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: 9.13 Sensitivity Test Construction Traffic Modelling – HGVs and Worker Vehicles

Planning Act 2008

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

Date: June 2022

DOCUMENT HISTORY

Document Ref	9.13		
Revision	1.0		
Author	T Jones (TJ)		
Signed	TJ	**Date**	23.06.22
Approved By	Stephen Moss (SM)		
Signed	SM	**Date**	23.06.22
Document Owner	AECOM		

CONTENTS

TABLES

1.0 INTRODUCTION

1.1.1 This technical note, 'Sensitivity Test Construction Traffic Modelling – HGVs and Worker Vehicles' (Document Ref. 9.13) has been prepared on behalf of Net Zero Teesside Power Limited and Net Zero North Sea Storage Limited (the 'Applicants'). It has been submitted to support of the Applicants' response to the Examining Authority's First Written Question TT.1.2 submitted at Deadline 2.

1.1.2 The technical note has been prepared to assess a sensitivity test based upon the following revised assumptions from those used within the supporting Transport Assessment (TA) supporting the Net Zero Teesside Project Application [APP-327 to APP-332]. Although it must be restated that the original assumptions, assessment and conclusions as set out in Chapter 16 Traffic and Transportation [APP-098] the Environmental Statement and TA are still valid, and this sensitivity test is only being undertaken in order to validate the robustness of these assessments.:

1.1.3 The changes can be set out as follows, with the new access points shown in Figure 1 for ease of refence.:

- This technical note assesses the scenarios of either between 1,000 and or 1,200 vehicles associated with construction workers accessing the Proposed Development site at the peak of construction activity. The TA [APP-327 to APP-332] assumes a total of 750 vehicles arriving or departing and was based on the best available information at the time of preparation.
- Access for construction workers would be via a new roundabout on the A1085 Trunk Road to the north of the A1085 Trunk Road/West Coatham Lane roundabout rather than through Steel House Gate as described in the ES [APP-327 to APP-332].
- This technical note also assesses access to the site for HGVs via the Lackenby Steelworks Gate off the A1085 Trunk Road rather than from the A66 / A1053 / Tees Dock Road roundabout via the PD-Ports Gate, as was assessed in the ES TA [APP-327 to APP-332]; and
- The peak year of construction has been updated to be 2025. Within the TA [APP-327 to APP-332] a peak year of 2024 was assumed, with this additional year assumed to provide an additional layer of robustness to the assessments.

1.1.4 As within the TA [APP-327 to APP-332] the following junctions have been considered at the updated peak construction design year, now 2025:

- Junction 1: A1085 Trunk Road / West Coatham Lane 6-arm roundabout;
- Junction 2: A1085 Trunk Road / A1053 Greystone Road 5-arm signalised roundabout ; and
- Junction 3: A174 / A1053 Greystone Road 4-arm part signalised roundabout.

1.1.5 The detailed assessment set out in this technical note should be read in conjunction with the TA [APP-327 to APP-332] for the Proposed Development, which it accompanies.

2.0 HIGHWAY NETWORK ASSESSMENT

2.1 Scope of Assessment

Study Area

2.1.1 The sensitivity test consists of an assessment of the level of change in traffic flows associated with 1,000 and 1,200 construction worker vehicles. The level of change has been considered at the following existing junctions:

- Junction 1: A1085 Trunk Road / West Coatham Lane 6-arm roundabout;
- Junction 2: A1085 Trunk Road / A1053 Greystone Road 5-arm signalised roundabout; and
- Junction 3: A174 / A1053 Greystone Road 4-arm part signalised roundabout.

2.1.2 The above is then consistent with the study area as set out in the TA [APP-327 to APP-332].

2.2 Existing Assumptions

Peak Hours

2.2.1 The hours used in the assessment are unchanged from the TA [APP-327 to APP-332] and are as follows:

- AM Peak – 08:00 hours to 09:00 hours.
- PM Peak – 17:00 hours to 18:00 hours.

Traffic Data

2.2.2 The baseline traffic data is unchanged, although given the change in design year from 2024 to 2025, the growth rates used are changed and are set out later in this document.

2.2.3 The levels of committed development assessed are the same as those set out in the TA [APP-327 to APP-332].

2.3 Updated Assumptions

TEMPRO Traffic Growth

2.3.1 To ensure consistency with the TA [APP-327 to APP-332] 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 (RTF 2018 Scenario 1), geographical area Redcar and Cleveland District and adjusted using the National Traffic Model for both principal and trunk road types.

2.3.2 Growth rates had previously been calculated for 2019-2024. New growth rates for 2024-2025 were calculated and added on to those for 2019-2024 to create 2019-2025 growth rates. The resulting 2019-2025 growth rates used are set out in **Table**

2-1 below, with the previous factors as set out in Table 16A-33 of the TA to 2024 also included for ease of reference.

Table 2-1 TEMPro Local Growth Factors

Road Type	Year	AM Peak	PM Peak
Principal	2019 -2025	1.0552	1.0527
	2019 – 2024 (Ref Table 16A-33 from the TA) include for comparison	1.0479	1.0459
Trunk	2019-2025	1.0630	1.0604
	2019 – 2024 (Ref Table 16A-33 from the TA) include for comparison	1.0549	1.0528

Source: Aecom

2.3.3 To derive an updated 2025 base assessment year, the traffic surveys undertaken in 2019 have had a combination of the Table 156A-33 growth factor from the TA [APP-327 to APP-332] and the Table 1 growth factor to establish the projected 2025 traffic conditions.

2.4 Assessment Scenarios

2.4.1 To assess the impact of the Proposed Development on the local road network, three assessment scenarios have been considered. The assessment scenarios are as follows:

- Base Year (2025) Without Proposed Development, with committed development, Weekday AM and PM Peaks.
- Base Year (2025) With Proposed Development, with committed development, 1,000 Vehicles – Weekday AM and PM Peaks.
- Base Year (2025) With Proposed Development, with committed development, 1,200 Vehicles – Weekday AM and PM Peaks.

2.4.2 An updated Base Year of 2025 has been chosen as it is the expected peak of construction for traffic. This is updated from 2024 as used within the TA [APP-327 to APP-332].

2.5 Trip Generation

2.5.1 The trip generation is based on the maximum daily construction vehicles which may arise at the peak of construction. Two sets of maximum daily construction vehicles scenarios have been assessed – one with 1,000 vehicles and one with 1,200 vehicles, which is an increase from the 750 in/out vehicles as set out in Table 16A-25 of the TA [APP-327 to APP-332]. The HGV trip generation is unchanged from that reported on in the TA [APP-327 to APP-332].

2.6 Trip Distribution

Construction Worker Distribution

2.6.1 The modelling completed has assessed the Proposed Development access as a new access on the A1085 Trunk Road between the A1085 Trunk Road / West Coatham Lane 6-arm roundabout (Junction 1) and the A1085 Trunk Road / A1042 Kirkleatham

Lane signalised crossroads. The wider distribution of permanent and transitory construction worker trips onto the A1085 Trunk Road and the wider network is unchanged from that reported on in the TA [APP-327 to APP-332].

HGV Distribution

- The modelling completed has assessed that HGVs will access the Proposed Development site at the existing British Steel Lackenby Main Entrance, from the A1085 Trunk Road 4-arm roundabout
- The wider distribution of HGV trips onto A1085 Trunk Road and the wider network is unchanged from that reported on in the TA [APP-327 to APP-332].

2.7 Development Impact

Impact Assessment

2.7.1 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. As part of the assessment reported on the in the TA [APP-327 to APP-332], a numerical increase in traffic flows of 30 or more occurring on an arm of an existing would merit further assessment of that junction.

2.7.2 **Table 2-2** provides a summary of the numerical change in vehicular trips travelling through each assessment area junction in the peak hours for each of the scenarios assessed.

Table 2-2 TEMPro Increase in Vehicular Trips

		2025 Development Trips (1,000 vehicles)		2025 Development Trips (1,200 vehicles)	
Junction No.	Junction	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1	A1085 Trunk Road / West Coatham Lane 6-arm roundabout	52	134	63	161
2	A1085 Trunk Road / A1053 Greystone Road 5-arm signalised roundabout	59	141	70	168
3	A174 / A1053 Greystone Road 4-arm part signalised roundabout	7	13	8	15

Source: AECOM

2.7.3 The above table identifies that there will be an increase in traffic flows of more than 30 trips at two junctions (Junctions 1 and 2), these will then be modelled, as set out later within this note, with this then being consistent with the assessment, as set out in the TA [APP-327 to APP-332].

2.7.4 With reference to Junction 3, it can be seen that the increase is below 30 peak hour trips in either scenario, and therefore, this junction does not require further analysis. This is therefore considered consistent with the TA [APP-327 to APP-332].

2.7.5 To further illustrate this, paragraph 16.10.22 of the TA states that *"modelling of the A1053 / A174 / B1380 roundabout was not required as the number of construction vehicles passing through the junction during the AM and PM peak hours is less than*

30 two-way vehicle movements". This approach has now been agreed with National Highways.

2.8 Summary

2.8.1 As a result of the percentage impact analysis, two junctions have been identified as requiring assessment using junction capacity software to determine the impact of the sensitivity tests and identify if any mitigation is required.

2.8.2 The junction(s) to be assessed in more detail are:

- Junction 1: A1085 Trunk Road / West Coatham Lane 6-arm roundabout, and
- Junction 2: A1085 Trunk Road / A1053 Greystone Road 5-arm signalised roundabout.

2.8.3 This is consistent with the results in Section 16.10 of the TA [APP-327 to APP-332].

3.0 JUNCTION CAPACITY ASSESSMENT

3.1 Introduction

3.1.1 This section sets out the results of the detailed highway network assessments undertaken on Junctions 1 and 2 as identified in the development impact assessment. The scenarios tested are the same as those presented in the Updated Assumptions section of the technical note, whereby the Base year flows have been adapted to 2025 and the assessments are based on this :

- Base Year (2025) Without Proposed Development traffic with committed development (referred to in Tables 3 and 4 as 2025 Base + Committed)
- Base Year (2025) With Proposed Development traffic, with committed development (referred to in Tables 3 and 4 as 2025 Base + Committed + Construction Peak (1000 vehicles))
- Base Year (2025) With Proposed Development traffic, with committed development (referred to in Tables 3 and 4 as 2025 Base + Committed + Construction Peak (1200 vehicles)

3.1.2 The 2025 Base refers to the 2025 Base traffic plus and Committed refers to the traffic generated by the committed development within the geographical parameters of the model.

3.2 Junction Models

3.2.1 In order to assess the traffic impact of the Proposed Development on the identified junctions, it has been necessary to use junction capacity assessment models. The same model parameters as used for the TA have been taken forward for the following model runs.

3.2.2 The junction capacity assessment has been undertaken using nationally recognised modelling software Junctions 9 for priority junctions.

3.2.3 The following section discusses the outcome of the capacity assessments undertaken for these junctions for all assessment scenarios. Acronyms used within this section are as follows:

- RFC Ratio of Flow to Capacity
- Q Queue length (vehicles)
- PCU Passenger Car Unit (One PCU is equivalent to one car)
- LOS Level of Service, as indicated by letters A (Free flow) through to F (Forced or Breakdown flow)
- DoS Degree of Saturation at stop lines/traffic signals

3.2.4 It is generally accepted that RFC values of 0.85 or less and DoS values of 90% or less are indicators that a junction is operating within desirable capacity limits. Although a junction would be said to be operating at maximum theoretical capacity at values of 1.00 or 100%, the use of 0.85 and 90% (desirable capacity) allow for a margin of

error and daily fluctuations in traffic flows, and these are consistent with the parameters as set out in the TA.

3.3 Junction Modelling Results

3.3.1 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**. These then include the revised HGV routeing and increased number of workers, with the relevant scenarios set out on the right-hand side of the following table.

Junction 1 - A1085 Trunk Road / West Coatham Lane

3.3.2 The A1085 Trunk Road / West Coatham Lane 6-arm roundabout (Junction 1) has been modelled using Junctions 9 for all scenarios. The results are shown in **Table 3-1**.

Table 3-1 Junction 1 A1085 Trunk Road / West Coatham Lane 6-arm roundabout modelling results

Scenario		AM Peak (08:00-09:00)				PM Peak (17:00-18:00)			
	Arm	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
2025 Base + Committed	A - A1085 N	1.4	5.14	0.58	A	0.7	4.26	0.40	A
	B - W Coatham Ln	0.4	4.37	0.30	A	0.2	3.63	0.17	A
	C - Wilton Site Access	0.1	3.31	0.12	A	0.0	2.96	0.03	A
	D - A1085 S	3.5	9.17	0.77	A	6.1	13.57	0.86	B
	E - Mini Chef Stop (York Potash Access)	0.0	7.51	0.01	A	0.1	4.51	0.09	A
	F - Site Access	0.2	2.93	0.13	A	0.7	3.99	0.40	A
2025 Base + Committed + Construction Peak (1,000 vehicles)	A - A1085 N	1.5	5.26	0.59	A	1.0	4.91	0.48	A
	B - W Coatham Ln	0.5	4.41	0.30	A	0.2	3.84	0.18	A
	C - Wilton Site Access	0.1	3.34	0.12	A	0.0	3.11	0.04	A
	D - A1085 S	4.0	10.13	0.79	B	6.7	14.77	0.87	B
	E - Mini Chef Stop (York Potash Access)	0.0	7.66	0.01	A	0.1	4.56	0.09	A
	F - Site Access	0.2	2.97	0.13	A	0.7	4.04	0.40	A

Scenario		AM Peak (08:00-09:00)				PM Peak (17:00-18:00)			
	Arm	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
2025 Base + Committed + Construction Peak (1,200 vehicles)	A - A1085 N	1.5	5.28	0.59	A	1.0	5.07	0.50	A
	B - W Coatham Ln	0.5	4.42	0.30	A	0.2	3.89	0.18	A
	C - Wilton Site Access	0.1	3.34	0.12	A	0.0	3.14	0.04	A
	D - A1085 S	4.1	10.33	0.80	B	6.8	15.07	0.87	C
	E - Mini Chef Stop (York Potash Access)	0.0	7.69	0.01	A	0.1	4.58	0.09	A
	F - Site Access	0.2	2.97	0.13	A	0.7	4.06	0.40	A

Source: AECOM

3.3.3 Table 3-1 shows the maximum RFC in the 2025 Base + Committed scenario is 0.86 on the A1085 S arm in the PM peak hour, with an associated queue of 6.1 PCU. Therefore, this roundabout is predicted to operate slightly above the normally accepted threshold of 0.85 which indicates that some queueing and delay is starting to occur. However, the queue is not considered to be significant in this location. It is then noted that, as would be expected, this is a slight worsening of the RFC on the arm from the results in the TA [APP-327 to APP-332] (Table 16A-48) which was based upon a peak of construction in 2024.

3.3.4 The impact of the peak of construction traffic on this junction increases the maximum RFC by 0.01 and queue length by 0.6 PCU for the 1,000 construction worker vehicle scenario and increases the maximum RFC by 0.01 and queue length by 0.7 PCU for the 1,200 construction worker vehicle scenario. This shows that the peak hour increases in RFC and queue length increase associated with the revised construction workers estimates is minimal and theoretical capacity limits are not breached. As such, it is considered acceptable.

3.3.5 For comparison this roundabout worked just within capacity, with a max RFC of 0.81 and a queue of 4.3 on the A1085 (S) arm in the 2024 Baseline Plus Committed Development Plus Peak of Construction scenario as presented in the TA [APP-327 to APP-332] (Ref Table 16A-49).

Junction 2 - A1085 Trunk Road / A1053 Greystone Road

3.3.6 The A1085 Trunk Road / A1053 Greystone Road 5-arm signalised roundabout (Junction 2) has been modelled using LinSig for all scenarios. The results are shown in **Table 3-2** below.

Table 3-2 Junction 2 A1085 Trunk Road / A1053 Greystone Road 5-arm signalised roundabout modelling results

Scenario	Approach	AM Peak (08:00-09:00) DoS %	AM Peak (08:00-09:00) Q (PCU)	PM Peak (17:00-18:00) DoS %	PM Peak (17:00-18:00) Q (PCU)
2025 Base + Committed	A1085 Trunk Road (N) Ahead Left	65.6%	12.2	81.3%	14.8
	A1085 Trunk Road (N) Ahead	61.5%	12.0	77.6%	14.7
	Wilton Works Access Ahead Left	2.2%	0.0	4.6%	0.0
	Wilton Works Access Ahead	5.8%	0.0	5.8%	0.0
	A1053 Greystone Stone Ahead Left	75.2%	17.9	41.9%	7.0
	A1053 Greystone Stone Ahead	69.5%	15.6	33.3%	5.2
	A1053 Greystone Stone Ahead	35.2%	5.6	17.6%	2.5
	A1085 Trunk Road (S) Ahead Left	18.4%	0.1	12.3%	0.1
	A1085 Trunk Road (S) Ahead	14.3%	0.1	14.0%	0.1
	A1053 - Tees Dock Road Left	66.9%	13.0	69.6%	15.8
	A1053 - Tees Dock Road Ahead Left	66.4%	12.6	93.5%	32.7
2025 Base + Committed + Construction Peak (1,000 vehicles)	A1085 Trunk Road (N) Ahead Left	67.8%	12.9	80.6%	15.7
	A1085 Trunk Road (N) Ahead	64.0%	12.6	76.5%	15.5
	Wilton Works Access Ahead Left	2.8%	0.0	5.8%	0.0
	Wilton Works Access Ahead	5.2%	0.0	4.5%	0.0
	A1053 Greystone Stone Ahead Left	74.5%	17.7	47.3%	7.7
	A1053 Greystone Stone Ahead	67.6%	14.9	38.2%	5.9
	A1053 Greystone Stone Ahead	38.5%	6.2	18.0%	2.4
	A1085 Trunk Road (S) Ahead Left	18.9%	0.1	11.0%	0.1
	A1085 Trunk Road (S) Ahead	14.3%	0.1	15.7%	0.1
	A1053 - Tees Dock Road Left	72.0%	14.3	71.0%	16.4
	A1053 - Tees Dock Road Ahead Left	71.5%	13.7	93.5%	32.7
2025 Base + Committed + Construction Peak (1,200 vehicles)	A1085 Trunk Road (N) Ahead Left	67.6%	12.8	80.6%	15.9
	A1085 Trunk Road (N) Ahead	64.5%	12.7	75.5%	15.4
	Wilton Works Access Ahead Left	2.6%	0.0	5.7%	0.0
	Wilton Works Access Ahead	5.3%	0.0	4.6%	0.0
	A1053 Greystone Stone Ahead Left	75.3%	17.8	59.5%	8.5
	A1053 Greystone Stone Ahead	68.9%	15.2	53.1%	7.3
	A1053 Greystone Stone Ahead	40.1%	6.6	29.5%	3.6
	A1085 Trunk Road (S) Ahead Left	19.0%	0.1	12.4%	0.1
	A1085 Trunk Road (S) Ahead	14.3%	0.1	14.3%	0.1
	A1053 - Tees Dock Road Left	72.3%	14.3	71.2%	16.5
	A1053 - Tees Dock Road Ahead Left	71.8%	13.9	93.5%	32.7

Source: AECOM

3.3.7 Table 3-2 shows that the maximum DoS in the 2025 Base + Committed scenario is 93.5% on the A1053 - Tees Dock Road Ahead Left approach in the PM peak hour. There is an associated queue of 32.7 PCU. Therefore, this roundabout is over the normally acceptable level of 90% and as such some increases in queueing and delay are beginning to occur. No other approaches are over 90%.

3.3.8 The impact of the construction traffic on this junction does not materially increase the maximum DoS or queue length in either the 1,000 construction worker vehicle scenario, or the 1,200 construction worker vehicle scenario.

3.3.9 This shows that, as with the conclusions from the TA [APP-327 to APP-332], there are no material peak hour increases in DoS and queue length associated with the construction workers, as such, it is considered acceptable.

3.3.10 For comparison this roundabout was above desirable capacity limits, with a maximum DoS of 92.9% and a queue of 31.8 on the A1053 Tees Dock Road Left approach in the 2024 Baseline Plus Committed Development Plus Peak of Construction scenario as presented in the TA [APP-327 to APP-332] (Ref 16A-52) and therefore as would be expected given the additional year of growth traffic levels have increased.

4.0 CONCLUSIONS

4.1.1 This note has been prepared to set out a sensitivity assessment to review the impact from an additional number of construction worker vehicles, a revised means of HGV access to the Proposed NZT development and a delay in the peak year of construction from 2024 to 2025. This note should be read with reference to the ES TA [APP-327 to APP-332].

4.1.2 The assessment and conclusions presented in the ES TA [APP-327 to APP-332] and Chapter 16 Traffic and Transportation [APP-098] are still valid and not contradicted by the results of this technical note.

4.1.3 Following a review of the increased levels of construction traffic the following two junctions were deemed to require a further assessment, as is consistent with the TA [APP-327 to APP-332].

- Junction 1: A1085 Trunk Road / West Coatham Lane 6-arm roundabout, and
- Junction 2: A1085 Trunk Road / A1053 Greystone Road 5-arm signalised roundabout.

4.1.4 The conclusion of the modelling at both junctions is that whilst the capacity has decreased due the additional year of assessment, as would be expected, the additional level of impact from the construction traffic in either scenario does not result in any additional capacity issues at the junction above those that would have occurred in the base, without development scenario.

4.1.5 Therefore, the conclusions of the original TA [APP-327 to APP-332] are still considered to be valid. Any impact can be managed through the implementation of the Construction Worker Travel Plan and the Construction Traffic Management Plan; Frameworks of which are presented as APP333 and APP334.