figure 1) has been carried out. This assessment has been carried out using the 2023 Visum model flows due to the lack of existing traffic flows at these locations. The validation of the Visum model at these locations is not to WebTAG standards and therefore it is recommended that if progressed to detailed design, then new traffic flows are collected to re-assess the traffic impact of upgrading these crossings. However, the modelling exercise carried out at this stage is considered to be sufficient to gain an understanding of the likely traffic impacts.

The 2023 Visum model has been used to assess the wider network traffic impacts of the scheme. The model predicts that even in the worst case, with the toucan crossings being activated every minute, the impacts of the scheme into the rest of the network are likely to be minimal.

The flows from the Visum model have been used to build a LinSig model of the two crossings. The LinSig model predicts that even in the worst case the crossings are expected to operate within capacity with minimal delays and queues.

APPENDIX A: TRAFFIC FLOW DIFFERENCES

Figure 2 Traffic flow differences with 60 sec cycle time (AM)

Figure 3 Traffic flow differences with 60 sec cycle time (PM)

Figure 4 Traffic flow differences with 120 sec cycle time (AM)

Figure 5 Traffic flow differences with 120 sec cycle time (PM)

Figure 6 Traffic flow differences with 180 sec cycle time (AM)

Figure 7 Traffic flow differences with 180 sec cycle time (PM)

APPENDIX B: LINSIG MODEL RESULTS

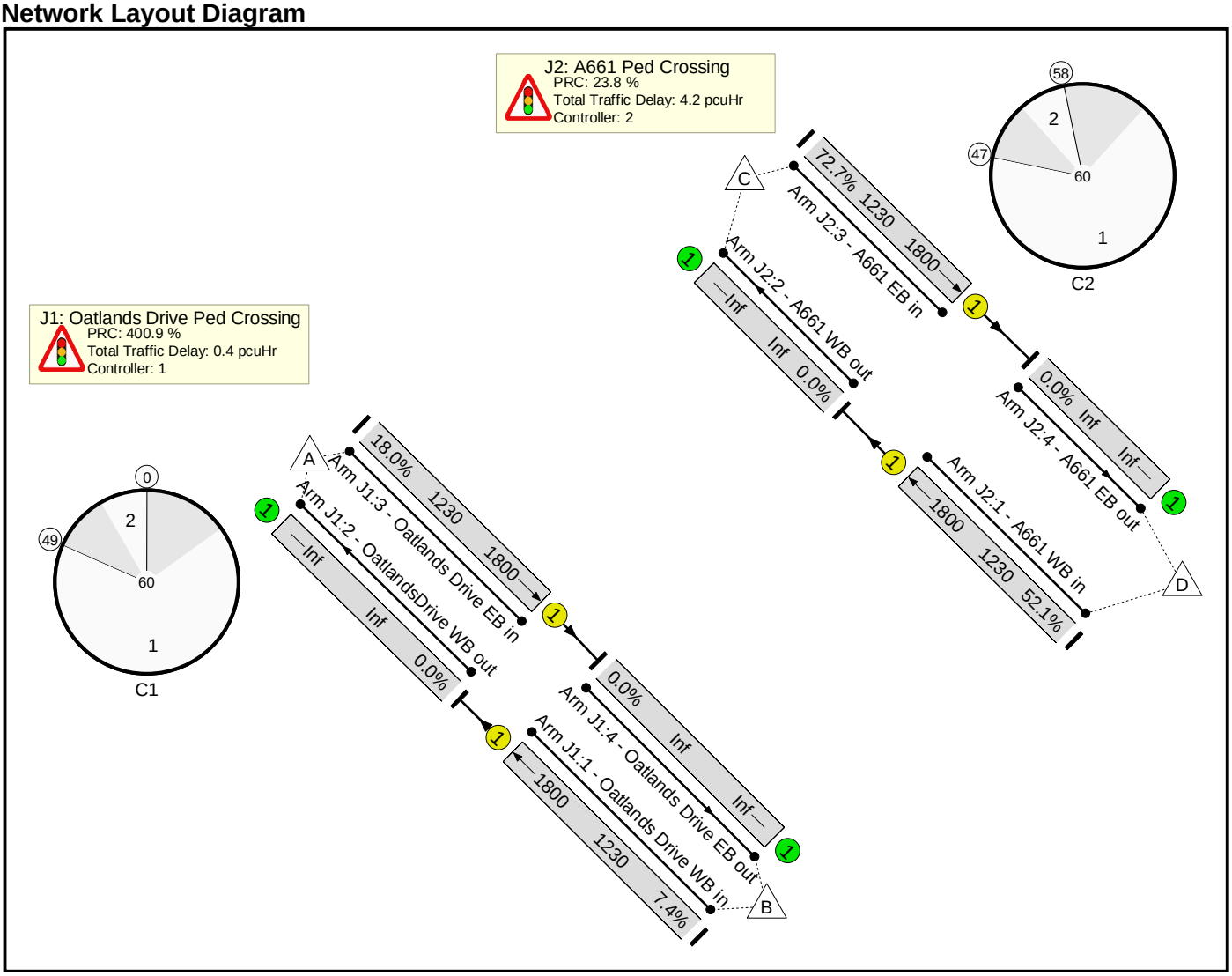
Basic Results Summary

User and Project Details

Project:	**70090992**
Title:	**Slingsby Walk Toucan Crossings**
Location:	Harrogate
Additional detail:	
File name:	Slingsby Walk.lsg3x
Author:	IG
Company:	WSP
Address:	

Scenario 1: '2023 AM 60 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

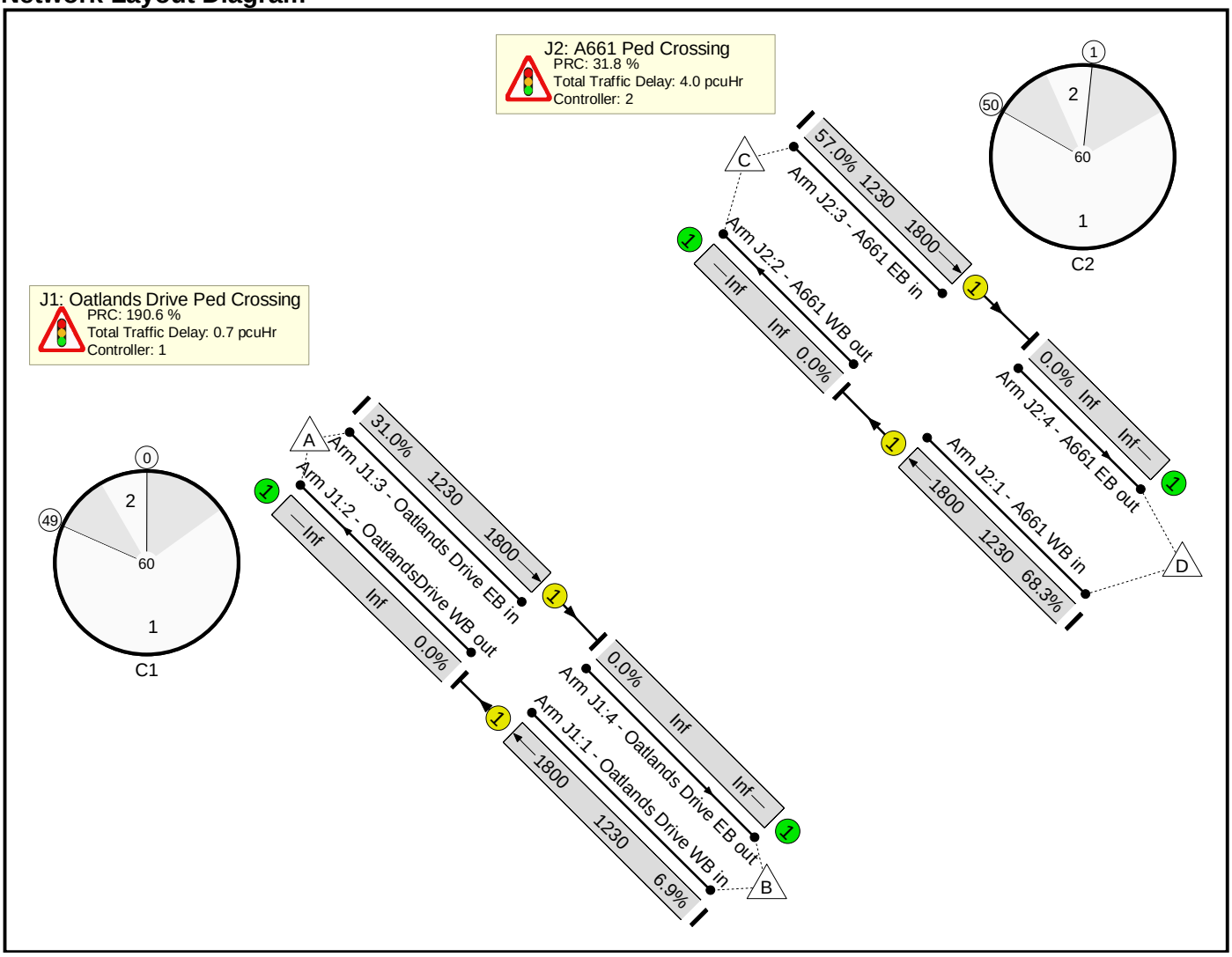
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**72.7%**	**0**	**0**	**0**	**4.6**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**18.0%**	**0**	**0**	**0**	**0.4**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	40	-	91	1800	1230	7.4%	-	-	-	0.1	4.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	40	-	221	1800	1230	18.0%	-	-	-	0.3	5.2	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**72.7%**	**0**	**0**	**0**	**4.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	40	-	641	1800	1230	52.1%	-	-	-	1.4	7.7	5.7
3/1	A661 EB in Ahead	U	C2:A		1	40	-	894	1800	1230	72.7%	-	-	-	2.8	11.3	10.5

C1	PRC for Signalled Lanes (%):	400.9	Total Delay for Signalled Lanes (pcuHr):	0.44	Cycle Time (s): 60
C2	PRC for Signalled Lanes (%):	23.8	Total Delay for Signalled Lanes (pcuHr):	4.18	Cycle Time (s): 60
	PRC Over All Lanes (%):	23.8	Total Delay Over All Lanes(pcuHr):	4.62	

Basic Results Summary

Scenario 2: '2023 PM 60 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

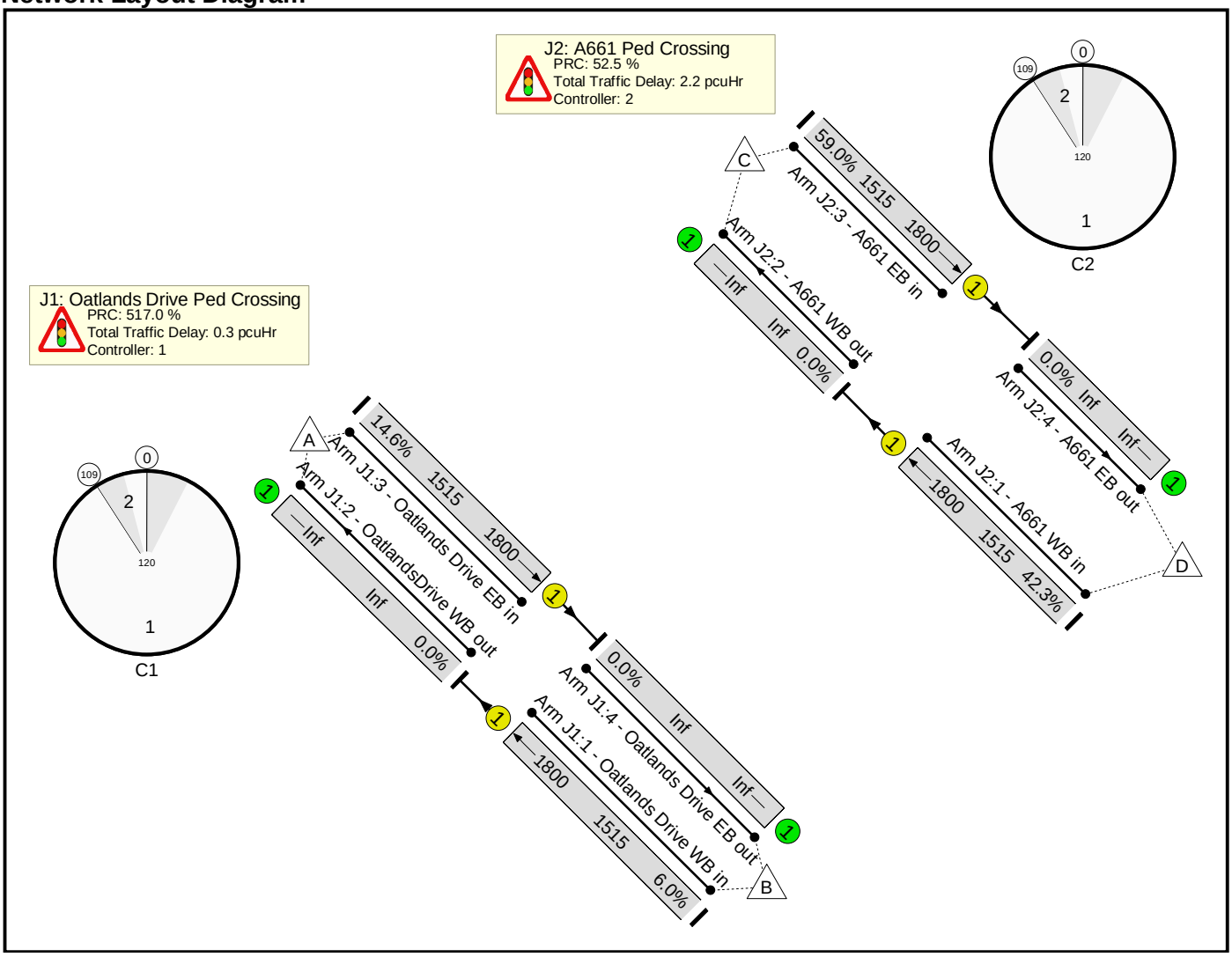
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**68.3%**	**0**	**0**	**0**	**4.7**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**31.0%**	**0**	**0**	**0**	**0.7**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	40	-	85	1800	1230	6.9%	-	-	-	0.1	4.7	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	40	-	381	1800	1230	31.0%	-	-	-	0.6	5.9	2.8
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**68.3%**	**0**	**0**	**0**	**4.0**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	40	-	840	1800	1230	68.3%	-	-	-	2.4	10.2	9.2
3/1	A661 EB in Ahead	U	C2:A		1	40	-	701	1800	1230	57.0%	-	-	-	1.6	8.3	6.7

C1	PRC for Signalled Lanes (%):	190.6	Total Delay for Signalled Lanes (pcuHr):	0.74	Cycle Time (s): 60
C2	PRC for Signalled Lanes (%):	31.8	Total Delay for Signalled Lanes (pcuHr):	4.01	Cycle Time (s): 60
	PRC Over All Lanes (%):	31.8	Total Delay Over All Lanes(pcuHr):	4.75	

Basic Results Summary

Scenario 3: '2023 AM 120 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

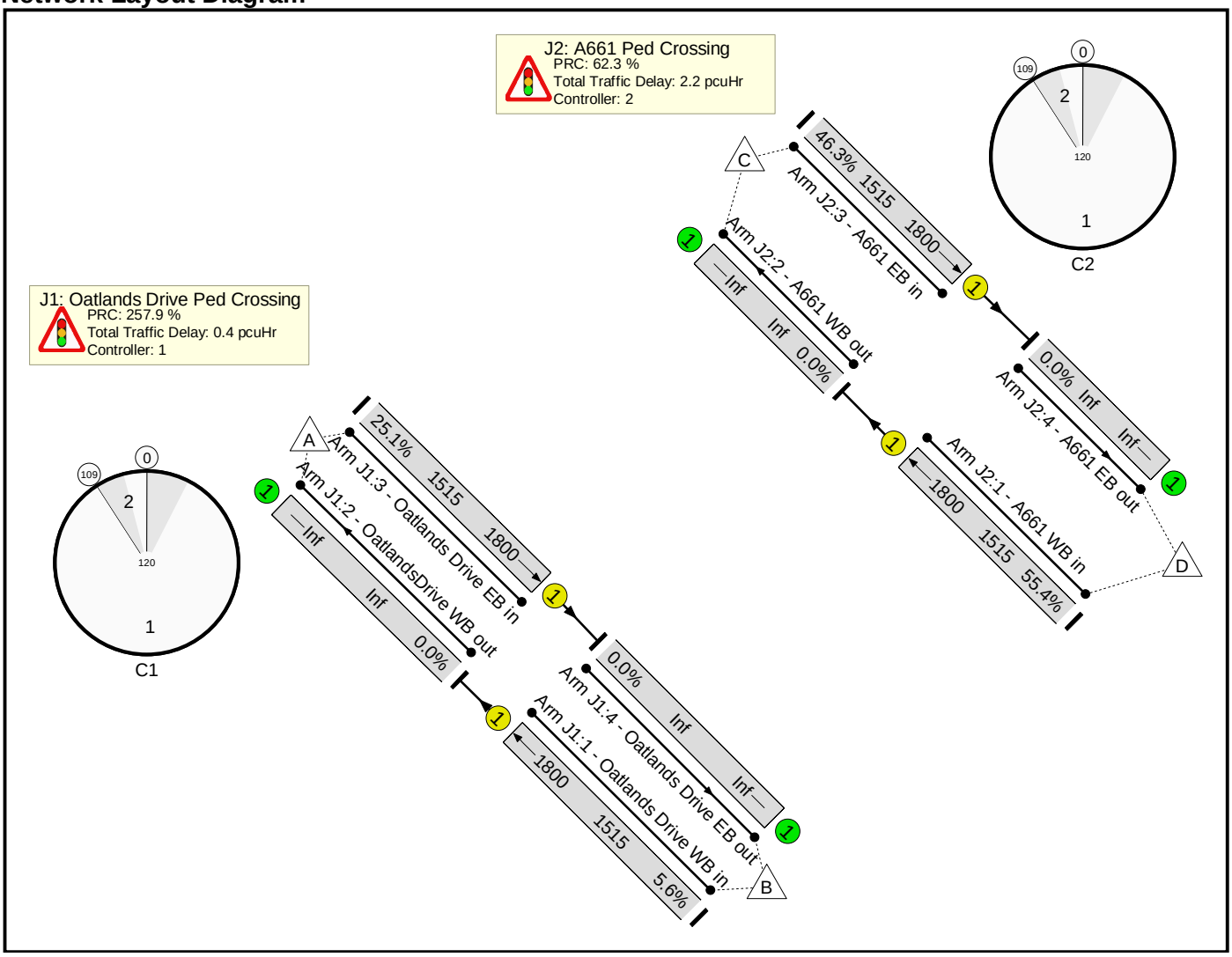
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**59.0%**	**0**	**0**	**0**	**2.5**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**14.6%**	**0**	**0**	**0**	**0.3**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	100	-	91	1800	1515	6.0%	-	-	-	0.1	2.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	100	-	221	1800	1515	14.6%	-	-	-	0.2	3.1	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**59.0%**	**0**	**0**	**0**	**2.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	100	-	641	1800	1515	42.3%	-	-	-	0.8	4.4	5.5
3/1	A661 EB in Ahead	U	C2:A		1	100	-	894	1800	1515	59.0%	-	-	-	1.5	5.9	9.9

C1	PRC for Signalled Lanes (%):	517.0	Total Delay for Signalled Lanes (pcuHr):	0.26	Cycle Time (s): 120
C2	PRC for Signalled Lanes (%):	52.5	Total Delay for Signalled Lanes (pcuHr):	2.24	Cycle Time (s): 120
	PRC Over All Lanes (%):	52.5	Total Delay Over All Lanes(pcuHr):	2.51	

Basic Results Summary

Scenario 4: '2023 PM 120 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

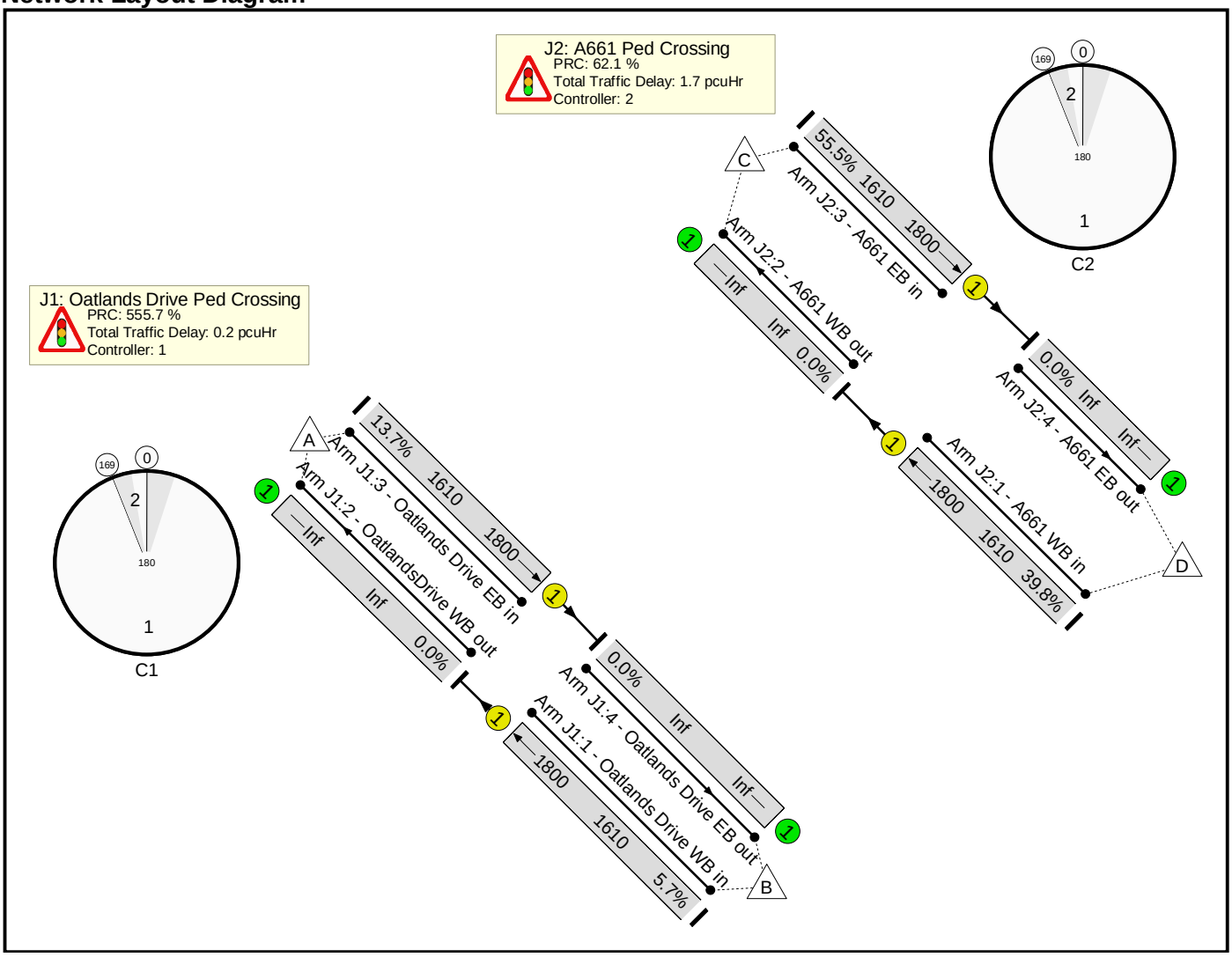
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**55.4%**	**0**	**0**	**0**	**2.6**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**25.1%**	**0**	**0**	**0**	**0.4**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	100	-	85	1800	1515	5.6%	-	-	-	0.1	2.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	100	-	381	1800	1515	25.1%	-	-	-	0.4	3.5	2.7
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**55.4%**	**0**	**0**	**0**	**2.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	100	-	840	1800	1515	55.4%	-	-	-	1.3	5.5	8.8
3/1	A661 EB in Ahead	U	C2:A		1	100	-	701	1800	1515	46.3%	-	-	-	0.9	4.7	6.5

C1	PRC for Signalled Lanes (%):	257.9	Total Delay for Signalled Lanes (pcuHr):	0.44	Cycle Time (s): 120
C2	PRC for Signalled Lanes (%):	62.3	Total Delay for Signalled Lanes (pcuHr):	2.19	Cycle Time (s): 120
	PRC Over All Lanes (%):	62.3	Total Delay Over All Lanes(pcuHr):	2.63	

Basic Results Summary

Scenario 5: '2023 AM 180 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

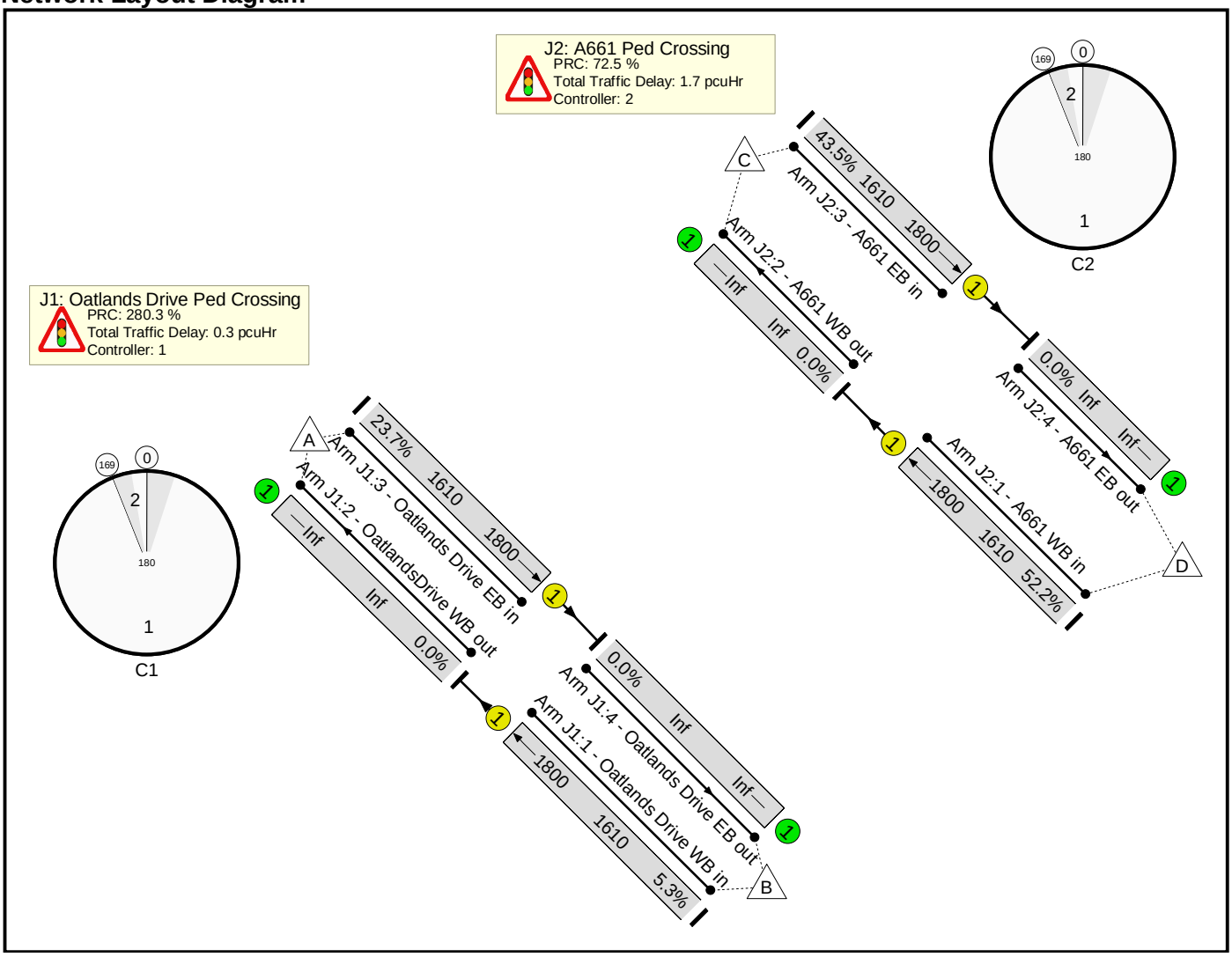
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**55.5%**	**0**	**0**	**0**	**1.9**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**13.7%**	**0**	**0**	**0**	**0.2**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	160	-	91	1800	1610	5.7%	-	-	-	0.1	2.2	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	160	-	221	1800	1610	13.7%	-	-	-	0.1	2.4	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**55.5%**	**0**	**0**	**0**	**1.7**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	160	-	641	1800	1610	39.8%	-	-	-	0.6	3.4	5.5
3/1	A661 EB in Ahead	U	C2:A		1	160	-	894	1800	1610	55.5%	-	-	-	1.1	4.5	9.8

C1	PRC for Signalled Lanes (%):	555.7	Total Delay for Signalled Lanes (pcuHr):	0.21	Cycle Time (s): 180
C2	PRC for Signalled Lanes (%):	62.1	Total Delay for Signalled Lanes (pcuHr):	1.73	Cycle Time (s): 180
	PRC Over All Lanes (%):	62.1	Total Delay Over All Lanes(pcuHr):	1.93	

Basic Results Summary

Scenario 6: '2023 PM 180 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**52.2%**	**0**	**0**	**0**	**2.0**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**23.7%**	**0**	**0**	**0**	**0.3**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	160	-	85	1800	1610	5.3%	-	-	-	0.1	2.2	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	160	-	381	1800	1610	23.7%	-	-	-	0.3	2.7	2.7
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**52.2%**	**0**	**0**	**0**	**1.7**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	160	-	840	1800	1610	52.2%	-	-	-	1.0	4.2	8.7
3/1	A661 EB in Ahead	U	C2:A		1	160	-	701	1800	1610	43.5%	-	-	-	0.7	3.6	6.4

C1	PRC for Signalled Lanes (%):	280.3	Total Delay for Signalled Lanes (pcuHr):	0.34	Cycle Time (s): 180
C2	PRC for Signalled Lanes (%):	72.5	Total Delay for Signalled Lanes (pcuHr):	1.69	Cycle Time (s): 180
	PRC Over All Lanes (%):	72.5	Total Delay Over All Lanes(pcuHr):	2.03	

TECHNICAL NOTE 1

DATE:	07 February 2022	**CONFIDENTIALITY:**	Restricted
SUBJECT:	Slingsby Walk Toucan Crossings – Preliminary Traffic Assessment		
PROJECT:	70090992	**AUTHOR:**	IG
CHECKED:	AF	**APPROVED:**	CD

INTRODUCTION

North Yorkshire County Council has requested WSP to undertake a preliminary assessment of the operational impacts of providing signalised Toucan crossings on Oatlands Road and the A661 in Harrogate. The location of these potential crossings is shown below.

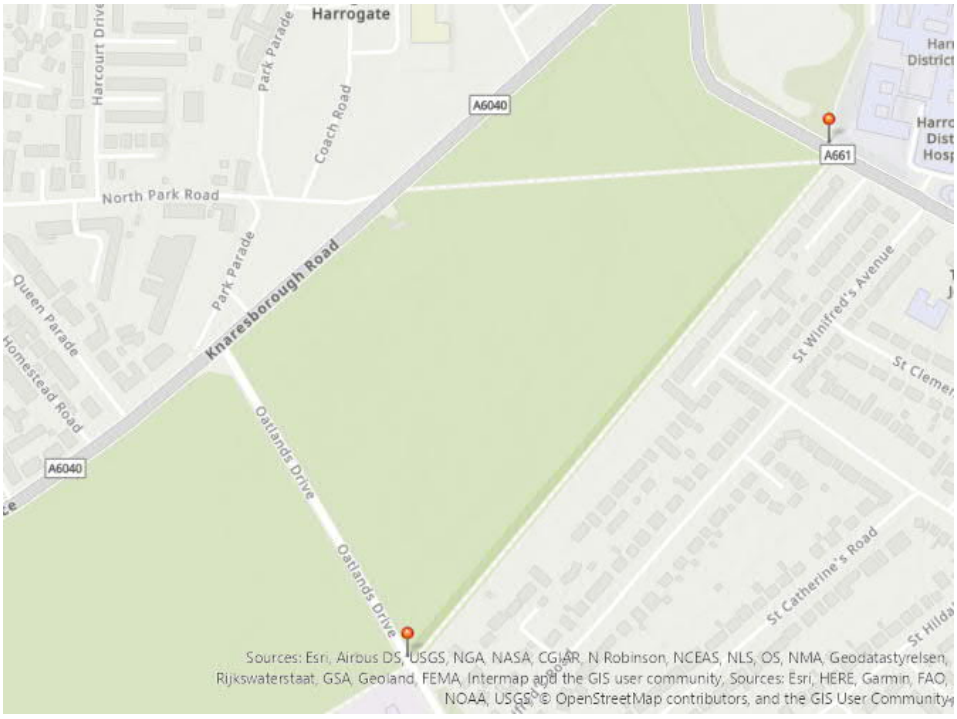


Figure 1 Potential Locations of the Toucan Crossings

METHODOLOGY

There are several existing transport models of Harrogate, including:

- Microsimulation Paramics Discovery model
- Strategic Visum model

The Paramics Discovery model would be the best tool to assess the operational performance of the crossings and the wider impact of the proposed crossings. However, these crossings are located outside the modelled area of the Paramics Discovery model. Therefore, it is proposed that the Visum model be used to assess the wider impacts of the proposed crossings and a new LinSig model be used to assess the operational performance of the scheme.

It is acknowledged that the Visum model does not validate well in the study area and therefore the traffic flows may not be an accurate representation of reality. To mitigate this risk of using lower flows, it is recommended that the 2023 Visum model is used for the assessment.

The wider network traffic impacts have been assessed using the 2023 Visum model, with the Station Gateway TCF scheme in place. For consistency, the new LinSig model has been calibrated using the traffic flows from the Visum model.

There is insufficient pedestrian flow data to estimate the frequency of the crossings and the duration that traffic would be held on red. For this reason, a sensitivity test has been carried out to assess the traffic impact of the crossings with a cycle time of 1min, 2 mins and 3 mins. This methodology allows identification of the possible traffic impacts of the scheme in various situations.

WIDER NETWORK IMPACTS

The 2023 Visum model with the Station Gateway TCF scheme in place has been used to assess the possible network impacts of upgrading the existing uncontrolled crossing facilities to a Toucan Crossing of Slingsby Walk at the A661 and Oatlands Drive.

Fixed signal times have been modelled with the following times:

- Cycle time: 3 tests with 60 sec, 120 sec and 180 sec.
- Traffic to pedestrians intergreen: 6 secs.
- Pedestrians to traffic intergreen: 9 secs.
- Minimum pedestrians green time: 5 secs.

Plans showing the traffic flow differences for the 3 scenarios for both AM and PM periods are in Appendix A. These plans show that traffic reassignment from Oatlands Drive is likely to be minimal in all 3 scenarios. Traffic reassignment from the A661 Wetherby Road is also likely to be minimal, except in the worst case that the crossing is activated every minute. In this case, the additional delays are likely to cause that around 30 vehicles will reassign to a different route, being the A59 the most attractive route. This reassignment is likely to cause a negligible impact on the alternative routes.

OPERATIONAL PERFORMANCE

The traffic flows from the 2023 Visum model with the Station Gateway TCF scheme have been used to develop a new LinSig model of the two new proposed Toucan Crossings. The same signal time assumptions described above have been applied to the LinSig model. Full details of this model can be found in Appendix B.

A summary of the model results (Degree of Saturation, Delays and Mean Maximum Queues) can be found in Tables 1 and 2 for the AM and PM respectively.

Table 1 LinSig summary results (AM)

	60 sec			120 sec			180 sec		
ROAD	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)
Oatlands Dr WB	7.4%	4.8	0.5	6.0%	2.8	0.5	5.7%	2.2	0.5
Oatlands Dr EB	18.0%	5.2	1.4	14.6%	3.1	1.4	13.7%	2.4	1.4
A661 WB	52.1%	7.7	5.7	42.3%	4.4	5.5	39.8%	3.4	5.5
A661 EB	72.7%	11.3	10.5	59.0%	5.9	9.9	55.5%	4.5	9.8

Table 2 LinSig summary results (PM)

	60 sec			120 sec			180 sec		
ROAD	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)	DoS (%)	Delay (s)	MMQ (pcu)
Oatlands Dr WB	6.9%	4.7	0.5	5.6%	2.8	0.5	5.3%	2.2	0.5
Oatlands Dr EB	31.0%	5.9	2.8	25.1%	3.5	2.7	23.7%	2.7	2.7
A661 WB	68.3%	10.2	9.2	55.4%	5.5	8.8	52.2%	4.2	8.7
A661 EB	57.0%	8.3	6.7	46.3%	4.7	6.5	43.5%	3.6	6.4

The LinSig model results show that the Toucan crossing on Oatlands Drive is likely to have negligible impacts on traffic even if the crossing is activated once every cycle. The crossing on the A661 is likely to have bigger traffic impacts than the other one, but it is still likely to operate with spare capacity and the average delays and queues are likely to be manageable.

SUMMARY

A preliminary traffic assessment of upgrading the existing uncontrolled crossing facilities at Slingsby Walk (see Figure 1) has been carried out. This assessment has been carried out using the 2023 Visum model flows due to the lack of existing traffic flows at these locations. The validation of the Visum model at these locations is not to WebTAG standards and therefore it is recommended that if progressed to detailed design, then new traffic flows are collected to re-assess the traffic impact of upgrading these crossings. However, the modelling exercise carried out at this stage is considered to be sufficient to gain an understanding of the likely traffic impacts.

The 2023 Visum model has been used to assess the wider network traffic impacts of the scheme. The model predicts that even in the worst case, with the toucan crossings being activated every minute, the impacts of the scheme into the rest of the network are likely to be minimal.

The flows from the Visum model have been used to build a LinSig model of the two crossings. The LinSig model predicts that even in the worst case the crossings are expected to operate within capacity with minimal delays and queues.

APPENDIX A: TRAFFIC FLOW DIFFERENCES

Figure 2 Traffic flow differences with 60 sec cycle time (AM)

Figure 3 Traffic flow differences with 60 sec cycle time (PM)

Figure 4 Traffic flow differences with 120 sec cycle time (AM)

Figure 5 Traffic flow differences with 120 sec cycle time (PM)

Figure 6 Traffic flow differences with 180 sec cycle time (AM)

Figure 7 Traffic flow differences with 180 sec cycle time (PM)

APPENDIX B: LINSIG MODEL RESULTS

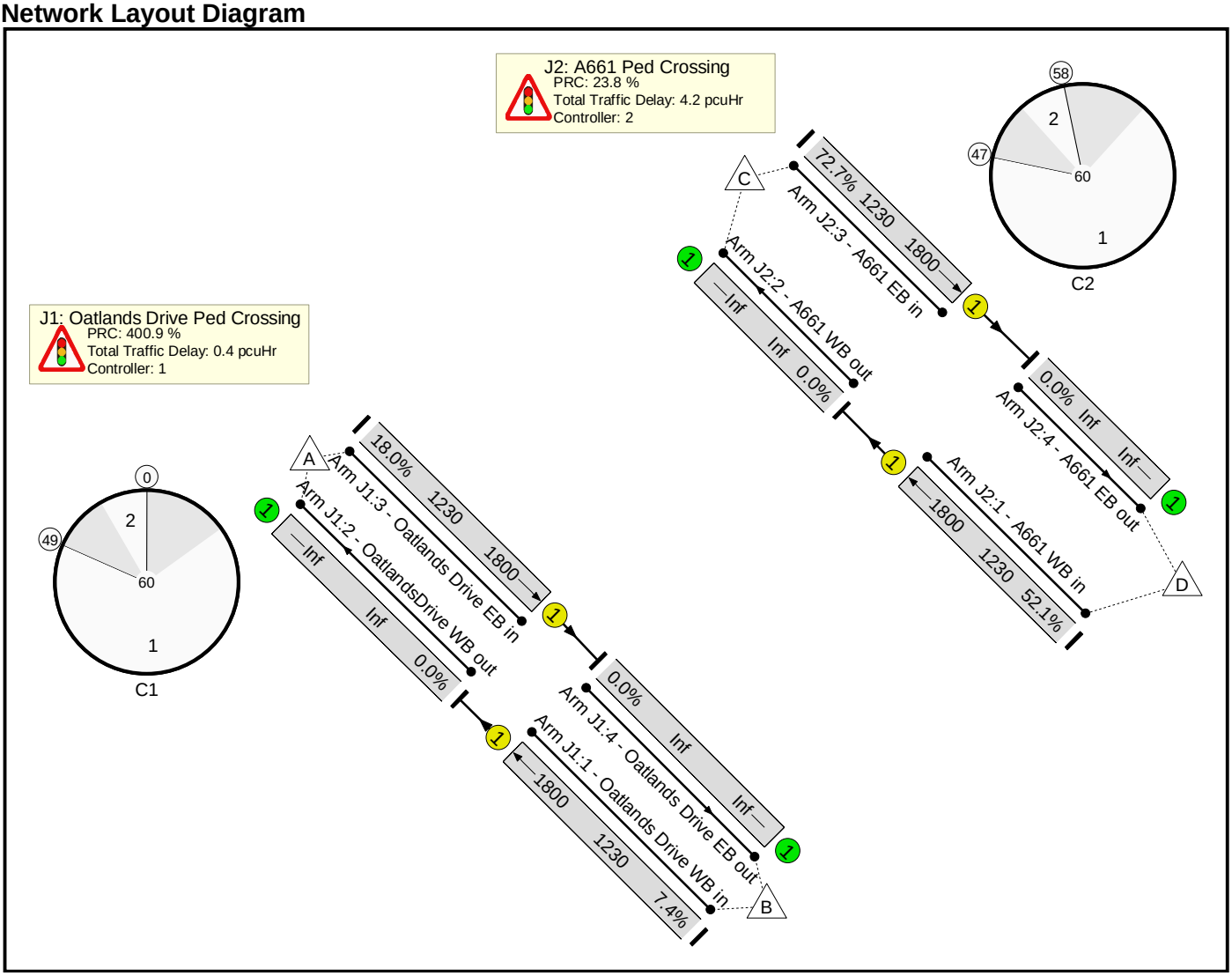
Basic Results Summary

User and Project Details

Project:	**70090992**
Title:	**Slingsby Walk Toucan Crossings**
Location:	Harrogate
Additional detail:	
File name:	Slingsby Walk.lsg3x
Author:	IG
Company:	WSP
Address:	

Scenario 1: '2023 AM 60 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

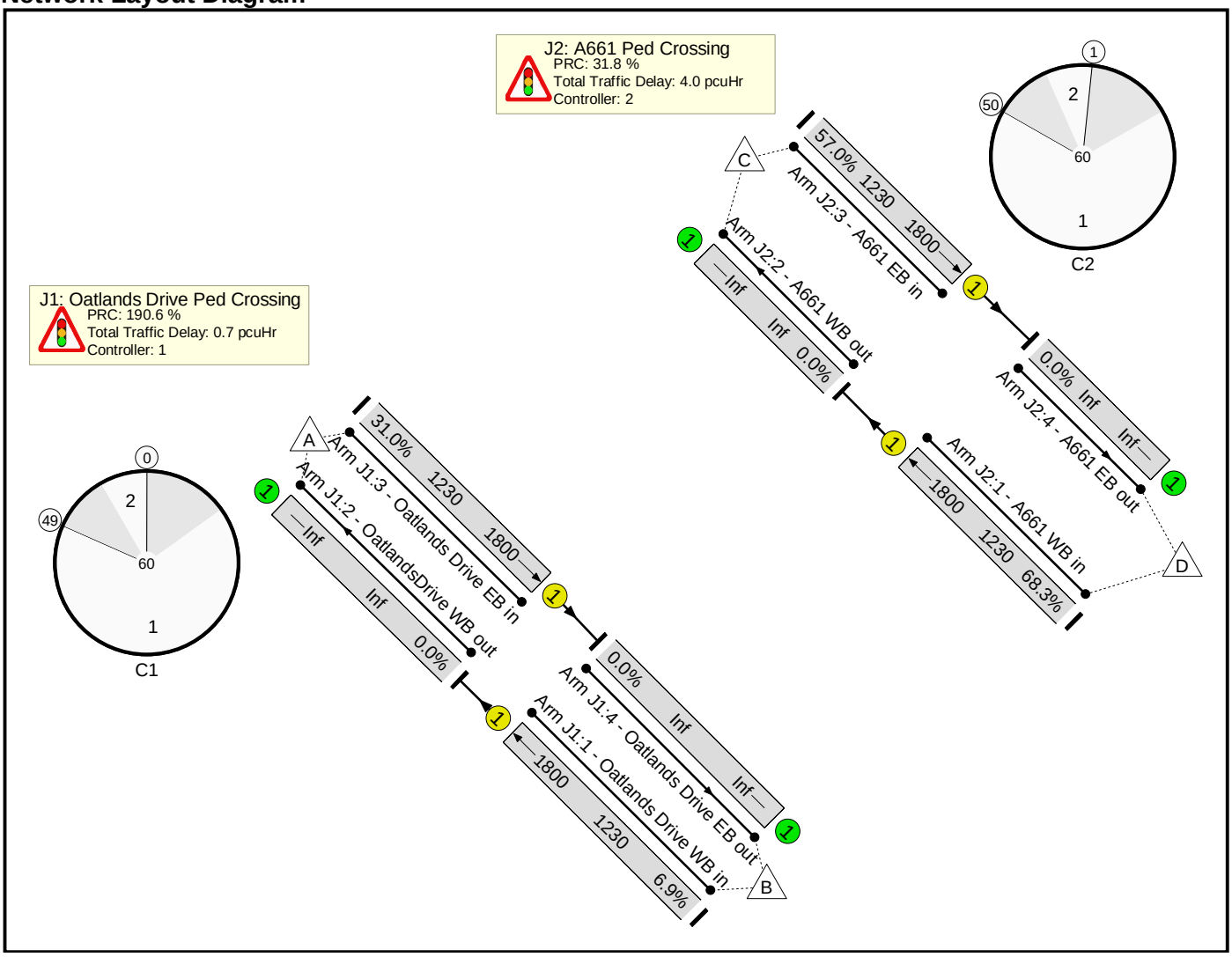
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**72.7%**	**0**	**0**	**0**	**4.6**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**18.0%**	**0**	**0**	**0**	**0.4**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	40	-	91	1800	1230	7.4%	-	-	-	0.1	4.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	40	-	221	1800	1230	18.0%	-	-	-	0.3	5.2	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**72.7%**	**0**	**0**	**0**	**4.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	40	-	641	1800	1230	52.1%	-	-	-	1.4	7.7	5.7
3/1	A661 EB in Ahead	U	C2:A		1	40	-	894	1800	1230	72.7%	-	-	-	2.8	11.3	10.5

C1	PRC for Signalled Lanes (%):	400.9	Total Delay for Signalled Lanes (pcuHr):	0.44	Cycle Time (s): 60
C2	PRC for Signalled Lanes (%):	23.8	Total Delay for Signalled Lanes (pcuHr):	4.18	Cycle Time (s): 60
	PRC Over All Lanes (%):	23.8	Total Delay Over All Lanes(pcuHr):	4.62	

Basic Results Summary

Scenario 2: '2023 PM 60 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

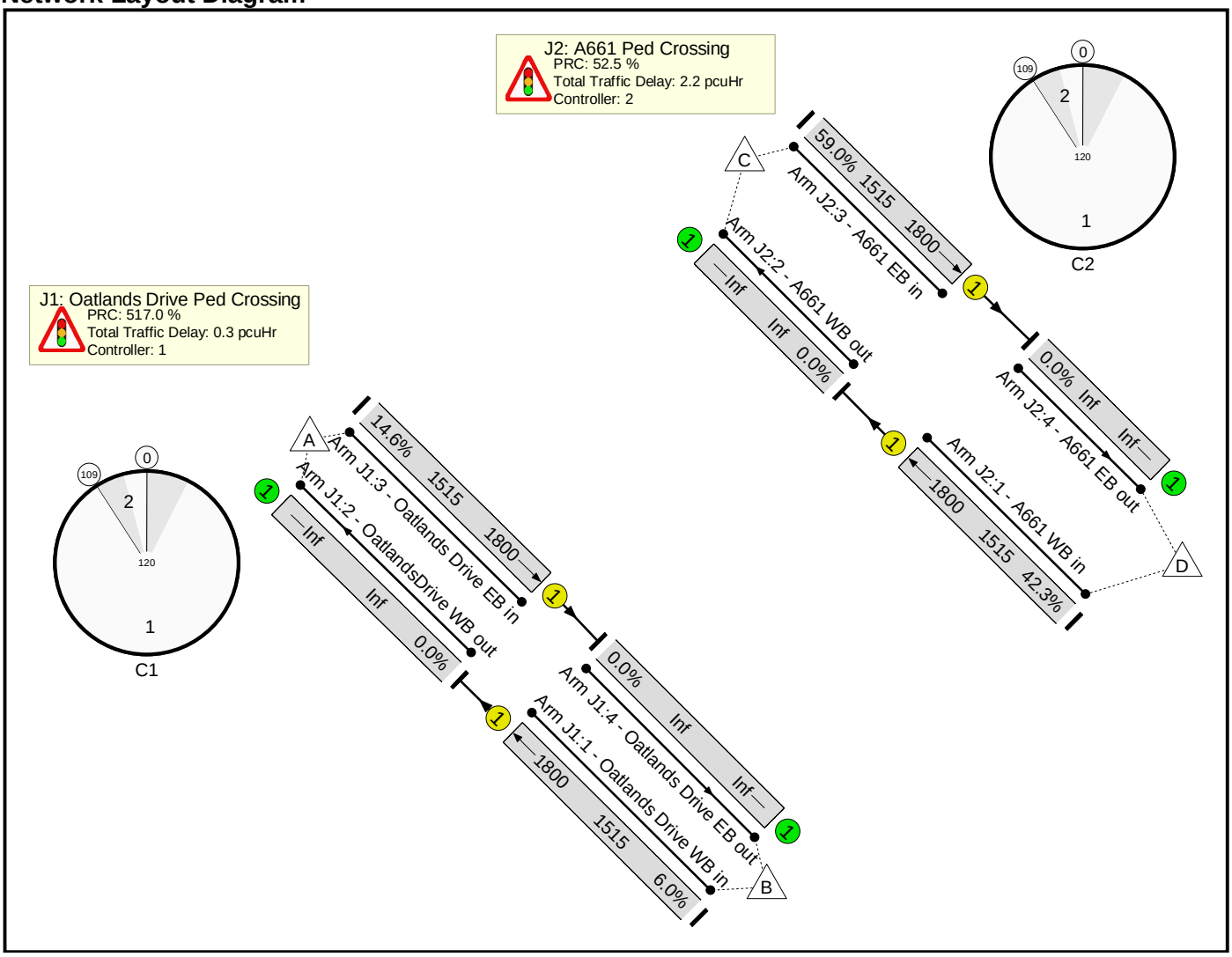
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**68.3%**	**0**	**0**	**0**	**4.7**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**31.0%**	**0**	**0**	**0**	**0.7**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	40	-	85	1800	1230	6.9%	-	-	-	0.1	4.7	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	40	-	381	1800	1230	31.0%	-	-	-	0.6	5.9	2.8
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**68.3%**	**0**	**0**	**0**	**4.0**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	40	-	840	1800	1230	68.3%	-	-	-	2.4	10.2	9.2
3/1	A661 EB in Ahead	U	C2:A		1	40	-	701	1800	1230	57.0%	-	-	-	1.6	8.3	6.7

C1	PRC for Signalled Lanes (%):	190.6	Total Delay for Signalled Lanes (pcuHr):	0.74	Cycle Time (s): 60
C2	PRC for Signalled Lanes (%):	31.8	Total Delay for Signalled Lanes (pcuHr):	4.01	Cycle Time (s): 60
	PRC Over All Lanes (%):	31.8	Total Delay Over All Lanes(pcuHr):	4.75	

Basic Results Summary

Scenario 3: '2023 AM 120 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

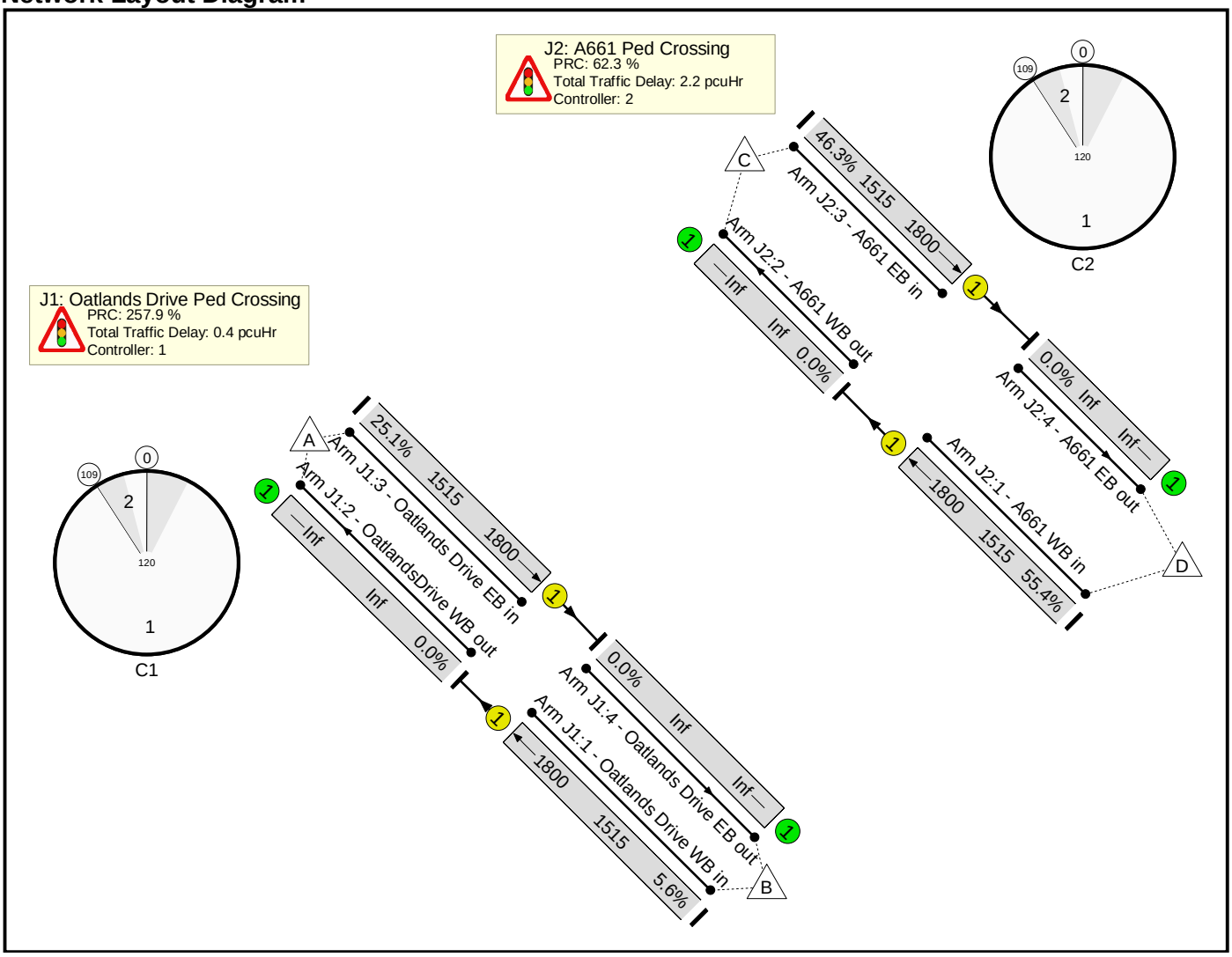
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**59.0%**	**0**	**0**	**0**	**2.5**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**14.6%**	**0**	**0**	**0**	**0.3**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	100	-	91	1800	1515	6.0%	-	-	-	0.1	2.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	100	-	221	1800	1515	14.6%	-	-	-	0.2	3.1	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**59.0%**	**0**	**0**	**0**	**2.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	100	-	641	1800	1515	42.3%	-	-	-	0.8	4.4	5.5
3/1	A661 EB in Ahead	U	C2:A		1	100	-	894	1800	1515	59.0%	-	-	-	1.5	5.9	9.9

C1	PRC for Signalled Lanes (%):	517.0	Total Delay for Signalled Lanes (pcuHr):	0.26	Cycle Time (s): 120
C2	PRC for Signalled Lanes (%):	52.5	Total Delay for Signalled Lanes (pcuHr):	2.24	Cycle Time (s): 120
	PRC Over All Lanes (%):	52.5	Total Delay Over All Lanes(pcuHr):	2.51	

Basic Results Summary

Scenario 4: '2023 PM 120 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

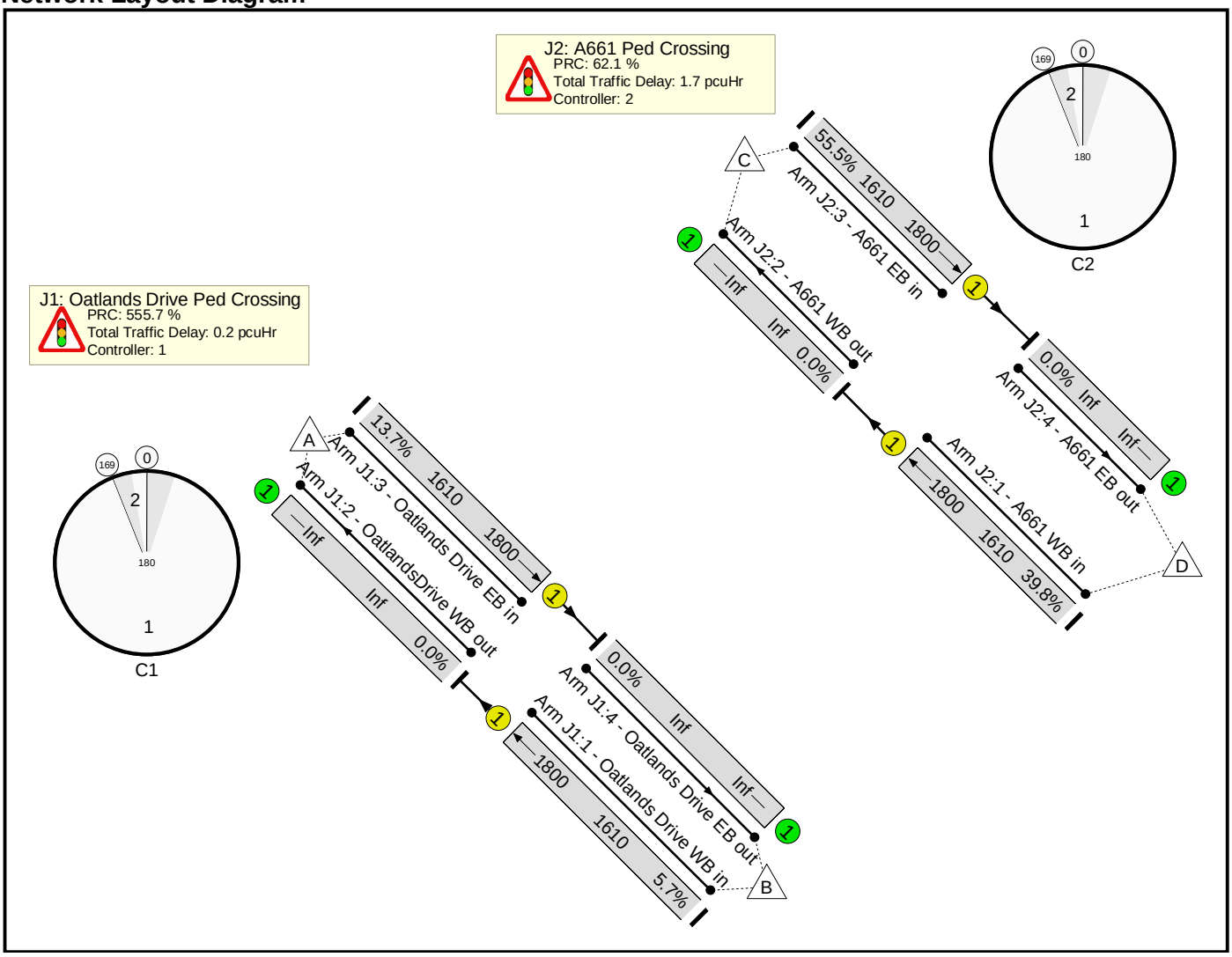
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**55.4%**	**0**	**0**	**0**	**2.6**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**25.1%**	**0**	**0**	**0**	**0.4**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	100	-	85	1800	1515	5.6%	-	-	-	0.1	2.8	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	100	-	381	1800	1515	25.1%	-	-	-	0.4	3.5	2.7
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**55.4%**	**0**	**0**	**0**	**2.2**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	100	-	840	1800	1515	55.4%	-	-	-	1.3	5.5	8.8
3/1	A661 EB in Ahead	U	C2:A		1	100	-	701	1800	1515	46.3%	-	-	-	0.9	4.7	6.5

C1	PRC for Signalled Lanes (%):	257.9	Total Delay for Signalled Lanes (pcuHr):	0.44	Cycle Time (s): 120
C2	PRC for Signalled Lanes (%):	62.3	Total Delay for Signalled Lanes (pcuHr):	2.19	Cycle Time (s): 120
	PRC Over All Lanes (%):	62.3	Total Delay Over All Lanes(pcuHr):	2.63	

Basic Results Summary

Scenario 5: '2023 AM 180 sec' (FG3: '2023 AM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

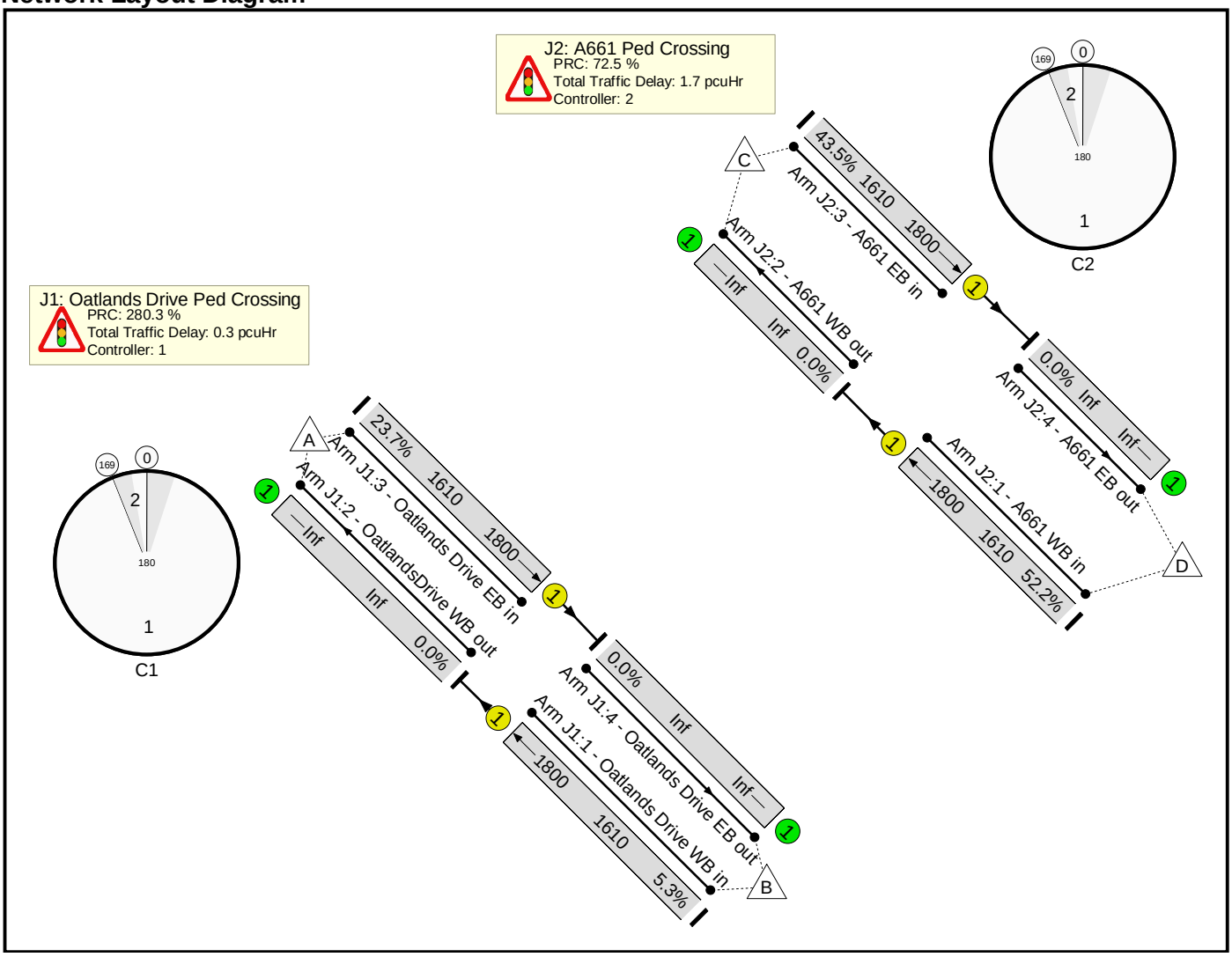
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**55.5%**	**0**	**0**	**0**	**1.9**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**13.7%**	**0**	**0**	**0**	**0.2**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	160	-	91	1800	1610	5.7%	-	-	-	0.1	2.2	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	160	-	221	1800	1610	13.7%	-	-	-	0.1	2.4	1.4
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**55.5%**	**0**	**0**	**0**	**1.7**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	160	-	641	1800	1610	39.8%	-	-	-	0.6	3.4	5.5
3/1	A661 EB in Ahead	U	C2:A		1	160	-	894	1800	1610	55.5%	-	-	-	1.1	4.5	9.8

C1	PRC for Signalled Lanes (%):	555.7	Total Delay for Signalled Lanes (pcuHr):	0.21	Cycle Time (s): 180
C2	PRC for Signalled Lanes (%):	62.1	Total Delay for Signalled Lanes (pcuHr):	1.73	Cycle Time (s): 180
	PRC Over All Lanes (%):	62.1	Total Delay Over All Lanes(pcuHr):	1.93	

Basic Results Summary

Scenario 6: '2023 PM 180 sec' (FG4: '2023 PM 180sec', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**52.2%**	**0**	**0**	**0**	**2.0**	-	-
J1: Oatlands Drive Ped Crossing	-	-	-		-	-	-	-	-	-	**23.7%**	**0**	**0**	**0**	**0.3**	-	-
1/1	Oatlands Drive WB in Ahead	U	C1:A		1	160	-	85	1800	1610	5.3%	-	-	-	0.1	2.2	0.5
3/1	Oatlands Drive EB in Ahead	U	C1:A		1	160	-	381	1800	1610	23.7%	-	-	-	0.3	2.7	2.7
J2: A661 Ped Crossing	-	-	-		-	-	-	-	-	-	**52.2%**	**0**	**0**	**0**	**1.7**	-	-
1/1	A661 WB in Ahead	U	C2:A		1	160	-	840	1800	1610	52.2%	-	-	-	1.0	4.2	8.7
3/1	A661 EB in Ahead	U	C2:A		1	160	-	701	1800	1610	43.5%	-	-	-	0.7	3.6	6.4

C1	PRC for Signalled Lanes (%):	280.3	Total Delay for Signalled Lanes (pcuHr):	0.34	Cycle Time (s): 180
C2	PRC for Signalled Lanes (%):	72.5	Total Delay for Signalled Lanes (pcuHr):	1.69	Cycle Time (s): 180
	PRC Over All Lanes (%):	72.5	Total Delay Over All Lanes(pcuHr):	2.03	