

Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three Offshore Wind Farm

Appendix 33 to Deadline I - A140 / B1113 Junction Technical Note

Date: 7th November 2018

Hornsea 3
Offshore Wind Farm

Orsted

Document Control			
Document Properties			
Organisation	Ørsted Hornsea Project Three		
Author	Create Consulting Engineers		
Checked by	Sarah Drljaca		
Approved by	Andrew Guyton		
Title	Appendix 33 to Deadline I - A140 / B1113 Junction Technical Note		
PINS Document Number	n/a		
Version History			
Date	Version	Status	Description / Changes
07/11/2018	A	Final	Submission at Deadline I (7 th Nov 2018)

Ørsted

5 Howick Place,

London, SW1P 1WG

© Ørsted Power (UK) Ltd, 2018. All rights reserved

Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2018.

Table of Contents

1. Introduction.....	1
2. Construction Traffic	2
3. Qualitative Assessment.....	4
4. Traffic Modelling	8
Summary	13
5. Land West of Ipswich Road.....	15
Summary of Operational Assessments.....	20
Other Changes to the Road Network	20
6. Summary and Conclusions.....	21
Appendix A LINSIG Output Files	22
Appendix B Consented A140/B1113/Tesco Junction Layout.....	38
Appendix C Consented A140/B1113/Tesco Junction LINSIG Output Files	39

List of Tables

Table 3.1: Summary of Day-to-Day Variation in Traffic Flows along the A140 (flows in PCUs)	5
Table 4.1: Summary of operational assessment of A140/B1113 signalised junction (actual construction flows)	9
Table 4.2: Summary of operational assessment of A140/B1113 junction (HVDC converter/HVAC substation construction flows)	12

Acronyms

Acronym	Definition
AADT	Annual Average Daily Traffic
ATC	Automatic Traffic Counter
DfT	Department for Transport
DoS	Degree of Saturation
HGVs	Heavy Goods Vehicles
LPA	Local Planning Authority
NPPF	National Planning Policy Framework
TEMPRO	Trip End Model presentation Programme
PCU	Passenger Car Units
PRC	Practical Reserve Capacity
PRoW	Public Rights of Way

1. Introduction

- 1.1 This document comprises a technical note that sets out the impact of construction traffic from Hornsea Project Three offshore wind farm (hereafter referred to as Hornsea Three) at the A140/B1113 signalised junction.
- 1.2 An assessment of the performance of the A140/B1113 junction is set out in section 1.6.6 of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159). This assessment shows that the junction currently operates in excess of capacity during the weekday AM (07:30 to 08:30) and PM (16:45 to 17:45) peak hours and then predicts a worsening of performance during future years and with the addition of construction traffic from Hornsea Three.
- 1.3 As the junction operates in excess of capacity, Section 1.6.6 of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) concludes that the impact at this junction will be discussed with Highway Officers at Norfolk County Council.
- 1.4 As a statutory consultee to the DCO application, Norfolk County Council reported to their Committee on 6 July 2018 and prepared their Relevant Representations on 9 July 2018, part of which contained comments from Highway Officers. These comments covered varying aspects of the DCO and sought clarification of particular matters.
- 1.5 The Relevant Representations also identified elements of the application where Norfolk County Council, as the Local Highway Authority, required clarification. There were no concerns raised as to the performance of this junction nor to the impact of the construction traffic upon the performance of this junction. A subsequent meeting was held with a Highway Officer at Norfolk County Council on 21 August 2018. Consistent with the Relevant Representations, this junction did not form part of those discussions.
- 1.6 This particular junction was however raised during engagement with two other consultees, South Norfolk Council and Highways England. During a meeting with SNC on 15 June 2018, SNC noted that an outline planning application which would affect the B1113/A140 had been recently been determined (application reference: 2017/2794). A meeting with Highways England on Wednesday 24 October 2018 also covered the matter of the B1113/A140 junction, and potential works to it.
- 1.7 This document has been prepared in response to Examining Authority Written Question 1.11.14.

2. Construction Traffic

- 2.1 The assessment of construction traffic in Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) is based on the Hornsea Three traffic and transport study area which includes the onshore elements of Hornsea Three (i.e. the Hornsea Three landfall area, the onshore cable corridor, HVAC booster station, HVDC converter/HVAC substation and the interconnection with the existing Norwich Main substation), together with the compounds (including main construction compound), storage areas, construction accesses and all highways, Public Rights of Way (PRoW), private accesses and railways in the vicinity that are anticipated to be used by, or affected by, the construction, operation and decommissioning traffic. The Hornsea Three traffic and transport study area also includes parts of the wider transport network that provide links between the onshore cable corridor and onshore HVDC converter/HVAC substation and HVAC booster station and the local and strategic transport networks (i.e. extends from the A148 at Fakenham to the A149 at Cromer, following the A1067 and A140 to the south to the Norwich ring road).
- 2.2 Details of the predicted construction traffic flows through the junction during the weekday AM and PM peak hours are set out at Appendix D of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159). In summary, 48 HGVs have been assessed turning through the A140/B1113 junction during the weekday AM and PM peak hours.
- 2.3 Section 7.8.3 of Volume 3, Chapter 7: Traffic and Transport of the Environmental Statement (APP-079) sets out details on the geographical distribution and assignment of construction vehicles and sets out that this is wholly dependent upon the procurement of materials at the time of construction.
- 2.4 The assessment recognises that there are likely to be day-to-day variances in the movement of material throughout the construction programme based on the procurement agreements in place and the resultant origins of materials. For example, an amount of material is sourced from one location, but when this amount is reached, material is then sourced from another location. This will change the movement of HGVs as the construction phase progresses and result in day-to-day variances.
- 2.5 To ensure that the assessment accounts for these day-to-day variances, Section 7.8.3 of Volume 3, Chapter 7: Traffic and Transport of the Environmental Statement (APP-079) sets out a suitable sensitivity methodology for assessment purposes.
- 2.6 For assessment purposes only, Section 7.8.3 of Volume 3, Chapter 7: Traffic and Transport of the Environmental Statement (APP-079) assumes a sensitivity methodology that allows for an increased number of construction vehicles generated at each of the entry points to the Hornsea Three traffic and transport study area study area. This allows for day-to-day variances in the proportion of HGVs originating from each of the entry points as the supply chain evolves throughout the construction period.
- 2.7 This sensitivity methodology ensures a robust assessment across the Hornsea Three traffic and transport study area as a whole, as such a sensitivity methodology is intended. However, in the context of a specific junction within a central area of the Hornsea Three traffic and transport study area network next to the onshore cable corridor (such as the A140/B1113 junction), where construction traffic from all entry points to the Hornsea Three traffic and transport study area have converged, it results in an over-estimate of construction vehicles through it.

- 2.8 This is because, in practice, an increase from one origin would be offset by a decrease from another origin, however, the above sensitivity methodology takes no account for this. The assessment in Section 1.6.6 of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) is based upon 48 HGVs turning through the A140/B1113 junction during the weekday AM and PM peak hours.
- 2.9 The actual number predicted to travel through this junction will be 24 HGVs during the weekday AM and PM peak hours. Section 1.6.6 of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) provides an account of traffic impact, based upon 48 HGVs turning through the A140/B1113 junction during the weekday AM and PM peak hours. The peak hours for construction traffic are identified in the Transport Assessment to be between 07:00 – 08:00 and 18:00 – 19:00.
- 2.10 The number predicted to travel through this junction is 24 HGVs during *each* of the weekday AM and PM peak hours, hence 2 x 24 HGVs results in 48 HGVs in total (as referred to above) when combining the two peak hour periods.

3. Qualitative Assessment

- 3.1 As set out in Section 2, it is predicted that 24 HGVs will turn through the A140/B1113 junction during the weekday AM and PM peak hours. To consider the context of these movements, the observed movements through the junction (as recorded from the traffic surveys) have been considered.
- 3.2 In traffic assessments, it is common to consider vehicles as Passenger Car Units (PCUs). This is a unit measure relative to a single car that combines all vehicle types and sizes with cars being given a PCU value of 1.0; smaller vehicles, such as motorbikes, being given a PCU value less than 1.0; and large vehicles, such as articulated HGVs, being given a PCU value more than 1.0.
- 3.3 Appendix D of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) set out the observed movements through the A140/B1113 junction during the AM and PM peak hours in PCUs. In summary, there were 2,829 PCUs and 2,715 PCUs during these periods respectively.
- 3.4 The types of HGVs generated by the construction will vary from vans and light/medium goods vehicles to articulated HGVs. For the purpose of this assessment only, and to ensure a robust case, it is assumed that 50% of the construction vehicles are large rigid HGVs (PCU value of 1.9) and 50% are articulated HGVs (PCU value of 2.9). PCU values are taken from the Department for Transport (DfT) Transport Analysis Guidance (WebTAG) document '*TAG Unit A5.4 Marginal External Costs*' (May 2018).
- 3.5 Applying this to 24 construction vehicles equates to 57.6 PCUs through the A140/B1113 junction. Applying this to the observed PCU movements through the A140/B1113 junction equates to increases of 2.0% and 2.1% in PCUs during the weekday AM and PM peak hours respectively.
- 3.6 Such increases are typically well within what can be expected as day-to-day variations in traffic flow.
- 3.7 Volume 6, Annex 7.3: Base Traffic Flows of the Environmental Statement (APP-161) sets out the location of traffic surveys, where it can be seen that an Automatic Traffic Counter (ATC) was located on the A140 to the south of the B1113. To consider the day-to-day variation in traffic flow through the junction, this ATC has been analysed. Vehicles have been calculated into PCUs for each of the 10 weekdays during the AM and PM peak hour, as set out in Table 3.1.

Table 3.1: Summary of Day-to-Day Variation in Traffic Flows along the A140 (flows in PCUs)

	Mon 12 th June	Tue 13 th June	Wed 14 th June	Thu 15 th June	Fri 16 th June	Mon 19 th June	Tue 20 th June	Wed 21 st June	Thu 22 nd June	Fri 23 rd June	Min.	Average	Max.	Min. % variance from average	Max. % variance from average	Variation (min to max)	Variation (min to average)	Variation (average to max)
08:00 to 09:00	2121	2177	2286	2246	2123	2117	2160	2265	2168	2141	2117	2180	2286	3.0%	4.8%	169	63	105
17:00 to 18:00	2259	2176	2385	2368	2316	2248	2234	2224	2098	2157	2098	2246	2385	7.1%	6.2%	287	149	138

- 3.8 As Table 3.1 shows, the day-to-day variance in traffic flow experienced during the weekday AM and PM peak hour along the A140 and through the junction ranges between 169 and 287 PCUs.
- 3.9 The observed weekday peak hour day-to-day variance in traffic flow is therefore substantially more than the 57.6 PCUs that the construction process would generate through the junction.
- 3.10 Even if a variance from the weekday peak hour average to maximum (i.e. the maximum variance above 'typical' conditions) is considered, Table 3.1 shows this to be 105 PCUs and 138 PCUs during the weekday AM and PM peak hours respectively.
- 3.11 This is still double the 57.6 PCUs that the construction process would generate through the junction.
- 3.12 The above shows that the construction traffic flows would be well within the day-to-day variation in traffic flows through the A140/B1113 junction.
- 3.13 National Policy Statement for Energy EN-1 sets out that if a project is likely to have significant transport implications, the applicant's Environmental Statement should include a Transport Assessment, using the NATA/WebTAG methodology stipulated in Department for Transport (DfT) guidance (DfT, 2007), or any successor to such methodology. That guidance document has since been withdrawn and guidance is now set out in Planning Practice Guidance Travel Plans, Transport Assessments and Statements, published by the Ministry of Housing, Communities & Local Government (PPG), 2014. This states that Transport Assessments and Statements can be used to establish whether the residual transport impacts of a proposed development are likely to be 'severe', which may be a reason for refusal, in accordance with the National Planning Policy Framework.
- 3.14 The revised National Planning Policy Framework (NPPF), published in July 2018, sets out, amongst other things, that developments should only be refused on highway grounds if the residual cumulative impact on the road network would be 'severe'. It is recognised that the NPPF or PPG have reduced weight as a consideration in a Planning Act 2008 DCO Application, however neither defines 'severe'. At congested junctions, the day-to-day variation in traffic flows during the weekday AM and PM peak hours indicates the daily changes in traffic conditions experienced by road users and it provides a good indication for an upper level of additional traffic when considering the impact of a development upon a junction and whether that impact is 'severe' or not. In this instance, the day-to-day variation is substantially more than the construction traffic for Hornsea Three.
- 3.15 The temporary nature of the construction period should also be borne in mind. The construction vehicles through the A140/B1113 junction are generated from the HVDC converter/HVAC substation and from two onshore cable sections (cable sections 20 and 21; see Figure 1.2 at Volume 6, Annex 7.8: Traffic and Transport Figures of the Environmental Statement (APP-166)).
- 3.16 The calculations have been made on the basis of both of these cable sections and the HVDC converter/HVAC substation all being constructed at the same time. Cable section 20 is 1.7km and cable section 21 is 1.8km and using the criteria in Volume 6, Annex 7.6: Construction Vehicle Trip Generation Assumptions of the Environmental Statement (APP-164), equates to a construction duration of less than six months. The HVDC converter/HVAC substation is predicted to be constructed in three years.
- 3.17 Therefore, the construction traffic flows set out above (57.6 PCUs) would only be generated for a six-month period.

- 3.18 For the remaining 30-month period, only construction vehicles associated with the HVDC converter/HVAC substation will be generated. Using the criteria in Volume 6, Annex 7.6: Construction Vehicle Trip Generation Assumptions of the Environmental Statement (APP-164), and the PCU values above, this equates to 15 PCUs (6 HGVs) during the weekday AM and PM peak hours.
- 3.19 This is substantially lower than the day-to-day variance in traffic flows set out above. Indeed, it equates to only 9% of the day-to-day variance in traffic flows during the weekday AM peak hour and only 5% of the day-to-day variance in traffic flows during the weekday PM peak hour.
- 3.20 Therefore, during the remaining 30-month period, the HGV movements associated with the HVDC converter/HVAC substation will not generate traffic volumes over and above what is currently generated during normal day to day variance

4. Traffic Modelling

- 4.1 Table 1.9 of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) sets out the results of the operational assessments undertaken at the A140/B1113 junction using the LINSIG computer modelling software. As set out in Section 2, this was undertaken based on the sensitivity methodology which, for this junction, is an overestimate of the construction traffic generation.
- 4.2 These assessments have therefore been repeated using the actual number of HGVs (24 HGVs which equates to 57.6 PCUs) predicted to travel through the junction during the weekday AM and PM peak hours.
- 4.3 Table 1.9 of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) is therefore replicated in Table 4.1, below, with the last column (2022 Baseline plus Construction) revised to include only the actual number of HGVs (24 HGVs which equates to 57.6 PCUs) predicted to travel through the junction. Model outputs are attached at Appendix A.

Table 4.1: Summary of operational assessment of A140/B1113 signalised junction (actual construction flows)

Results of operational assessment of A140/B1113 signalised junction (actual construction flows)						
AM Peak Hour						
	2017 Observed		2022 Baseline		2022 Baseline plus Construction (actual construction flows)	
	DoS	MMQ	DoS	MMQ	DoS	MMQ
A140 Ipswich Road (North) – Southbound nearside lane – Ahead only	92.4%	13.8	100.3%	24.9	100.3%	24.9
A140 Ipswich Road (North) – Southbound offside lane – Right turn only	90.4%	5.7	98.0%	8.2	98.0%	8.2
A140 Ipswich Road (South) – Northbound nearside lane – Ahead and left turn	101.8%	26.7	110.4%	50.8	112.6%	57.7
A140 Ipswich Road (South) – Northbound offside lane – Ahead only	101.2%	24.7	110.2%	48.8	112.6%	56.1
B1113 – Left turn only	94.4%	13.8	102.5%	25.0	102.5%	25.0
B1113 – Right turn only	98.2%	3.9	106.8%	6.1	98.0%	8.2
Junction Practical Reserve Capacity (PRC)	-13.1%		-22.7%		-39.7%	
Total Delay (pcuHr)	63.13		138.00		165.66	
Cycle Time (Seconds)	56		56		56	
PM Peak Hour						
	2017 Observed		2022 Baseline		2022 Baseline plus Construction (actual construction flows)	
	DoS	MMQ	DoS	MMQ	DoS	MMQ
A140 Ipswich Road (North) – Southbound nearside lane – Ahead only	77.0%	12.5	83.7%	15.5	83.7%	15.5
A140 Ipswich Road (North) – Southbound offside lane – Right turn only	94.6%	11.4	102.7%	19.6	102.7%	19.6

Results of operational assessment of A140/B1113 signalised junction (actual construction flows)						
A140 Ipswich Road (South) – Northbound nearside lane – Ahead and left turn	104.6%	12.3	113.4%	19.0	129.5%	33.2
A140 Ipswich Road (South) – Northbound offside lane – Ahead only	69.1%	10.1	75.1%	11.7	75.1%	11.7
B1113 – Left turn only	95.2%	9.2	103.5%	15.4	103.5%	15.4
B1113 – Right turn only	98.6%	3.8	107.0%	5.9	127.2%	12.7
Junction Practical Reserve Capacity (PRC)	-16.2%		-26.0%		-43.9%	
Total Delay (pcuHr)	38.56		65.15		92.81	
Cycle Time (Seconds)	56		56		56	

- 4.4 As can be seen, the junction currently operates in excess of capacity during both the AM and PM peak hours and would continue to do so in the 2022 baseline scenario.
- 4.5 In the 2022 baseline scenario, a maximum Degree of Saturation (DoS) of 113.4% is predicted on the A140 Ipswich Road (south arm) during the PM peak hour with an associated queue length of 19.0 PCUs and a Practical Reserve Capacity (PRC) of -26.0%. During the AM peak hour, a maximum DoS of 110.4% is predicted on the A140 Ipswich Road (south arm) with an associated queue length of 50.8 PCUs and a PRC of -22.7%.
- 4.6 Following the addition of the actual construction flows in 2022, the junction is predicted to perform similarly in excess of capacity. A maximum Degree of Saturation (DoS) of 129.5% is predicted on the A140 Ipswich Road (south arm) during the PM peak hour with an associated queue length of 33.2 PCUs and a Practical Reserve Capacity (PRC) of -43.9%. During the AM peak hour, a maximum DoS of 112.6% is predicted on the A140 Ipswich Road (south arm) with an associated queue length of 57.7 PCUs and a PRC of -39.7%.
- 4.7 As set out above, these conditions would only be temporary for up to a six-month period.
- 4.8 It should also be noted that the change in flows as a result of the actual construction flows are less than the day-to-day variance in traffic flows. Therefore, the queuing at the junction with the addition of the actual construction flows are already experienced on some days of the week. The performance of the junction with the addition of the actual construction flows is therefore already part of the 'normal' fluctuations in queuing that day-to-day road users experience.
- 4.9 For the remaining 30-month period, only construction traffic associated with the HVDC converter/HVAC substation will be generated through the junction. As set out in Section 3, this equates to 15 PCUs during the weekday AM and PM peak hours.

- 4.10 Operational assessments of the junction have been undertaken with only the HVDC converter/HVAC substation construction traffic flows through it, a summary of which is set out in Table 4.2 with model outputs attached at Appendix A.

Table 4.2: Summary of operational assessment of A140/B1113 junction (HVDC converter/HVAC substation construction flows)

Results of operational assessment of A140/B1113 signalised junction (HVDC converter / HVAC substation construction flows)						
AM Peak Hour						
	2017 Observed		2022 Baseline		2022 Baseline plus Construction (HVDC converter / HVAC substation construction flows)	
	DoS	MMQ	DoS	MMQ	DoS	MMQ
A140 Ipswich Road (North) – Southbound nearside lane – Ahead only	92.4%	13.8	100.3%	24.9	100.3%	24.9
A140 Ipswich Road (North) – Southbound offside lane – Right turn only	90.4%	5.7	98.0%	8.2	98.0%	8.2
A140 Ipswich Road (South) – Northbound nearside lane – Ahead and left turn	101.8%	26.7	110.4%	50.8	111.0%	52.8
A140 Ipswich Road (South) – Northbound offside lane – Ahead only	101.2%	24.7	110.2%	48.8	110.8%	50.7
B1113 – Left turn only	94.4%	13.8	102.5%	25.0	102.5%	25.0
B1113 – Right turn only	98.2%	3.9	106.8%	6.1	111.3%	7.6
Junction Practical Reserve Capacity (PRC)	-13.1%		-22.7%		-23.7%	
Total Delay (pcuHr)	63.13		138.00		144.83	
Cycle Time (Seconds)	56		56		56	
PM Peak Hour						
	2017 Observed		2022 Baseline		2022 Baseline plus Construction (actual construction flows)	
	DoS	MMQ	DoS	MMQ	DoS	MMQ
A140 Ipswich Road (North) – Southbound nearside lane – Ahead only	77.0%	12.5	83.7%	15.5	83.7%	15.5

Results of operational assessment of A140/B1113 signalised junction (HVDC converter / HVAC substation construction flows)						
A140 Ipswich Road (North) – Southbound offside lane – Right turn only	94.6%	11.4	102.7%	19.6	102.7%	19.6
A140 Ipswich Road (South) – Northbound nearside lane – Ahead and left turn	104.6%	12.3	113.4%	19.0	117.9%	22.8
A140 Ipswich Road (South) – Northbound offside lane – Ahead only	69.1%	10.1	75.1%	11.7	75.1%	11.7
B1113 – Left turn only	95.2%	9.2	103.5%	15.4	103.5%	15.4
B1113 – Right turn only	98.6%	3.8	107.0%	5.9	111.9%	19.6
Junction Practical Reserve Capacity (PRC)	-16.2%		-26.0%		-31.0%	
Total Delay (pcuHr)	38.56		65.15		71.86	
Cycle Time (Seconds)	56		56		56	

- 4.11 Following the addition of the HVDC converter/HVAC substation construction flows in 2022, the performance of the junction is predicted to be similar to the 2022 baseline scenario.
- 4.12 A maximum Degree of Saturation (DoS) of 117.9% is predicted on the A140 Ipswich Road (south arm) during the PM peak hour with an associated queue length of 22.8 PCUs and a Practical Reserve Capacity (PRC) of -31.0%. This represents an increase in queuing of 2.8 PCUs on the A140 Ipswich Road (south arm) in comparison to baseline conditions. Notwithstanding the day-to-day variations in traffic flow through the junction, such changes in queueing will be difficult to perceive.
- 4.13 During the AM peak hour, a maximum DoS of 110.0% is predicted on the A140 Ipswich Road (south arm) with an associated queue length of 52.8 PCUs and a PRC of -23.7%. This represents an increase in queuing of 2.0 PCUs on the A140 Ipswich Road (south arm) in comparison to baseline conditions. Notwithstanding the day-to-day variations in traffic flow through the junction, such changes in queueing will be difficult to perceive.
- 4.14 As set out above, these conditions would only be temporary for up to a 30-month period.

Summary

- 4.15 The above sets out that queuing could in theory increase at the B1113/A140 junction with the addition of actual construction traffic flows. However, the numbers of vehicles in question are less than road users would experience in 'normal' fluctuations in queueing at the junction. These conditions would be for less than a six-month period only.

- 4.16 For the remaining 30-month period, with the addition of the HVDC converter/HVAC substation construction flows, the junction is predicted to perform similarly to the 2022 baseline conditions.
- 4.17 The impact of the construction traffic is temporary and reversible, and it is considered that the residual cumulative impact would not be severe.

5. Land West of Ipswich Road

- 5.1 Land West of Ipswich Road is an allocated site in the triangular piece of land between the B1113 and the A140. Planning consent was granted in May 2018 (application reference: 2017/2794) for an employment development consisting of B1, B2 and B8 uses, associated access and landscaping and a link road between the A140 and the B1113.
- 5.2 Prior to occupation, the development will provide a new link road through the development site between the B1113 and the A140. The new link road will join with the A140 at the existing Tesco junction. This is currently a three-arm signalised junction and the new link road will make it a four-arm signalised junction. This layout is shown on Create Drawing Numbers 731/03/020/H and 731/03/001/F, copies of which are attached at Appendix B.
- 5.3 This will effectively make the existing B1113 / A140 signalised junction redundant as the new link road will divert traffic away from it. The only traffic movement remaining through it will be the left turn movement from the northbound B1113 onto the northbound A140. This will become a priority controlled (give way) junction. All other movements will be physically prevented.
- 5.4 A Transport Assessment (reference: PP/CC/P14-731/01 Rev B) was submitted as part of the planning application for Land West of Ipswich Road and this assessed the performance of the consented junction.
- 5.5 The Transport Assessment predicted the junction (including the traffic generated by Land West of Ipswich Road) to operate at capacity in the future year 2020 and in excess of its capacity in the future year 2026. The assessments undertaken in the Transport Assessment for the development predict the four-arm signalised junction would operate within capacity during the weekday AM peak hour in the future years of 2020 and 2026. It predicts it would operate at capacity during the weekday PM peak hour in the future year 2020 and in excess of capacity in the future year 2026.

- 5.6 This development creates three scenarios in relation Hornsea Three:
- Scenario 1 is if Hornsea Three is fully constructed before this development and its junction scheme comes along (or it doesn't come along at all). In this instance, Hornsea Three will generate construction traffic through the existing three-arm B1113 / A140 signalised junction (as assessed in Section 4);
 - Scenario 2 is if this development and its junction scheme comes along before Hornsea Three. In this instance, Hornsea Three will generate construction traffic through the consented (Land West of Ipswich Road) four-arm A140/B1113 signalised junction (as assessed below);
 - Scenario 3 is if Land West of Ipswich Road and its consented junction scheme comes along whilst Hornsea Three is being constructed. In this instance, Hornsea Three will generate construction traffic through the existing three-arm A140/B1113 signalised junction. That junction would remain in place and open to traffic until such time as the consented four-arm A140/B1113 signalised junction is fully constructed. At that time, traffic would then be directed along the new B1113 link road and the existing A140/B1113 junction would be downgraded. In this scenario, traffic would route through the existing junction (as assessed in Section 4) and then through the consented junction (as assessed below) and there is therefore no need to undertake any additional assessments from the above two scenarios.
- 5.7 This section therefore considers Scenario 2, i.e. the effect of Hornsea Three through the consented (Land West of Ipswich Road) four-arm A140/B1113 signalised junction.
- 5.8 The Land West of Ipswich Road Transport Assessment set out traffic flows surveyed in 2015 for a range of locations including the existing A140/B1113 junction and the existing A140/Tesco junction. Inspection of these traffic flows shows that they are very similar to those surveyed by Hornsea Three in 2017. It can therefore be concluded that traffic flows have not substantially changed in this location between 2015 and 2017 (i.e. there has been no significant traffic growth).
- 5.9 The Land West of Ipswich Road Transport Assessment applied traffic growth rates to estimate the 2020 and 2026 future year baseline traffic flows. The traffic growth rates were estimated in a recognised and 'industry standard' manner using Department for Transport estimations from the Trip End Model presentation Programme (TEMPRO).
- 5.10 The growth rates applied to create the 2020 future year baseline scenario were larger than those that have been used by Hornsea Three (which were also estimated in the same way, but the rates are constantly evolving, hence the difference) to create the 2022 future year baseline scenario. Therefore, if the Hornsea Three traffic growth rates were applied then estimated future year traffic flows would be lower in comparison to if those from Land West of Ipswich Road were used.
- 5.11 The 2022 future year baseline traffic flows were therefore assumed to be the same as the 2020 baseline plus development traffic flow scenario in the Land West of Ipswich Road Transport Assessment.

- 5.12 This is robust and suitable for two reasons. Firstly, if the Hornsea Three growth rates were applied then, as above, traffic flows would be lower and thus this method provides a maximum estimate for such flows. Secondly, by utilising the same traffic flows as Land West of Ipswich Road, the results of this assessment are directly comparable to those in its Transport Assessment and the change in junction performance can be easily considered in relation to the performance that was granted consent,
- 5.13 In order to test the performance of the junction three model scenarios have been created:
- 2022 baseline;
 - 2022 baseline plus actual construction flows (as assessed within Table 4.1, above); and
 - 2022 baseline plus HVDC converter/HVAC substation flows (as assessed within Table 4.2, above).
- 5.14 The assessment model outputs contained at Appendix J of the Land West of Ipswich Road Transport Assessment have been analysed and they have been used to create a new LINSIG model of the A140/B1113/Tesco junction with the above three scenarios. The 2022 baseline scenario has the same traffic flows as the 2020 baseline plus development traffic flow scenario in the Land West of Ipswich Road Transport Assessment and the results of the new LINSIG model match the results from the Land West of Ipswich Road Transport Assessment, thus validating the model.
- 5.15 A summary of the results of the assessments for the above three scenarios are set out in Table 5.1 and all model outputs are attached at Appendix C.

Table 5.1: Summary of operational assessment of A140/B1113/Tesco junction (Improved by Land West of Ipswich Road)

Results of operational assessment of A140/B1113 Link Road /Tesco Road signalised junction						
AM Peak Hour						
	2022 Baseline		2022 Baseline + Construction Flows		2022 Baseline + HVDC converter/HVAC substation Construction Flows	
	DoS	MMQ	DoS	MMQ	DoS	MMQ
A140 Ipswich Road (South) – Northbound nearside lane – Ahead and left turn	77.4%	41.3	78.9%	42.7	77.8%	41.8
A140 Ipswich Road (South) – Northbound offside lane – Ahead and right turn	77.5%	45.1	78.6%	46.3	77.8%	45.3

Results of operational assessment of A140/B1113 Link Road /Tesco Road signalised junction						
A140 Ipswich Road (North) – Southbound nearside lane – Ahead only	47.0%	22.1	47.0%	22.1	47.0%	22.1
A140 Ipswich Road (North) – Southbound offside lane – Ahead only	22.7%	9.0	22.7%	9.0	22.7%	9.0
A140 Ipswich Road (North) – Southbound offside lane – Right turn only	75.6%	16.1	75.6%	16.1	75.6%	16.1
Tesco Road Left/Ahead/Right	60.2%	10.0	60.2%	10.0	60.2%	10.0
B1113 Link Road – Left/Ahead/Right	77.6%	9.2	96.6%	15.3	82.2%	10.2
Junction Practical Reserve Capacity (PRC)	16.0		-7.4		9.5	
Total Delay (pcuHr)	51.17		56.85		52.07	
Cycle Time (Seconds)	240		240		240	
PM Peak Hour						
	2022 Baseline		2022 Baseline + Construction Flows		2022 Baseline + HVDC converter/HVAC substation Construction Flows	
	DoS	MMQ	DoS	MMQ	DoS	MMQ
A140 Ipswich Road (South) – Northbound nearside lane – Ahead and left turn	88.8%	36.7	92.2%	39.3	89.4%	37.2
A140 Ipswich Road (South) – Northbound offside lane – Ahead and right turn	89.9%	40.0	93.1%	42.8	90.5%	40.5
A140 Ipswich Road (North) – Southbound nearside lane – Ahead only	95.1%	47.0	96.4%	48.4	95.2%	47.1
A140 Ipswich Road (North) – Southbound offside lane – Ahead only	93.8%	45.4	95.1%	46.4	93.7%	45.2
A140 Ipswich Road (North) – Southbound offside lane – Right turn only	95.0%	47.4	93.8%	46.4	95.0%	47.4
Tesco Road Left/Ahead/Right	50.3%	9.8	50.2%	9.8	50.3%	9.8

Results of operational assessment of A140/B1113 Link Road /Tesco Road signalised junction						
B1113 Link Road – Left/Ahead/Right	94.8%	18.1	110.1%	34.1	98.2%	20.5
Junction Practical Reserve Capacity (PRC)	-5.6		-22.4		-9.1	
Total Delay (pcuHr)	109.60		130.79		112.34	
Cycle Time (Seconds)	240		240		240	

- 5.16 In the 2022 baseline scenario, the model predicts the consented (Land West of Ipswich Road) junction to operate within capacity during the AM peak hour and at capacity during the PM peak hour.
- 5.17 During the AM peak hour, a maximum DoS of 77.6% is predicted on the B1113 link road with an associated queue length of 9.2 PCUs and a PRC of 16.0%. During the PM peak hour, a maximum DoS of 95.1% is predicted on the A140 South with an associated queue length of 47.0 PCUs and a PRC of -5.6%.
- 5.18 When the construction traffic flows are added, the junction is predicted to operate at capacity during the AM peak hour and in excess of capacity during the PM peak hour. During the AM peak hour, a maximum DoS of 96.6% is predicted on the B1113 link road with an associated queue length of 15.3 PCUs and a PRC of -7.4%. During the PM peak hour, a maximum DoS of 110.1% is predicted on the B1113 link road with an associated queue length of 34.1 PCUs and a PRC of -22.4%.
- 5.19 When the HVDC converter/HVAC substation construction traffic flows are added, the junction is predicted to operate within capacity during the AM peak hour and at excess of capacity during the PM peak hour. During the AM peak hour, a maximum DoS of 82.2% is predicted on the B1113 link road with an associated queue length of 10.2 PCUs and a PRC of 9.5%. During the PM peak hour, a maximum DoS of 98.2% is predicted on the B1113 link road with an associated queue length of 20.5 PCUs and a PRC of -9.1%.
- 5.20 There are four assessments above with the addition of construction flows; AM and PM peak hour periods (two periods) and construction flows and HVDC converter/HVAC substation flows (two scenarios). Three of these all predict the junction to operate either within capacity or at capacity.
- 5.21 During the AM peak hour, with the addition of the construction traffic flows (for an approximate six-month period; as explained in Section 3), the junction would operate at capacity. With the addition of the HVDC converter/HVAC substation construction flows, the junction would operate within capacity. During the PM peak hour, with the addition of the HVDC converter/HVAC substation construction flows, the junction would operate at capacity.
- 5.22 During the PM peak hour, when the construction flows are added, the junction would operate in excess of capacity for an approximate six-month period, during which its operation would be similar to the 2022 baseline scenario for the existing junction.

- 5.23 That is to say that the consented (Land West of Ipswich Road) junction would offer long term improvement to the junction but there would be a period of approximately six months when conditions would remain similar to the predicted 2022 baseline scenario.
- 5.24 Notwithstanding, Section 3 sets out that the change in flows as a result of the construction flows are less than the day-to-day variance in traffic flows. Therefore, the queuing at the junction with the addition of the actual construction flows would already be experienced on some days of the week. The performance of the junction with the addition of the construction flows would therefore already be part of the 'normal' fluctuations in queueing that day-to-day road users experience.

Summary of Operational Assessments

- 5.25 The above sets out that of the four assessments undertaken, three of these all predict the junction to operate either within capacity or at capacity.
- 5.26 It is only during the PM peak hour, when the construction flows are added (construction of the HVDC converter/HVAC substation construction flows and adjacent sections of the onshore cable corridor simultaneously), that the junction would operate in excess of capacity for an approximate six-month period.
- 5.27 During this period, its operation would be similar to the 2022 baseline scenario for the existing junction. Queuing would increase, however, this is already part of the 'normal' fluctuations in queueing that day-to-day road users would experience. These conditions would be for an approximate six-month period only.
- 5.28 The impact of the construction traffic is temporary and reversible, and it is considered that the residual cumulative impact on the consented (Land West of Ipswich Road) junction would not be severe.

Other Changes to the Road Network

- 5.29 As part of the link road, a new roundabout would be formed onto the B1113. The applicant undertook a swept path analysis of an articulated HGV turning through this roundabout and this showed such movements to be satisfactory. The changes to the road network would therefore not inhibit the movement of HGVs associated with Hornsea Three.
- 5.30 The B1113 forms the proposed access route for Abnormal Indivisible Loads transporting the transformers to the HVDC converter/HVAC substation. The changes to the road network mean that additional highway accommodation works may be required for their transportation.
- 5.31 A detailed exercise of pre-planning will be required for the Abnormal Indivisible Load vehicles as part of the consenting process to travel along the public highway. This will identify the precise extent of street furniture removal / relocation etc. This pre-planning will include the new roundabout and the alterations to the A140/B1113/Tesco junction if those works are implemented. This will be a matter of detail to consider at the stage of seeking consent to move the Abnormal Indivisible Load vehicles with the transformers.

6. Summary and Conclusions

- 6.1 This note has been prepared to set out the impact of Hornsea Three construction traffic at the A140/B1113 signalised junction.
- 6.2 It sets out that the assessment contained in Section 1.6.6 of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) is based on a sensitivity methodology for estimating construction vehicle movements.
- 6.3 Section 1.6.6 of Volume 6, Annex 7.1: Transport Assessment of the Environmental Statement (APP-159) is based upon 48 HGVs turning through the A140/B1113 junction during the weekday AM and PM peak hours, based on the sensitivity methodology. The actual number predicted to travel through this junction will be 24 HGVs during the weekday AM and PM peak hours.
- 6.4 Assessments have been undertaken after converting vehicle movements through the A140/B1113 junction into Passenger Car Units (PCUs) using Department for Transport methodologies and 24 HGVs equates to 57.6 PCUs.
- 6.5 It is estimated that this increase in PCUs through the A140/B1113 junction equates to increases of 2.0% and 2.1% in PCUs during the weekday AM and PM peak hours respectively. This was found to be well within the day-to-day variation in traffic flows through the junction.
- 6.6 The construction vehicles through the A140 / B1113 junction are generated from the HVDC converter/HVAC substation and from two onshore cable sections all being constructed at the same time.
- 6.7 The duration that these construction vehicles (24 HGVs; 57.6 PCUs) will be generated is less than six months. The remaining construction period during which vehicles will be generated through the junction will be 30 months, during which 6 HGVs (15 PCUs) will be generated during the weekday AM and PM peak hours.
- 6.8 This was found to be substantially lower than the day-to-day variance in traffic flows.
- 6.9 Junction modelling has found that queuing would increase at the B1113/A140 junction with the addition of actual construction traffic flows, however, this is already part of the 'normal' fluctuations in queuing that day-to-day road users experience. These conditions would be for a six-month period only.
- 6.10 For the remaining 30-month period, with the addition of the HVDC converter/HVAC substation construction flows, the junction is predicted to perform similarly to the 2022 baseline conditions.
- 6.11 Land West of Ipswich Road is a consented employment site and propose changes to the road network including the realignment of the B1113 to form a revised junction with the A140 and Tesco. Assessments undertaken at this consented junction show a betterment in terms of performance in relation to the existing junction. Similarly, with the consented junction, changes in queuing would already be part of the 'normal' fluctuations in queuing that day-to-day road users experience.
- 6.12 The impact of the construction traffic is temporary and reversible, and it is considered that the residual cumulative impact would not be severe.

Appendix A LINSIG Output Files

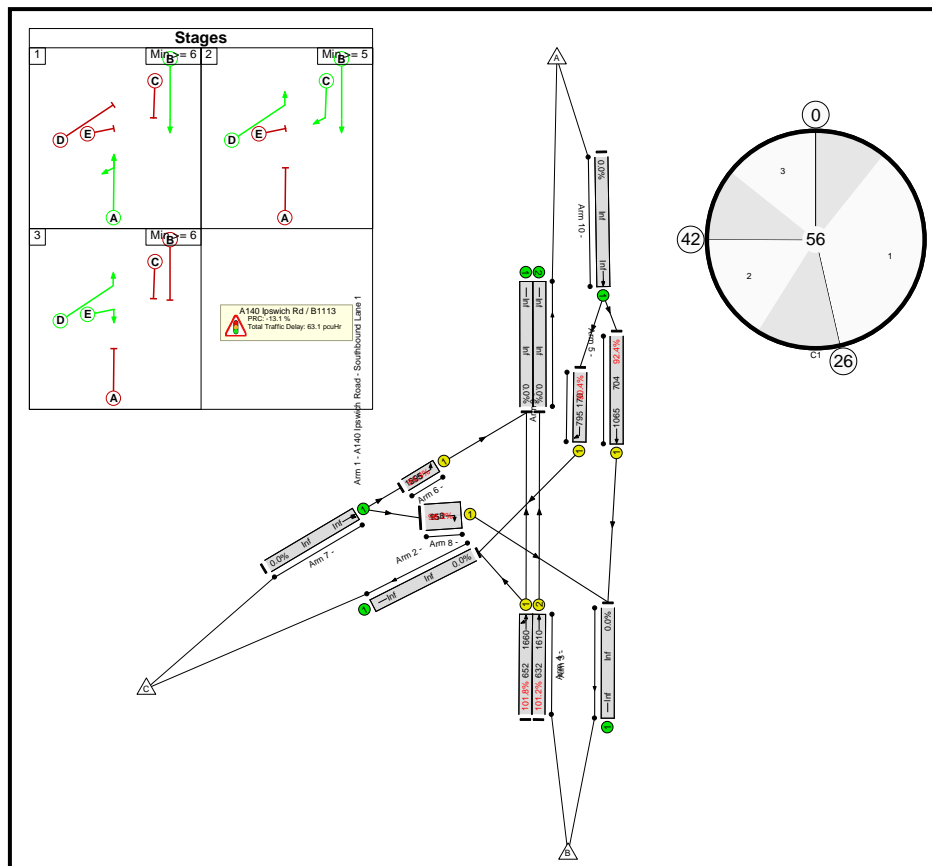
Basic Results Summary

User and Project Details

Project:	JNY8772 Hornsea Project 3
Title:	Existing junction model
Location:	
Additional detail:	
File name:	A140 - B1113 Junction Revised 30-07-18.lsg3x
Author:	Paul Warner
Company:	RPS
Address:	

Scenario 1: '2017 Existing AM Peak' (FG1: '2017 AM Peak Hour Existing', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

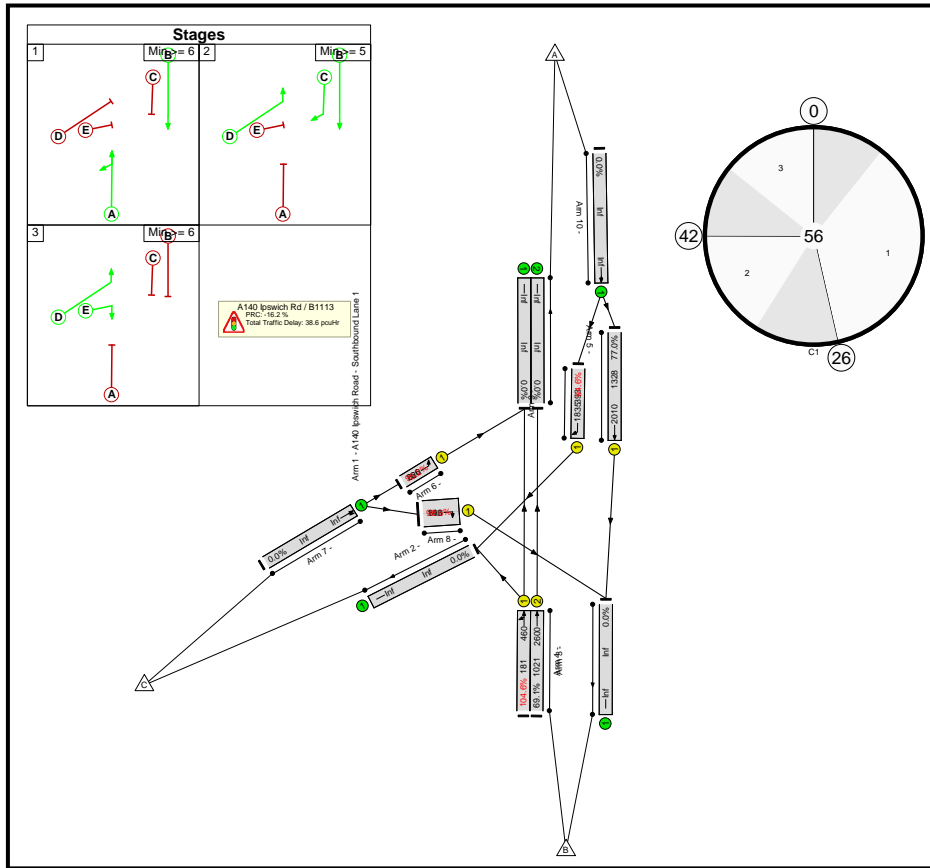


Network Results

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: Existing junction model	-	-	-		-	-	-	-	-	-	101.8%	0	0	0	63.1	-	-
A140 Ipswich Rd / B1113	-	-	-		-	-	-	-	-	-	101.8%	0	0	0	63.1	-	-
1/1	A140 Ipswich Road - Southbound Lane 1 Ahead	U	B		1	36	-	650	1065	704	92.4%	-	-	-	6.6	36.5	13.8
4/1	Left Ahead	U	A		1	21	-	664	1660	652	101.8%	-	-	-	19.6	106.4	26.7
4/2	Ahead	U	A		1	21	-	640	1610	632	101.2%	-	-	-	17.9	100.6	24.7
6/1	Left	U	D		1	23	-	524	1295	555	94.4%	-	-	-	8.3	57.1	13.8
8/1	Right	U	E		1	8	-	150	950	153	98.2%	-	-	-	6.5	155.2	3.9
9/1	Right	U	C		1	11	-	154	795	170	90.4%	-	-	-	4.3	99.6	5.7
		C1	PRC for Signalled Lanes (%):		-13.1		Total Delay for Signalled Lanes (pcuHr):		63.13		Cycle Time (s):		56				
			PRC Over All Lanes (%):		-13.1		Total Delay Over All Lanes (pcuHr):		63.13								

Scenario 2: '2017 Existing PM Peak' (FG2: '2017 PM Peak Hour Existing', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

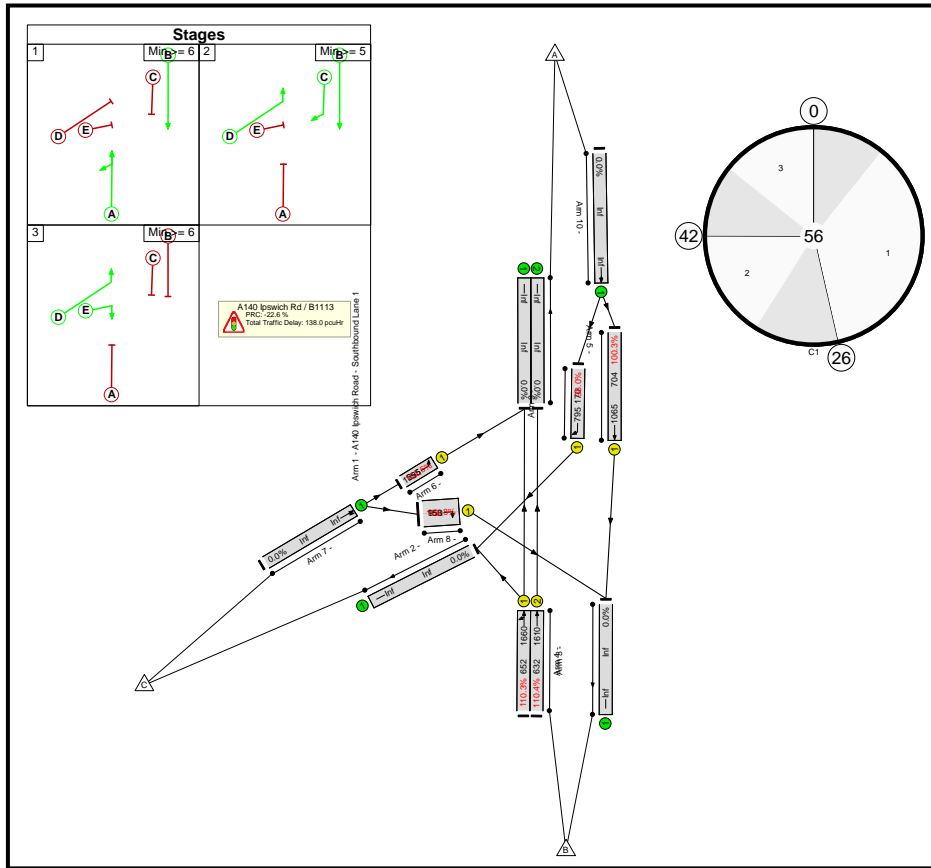


Network Results

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: Existing junction model	-	-	-		-	-	-	-	-	-	104.6%	0	0	0	38.6	-	-
A140 Ipswich Rd / B1113	-	-	-		-	-	-	-	-	-	104.6%	0	0	0	38.6	-	-
1/1	A140 Ipswich Road - Southbound Lane 1 Ahead	U	B		1	36	-	1023	2010	1328	77.0%	-	-	-	3.5	12.4	12.5
4/1	Left Ahead	U	A		1	21	-	189	460	181	104.6%	-	-	-	10.4	197.3	12.3
4/2	Ahead	U	A		1	21	-	706	2600	1021	69.1%	-	-	-	3.9	19.8	10.1
6/1	Left	U	D		1	23	-	253	620	266	95.2%	-	-	-	6.5	92.1	9.2
8/1	Right	U	E		1	8	-	141	890	143	98.6%	-	-	-	6.4	162.6	3.8
9/1	Right	U	C		1	11	-	372	1835	393	94.6%	-	-	-	7.9	76.9	11.4
		C1	PRC for Signalled Lanes (%):		-16.2		Total Delay for Signalled Lanes (pcuHr):		38.56		Cycle Time (s):		56				
			PRC Over All Lanes (%):		-16.2		Total Delay Over All Lanes(pcuHr):		38.56								

Scenario 3: '2022 Growthed AM Peak' (FG3: '2022 AM Peak Hour Growthed', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

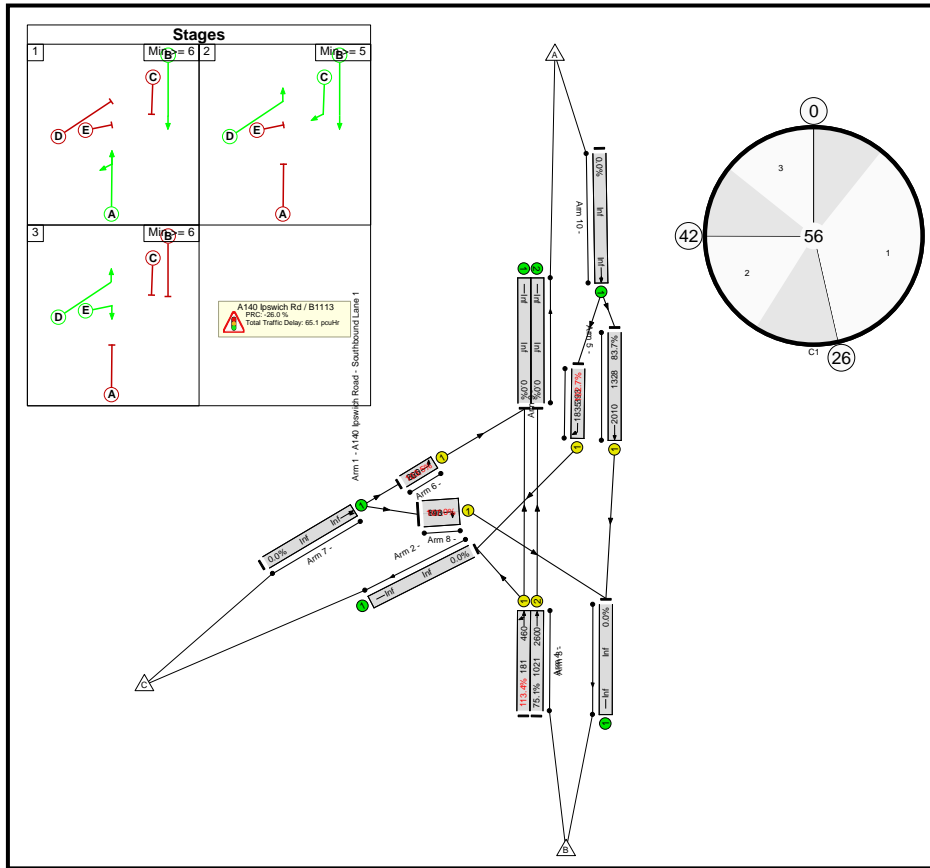


Network Results

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: Existing junction model	-	-	-		-	-	-	-	-	-	110.4%	0	0	0	138.0	-	-
A140 Ipswich Rd / B1113	-	-	-		-	-	-	-	-	-	110.4%	0	0	0	138.0	-	-
1/1	A140 Ipswich Road - Southbound Lane 1 Ahead	U	B		1	36	-	706	1065	704	100.3%	-	-	-	15.8	80.6	24.9
4/1	Left Ahead	U	A		1	21	-	719	1660	652	110.3%	-	-	-	43.3	216.8	50.4
4/2	Ahead	U	A		1	21	-	698	1610	632	110.4%	-	-	-	42.4	218.8	49.3
6/1	Left	U	D		1	23	-	569	1295	555	102.5%	-	-	-	18.9	119.8	25.0
8/1	Right	U	E		1	8	-	163	950	153	106.8%	-	-	-	10.9	239.8	6.1
9/1	Right	U	C		1	11	-	167	795	170	98.0%	-	-	-	6.7	144.3	8.2
		C1	PRC for Signalled Lanes (%):		-22.6		Total Delay for Signalled Lanes (pcuHr):		138.00		Cycle Time (s):		56				
			PRC Over All Lanes (%):		-22.6		Total Delay Over All Lanes(pcuHr):		138.00								

Scenario 4: '2022 Growthed PM Peak' (FG4: '2022 PM Peak Hour Growthed', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

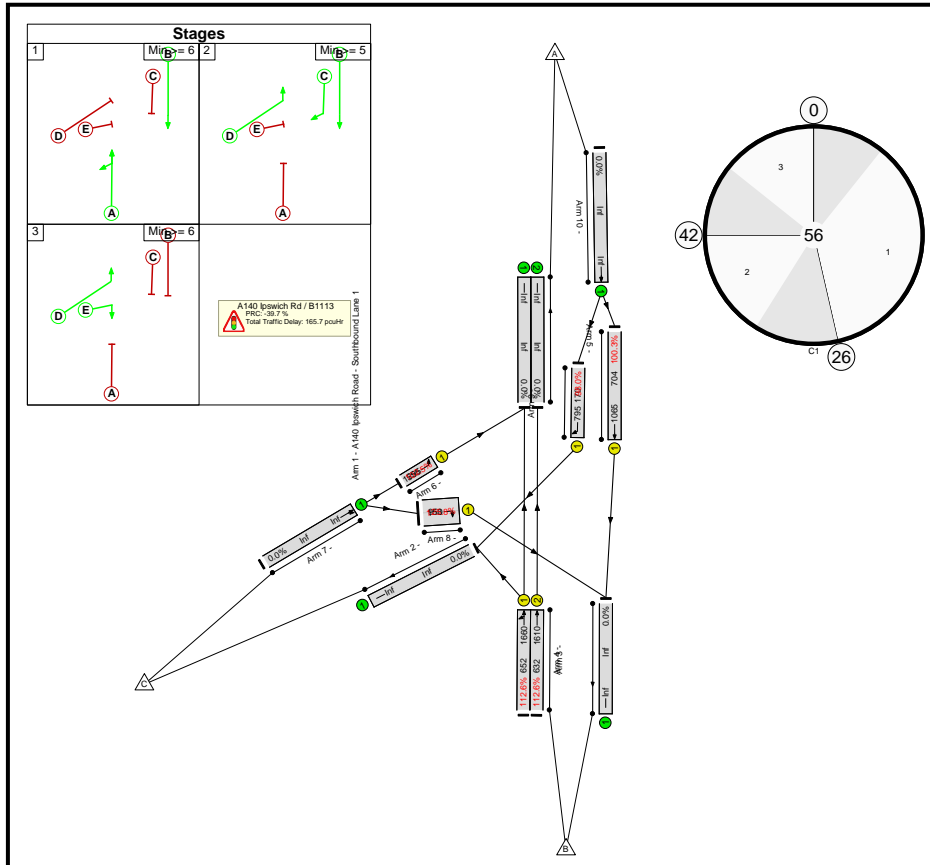


Network Results

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: Existing junction model	-	-	-		-	-	-	-	-	-	113.4%	0	0	0	65.1	-	-
A140 Ipswich Rd / B1113	-	-	-		-	-	-	-	-	-	113.4%	0	0	0	65.1	-	-
1/1	A140 Ipswich Road - Southbound Lane 1 Ahead	U	B		1	36	-	1112	2010	1328	83.7%	-	-	-	4.7	15.4	15.5
4/1	Left Ahead	U	A		1	21	-	205	460	181	113.4%	-	-	-	17.1	299.7	19.0
4/2	Ahead	U	A		1	21	-	767	2600	1021	75.1%	-	-	-	4.6	21.6	11.7
6/1	Left	U	D		1	23	-	275	620	266	103.5%	-	-	-	12.5	163.2	15.4
8/1	Right	U	E		1	8	-	153	890	143	107.0%	-	-	-	10.5	246.4	5.9
9/1	Right	U	C		1	11	-	404	1835	393	102.7%	-	-	-	15.8	140.7	19.6
		C1	PRC for Signalled Lanes (%):		-26.0		Total Delay for Signalled Lanes (pcuHr):		65.15		Cycle Time (s):		56				
			PRC Over All Lanes (%):		-26.0		Total Delay Over All Lanes(pcuHr):		65.15								

Scenario 5: '2022 AM Peak + Proposed Development (All elements)' (FG5: '2022 AM Peak Hour + Proposed Development (All elements)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

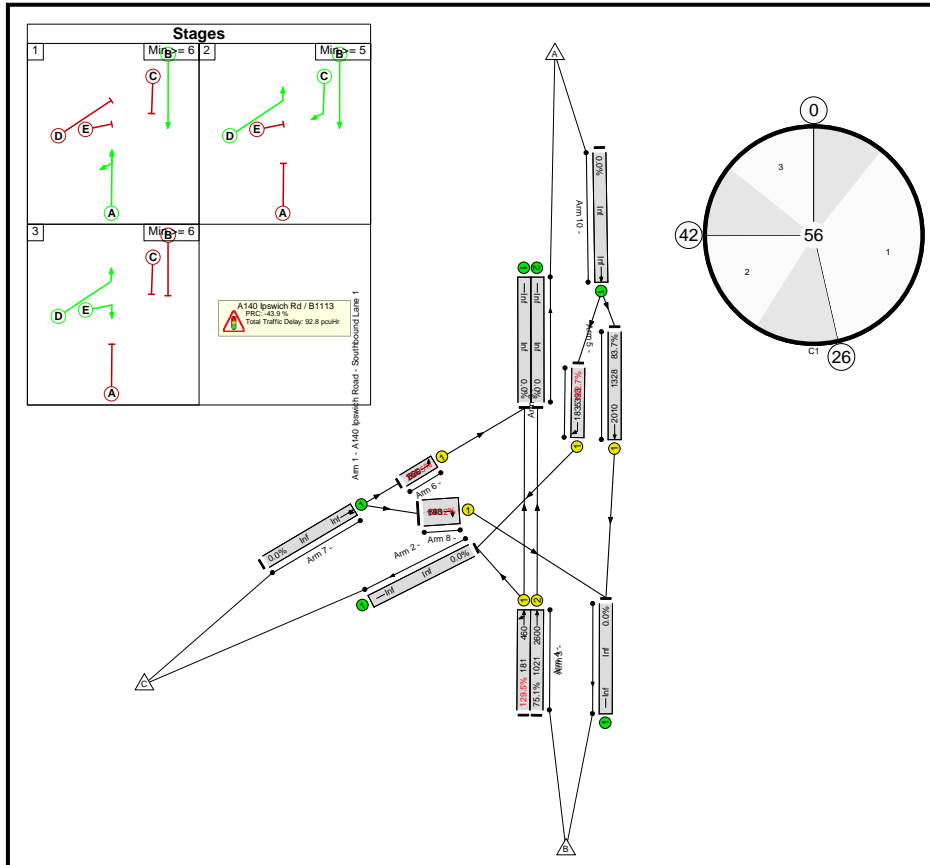


Network Results

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: Existing junction model	-	-	-		-	-	-	-	-	-	125.8%	0	0	0	165.7	-	-
A140 Ipswich Rd / B1113	-	-	-		-	-	-	-	-	-	125.8%	0	0	0	165.7	-	-
1/1	A140 Ipswich Road - Southbound Lane 1 Ahead	U	B		1	36	-	706	1065	704	100.3%	-	-	-	15.8	80.6	24.9
4/1	Left Ahead	U	A		1	21	-	734	1660	652	112.6%	-	-	-	50.6	248.3	57.7
4/2	Ahead	U	A		1	21	-	712	1610	632	112.6%	-	-	-	49.3	249.1	56.1
6/1	Left	U	D		1	23	-	569	1295	555	102.5%	-	-	-	18.9	119.8	25.0
8/1	Right	U	E		1	8	-	192	950	153	125.8%	-	-	-	24.4	456.7	13.0
9/1	Right	U	C		1	11	-	167	795	170	98.0%	-	-	-	6.7	144.3	8.2
		C1	PRC for Signalled Lanes (%):		-39.7		Total Delay for Signalled Lanes (pcuHr):		165.66		Cycle Time (s):		56				
			PRC Over All Lanes (%):		-39.7		Total Delay Over All Lanes(pcuHr):		165.66								

Scenario 6: '2022 PM Peak + Proposed Development (All elements)' (FG6: '2022 PM Peak Hour + Proposed Development (All elements)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

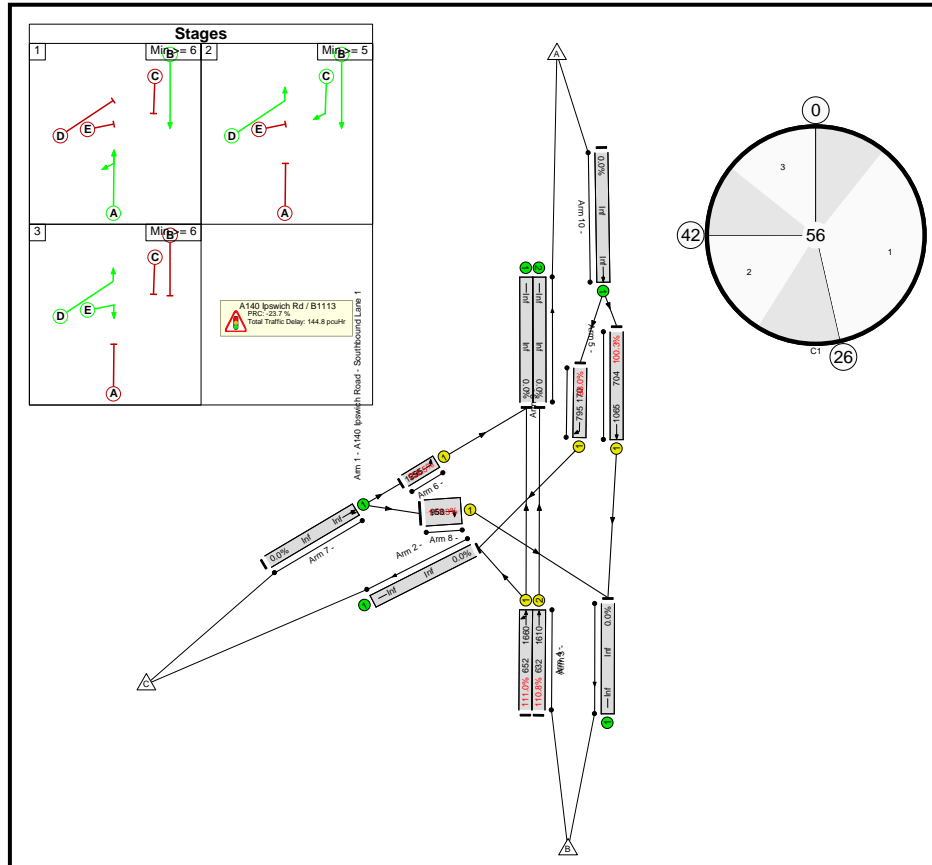


Network Results

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: Existing junction model	-	-	-		-	-	-	-	-	-	129.5%	0	0	0	92.8	-	-
A140 Ipswich Rd / B1113	-	-	-		-	-	-	-	-	-	129.5%	0	0	0	92.8	-	-
1/1	A140 Ipswich Road - Southbound Lane 1 Ahead	U	B		1	36	-	1112	2010	1328	83.7%	-	-	-	4.7	15.4	15.5
4/1	Left Ahead	U	A		1	21	-	234	460	181	129.5%	-	-	-	31.2	479.8	33.2
4/2	Ahead	U	A		1	21	-	767	2600	1021	75.1%	-	-	-	4.6	21.6	11.7
6/1	Left	U	D		1	23	-	275	620	266	103.5%	-	-	-	12.5	163.2	15.4
8/1	Right	U	E		1	8	-	182	890	143	127.2%	-	-	-	24.0	475.0	12.7
9/1	Right	U	C		1	11	-	404	1835	393	102.7%	-	-	-	15.8	140.7	19.6
		C1		PRC for Signalled Lanes (%):		-43.9		Total Delay for Signalled Lanes (pcuHr):		92.81		Cycle Time (s):		56			
				PRC Over All Lanes (%):		-43.9		Total Delay Over All Lanes(pcuHr):		92.81							

Scenario 7: '2022 AM Peak + Proposed Development (Part Only)' (FG7: '2022 AM Peak Hour + Proposed Development (Part Only)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

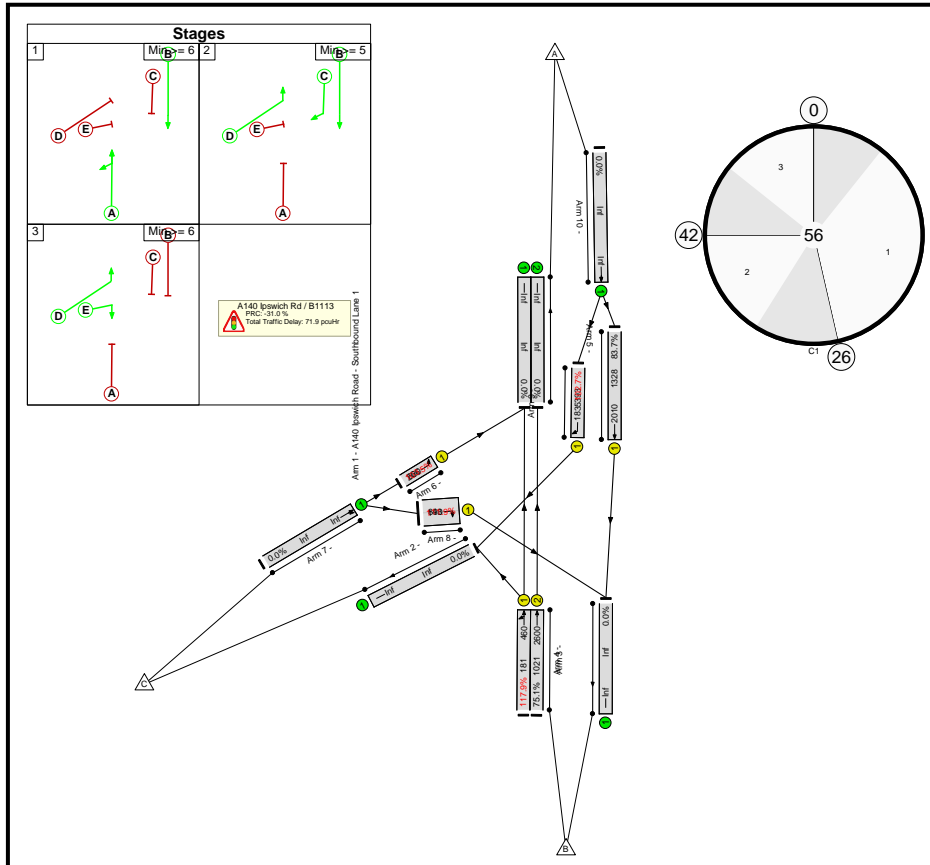


Network Results

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: Existing junction model	-	-	-		-	-	-	-	-	-	111.3%	0	0	0	144.8	-	-
A140 Ipswich Rd / B1113	-	-	-		-	-	-	-	-	-	111.3%	0	0	0	144.8	-	-
1/1	A140 Ipswich Road - Southbound Lane 1 Ahead	U	B		1	36	-	706	1065	704	100.3%	-	-	-	15.8	80.6	24.9
4/1	Left Ahead	U	A		1	21	-	724	1660	652	111.0%	-	-	-	45.7	227.3	52.8
4/2	Ahead	U	A		1	21	-	701	1610	632	110.8%	-	-	-	43.9	225.3	50.7
6/1	Left	U	D		1	23	-	569	1295	555	102.5%	-	-	-	18.9	119.8	25.0
8/1	Right	U	E		1	8	-	170	950	153	111.3%	-	-	-	13.8	292.6	7.6
9/1	Right	U	C		1	11	-	167	795	170	98.0%	-	-	-	6.7	144.3	8.2
		C1	PRC for Signalled Lanes (%):		-23.7		Total Delay for Signalled Lanes (pcuHr):		144.83		Cycle Time (s):		56				
			PRC Over All Lanes (%):		-23.7		Total Delay Over All Lanes(pcuHr):		144.83								

Scenario 8: '2022 PM Peak + Proposed Development (Part Only)' (FG8: '2022 PM Peak Hour + Proposed Development (Part Only)', Plan 1: 'Network Control Plan 1')

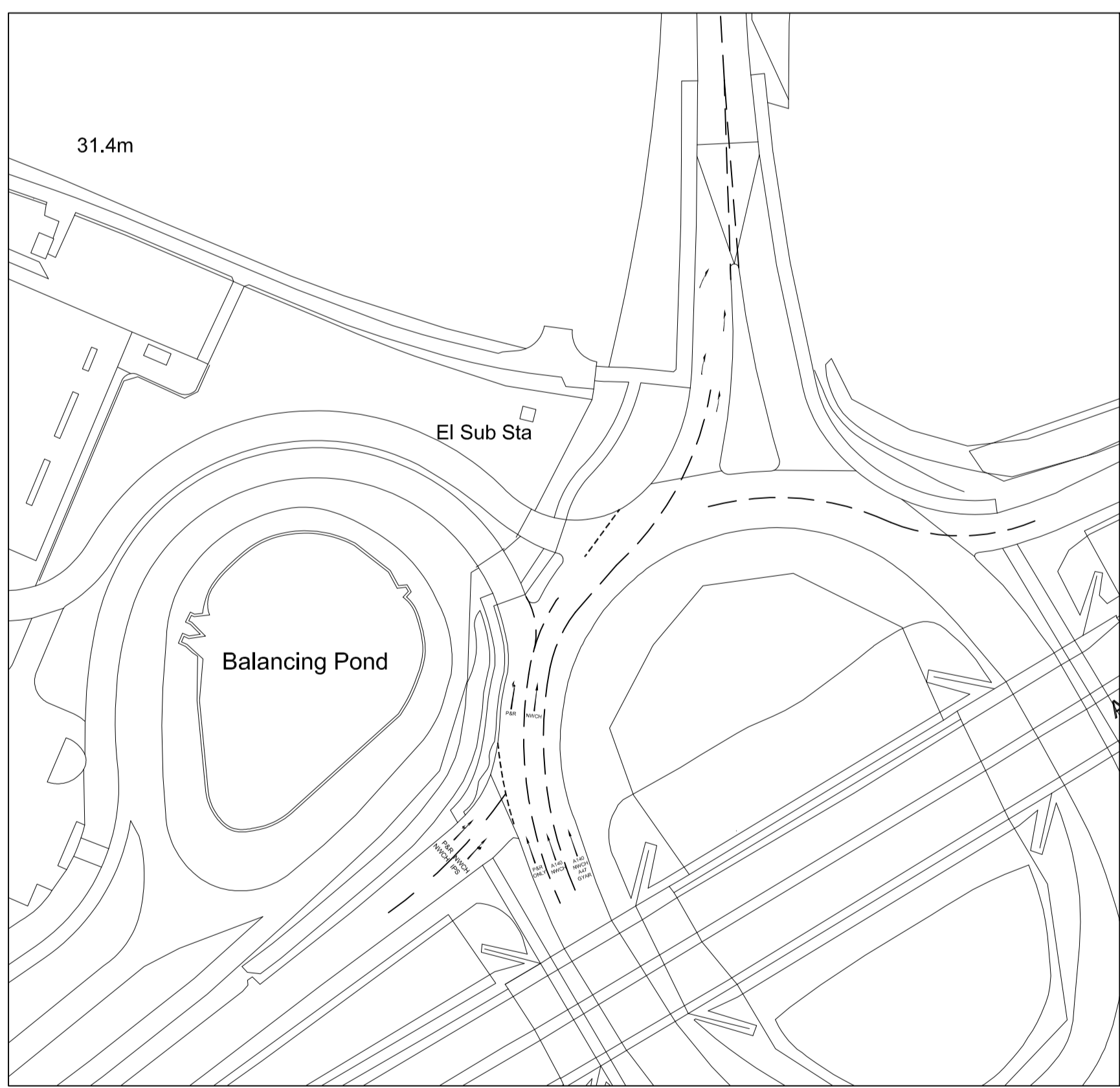
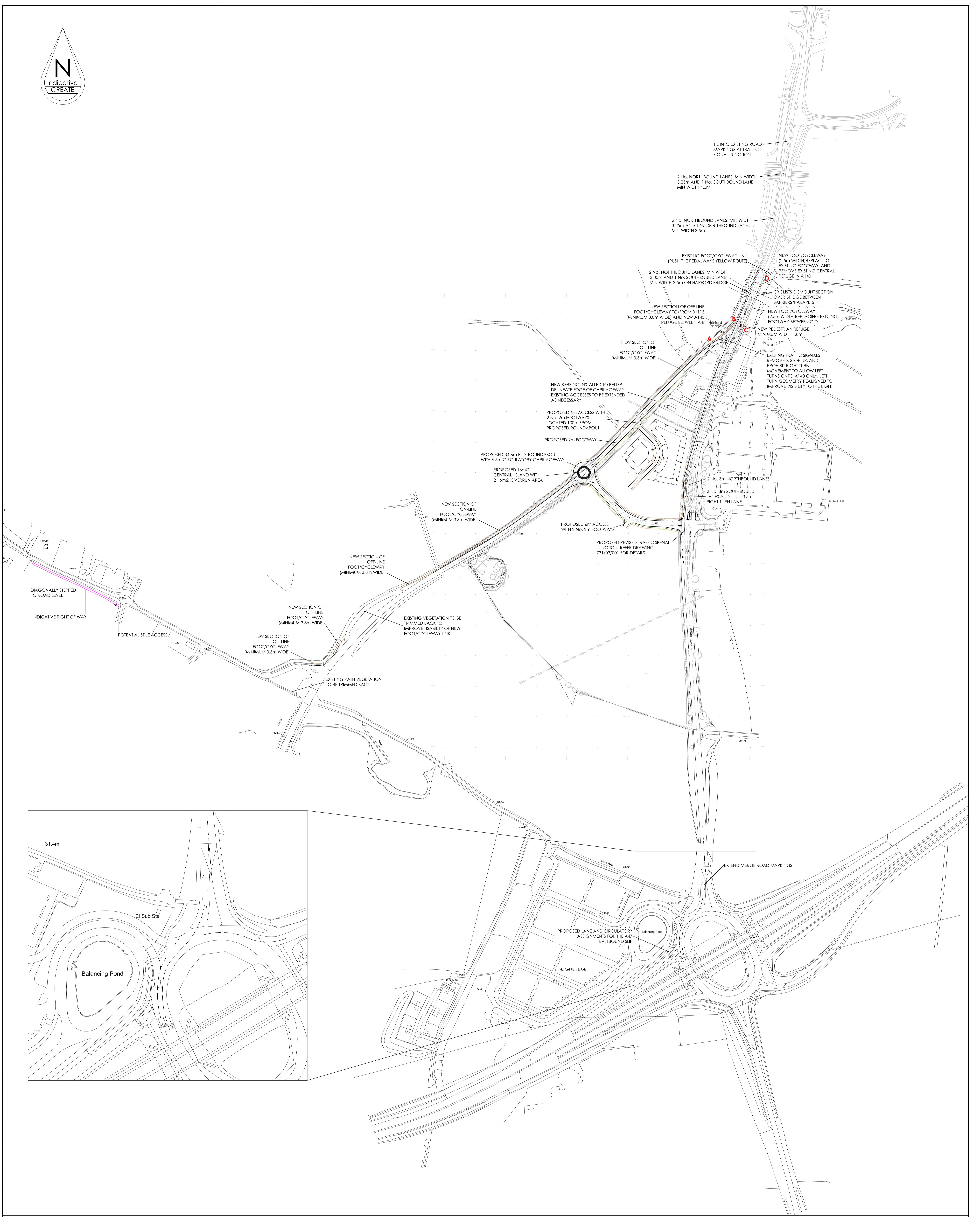
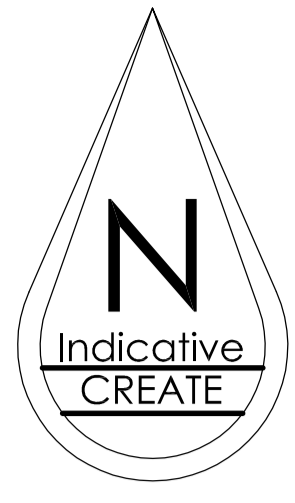
Network Layout Diagram



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: Existing junction model	-	-	-		-	-	-	-	-	-	117.9%	0	0	0	71.9	-	-			
A140 Ipswich Rd / B1113	-	-	-		-	-	-	-	-	-	117.9%	0	0	0	71.9	-	-			
1/1	A140 Ipswich Road - Southbound Lane 1 Ahead	U	B		1	36	-	1112	2010	1328	83.7%	-	-	-	4.7	15.4	15.5			
4/1	Left Ahead	U	A		1	21	-	213	460	181	117.9%	-	-	-	20.8	351.6	22.8			
4/2	Ahead	U	A		1	21	-	767	2600	1021	75.1%	-	-	-	4.6	21.6	11.7			
6/1	Left	U	D		1	23	-	275	620	266	103.5%	-	-	-	12.5	163.2	15.4			
8/1	Right	U	E		1	8	-	160	890	143	111.9%	-	-	-	13.4	302.3	7.4			
9/1	Right	U	C		1	11	-	404	1835	393	102.7%	-	-	-	15.8	140.7	19.6			
C1												PRC for Signalled Lanes (%):			-31.0			Total Delay for Signalled Lanes (pcuHr):		
71.86 Cycle Time (s):												56								
												PRC Over All Lanes (%):			-31.0			Total Delay Over All Lanes (pcuHr):		
												71.86								

Appendix B Consented A140/B1113/Tesco Junction Layout



REV	DATE	AMENDMENT DETAILS	DRAWN	APPROVED
H	14.02.18	FOOT/CYCLEWAY WORKS BETWEEN LOW ROAD AND A140 ALONG B1113		
G	08.01.18	FOOT/CYCLEWAY WORKS NORTH OF PROPOSED A140 REFUGE	MDA	MDA
F	06.06.17	REDUCE SCOPE OF LOW ROAD RIGHT OF WAY WORKS (AGREED WITH NCC)	MDA	MDA
E	15.05.17	NEW PEDESTRIAN CROSSING SOUTH OF HARFORD BRIDGE	MDA	JPC
D	11.04.17	LOW ROAD RIGHT OF WAY ADDED	AF	SS
C	21.03.17	LINK ROAD HATCH AND A140 LANE WIDTHS AMENDED	AF	SS
B	23.02.17	ONE WAY JUNCTION ALTERED, ROUND AND ROUNDABOUT ADDED	DW	BKA
A	08.12.16	UPDATE FOLLOWING NCC COMMENTS	MDA	SS

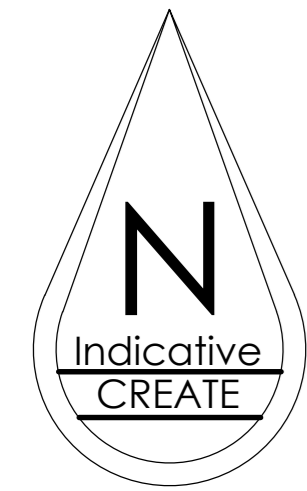
PROJECT	DATE	DRAWING STATUS	INFORMATION
HARFORD TRIANGLE	16.11.16	DESIGNED	SS
DRAWING TITLE	1:2000	CHECKED	AF
PROPOSED HIGHWAY MODIFICATION OVERVIEW		APPROVED	SS
JOB No.	731		
CLIENT	MAHB CAPITAL LTD	DRAWING No.	03/020
		REVISION	H

Create Consulting Engineers accept no responsibility for any unauthorised alterations to this drawing. Only signed drawings are to be used for construction.

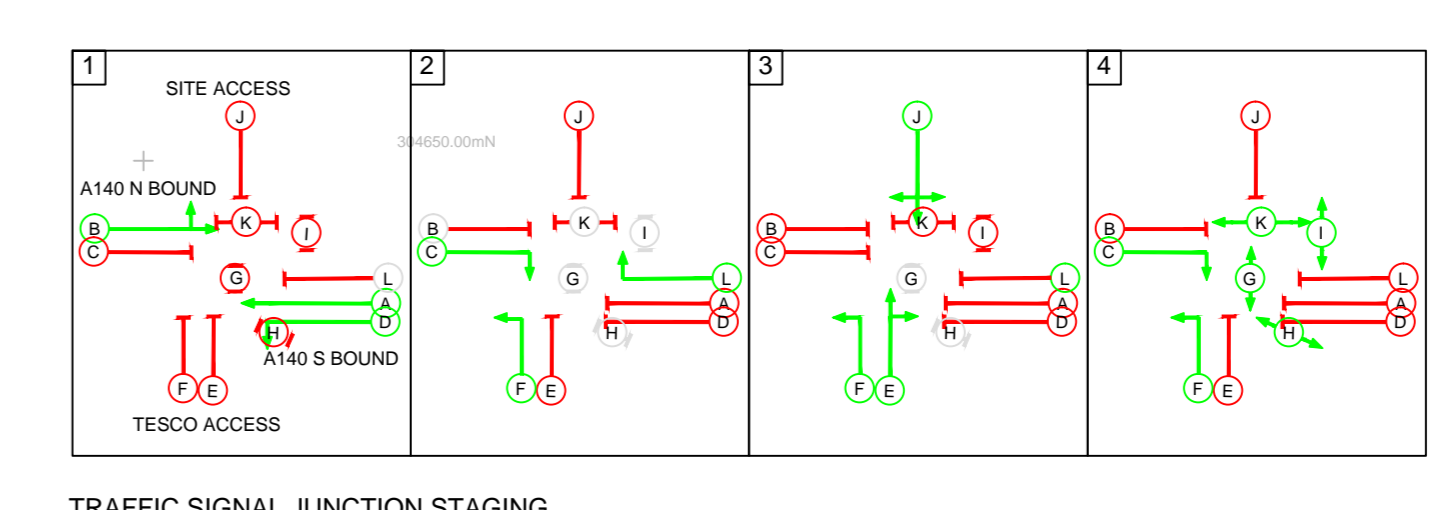
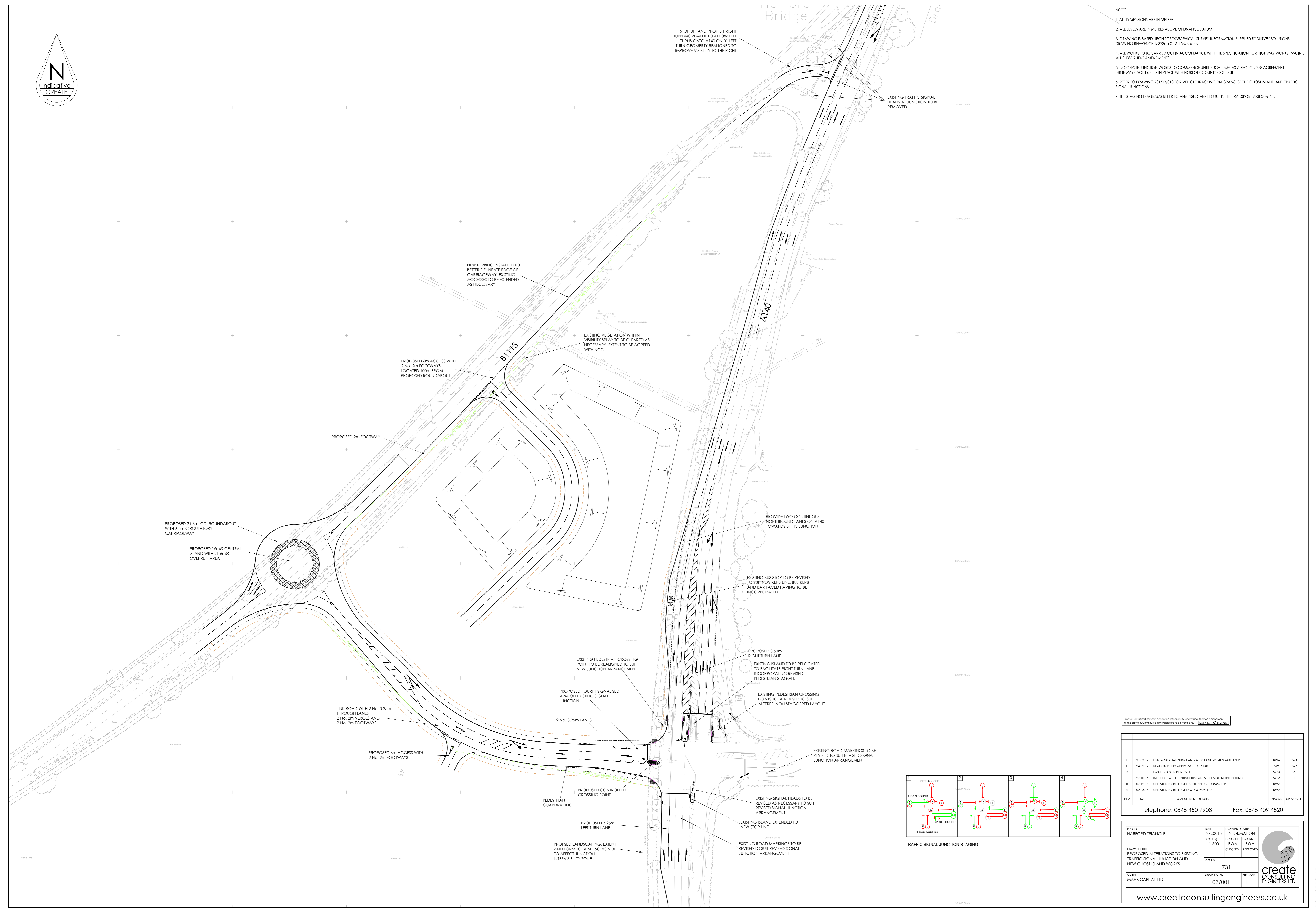
www.createconsultingengineers.co.uk

ORIGINAL SHEET SIZE - A0 Portrait

DO NOT SCALE



- NOTES
1. ALL DIMENSIONS ARE IN METRES
 2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM
 3. DRAWING IS BASED UPON TOPOGRAPHICAL SURVEY INFORMATION SUPPLIED BY SURVEY SOLUTIONS. DRAWING REFERENCE 1532360-01 & 1532360-02.
 4. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS 1998 INC ALL SUBSEQUENT AMENDMENTS
 5. NO OFFSITE JUNCTION WORKS TO COMMENCE UNTIL SUCH TIMES AS A SECTION 278 AGREEMENT (HIGHWAYS ACT 1980) IS IN PLACE WITH NORFOLK COUNTY COUNCIL.
 6. REFER TO DRAWING 731/03/010 FOR VEHICLE TRACKING DIAGRAMS OF THE GHOST ISLAND AND TRAFFIC SIGNAL JUNCTIONS.
 7. THE STAGING DIAGRAMS REFER TO ANALYSIS CARRIED OUT IN THE TRANSPORT ASSESSMENT.



REV	DATE	AMENDMENT DETAILS	DRAWN	APPROVED
F	21.03.17	LINK ROAD HATCHING AND A140 LANE WIDTHS AMENDED	BWA	BWA
E	24.02.17	REALIGN B1113 APPROACH TO A140	SW	BWA
D		DRAFT STICKER REMOVED	MDA	SS
C	27.10.16	INCLUDE TWO CONTINUOUS LANES ON A140 NORTHBOUND	MDA	JPC
B	07.12.15	UPDATED TO REFLECT FURTHER NCC COMMENTS	BWA	BWA
A	02.03.15	UPDATED TO REFLECT NCC COMMENTS	BWA	BWA

Telephone: 0845 450 7908 Fax: 0845 409 4520

PROJECT HARFORD TRIANGLE	DATE 27.02.15	DRAWING STATUS INFORMATION	
DRAWING TITLE PROPOSED ALTERATIONS TO EXISTING TRAFFIC SIGNAL JUNCTION AND NEW GHOST ISLAND WORKS	SCALE(S) 1:500	DESIGNED BWA	
CLIENT MAHB CAPITAL LTD	DRAWING No. 731	CHECKED BWA	www.createconsultingengineers.co.uk
	03/001	APPROVED F	

DO NOT SCALE ORIGINAL SHEET SIZE - A0 Landscape

Appendix C Consented A140/B1113/Tesco Junction LINSIG Output Files

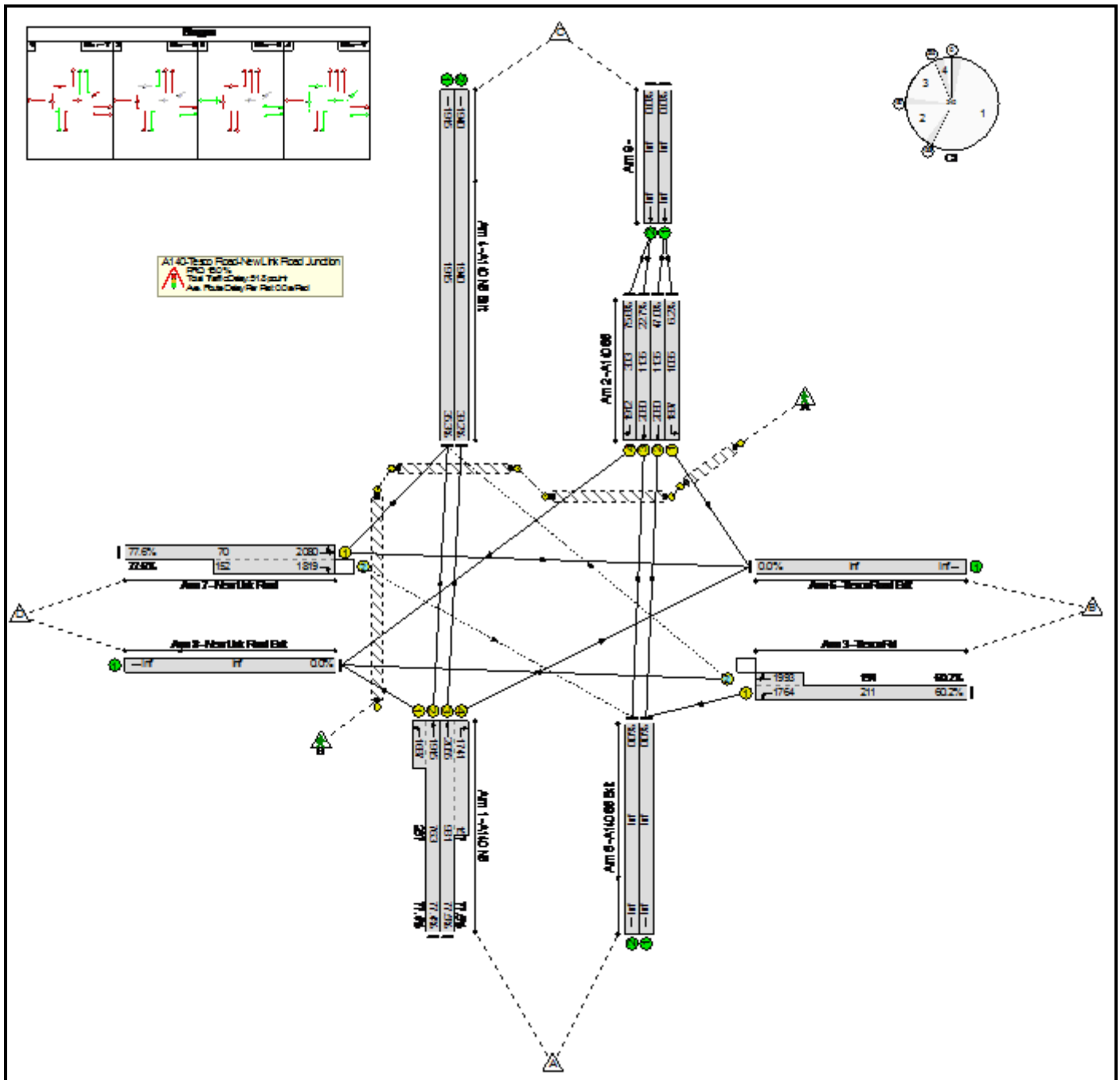
Basic Results Summary

User and Project Details

Project:	JNY8772 Hornsea Project 3
Title:	A140 / Tesco / New Link Road Proposed Layout
Location:	
Additional detail:	
File name:	A140-Tesco-New Link Road 31-08-18 with Revision for 2022 Sen Con AM.lsg3x
Author:	Richard Zhu
Company:	RPS
Address:	

Scenario 1: '2022 Baseline AM' (FG1: '2022 Baseline AM Peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

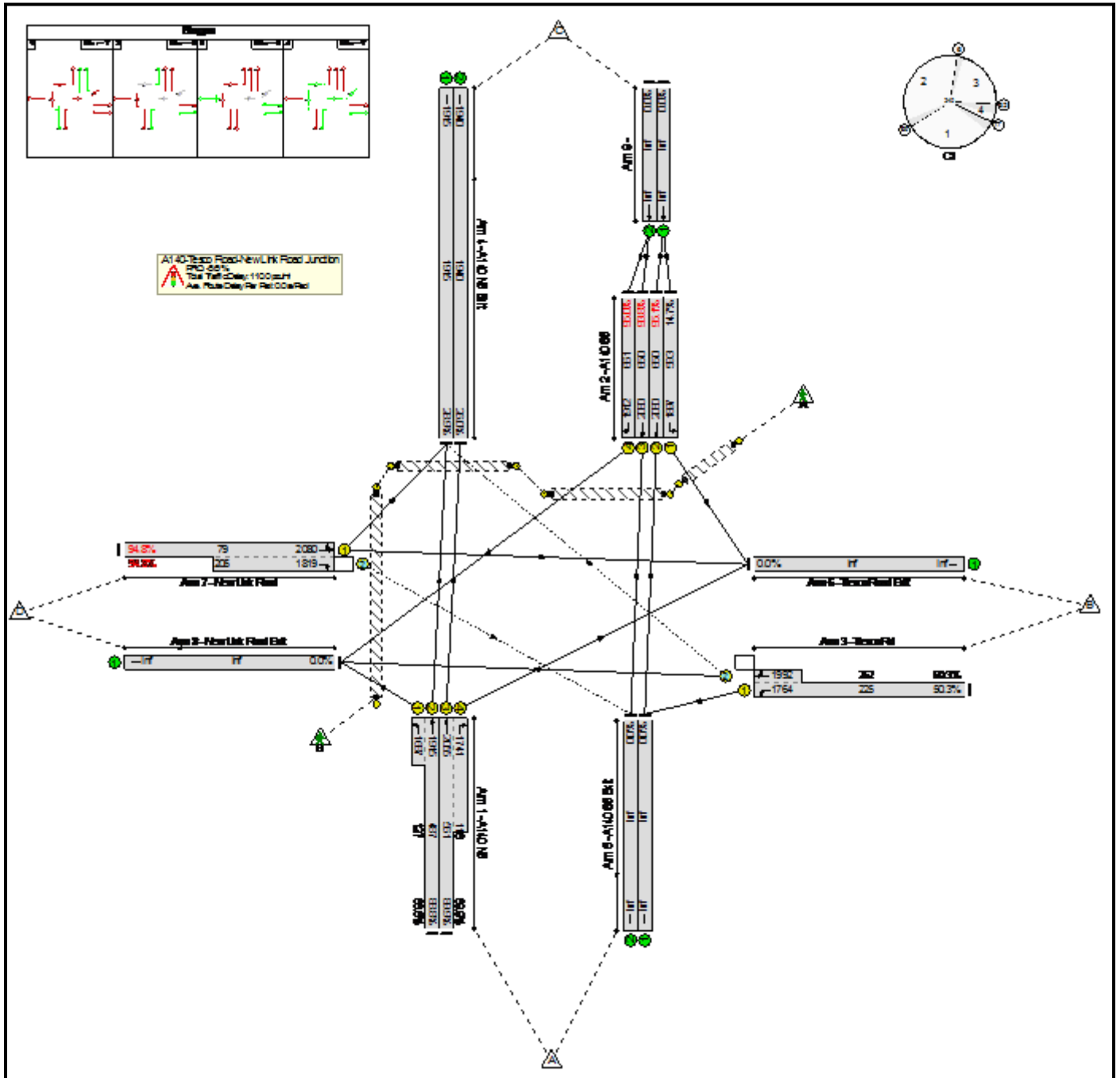


Network Results

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: A140 / Tesco / New Link Road Proposed Layout	-	-	-		-	-	-	-	-	-	77.6%	195	0	0	51.8	-	-
A140-Tesco Road-New Link Road Junction	-	-	-		-	-	-	-	-	-	77.6%	195	0	0	51.8	-	-
1/2+1/1	A140 NB Ahead Left	U	B		1	131	-	812	1915:1687	763+287	77.4 : 77.4%	-	-	-	10.8	47.8	41.3
1/3+1/4	A140 NB Ahead Right	U	B C		1:2	131:46	-	882	2055:1741	981+157	77.5 : 77.5%	-	-	-	12.9	52.7	45.1
2/1	A140 SB Left	U	D		1	130	-	64	1897	1035	6.2%	-	-	-	0.5	27.5	2.0
2/2	A140 SB Ahead	U	A		1	130	-	534	2080	1135	47.0%	-	-	-	5.4	36.3	22.1
2/3	A140 SB Ahead	U	A		1	130	-	258	2080	1135	22.7%	-	-	-	2.2	30.3	9.0
2/4	A140 SB Right	U	L		1	37	-	229	1912	303	75.6%	-	-	-	7.6	120.0	16.1
3/1+3/2	Tesco Rd Right Left Ahead	U+O	F E		1	96:40	-	244	1764:1993	211+194	60.2 : 60.2%	77	0	0	5.6	82.2	10.0
4/1	A140 NB Exit	U	-		-	-	-	676	1915	1915	35.3%	-	-	-	0.3	1.5	0.3
4/2	A140 NB Exit	U	-		-	-	-	760	1940	1940	39.2%	-	-	-	0.4	1.7	15.4
7/1+7/2	New Link Road Left Right Ahead	U+O	J		1	40	-	172	2080:1819	70+152	77.6 : 77.6%	118	0	0	6.2	130.6	9.2
Ped Link: P1	Unnamed Ped Link	-	H		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P2	Unnamed Ped Link	-	G		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P3	Unnamed Ped Link	-	I		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P4	Unnamed Ped Link	-	K		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
C1			PRC for Signalled Lanes (%):		16.0	Total Delay for Signalled Lanes (pcuHr):		51.17	Cycle Time (s):		240						
			PRC Over All Lanes (%):		16.0	Total Delay Over All Lanes(pcuHr):		51.79									

Scenario 2: '2022 Baseline PM' (FG2: '2022 Baseline PM Peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

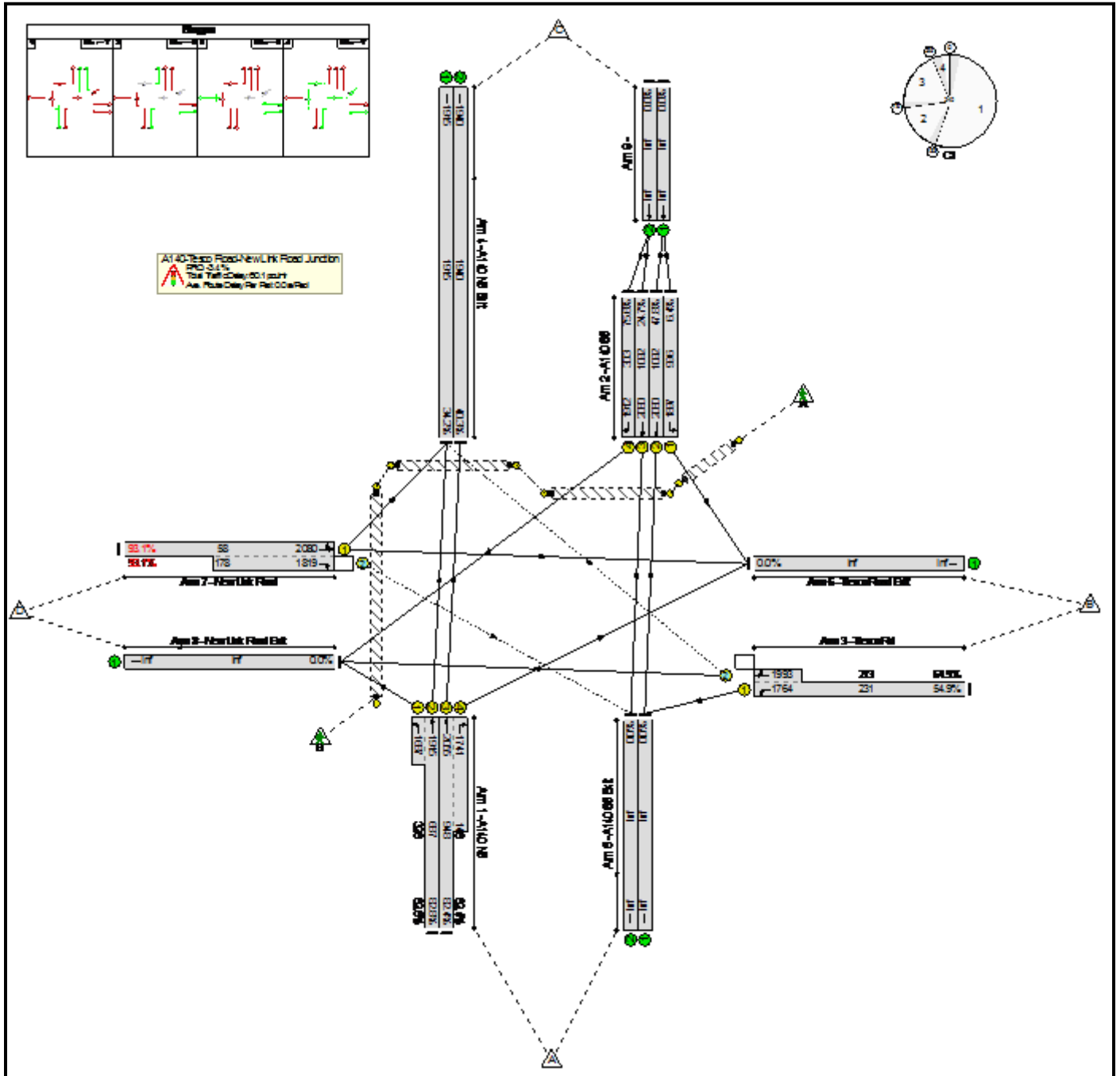


Network Results

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: A140 / Tesco / New Link Road Proposed Layout	-	-	-		-	-	-	-	-	-	95.1%	278	0	0	110.0	-	-
A140-Tesco Road-New Link Road Junction	-	-	-		-	-	-	-	-	-	95.1%	278	0	0	110.0	-	-
1/2+1/1	A140 NB Ahead Left	U	B		1	75	-	546	1915:1687	487+127	88.8 : 88.8%	-	-	-	15.2	100.4	36.7
1/3+1/4	A140 NB Ahead Right	U	B C		1:2	75:91	-	608	2055:1741	561+116	89.9 : 89.9%	-	-	-	16.2	96.0	40.0
2/1	A140 SB Left	U	D		1	74	-	87	1897	593	14.7%	-	-	-	1.5	63.0	4.2
2/2	A140 SB Ahead	U	A		1	74	-	618	2080	650	95.1%	-	-	-	20.6	120.2	47.0
2/3	A140 SB Ahead	U	A		1	74	-	610	2080	650	93.8%	-	-	-	19.5	115.0	45.4
2/4	A140 SB Right	U	L		1	82	-	628	1912	661	95.0%	-	-	-	20.1	115.0	47.4
3/1+3/2	Tesco Rd Right Left Ahead	U+O	F E		1	152:51	-	240	1764:1992	225+252	50.3 : 50.3%	84	0	0	4.2	63.1	9.8
4/1	A140 NB Exit	U	-		-	-	-	554	1915	1915	28.9%	-	-	-	0.2	1.3	0.2
4/2	A140 NB Exit	U	-		-	-	-	504	1940	1940	26.0%	-	-	-	0.2	1.4	13.7
7/1+7/2	New Link Road Left Right Ahead	U+O	J		1	51	-	269	2080:1819	79+205	94.8 : 94.8%	194	0	0	12.2	163.9	18.1
Ped Link: P1	Unnamed Ped Link	-	H		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P2	Unnamed Ped Link	-	G		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P3	Unnamed Ped Link	-	I		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P4	Unnamed Ped Link	-	K		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
C1			PRC for Signalled Lanes (%):		-5.6		Total Delay for Signalled Lanes (pcuHr):		109.60		Cycle Time (s):		240				
			PRC Over All Lanes (%):		-5.6		Total Delay Over All Lanes(pcuHr):		110.01								

Scenario 3: '2022 Baseline+Sen Con Flows AM' (FG3: '2022 Baseline+Sensitivity Construction Flows AM Peak',
Plan 1: 'Network Control Plan 1')

Network Layout Diagram

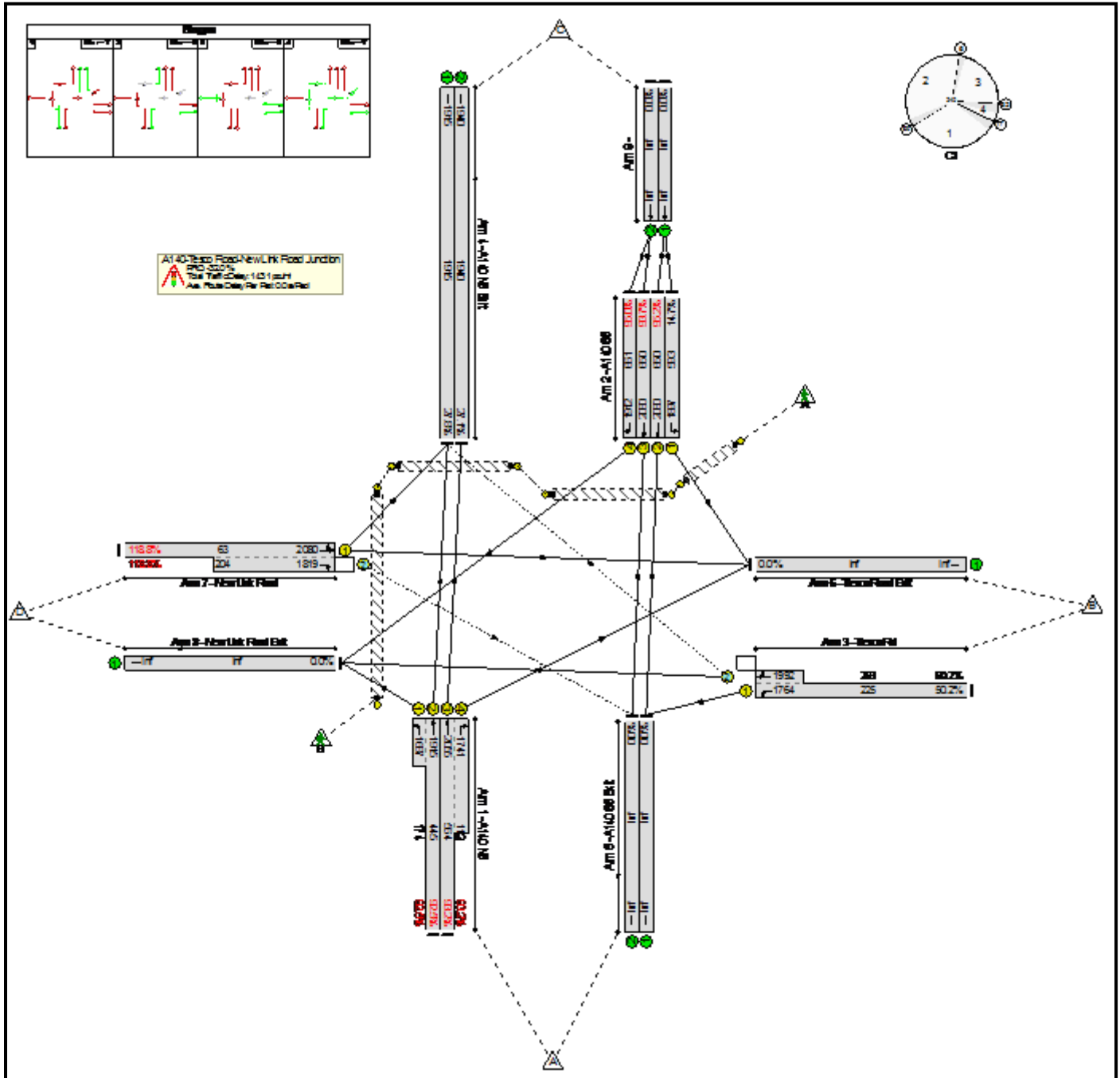


Network Results

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: A140 / Tesco / New Link Road Proposed Layout	-	-	-		-	-	-	-	-	-	93.1%	243	0	0	60.1	-	-
A140-Tesco Road-New Link Road Junction	-	-	-		-	-	-	-	-	-	93.1%	243	0	0	60.1	-	-
1/2+1/1	A140 NB Ahead Left	U	B		1	126	-	839	1915:1687	687+326	82.8 : 82.8%	-	-	-	12.8	55.0	46.1
1/3+1/4	A140 NB Ahead Right	U	B C		1:2	126:46	-	903	2055:1741	948+148	82.4 : 82.4%	-	-	-	14.8	59.1	49.8
2/1	A140 SB Left	U	D		1	125	-	64	1897	996	6.4%	-	-	-	0.5	30.0	2.1
2/2	A140 SB Ahead	U	A		1	125	-	522	2080	1092	47.8%	-	-	-	5.7	39.3	22.5
2/3	A140 SB Ahead	U	A		1	125	-	270	2080	1092	24.7%	-	-	-	2.5	33.3	10.0
2/4	A140 SB Right	U	L		1	37	-	229	1912	303	75.6%	-	-	-	7.6	120.0	16.1
3/1+3/2	Tesco Rd Right Left Ahead	U+O	F E		1	101:45	-	244	1764:1993	231+213	54.9 : 54.9%	77	0	0	5.1	75.7	9.4
4/1	A140 NB Exit	U	-		-	-	-	655	1915	1915	34.2%	-	-	-	0.3	1.4	0.3
4/2	A140 NB Exit	U	-		-	-	-	781	1940	1940	40.3%	-	-	-	0.4	1.7	15.5
7/1+7/2	New Link Road Left Right Ahead	U+O	J		1	45	-	220	2080:1819	58+178	93.1 : 93.1%	166	0	0	10.3	169.0	15.3
Ped Link: P1	Unnamed Ped Link	-	H		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P2	Unnamed Ped Link	-	G		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P3	Unnamed Ped Link	-	I		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P4	Unnamed Ped Link	-	K		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
C1			PRC for Signalled Lanes (%):		-3.4		Total Delay for Signalled Lanes (pcuHr):		59.46		Cycle Time (s):		240				
			PRC Over All Lanes (%):		-3.4		Total Delay Over All Lanes(pcuHr):		60.08								

Scenario 4: '2022 Baseline+Sen Con Flows PM' (FG4: '2022 Baseline+Sensitivity Construction Flows PM Peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

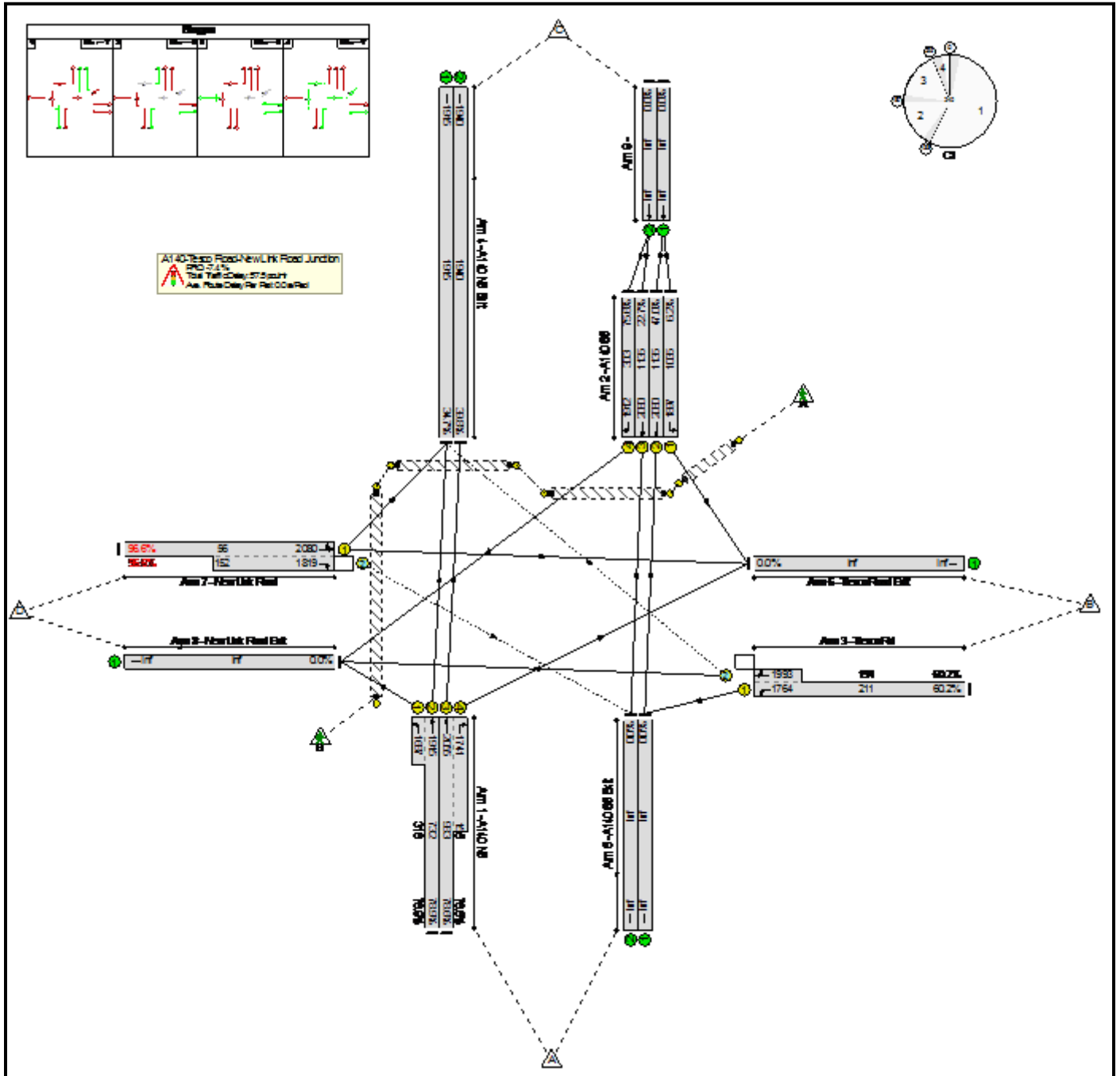


Network Results

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: A140 / Tesco / New Link Road Proposed Layout	-	-	-		-	-	-	-	-	-	118.8%	288	0	0	143.1	-	-		
A140-Tesco Road-New Link Road Junction	-	-	-		-	-	-	-	-	-	118.8%	288	0	0	143.1	-	-		
1/2+1/1	A140 NB Ahead Left	U	B		1	75	-	573	1915:1687	445+174	92.5 : 92.5%	-	-	-	17.4	109.3	39.9		
1/3+1/4	A140 NB Ahead Right	U	B C		1:2	75:91	-	629	2055:1741	564+112	93.2 : 93.2%	-	-	-	18.4	105.3	43.4		
2/1	A140 SB Left	U	D		1	74	-	87	1897	593	14.7%	-	-	-	1.5	63.0	4.2		
2/2	A140 SB Ahead	U	A		1	74	-	619	2080	650	95.2%	-	-	-	20.8	120.9	47.1		
2/3	A140 SB Ahead	U	A		1	74	-	609	2080	650	93.7%	-	-	-	19.4	114.4	45.2		
2/4	A140 SB Right	U	L		1	82	-	628	1912	661	95.0%	-	-	-	20.1	115.0	47.4		
3/1+3/2	Tesco Rd Right Left Ahead	U+O	F E		1	152:51	-	240	1764:1992	225+253	50.2 : 50.2%	84	0	0	4.1	62.2	9.8		
4/1	A140 NB Exit	U	-		-	-	-	533	1915	1915	27.8%	-	-	-	0.2	1.3	0.2		
4/2	A140 NB Exit	U	-		-	-	-	525	1940	1940	27.1%	-	-	-	0.2	1.5	13.7		
7/1+7/2	New Link Road Left Right Ahead	U+O	J		1	51	-	317	2080:1819	63+204	118.8 : 118.8%	204	0	0	41.1	466.3	48.4		
Ped Link: P1	Unnamed Ped Link	-	H		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0		
Ped Link: P2	Unnamed Ped Link	-	G		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0		
Ped Link: P3	Unnamed Ped Link	-	I		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0		
Ped Link: P4	Unnamed Ped Link	-	K		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0		
C1		PRC for Signalled Lanes (%):		-32.0	Total Delay for Signalled Lanes (pcuHr):		142.73	Cycle Time (s):		240									
		PRC Over All Lanes (%):		-32.0	Total Delay Over All Lanes(pcuHr):		143.14												

Scenario 5: '2022 Baseline+Con Flows AM' (FG5: '2022 Baseline+Construction Flows AM Peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

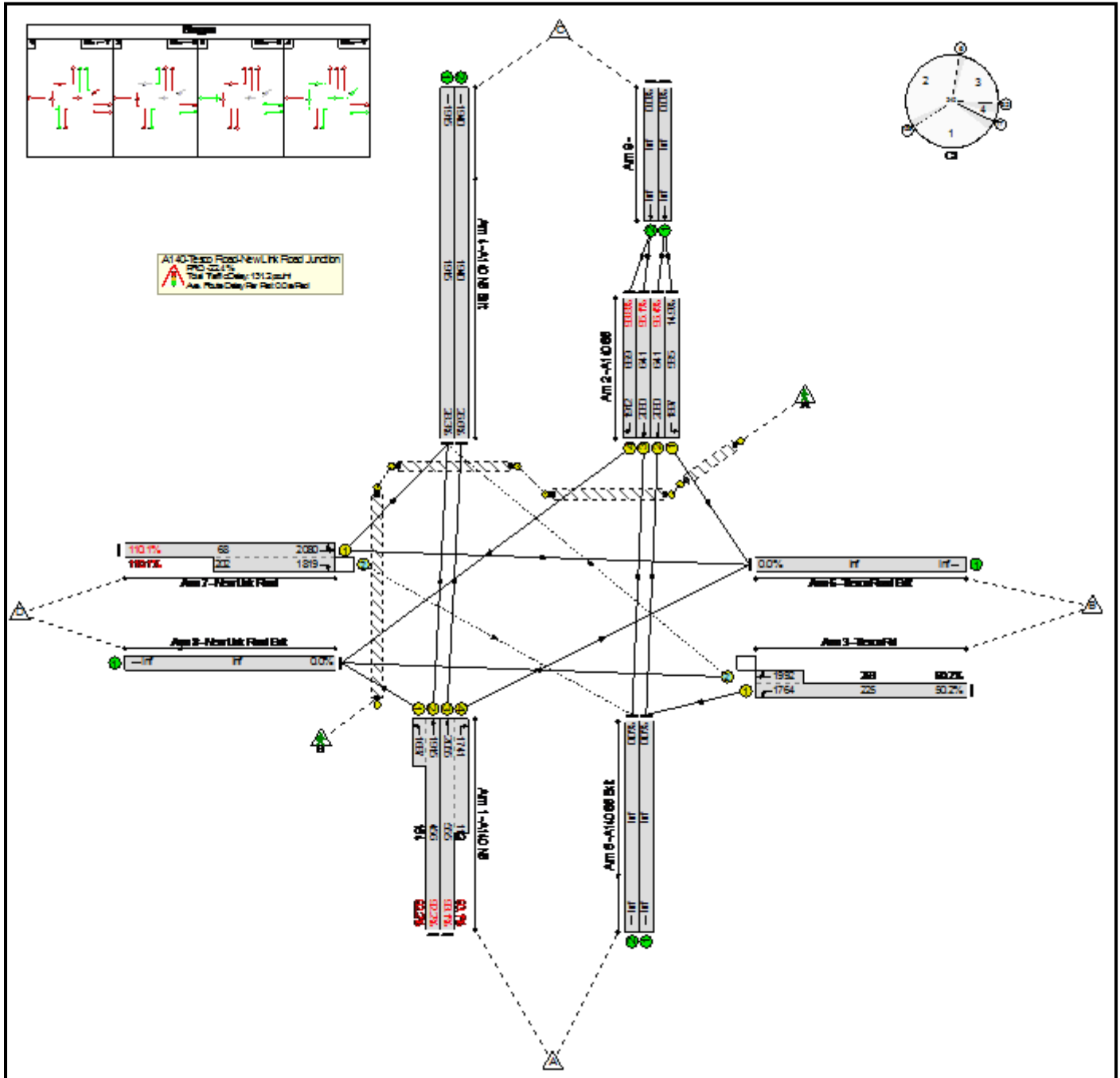


Network Results

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: A140 / Tesco / New Link Road Proposed Layout	-	-	-		-	-	-	-	-	-	96.6%	224	0	0	57.5	-	-
A140-Tesco Road-New Link Road Junction	-	-	-		-	-	-	-	-	-	96.6%	224	0	0	57.5	-	-
1/2+1/1	A140 NB Ahead Left	U	B		1	131	-	829	1915:1687	732+318	78.9 : 78.9%	-	-	-	11.2	48.7	42.7
1/3+1/4	A140 NB Ahead Right	U	B C		1:2	131:46	-	894	2055:1741	983+155	78.6 : 78.6%	-	-	-	13.3	53.4	46.3
2/1	A140 SB Left	U	D		1	130	-	64	1897	1035	6.2%	-	-	-	0.5	27.5	2.0
2/2	A140 SB Ahead	U	A		1	130	-	534	2080	1135	47.0%	-	-	-	5.4	36.3	22.1
2/3	A140 SB Ahead	U	A		1	130	-	258	2080	1135	22.7%	-	-	-	2.2	30.3	9.0
2/4	A140 SB Right	U	L		1	37	-	229	1912	303	75.6%	-	-	-	7.6	120.0	16.1
3/1+3/2	Tesco Rd Right Left Ahead	U+O	F E		1	96:40	-	244	1764:1993	211+194	60.2 : 60.2%	77	0	0	5.6	82.2	10.0
4/1	A140 NB Exit	U	-		-	-	-	664	1915	1915	34.7%	-	-	-	0.3	1.4	0.3
4/2	A140 NB Exit	U	-		-	-	-	772	1940	1940	39.8%	-	-	-	0.4	1.7	15.4
7/1+7/2	New Link Road Left Right Ahead	U+O	J		1	40	-	201	2080:1819	56+152	96.6 : 96.6%	147	0	0	11.1	199.4	15.3
Ped Link: P1	Unnamed Ped Link	-	H		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P2	Unnamed Ped Link	-	G		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P3	Unnamed Ped Link	-	I		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P4	Unnamed Ped Link	-	K		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
C1			PRC for Signalled Lanes (%):		-7.4	Total Delay for Signalled Lanes (pcuHr):		56.85	Cycle Time (s):		240						
			PRC Over All Lanes (%):		-7.4	Total Delay Over All Lanes(pcuHr):		57.48									

Scenario 6: '2022 Baseline+Con Flows PM' (FG6: '2022 Baseline+Construction Flows PM Peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

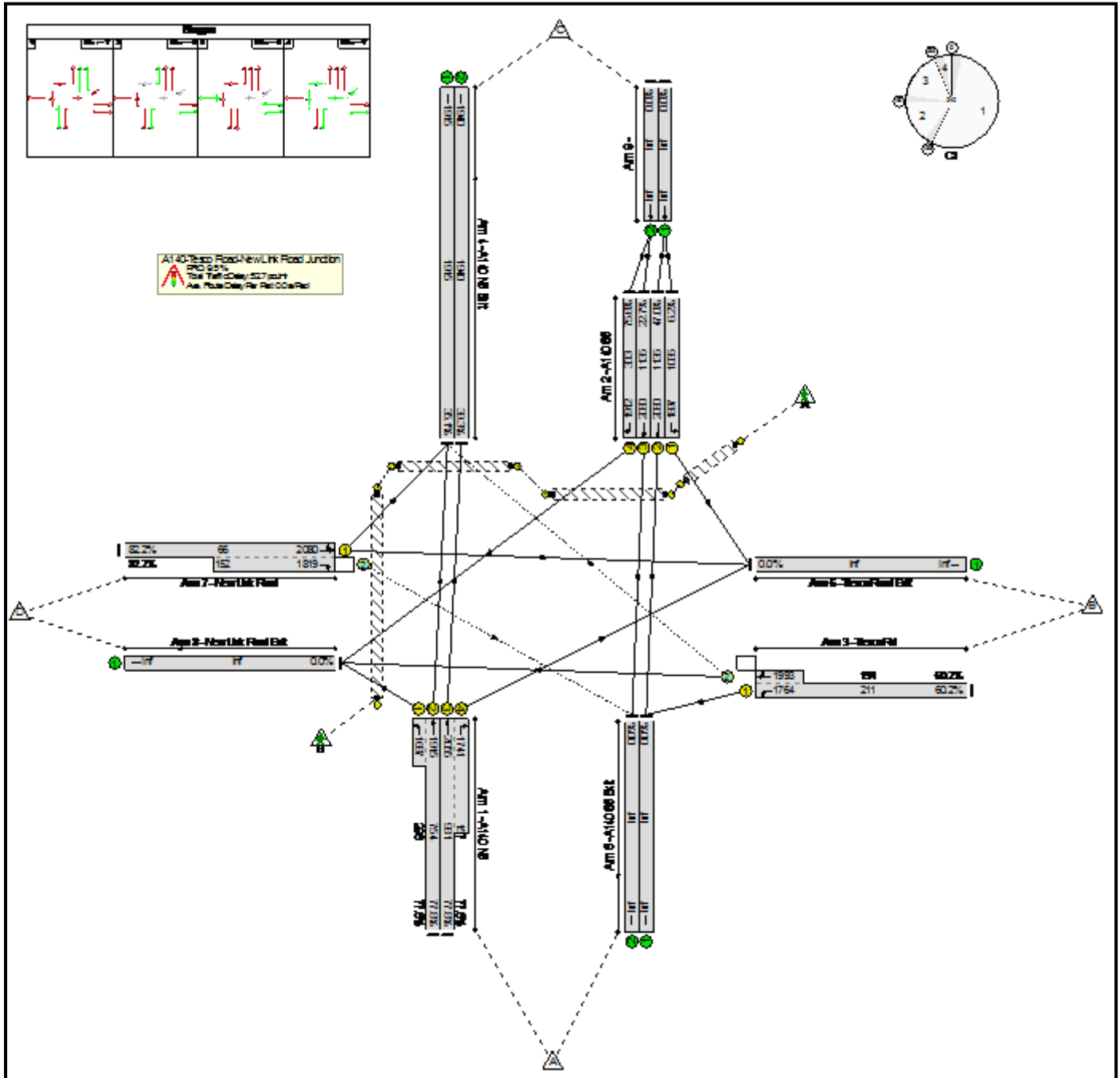


Network Results

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: A140 / Tesco / New Link Road Proposed Layout	-	-	-		-	-	-	-	-	-	110.1%	286	0	0	131.2	-	-
A140-Tesco Road-New Link Road Junction	-	-	-		-	-	-	-	-	-	110.1%	286	0	0	131.2	-	-
1/2+1/1	A140 NB Ahead Left	U	B		1	74	-	562	1915:1687	456+154	92.2 : 92.2%	-	-	-	17.1	109.4	39.3
1/3+1/4	A140 NB Ahead Right	U	B C		1:2	74:92	-	621	2055:1741	555+112	93.1 : 93.1%	-	-	-	18.2	105.5	42.8
2/1	A140 SB Left	U	D		1	73	-	87	1897	585	14.9%	-	-	-	1.5	63.8	4.3
2/2	A140 SB Ahead	U	A		1	73	-	618	2080	641	96.4%	-	-	-	21.9	127.7	48.4
2/3	A140 SB Ahead	U	A		1	73	-	610	2080	641	95.1%	-	-	-	20.6	121.3	46.4
2/4	A140 SB Right	U	L		1	83	-	628	1912	669	93.8%	-	-	-	19.1	109.4	46.4
3/1+3/2	Tesco Rd Right Left Ahead	U+O	F E		1	153:51	-	240	1764:1992	225+253	50.2 : 50.2%	84	0	0	4.2	62.5	9.8
4/1	A140 NB Exit	U	-		-	-	-	541	1915	1915	28.3%	-	-	-	0.2	1.3	0.2
4/2	A140 NB Exit	U	-		-	-	-	517	1940	1940	26.6%	-	-	-	0.2	1.4	13.7
7/1+7/2	New Link Road Left Right Ahead	U+O	J		1	51	-	298	2080:1819	68+202	110.1 : 110.1%	202	0	0	28.2	341.1	34.1
Ped Link: P1	Unnamed Ped Link	-	H		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P2	Unnamed Ped Link	-	G		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P3	Unnamed Ped Link	-	I		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P4	Unnamed Ped Link	-	K		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
C1		PRC for Signalled Lanes (%):		-22.4	Total Delay for Signalled Lanes (pcuHr):		130.79	Cycle Time (s):		240	PRC Over All Lanes (%):		-22.4	Total Delay Over All Lanes(pcuHr):		131.20	

Scenario 7: '2022 Baseline+Sub Con Flows AM' (FG7: '2022 Baseline+Substation Construction Flows AM Peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram

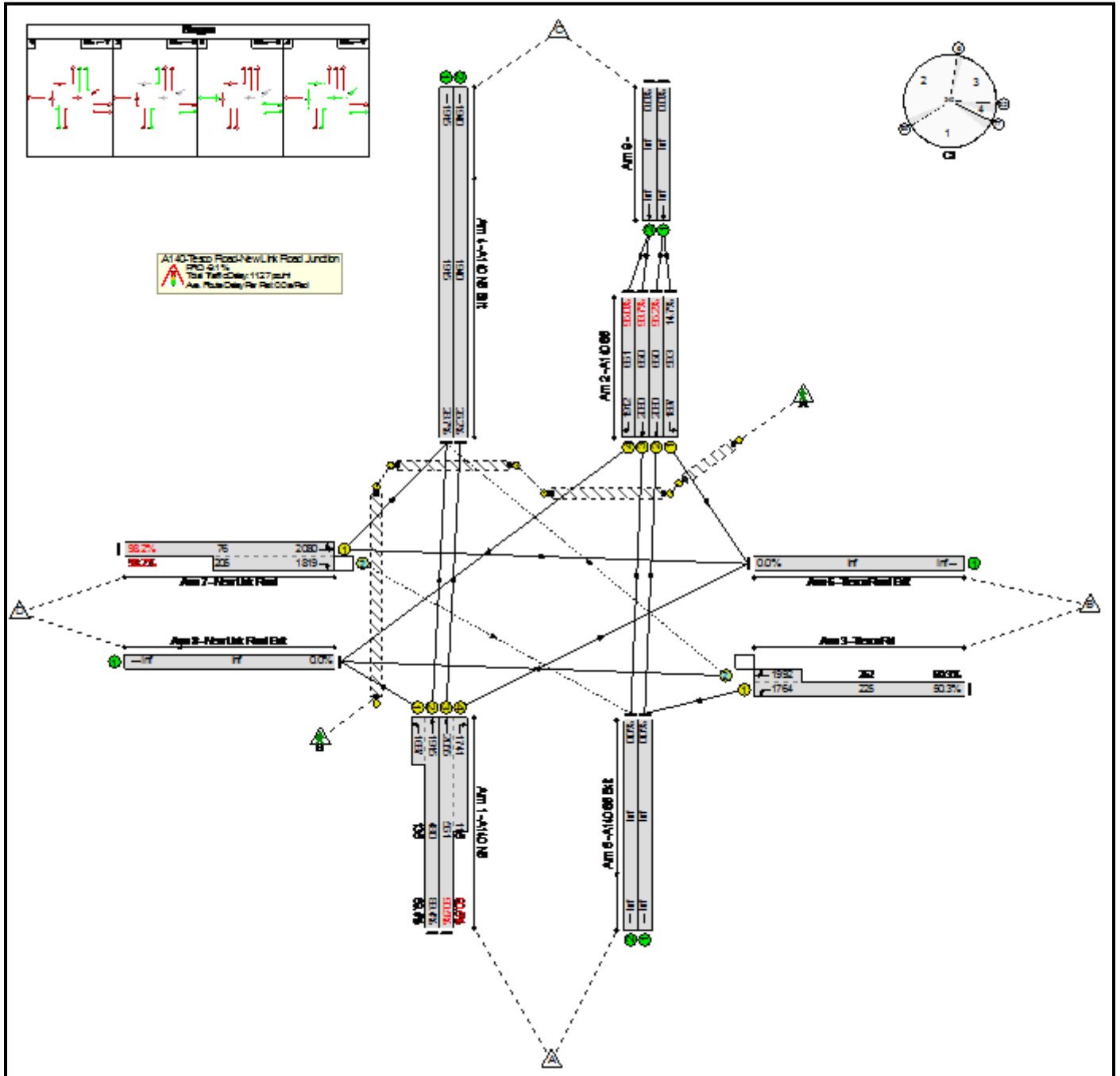


Network Results

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: A140 / Tesco / New Link Road Proposed Layout	-	-	-		-	-	-	-	-	-	82.2%	202	0	0	52.7	-	-
A140-Tesco Road-New Link Road Junction	-	-	-		-	-	-	-	-	-	82.2%	202	0	0	52.7	-	-
1/2+1/1	A140 NB Ahead Left	U	B		1	131	-	817	1915:1687	754+296	77.8 : 77.8%	-	-	-	10.9	48.0	41.8
1/3+1/4	A140 NB Ahead Right	U	B C		1:2	131:46	-	885	2055:1741	981+157	77.8 : 77.8%	-	-	-	13.0	52.8	45.3
2/1	A140 SB Left	U	D		1	130	-	64	1897	1035	6.2%	-	-	-	0.5	27.5	2.0
2/2	A140 SB Ahead	U	A		1	130	-	534	2080	1135	47.0%	-	-	-	5.4	36.3	22.1
2/3	A140 SB Ahead	U	A		1	130	-	258	2080	1135	22.7%	-	-	-	2.2	30.3	9.0
2/4	A140 SB Right	U	L		1	37	-	229	1912	303	75.6%	-	-	-	7.6	120.0	16.1
3/1+3/2	Tesco Rd Right Left Ahead	U+O	F E		1	96:40	-	244	1764:1993	211+194	60.2 : 60.2%	77	0	0	5.6	82.2	10.0
4/1	A140 NB Exit	U	-		-	-	-	673	1915	1915	35.1%	-	-	-	0.3	1.4	0.3
4/2	A140 NB Exit	U	-		-	-	-	763	1940	1940	39.3%	-	-	-	0.4	1.7	15.4
7/1+7/2	New Link Road Left Right Ahead	U+O	J		1	40	-	179	2080:1819	66+152	82.2 : 82.2%	125	0	0	6.9	139.3	10.2
Ped Link: P1	Unnamed Ped Link	-	H		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P2	Unnamed Ped Link	-	G		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P3	Unnamed Ped Link	-	I		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P4	Unnamed Ped Link	-	K		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
C1			PRC for Signalled Lanes (%):		9.5		Total Delay for Signalled Lanes (pcuHr):		52.07		Cycle Time (s):		240				
			PRC Over All Lanes (%):		9.5		Total Delay Over All Lanes(pcuHr):		52.69								

Scenario 8: '2022 Baseline+Sub Con Flows AM' (FG8: '2022 Baseline+Substation Construction Flows PM Peak', 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: A140 / Tesco / New Link Road Proposed Layout	-	-	-		-	-	-	-	-	-	98.2%	285	0	0	112.7	-	-
A140-Tesco Road-New Link Road Junction	-	-	-		-	-	-	-	-	-	98.2%	285	0	0	112.7	-	-
1/2+1/1	A140 NB Ahead Left	U	B		1	75	-	550	1915:1687	480+135	89.4 : 89.4%	-	-	-	15.5	101.4	37.2
1/3+1/4	A140 NB Ahead Right	U	B C		1:2	75:91	-	612	2055:1741	561+115	90.5 : 90.5%	-	-	-	16.6	97.5	40.5
2/1	A140 SB Left	U	D		1	74	-	87	1897	593	14.7%	-	-	-	1.5	63.0	4.2
2/2	A140 SB Ahead	U	A		1	74	-	619	2080	650	95.2%	-	-	-	20.8	120.9	47.1
2/3	A140 SB Ahead	U	A		1	74	-	609	2080	650	93.7%	-	-	-	19.4	114.4	45.2
2/4	A140 SB Right	U	L		1	82	-	628	1912	661	95.0%	-	-	-	20.1	115.0	47.4
3/1+3/2	Tesco Rd Right Left Ahead	U+O	F E		1	152:51	-	240	1764:1992	225+252	50.3 : 50.3%	84	0	0	4.2	63.1	9.8
4/1	A140 NB Exit	U	-		-	-	-	550	1915	1915	28.7%	-	-	-	0.2	1.3	0.2
4/2	A140 NB Exit	U	-		-	-	-	508	1940	1940	26.2%	-	-	-	0.2	1.4	13.7
7/1+7/2	New Link Road Left Right Ahead	U+O	J		1	51	-	276	2080:1819	76+205	98.2 : 98.2%	201	0	0	14.3	186.9	20.5
Ped Link: P1	Unnamed Ped Link	-	H		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P2	Unnamed Ped Link	-	G		1	15	-	0	-	4500	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P3	Unnamed Ped Link	-	I		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
Ped Link: P4	Unnamed Ped Link	-	K		1	7	-	0	-	2100	0.0%	-	-	-	0.0	0.0	0.0
C1 PRC for Signalled Lanes (%): -9.1 Total Delay for Signalled Lanes (pcuHr): 112.34 Cycle Time (s): 240 PRC Over All Lanes (%): -9.1 Total Delay Over All Lanes(pcuHr): 112.74																	