Net Zero Teesside Project

Planning Inspectorate Reference: EN010103

Land at and in the vicinity of the former Redcar Steel Works site, Redcar and in Stockton-on-Tees, Teesside

The Net Zero Teesside Order

Document Reference: 9.16 Sensitivity Test Traffic Modelling of A1085 Trunk Road / A1042 Kirkleatham Lane

Planning Act 2008

Applicants: Net Zero Teesside Power Limited (NZT Power Ltd) & Net Zero North Sea Storage Limited (NZNS Storage Ltd)

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GLOSSARY

Abbreviation	Description
CWTP	Construction Worker Travel Plan
DfT	Department for Transport
DoS	Degree of Saturation
ES	Environmental Statement
HGV	Heavy Goods Vehicles
TA	Transport Assessment

CONTENTS

TABLES

FIGURES

1.0 INTRODUCTION

1.1.1 This report has been prepared in response to a comment in the Redcar and Cleveland Brough Council Local Impact Report [REP1-046], which requested evidence that the A1085 Trunk Road / A1042 Kirkleatham Lane junction had sufficient capacity to deal with traffic from the construction of the Proposed Development.

1.1.2 To assess the signalised 4-arm A1085 Trunk Road / A1042 Kirkleatham Lane junction in Redcar based upon the assumptions as set out within the accompanying Transport Assessment (750 worker vehicles at 2024), along with two other sensitivity test scenarios. It should also be noted that this junction was not assessed as part of either the submitted ES or TA as it was not included as part of the agreed scope with the Local Authority.

1.1.3 The additional sensitivity tests include the following:

- Either 1,000 or 1,200 vehicles associated with construction workers on site at the peak of activity, with the TA assuming a total of 750 vehicles arriving or departing, and
- The peak year of construction for this increased level of construction worker trips is now 2025, within the TA a year of 2024 was assumed.
- This will then present a scenario consistent with the submitted TA and ES along with the sensitivity tests regarding an increased level of construction workers as included in recent Technical Notes.

1.1.4 The detailed assessment can then be set out as follows.

2.0 SCOPE OF ASSESSMENT

2.1 Study Area

2.1.1 The study area comprises the A1085 Trunk Road / A1042 Kirkleatham Lane signalised crossroads to the east of the study area as set out in the Transport Assessment and is only impacted by the worker trips heading to and from Redcar. It is therefore unaffected by the previously submitted sensitivity tests where different options for both construction worker and HGV access were considered.

2.1.2 The location of the junction is shown below for ease of reference.

Figure 3.1 Junction Location

2.2 Traffic Data

2.2.1 The traffic count to inform the base year modelling was conducted on Wednesday 15th June 2022 between 0700 and 1000 and 1600 and 1900 and included a fully classified turning count at the junction.

2.2.2 The peak hours were then identified as being between 0800 and 0900 and 1615 to 1715, and these have then been used within the assessments as set out in this note.

2.2.3 Also given the change in design year from 2024 to 2025, the growth rates used are changed and are set out later in this document. The levels of committed development are assumed to be the same as set out in the TA.

2.3 TEMPRO Traffic Growth

2.3.1 Reference has been made to the Department for Transport's (DfT) traffic growth software TEMPro to derive future year traffic flows. Car driver traffic growth factors for the future year have been derived using dataset 72 for MSOA 001,002 and 003 within Redcar.

2.3.2 Growth rates have calculated for 2022-2024 and 2022-2025 based on the 2022 manual count surveyed on 15/06/2022.

2.3.3 The resulting growth rates used are set out in **Table 3-1** below.

Table 3-1 TEMPro Local Growth Factors

YEAR	AM PEAK	PM PEAK
2022 -2024	1.0247	1.0237
2022-2025	1.0370	1.0355

Source: AECOM

2.4 Assessment Scenarios

2.4.1 To assess the impact of the Proposed Development on the local road network, the following assessment scenarios have been considered, which will then assess not only the impact of the development but also the base plus committed traffic scenario in order to establish the baseline "no development" level of capacity.:

- Future Year (2024) With Committed Development, Weekday AM and PM Peaks;
- Future Year (2024) With Committed Development and Development (750 Vehicles), Weekday AM and PM Peaks;
- Future Year (2025) With Committed Development, Weekday AM and PM Peaks;
- Future Year (2025) With Committed Development and Development (1000 Vehicles), Weekday AM and PM Peaks; and
- Future Year (2025) With Committed Development and Development (1200 Vehicles), Weekday AM and PM Peaks.

2.4.2 The Future Year of 2025 has been chosen as it is the expected construction peak year within the sensitivity testing for either 1,000 or 1,200 worker vehicles, with 2024 still be assumed for the scenario as set out in the TA and ES with 750 worker vehicles.

2.5 Trip Generation / Distribution

2.5.1 The trip generation is based on the maximum daily construction vehicles and HGV's, with three sets of maximum daily construction vehicles scenarios being assessed, 750 as per the TA and two sensitivity tests based upon 1,000 vehicles and 1,200 vehicles.

2.5.2 The distribution is the same as used within the TA and ES and is unaffected by the recent other sensitivity testing, as it is located to the east of the study area.

2.6 Impact Assessment

2.6.1 To establish the impact of the Proposed Development on the local highway network, a numerical change assessment has been carried out for all assessment scenarios. It is typically considered that if an existing junction includes an arm where an increase in traffic flows of 30 or more occurs in a given scenario, then the junction merits further assessment.

2.6.2 **Table 3-2** below provides a summary of the numerical change in vehicular trips travelling through each junction in the peak hours for each of the scenarios assessed, and it must be stressed that this represents the peak of construction and once operational the impact will not be material or severe.

Table 2-2 Increase in Vehicular Trips at A1085/Kirkleatham Lane

	2024 DEVELOPMENT TRIPS (750 VEHICLES)		2025 DEVELOPMENT TRIPS (1,000 VEHICLES)		2025 DEVELOPMENT TRIPS (1,200 VEHICLES)	
Junction	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
A1085/Kirkleatham Lane	14	50	19	62	21	71

Source: AECOM

2.6.3 The above table identifies that there will be an increase in traffic flows of more than 30 the junction within the PM peak hour although the AM does not meet the 30 two-way trip criteria this has still been included for completeness, the results of the modelling are outlined in the section below.

2.6.4 Although this level of numerical impact should be considered when reviewing the results of the capacity analysis and in particular the additional number of trips in the PM peak, at around 1 every minute, could be within any daily variation.

3.0 HIGHWAY NETWORK ASSESSMENT

3.1 Introduction

3.1.1 This section sets out the results of the junction capacity assessment.

3.2 Junction Models

3.2.1 In order to assess the traffic impact of the development on the identified junction, it has been necessary to use junction capacity assessment models. The junction capacity assessment has been undertaken using LinSig v3, an industry standard signal modelling software.

3.2.2 In LinSig v3 a Degree of Saturation (DoS %) value of 90% or less typically demonstrates that a junction arm or turning movement is operating within capacity and is therefore unlikely to experience excessive queuing. With values between 90% and 100% indicating that some additional delay and queuing may occur and not all vehicles may be able to clear in a single green period.

3.2.3 The PRC % indicates how much spare capacity a junction may have so a PRC of 0% represents a junction operating at its capacity limit.

3.3 Junction Staging

3.3.1 The junction has been assessed using two assumptions regarding the staging, a stage being a number of different movements both traffic and pedestrian that can run at the same time without conflict, these then combine to make a cycle which is the overall time taken for all the different stages to then receive a green period.

3.3.2 Two assumptions have been included, one whereby an all red pedestrian stage is called every cycle, i.e. once every 120 seconds and a second scenario whereby the all red pedestrian stage is not called, with this second assumption deemed to be more realistic.

3.3.3 This second scenario is deemed necessary as by including an all red pedestrian stage effectively stops all cars whilst the pedestrians are crossing and a such reduces the amount of overall greentime which is then given to traffic movements, thus reducing the level of overall capacity.

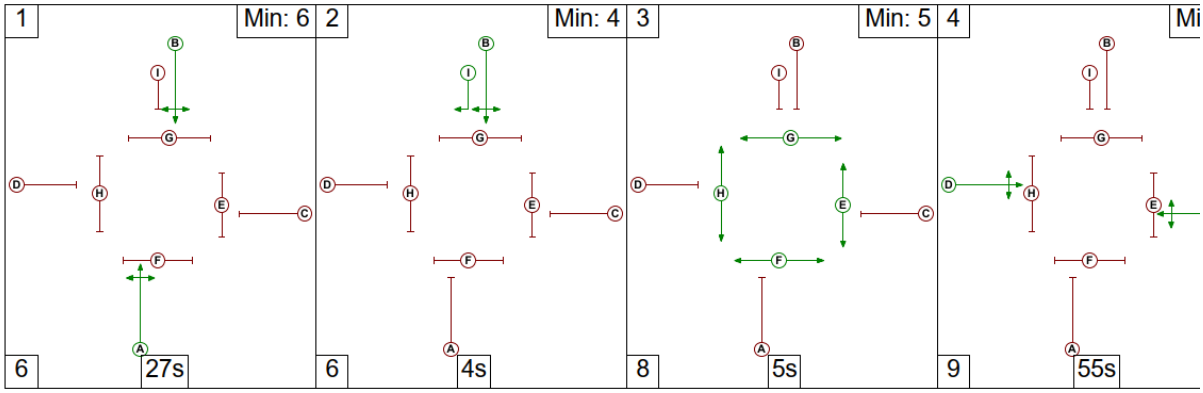
3.4 Scenario 1 – With the all red pedestrian stage

3.4.1 This assumes a 4 stage operation as shown below, with:

- Stage 1 being the A1042 Kirkleatham Lane in both directions;
- Stage 2 being the Kirkleatham Lane (N) only ahead and right;
- Stage 3 being and all red pedestrian stage, and
- Stage 4 being the A1085 Trunk Road in all directions.

3.4.2 This is then shown below for ease of reference:

Figure 4.1 Staging Arrangment



3.4.3 The above then provides a robust assessment as it then assumes that the all red pedestrian phase will run every cycle.

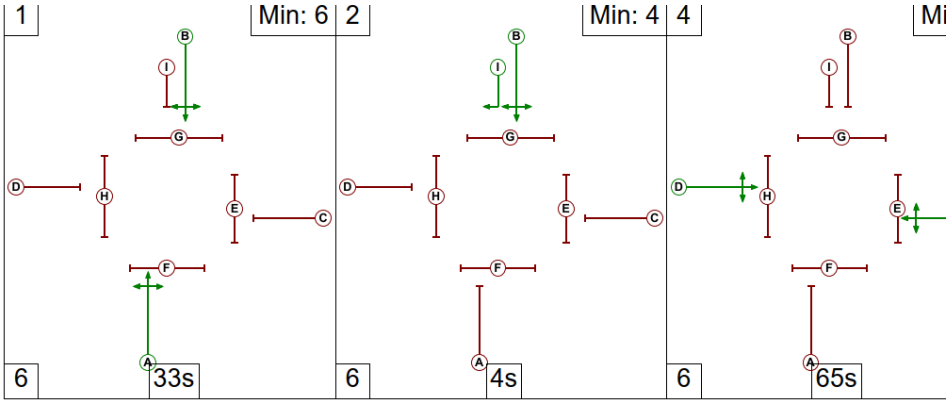
3.5 Scenario 2 – No all red pedestrian stage

3.5.1 We have then also undertaken a further assessment based upon the all red pedestrian phase not being called and this is shown as follows:

- Stage 1 being the A1042 Kirkleatham Lane in both directions;
- Stage 2 being the Kirkleatham Lane (N) only ahead and right;
- Stage 4 being the A1085 Trunk Road in all directions.

3.5.2 This is then shown below for ease of reference.

Figure 4.2 Staging - No pedestrian stage



4.0 JUNCTION MODELLING RESULTS – WITH ALL RED PEDESTRIAN STAGE

4.1.1 The results of the junction modelling are set out in the following paragraphs and the capacity assessment results are set out in full in Appendix A.

4.1.2 These results then assume that the all red pedestrian stage is called every cycle during the peak times, that is once every 120 seconds, which we would consider to be a robust level of assessment.

4.2 2024 Modelling Results Base plus Committed Development

4.2.1 The tables below outline the results of the 2024 scenario with an increased level of base traffic due to an assessment year of 2024 along with the addition of the committed development trips.

Table 4-1 Base 2024 + Committed AM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	24.1%	1.4	4.4
1/2	Kirkleatham Lane - Entry Right	55.5%	3.0	6.7
2/1	Trunk Road - Entry Left	29.5%	1.6	4.5
2/2	Trunk Road - Entry Right Ahead	72.5%	5.3	12.5
3/1	A1042 - Entry Ahead Left	57.5%	3.8	10.4
3/2	A1042 - Entry Right	80.0%	5.4	11.2
4/1	A1085 Corporation Road - Entry Right Ahead Left	81.8%	7.5	18.6
Practical Reserve capacity (PRC)		10.0%		
Cycle time		120s		

4.2.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 4-2 Base 2024 + Committed PM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	42.1%	2.7	7.4
1/2	Kirkleatham Lane - Entry Right	68.9%	4.0	8.1
2/1	Trunk Road - Entry Left	39.3%	2.2	7.1
2/2	Trunk Road - Entry Right Ahead	86.8%	7.9	19.4
3/1	A1042 - Entry Ahead Left	58.7%	3.7	8.6
3/2	A1042 - Entry Right	85.3%	5.0	8.0
4/1	A1085 Corporation Road - Entry Right Ahead Left	71.6%	5.7	17.3
Practical Reserve capacity (PRC)		3.6%		
Cycle time		120s		

4.2.3 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

4.2.4 However as mentioned the arms are still predicted to be within theoretical capacity.

4.3 2024 Modelling Results Base plus Committed Development plus 750 Worker Cars

4.3.1 This scenario then assesses the impact of the addition of construction worker trips in 2024 based upon 750 worker cars.

Table 4-3 Base 2024 + Committed + Development (750 worker Vehicles) AM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	24.6%	1.4	4.5
1/2	Kirkleatham Lane - Entry Right	58.1%	3.1	6.9
2/1	Trunk Road - Entry Left	28.8%	1.6	4.4
2/2	Trunk Road - Entry Right Ahead	72.6%	5.3	12.5
3/1	A1042 - Entry Ahead Left	59.7%	4.0	10.8
3/2	A1042 - Entry Right	82.3%	5.8	11.7
4/1	A1085 Corporation Road - Entry Right Ahead Left	80.6%	7.3	18.4
Practical Reserve capacity (PRC)		9.3%		
Cycle time		120s		

4.3.2 With the addition of the peak development traffic associated with 750 worker vehicles, the junction is predicted to remain within capacity with only minor increases in the DoS, with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 4-4 Base 2024 + Committed + Development (750 worker Vehicles) PM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	43.2%	2.8	7.5
1/2	Kirkleatham Lane - Entry Right	72.0%	4.2	8.3
2/1	Trunk Road - Entry Left	38.6%	2.1	6.9
2/2	Trunk Road - Entry Right Ahead	95.7%	12.8	25.5
3/1	A1042 - Entry Ahead Left	61.3%	3.9	9.0
3/2	A1042 - Entry Right	90.7%	6.0	9.1
4/1	A1085 Corporation Road - Entry Right Ahead Left	70.6%	5.5	17.2
Practical Reserve capacity (PRC)		-6.4%		
Cycle time		120s		

4.3.3 The modelling results, as shown by the table above, indicate that the junction starts to operate close to 90% (based upon 750 worker vehicles) with some arms operating

>90% DoS indicating that queuing can start to occur on more regular basis and not fully discharging during the green phase.

4.3.4 Both the Trunk Road - Entry Right Ahead and A1042 - Entry Right are predicted to have DoS >90%, from 86.8% to 95.7% and 85.3% to 90.7% respectively. However, the increases in queue length are 6 on the Trunk Road approach and 1 on the A1042 approach.

4.3.5 It is therefore considered that the impact at the junction can then be managed through the Construction Worker Travel Plan (CWTP) in order to minimise as far as is possible the impact at this junction in the peak periods.

4.3.6 The remaining arms are all below this level. and operate with a DoS below 90%.

4.4 2025 Modelling Results – baseline plus Committed Development

4.4.1 The tables below outline the results of the 2025 scenario with increased levels of growth along with the addition of the committed development traffic.

Table 4-5 Base 2025 + Committed AM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	24.5%	1.4	4.5
1/2	Kirkleatham Lane - Entry Right	56.9%	3.1	6.9
2/1	Trunk Road - Entry Left	29.8%	1.6	4.6
2/2	Trunk Road - Entry Right Ahead	76.0%	5.6	13.0
3/1	A1042 - Entry Ahead Left	58.1%	3.9	10.6
3/2	A1042 - Entry Right	80.9%	5.6	11.5
4/1	A1085 Corporation Road - Entry Right Ahead Left	82.9%	7.8	19.0
Practical Reserve capacity (PRC)		8.6%		
Cycle time		120s		

4.4.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with no significant increases in Degree of Saturation (DoS) as well as the DoS <90% on all the arms with only minor levels of predicted delay.

Table 4-6 Base 2025 + Committed PM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	42.6%	2.8	7.5
1/2	Kirkleatham Lane - Entry Right	70.4%	4.1	8.3
2/1	Trunk Road - Entry Left	39.8%	2.2	7.2
2/2	Trunk Road - Entry Right Ahead	90.2%	9.0	20.8
3/1	A1042 - Entry Ahead Left	59.5%	3.8	8.9
3/2	A1042 - Entry Right	87.0%	5.3	8.3
4/1	A1085 Corporation Road - Entry Right Ahead Left	72.2%	5.8	17.5
Practical Reserve capacity (PRC)		-0.2%		
Cycle time		120s		

4.4.3 The modelling results, as shown by the table above, indicate that the junction will remain within largely within capacity with Only the Trunk Road Right and Ahead being very marginally over a DoS of 90% at 90.2%

4.5 2025 Modelling Results Base plus Committed Development plus 1000 Worker Cars

4.5.1 This then assess the impact of the addition of 1000 worker car trips

Table 4-7 Base 2025 + Committed + Development (1000 Vehicles) AM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	24.9%	1.4	4.6
1/2	Kirkleatham Lane - Entry Right	59.2%	3.2	7.1
2/1	Trunk Road - Entry Left	29.1%	1.6	4.5
2/2	Trunk Road - Entry Right Ahead	77.1%	5.7	13.1
3/1	A1042 - Entry Ahead Left	60.5%	4.1	10.9
3/2	A1042 - Entry Right	83.5%	6.0	11.9
4/1	A1085 Corporation Road - Entry Right Ahead Left	82.0%	7.6	19.0
Practical Reserve capacity (PRC)		7.8%		
Cycle time		120s		

4.5.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with no significant increases in Degree of Saturation (DoS) as well as the DoS <90% on all the arms with only minor levels of predicted delay.

Table 4-8 Base 2025 + Committed + Development (1000 Vehicles) PM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	44.8%	2.9	7.7

1/2	Kirkleatham Lane - Entry Right	76.7%	4.7	8.8
2/1	Trunk Road - Entry Left	38.4%	2.1	6.9
2/2	Trunk Road - Entry Right Ahead	96.4%	13.6	26.8
3/1	A1042 - Entry Ahead Left	64.6%	4.1	9.3
3/2	A1042 - Entry Right	99.0%	8.8	11.9
4/1	A1085 Corporation Road - Entry Right Ahead Left	70.0%	5.4	17.1
Practical Reserve capacity (PRC)		-10.0%		
Cycle time		120s		

4.5.3 The modelling results, as shown by the table above, indicate that the junction starts to operate >90% DoS indicating that queuing can start to occur on more regular basis and not fully discharge during the green phase.

4.5.4 Both the Trunk Road - Entry Right Ahead and A1042 - Entry Right are predicted to have DoS >90%, from 90.2% to 96.4% and 87.0% to 99.0% respectively. However, the increase in queue length is only 6 on the Trunk Road approach and 4 on the A1042 approach.

4.5.5 The remaining arms are all below this level. The results within this scenario indicate that on some arms the full capacity is being utilised.

4.5.6 It is therefore considered that the impact at the junction can then be managed through the Construction Worker Travel Plan (CWTP) in order to minimise as far as is possible the impact at this junction in the peak periods.

4.6 2025 Modelling Results Base plus Committed Development plus 1200 Worker Cars

4.6.1 This then assess the impact of the addition of 1200 worker car trips

Table 4-9 Base 2025 + Committed + Development (1200 Vehicles) AM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	24.9%	1.4	4.6
1/2	Kirkleatham Lane - Entry Right	59.4%	3.2	7.1
2/1	Trunk Road - Entry Left	29.1%	1.6	4.5
2/2	Trunk Road - Entry Right Ahead	77.1%	5.7	13.1
3/1	A1042 - Entry Ahead Left	60.7%	4.1	11.1
3/2	A1042 - Entry Right	83.5%	6.0	11.9
4/1	A1085 Corporation Road - Entry Right Ahead Left	82.1%	7.7	19.1
Practical Reserve capacity (PRC)		7.8%		
Cycle time		120s		

4.6.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with no significant increases in Degree of Saturation (DoS) as well as the DoS <90% on all the arms with only minor levels of predicted delay.

Table 4-10 Base 2025 + Committed + Development (1200 Vehicles) PM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	44.8%	2.9	7.7
1/2	Kirkleatham Lane - Entry Right	76.7%	4.7	8.8
2/1	Trunk Road - Entry Left	38.4%	2.1	6.9
2/2	Trunk Road - Entry Right Ahead	98.5%	16.1	29.6
3/1	A1042 - Entry Ahead Left	64.6%	4.1	9.3
3/2	A1042 - Entry Right	99.0%	8.8	11.9
4/1	A1085 Corporation Road - Entry Right Ahead Left	70.1%	5.5	17.2
Practical Reserve capacity (PRC)		-10.0%		
Cycle time		120s		

4.6.3 The modelling results, as shown by the table above, indicate that the junction starts to operate >90% DoS indicating that queuing can start to occur on more regular basis and not fully discharging during the green phase.

4.6.4 Both the Trunk Road - Entry Right Ahead and A1042 - Entry Right are predicted to have DoS >90%, from 90.2% to 98.5% and 87.0% to 99.8% respectively., which is then similar to the scenario whereby 1,000 worker cars area assumed. The increases in queue length are 7 on the Trunk Road approach and 4 on the A1042 approach.

4.6.5 The remaining arms are all below this level. The results within this scenario indicate that on some arms the full capacity is being utilised.

4.6.6 It is therefore considered that the impact at the junction can then be managed through the Construction Worker Travel Plan (CWTP) in order to minimise as far as is possible the impact at this junction in the peak periods.

4.7 Summary

4.7.1 From the above, which assumes that the pedestrian stage is called every 120 seconds, the junction is predicted to operate with Degrees of Saturation either very slightly above or below 90% in the base plus committed development scenario at both 2024 and 2025 traffic levels.

4.7.2 With the addition of the 750 worker vehicles during the PM peak period at 2024 , on both the Trunk Road Ahead and A1042 right turn the DoS increase to above 90% which would then indicate that some queues are starting to form and not all traffic will clear in the green period. However, the increase in queue length on these arms is 6 and 1 on the Trunk Road and A1042 respectively,

4.7.3 With the addition of either the 1000 or 1200 worker vehicles this increases, again on the Trunk Road Ahead and A1042 approaches, with maximum increases in queue length on the Trunk Road Ahead of 7 cars and 4 cars on the A1042 approach during the peak of the construction phase.

4.7.4 However, as previously mentioned this impact is only associated with the peak construction phase of the proposal and as such it is therefore considered that it can then be managed through the Construction Worker Travel Plan (CWTP).

5.0 JUNCTION MODELLING RESULTS – WITHOUT ALL RED PEDESTRIAN STAGE

5.1.1 As a further assessment we have then assessed the operation of the junction based upon a 3 stage operation assuming that the all red stage for pedestrians does not occur every cycle, which is considered to provide a more realistic level of assessment.

5.2 2024 Modelling Results Baseline – No pedestrian stage

5.2.1 This assesses the impact at the junction based upon the 2024 base scenario assuming that the all red pedestrian stage is not called every cycle.

Table 5-1 Base 2024 AM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	22.0%	1.2	4.1
1/2	Kirkleatham Lane - Entry Right	48.9%	2.5	6.1
2/1	Trunk Road - Entry Left	22.9%	1.1	3.8
2/2	Trunk Road - Entry Right Ahead	36.8%	2.3	6.8
3/1	A1042 - Entry Ahead Left	51.5%	3.3	9.6
3/2	A1042 - Entry Right	44.3%	2.1	5.3
4/1	A1085 Corporation Road - Entry Right Ahead Left	52.2%	3.5	11.2
Practical Reserve capacity (PRC)		72.4%		
Cycle time		120s		

5.2.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 5-2 Base 2024 PM

LANE	MOVEMENT	DEGREE OF SATURATION (%)	DELAY (PCU/HR)	MEAN MAX QUEUE (PCU)
1/1	Kirkleatham Lane - Entry Ahead Left	33.7%	2.1	6.4
1/2	Kirkleatham Lane - Entry Right	50.9%	2.8	6.6
2/1	Trunk Road - Entry Left	34.8%	1.8	6.3
2/2	Trunk Road - Entry Right Ahead	51.3%	3.4	11.6
3/1	A1042 - Entry Ahead Left	45.5%	2.8	7.6
3/2	A1042 - Entry Right	42.6%	1.8	3.9
4/1	A1085 Corporation Road - Entry Right Ahead Left	42.3%	2.5	8.7
Practical Reserve capacity (PRC)		75.6%		
Cycle time		120s		

5.2.3 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

5.3 2024 Modelling Results Base plus Committed Development – No pedestrian stage

5.3.1 This assesses the impact at the junction based upon the 2024 base plus committed development, assuming that the all red pedestrian stage is not called every cycle.

Table 5-3 Base + Committed 2024 AM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	21.2%	1.1	4.0
1/2	Kirkleatham Lane - Entry Right	46.3%	2.3	5.9
2/1	Trunk Road - Entry Left	23.8%	1.2	3.9
2/2	Trunk Road - Entry Right Ahead	53.4%	3.6	10.4
3/1	A1042 - Entry Ahead Left	49.4%	3.1	9.4
3/2	A1042 - Entry Right	66.3%	3.9	9.4
4/1	A1085 Corporation Road - Entry Right Ahead Left	67.4%	5.2	15.5
Practical Reserve capacity (PRC)		33.5%		
Cycle time		120s		

5.3.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 5-4 Base + Committed 2024 PM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	35.8%	2.2	6.6
1/2	Kirkleatham Lane - Entry Right	55.8%	3.1	7.0
2/1	Trunk Road - Entry Left	33.2%	1.6	6.0
2/2	Trunk Road - Entry Right Ahead	63.5%	4.2	14.7
3/1	A1042 - Entry Ahead Left	47.8%	3.0	7.8
3/2	A1042 - Entry Right	61.7%	2.9	5.9
4/1	A1085 Corporation Road - Entry Right Ahead Left	61.3%	4.1	14.7
Practical Reserve capacity (PRC)		41.7%		

Cycle time	120s

5.3.3 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

5.4 2024 Modelling Results Base plus Committed Development plus 750 Worker Cars – No pedestrian stage

5.4.1 This assesses the impact of the addition of the 750 worker cars again assuming that the all red pedestrian stage is not called every cycle.

Table 5-5 Base + Committed + Development (750 Vehicles) 2024 AM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	21.2%	1.1	4.0
1/2	Kirkleatham Lane - Entry Right	46.9%	2.4	5.9
2/1	Trunk Road - Entry Left	23.8%	1.2	3.9
2/2	Trunk Road - Entry Right Ahead	54.8%	3.7	10.5
3/1	A1042 - Entry Ahead Left	50.2%	3.1	9.5
3/2	A1042 - Entry Right	66.3%	3.9	9.4
4/1	A1085 Corporation Road - Entry Right Ahead Left	68.0%	5.3	15.8
Practical Reserve capacity (PRC)		32.2%		
Cycle time		120s		

5.4.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 5-6 Base + Committed + Development (750 Vehicles) 2024 PM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	37.4%	2.4	6.9
1/2	Kirkleatham Lane - Entry Right	59.2%	3.3	7.3
2/1	Trunk Road - Entry Left	32.2%	1.5	5.7
2/2	Trunk Road - Entry Right Ahead	67.0%	4.8	16.2
3/1	A1042 - Entry Ahead Left	51.1%	3.2	8.2
3/2	A1042 - Entry Right	67.2%	3.2	6.2

4/1	A1085 Corporation Road - Entry Right Ahead Left	59.7%	3.9	14.2
Practical Reserve capacity (PRC)		34.0%		
Cycle time		120s		

5.4.3 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

5.5 2025 Modelling Results Baseline – No pedestrian stage

5.5.1 This assesses the impact at the junction based upon the 2025 baseline assuming that the all red pedestrian stage is not called every cycle.

Table 5-7 Base 2025 AM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	22.3%	1.2	4.1
1/2	Kirkleatham Lane - Entry Right	49.7%	2.6	6.3
2/1	Trunk Road - Entry Left	23.2%	1.2	3.8
2/2	Trunk Road - Entry Right Ahead	37.4%	2.3	6.8
3/1	A1042 - Entry Ahead Left	52.1%	3.3	9.7
3/2	A1042 - Entry Right	45.0%	2.2	5.4
4/1	A1085 Corporation Road - Entry Right Ahead Left	53.0%	3.6	11.4
Practical Reserve capacity (PRC)		69.7%		
Cycle time		120s		

5.5.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 5-8 Base 2025 PM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	34.1%	2.1	6.5
1/2	Kirkleatham Lane - Entry Right	51.6%	2.9	6.8
2/1	Trunk Road - Entry Left	35.3%	1.8	6.4
2/2	Trunk Road - Entry Right Ahead	51.9%	3.5	11.9

3/1	A1042 - Entry Ahead Left	47.3%	3.0	7.8
3/2	A1042 - Entry Right	44.7%	1.9	4.0
4/1	A1085 Corporation Road - Entry Right Ahead Left	42.8%	2.5	8.8
Practical Reserve capacity (PRC)		73.6%		
Cycle time		120s		

5.5.3 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

5.6 2025 Modelling Results Base plus Committed Development – No pedestrian stage

5.6.1 This assesses the impact at the junction based upon the 2025 base plus committed development, assuming that the all red pedestrian stage is not called every cycle.

Table 5-9 Base + Committed 2025 AM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	21.6%	1.1	4.0
1/2	Kirkleatham Lane - Entry Right	47.4%	2.4	6.0
2/1	Trunk Road - Entry Left	24.1%	1.2	3.9
2/2	Trunk Road - Entry Right Ahead	54.2%	3.7	10.5
3/1	A1042 - Entry Ahead Left	50.0%	3.1	9.5
3/2	A1042 - Entry Right	67.2%	4.0	9.5
4/1	A1085 Corporation Road - Entry Right Ahead Left	68.3%	5.3	15.9
Practical Reserve capacity (PRC)		31.8%		
Cycle time		120s		

5.6.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 5-10 Base + Committed 2025 PM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	36.2%	2.3	6.8
1/2	Kirkleatham Lane - Entry Right	56.8%	3.2	7.2
2/1	Trunk Road - Entry Left	33.6%	1.6	6.1

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
2/2	Trunk Road - Entry Right Ahead	64.2%	4.4	14.9
3/1	A1042 - Entry Ahead Left	48.5%	3.0	7.9
3/2	A1042 - Entry Right	62.4%	3.0	6.0
4/1	A1085 Corporation Road - Entry Right Ahead Left	61.8%	4.2	14.8
Practical Reserve capacity (PRC)		40.1%		
Cycle time		120s		

5.6.3 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

5.7 2025 Modelling Results Base plus Committed Development plus 1000 Worker Cars – No pedestrian stage

5.7.1 This the assesses the impact of the addition of the 1000 worker cars at 2025 again assuming that the all red pedestrian stage is not called every cycle.

Table 5-11 Base + Committed + Development 2025 (1000 Vehicles) AM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	21.9%	1.2	4.1
1/2	Kirkleatham Lane - Entry Right	49.0%	2.5	6.2
2/1	Trunk Road - Entry Left	23.6%	1.2	3.9
2/2	Trunk Road - Entry Right Ahead	55.0%	3.7	10.5
3/1	A1042 - Entry Ahead Left	51.9%	3.3	9.9
3/2	A1042 - Entry Right	69.0%	4.1	9.8
4/1	A1085 Corporation Road - Entry Right Ahead Left	67.8%	5.3	15.9
Practical Reserve capacity (PRC)		30.5%		
Cycle time		120s		

5.7.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 5-12 Base + Committed + Development 2025 (1000 Vehicles) PM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	37.8%	2.4	7.0
1/2	Kirkleatham Lane - Entry Right	60.9%	3.4	7.5
2/1	Trunk Road - Entry Left	32.6%	1.5	5.8
2/2	Trunk Road - Entry Right Ahead	70.7%	5.3	17.1
3/1	A1042 - Entry Ahead Left	52.1%	3.3	8.3
3/2	A1042 - Entry Right	68.4%	3.3	6.3
4/1	A1085 Corporation Road - Entry Right Ahead Left	60.3%	3.9	14.4
Practical Reserve capacity (PRC)		27.3%		
Cycle time		120s		

5.7.3 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

5.8 2025 Modelling Results Base plus Committed Development plus 1200 Worker Cars – No pedestrian stage

5.8.1 This the assesses the impact of the addition of the 1200 worker cars at 2025 again assuming that the all red pedestrian stage is not called every cycle.

Table 13 Base + Committed + Development 2025 (1200 Vehicles) AM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	21.9%	1.2	4.1
1/2	Kirkleatham Lane - Entry Right	49.1%	2.5	6.2
2/1	Trunk Road - Entry Left	23.6%	1.2	3.9
2/2	Trunk Road - Entry Right Ahead	55.0%	3.7	10.5
3/1	A1042 - Entry Ahead Left	52.1%	3.3	9.9
3/2	A1042 - Entry Right	69.0%	4.1	9.8
4/1	A1085 Corporation Road - Entry Right Ahead Left	67.9%	5.3	15.9
Practical Reserve capacity (PRC)		30.5%		
Cycle time		120s		

5.8.2 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

Table 14 Base + Committed + Development 2025 (1200 Vehicles) PM

Lane	Movement	Degree of Saturation (%)	Delay (Pcu/Hr)	Mean Max Queue (pcu)
1/1	Kirkleatham Lane - Entry Ahead Left	38.7%	2.5	7.1
1/2	Kirkleatham Lane - Entry Right	62.8%	3.6	7.7
2/1	Trunk Road - Entry Left	32.1%	1.5	5.7
2/2	Trunk Road - Entry Right Ahead	69.2%	5.1	17.1
3/1	A1042 - Entry Ahead Left	53.5%	3.4	8.4
3/2	A1042 - Entry Right	71.8%	3.5	6.6
4/1	A1085 Corporation Road - Entry Right Ahead Left	59.5%	3.8	14.2
Practical Reserve capacity (PRC)		25.4%		
Cycle time		120s		

5.8.3 The modelling results, as shown by the table above, indicate that the junction will remain within capacity with all arms predicted to have a DoS <90% with only minor levels of predicted delay.

5.9 Summary

5.9.1 From the above, it can be seen that in all scenarios in both 2024 and 2025 with 750, 1000 and 1,200 workers, and assuming that the all red pedestrian stage is not called every cycle, that the junction will continue to operate within capacity with the addition of the traffic during the construction phase.

5.9.2 Therefore, through the adoption of the Construction Worker Travel Plan (CWTP) the number of construction vehicles can then be managed at this junction to further reduce the level of impact.

6.0 CONCLUSIONS

6.1.1 This note has been prepared to set out an assessment to review the impact of the development at the A1085 Trunk Road / Kirkleatham Lane junction, and the main conclusions / points can be set out as follows:

- The junction has been assessed at both 2024 and 2025 to reflect both the peak construction year and number of worker vehicles (750) in the TA and ES as well as the year of the sensitivity testis based upon 1000 and 1200 workers.
- Overall, in the peak of construction the number of additional vehicles in the AM peak is not considered to be material, with in the region of 1 extra car every minute in the PM peak period as an average over the range of worker car trips tested (750, 1000 and 1200), which could be considered to be within any daily variation in traffic;
- The assessment has been based upon 2 scenarios around the operation of the junction~:
  - Where the all red pedestrian stage is called every cycle, which is considered to provide a more robust level of assessment and
  - Where the all red pedestrian stage is not called.
- In the scenario whereby the all red pedestrian stage is called every cycle, which is considered to provide a robust level of assessment:
  - In the base plus committed development scenarios at both 2024 and 2025 the junction is predicted to operate largely with DoS below 90% although one arm, the Trunk Road Ahead is very slightly over at 90.2% in 2025.
  - With the addition of the peak worker vehicle trips the junction then is predicted to operate with DoS above 90% with a maximum increase in queue length on the Truck Road Ahead movement of 7 vehicles.
  - We would therefore consider that the impact should then be managed through the Construction Worker Travel Plan.
- In the scenario whereby the all red pedestrian stage is NOT called every cycle,
  - The junction is predicted to operate within capacity in all scenarios, with and without all options for the number of construction worker vehicles.
  - However, the We would therefore consider that the impact can still then be managed through the Construction Worker Travel Plan.