Onshore Converter Station

Access Management Plan

Requirement 16 (1) and 27 (1)(c)

(Applicable to Work Numbers 62 to 69)

Prepared by:	Checked by:	Approved by:
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Revision Summary				
Rev	**Date**	**Prepared by**	**Checked by**	**Approved by**
1	18/12/20	Kay Griffin	Colin Bryans	David Boyd
2	25/01/22	Kay Griffin	Phil Rew Williamson	Gareth Mills
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Description of Revisions			
Rev	**Page**	**Section**	**Description**
1	ALL	ALL	New Document
2	ALL	ALL	Amended in accordance with comments received on the Interim Draft Document from SCC (14/01/21)
3	ALL	ALL	Amended in accordance with comments received on the Final Draft Document from SCC (17/02/22)

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1. INTRODUCTION AND SCOPE

1.1. Project Overview

1. East Anglia Three Limited (EATL) was awarded a Development Consent Order (DCO) by the Secretary of State, Department of Business, Energy and Industrial Strategy (DBEIS) on 7 August 2017 for the East Anglia THREE Offshore Windfarm (EA THREE). The DCO granted consent for the development of a 1,200MW offshore windfarm and associated infrastructure and is live until 28 August 2022. The DCO has now been subject to three non-material variations:

- In March 2019 EATL submitted a non-material change application to DBEIS to amend the consent to increase the maximum generating capacity from 1,200MW to 1,400MW and to limit the maximum number of gravity base foundations to 100. In June 2019 DBEIS authorised the proposed change application and issued an Amendments Order.
- In July 2020 EATL submitted a second non-material change application to DBEIS to amend the parameters of its offshore substations (reducing the number of these to one) and wind turbines (a decrease in the number of turbines and an increase in their hub height and rotor radius). On 15 April 2021 DBEIS authorised this proposed change application and issued an Amendments Order.
- In August 2021 EATL submitted a third non-material change application to DBEIS to amend the consent to remove the maximum generating capacity of 1,400MW and to amend the parameters of its wind turbines (a decrease in the number of turbines and an increase in their hub height and rotor radius). The application is currently in the consultation phase.

2. The onshore construction works associated with EA THREE will have a capacity of 1,400MW and transmission connection of 1,320MW. The construction works will be spread across a 37km corridor between the Suffolk coast at Bawdsey and the converter station at Bramford, passing the northern side of Ipswich. As a result of the strategic approach taken, the cables will be pulled through pre-installed ducts laid during the onshore works for East Anglia ONE Offshore Windfarm (EA ONE), thereby substantially reducing the impacts of connecting to the National Grid (NG) at the same location. The infrastructure to be installed for EA THREE, therefore, comprises:

- The landfall site with one associated transition bay location with two transition bays containing the connection between the offshore and onshore cables;
- Two onshore electrical cables (single core);
- Up to 62 jointing bay locations each with up to two jointing bays;
- One onshore converter station, adjacent to the EA ONE Substation;
- Three cables to link the converter station to the National Grid Bramford Substation;
- Up to three onshore fibre optic cables; and
- Landscaping and tree planting around the onshore converter station location.

3. Since the granting of the DCO, the decision has been made that the electrical connection for EA THREE will comprise a high voltage direct current (HVDC) cable rather than a high voltage alternating current cable and, therefore, the type of substation that will be required is a HVDC converter station. The substation will, therefore, be referred to here as a 'converter station' and this amended terminology has been agreed with the relevant authorities on 15 October 2020. It has also been determined that only one converter station will be constructed rather than two and that the converter station will be installed in a single construction phase.

1.2. Purpose and Scope

4. This Access Management Plan (AMP) focuses on the procedures for managing the impact of access to the EA THREE onshore Converter Station Stage. This document has been produced to discharge DCO Requirements 16 (1) and 27 (1) (c) which state:

> **Highway accesses and improvements**
>
> 16.—(1) *No stage of the connection works may commence until for that stage written details (which accord with the outline access management plan) of the siting, design, layout and any access management measures for any new, permanent or temporary means of access to a highway to be used by vehicular traffic, or any alteration to an existing means of access to a highway used by vehicular traffic, has, after consultation with the highway authority, been submitted to and approved by the relevant planning authority.*

Traffic

27. (1) *No stage of the connection works may commence until for that stage the following have been submitted to and approved by the relevant local planning authority in consultation with the relevant highway authority—*

…

(c) an access management plan which must be in accordance with the outline access management plan.

5. The scope of this document relates to the AMP associated with the construction of the onshore converter station Stage. This stage comprises Work No.s 62 to 69, located to the north of the existing NG substation and adjacent to the EA ONE Substation (Figure 1 Site Context Plan). Separate AMPs have been produced for each stage of the EA THREE onshore works and are provided under separate cover. This AMP describes the proposed access to the EA THREE Converter Station Stage which will use the same access as that constructed for the EA ONE Substation. No new access from the public highway will, therefore, be required. It presents the requirements and standards that have been considered.

6. Construction works at the Converter Station will be some of the first onshore connection works to commence. The access track and temporary laydown will be constructed in Summer 2022 with the remaining works being undertaken from Q2 2023.

7. No highway improvements are required with respect to the Converter Station Stage, other than the temporary measures required for the short duration of the transport of abnormal loads (see Section 6.3.2).

8. EATL will work with SCC to ensure appropriate resourcing is in place to monitor compliance with the provisions of this AMP.

9. The measures contained herein will be adhered to by the Principal Contractors (and thereby all tiers of the construction workforce) and the implementation and compliance will be monitored by the Construction Management Team. These measures will only be revised with the agreement of SCC and Mid Suffolk District Council (MSDC).

10. This AMP takes account of the route surveys, assessments and route evaluations undertaken and has been developed in accordance with the Outline Access Management Plan (Document Reference 8.9 of the DCO application). This AMP also takes account of the lessons learned from the EA ONE construction works.

11. This AMP is complemented by the Traffic Management Plan (TMP) (EA3-GRD-CON-PLN-IBR-000105) which details additional measures to facilitate vehicles (particularly HGVs) to safely access the main distributor highway network via identified access routes.

2. ABBREVIATIONS

AMP	Access Management Plan
Chapter 8	Guidelines for (Public) Highways signing, lighting and guarding
DBEIS	Department of Business, Energy and Industrial Strategy
DCO	Development Consent Order
DfT	Department for Transport
EA THREE	East Anglia THREE
EATL	East Anglia THREE Limited
ES	Environmental Statement
HGV	Heavy goods vehicle
HVDC	High voltage direct current
MfS	Manual for Streets
MSDC	Mid Suffolk District Council
MW	Megawatt
SCC	Suffolk County Council
SDD	Stopping Sight Distance

TCo	Traffic Co-ordinator
TMP	Traffic Management Plan

3. ACCESS MANAGEMENT PLAN GOVERNANCE

12. Prior to the commencement of construction, a Traffic Co-ordinator (TCo) will be appointed by each Principal Contractor. Their key responsibilities will include:

- Managing the implementation of the AMP, the TMP and the Travel Plan;
- Reporting on a quarterly basis to MSDC and SCC with respect to these plans and their monitoring targets; and
- Acting as a point of contact for construction workers and sub-contractors.

13. Contact details for the TCos (and any subsequent personnel changes) will be submitted to stakeholders for their records prior to commencement of construction.

14. The TCos will liaise with respect to the works using the common access from Bullen Lane and will hold a meeting with SCC to confirm responsibilities. The Converter Station Principal Contractor will, however, be responsible for traffic management for vehicles using the converter station access from Bullen Lane. The TCos will report to a senior member of the SPR Construction Management Team.

15. The TCos will liaise closely with one another to enable a co-ordinated approach to access management measures.

4. LOCAL COMMUNITY LIAISON

16. EATL is committed to providing clear communication to local residents and will manage public relations with local residents and businesses that will be affected by construction traffic. Proactive community liaison will be maintained, keeping local residents informed of the type and timing of works involved, the transport routes associated with the works, the hours of likely construction traffic movements and key traffic management measures. As outlined in the Code of Construction Practice (EA3-GRD-CON-PLN-IBR-000110), a combination of communication mechanisms such as posters, notices, exhibitions, letters, newsletters, website updates and parish council meetings will be employed to keep local residents and businesses informed.

17. A designated EA THREE Community Liaison Officer (CLO) will manage and respond to any public concerns, queries or complaints in a professional and diligent manner as set out in the Community Liaison and Public Relations Procedure contained within the Code of Construction Practice (EA3-GRD-CON-PLN-IBR-000110). The Complaints Procedure will be publicised and complaints will be directed to the EATL Community Liaison Officer. All enquiries will be logged, investigated and rectifying actions taken when deemed appropriate. Enquiries will be dealt with in an expedient and courteous manner. Details of complaints will be reported to Mid Suffolk District Council (MSDC) and SCC within 48 hours.

18. The CLO will liaise with parish councils to identify any local activities that may overlap with the construction works. EATL's Land Team will also speak to landowners regarding the timing of harvest and agricultural activity.

19. Parish Councils District Councillors and County Councillors including Ward Members and Portfolio Holders, in the area and the local liaison group will be contacted (in writing) in advance of the proposed works and ahead of key milestones in order to advise them of the ongoing works. The information provided will include a timetable of works, a schedule of working hours, the extent of the works, and a contact name, address and telephone number in case of complaint or query.

20. As part of the Converter Station Stage TMP (EA3-GRD-CON-PLN-IBR-000105), all transport related to the construction of the EA THREE connection works will be registered and issued with a unique vehicle identification code. This will be included on an identification sticker/board that will be placed in a prominent position on the vehicle to enable the site management team and members of the public to identify the vehicle and its association to EA THREE. This will be monitored by the Traffic Co-ordinator (see Section 4 of the TMP). Details of the scheme will also be shared with MSDC. This scheme shall be submitted to and approved by SCC. SPR construction vehicles will have a defined identification livery so that they are immediately identifiable to construction staff and third parties.

5. REQUIREMENTS AND STANDARDS

21. This AMP and the works detailed within comply with the following guidance and standards:

- New Roads and Street Works Act 1991;

- Highways Act 1980;
- Design Manual for Roads and Bridges;
- HSG47: Avoiding danger from underground Services (Third edition, 2014); and
- Safety at Street Works and Road Works: A Code of Practice, 2014
- Department for Transport's Chapter 8: Traffic Safety Measures and Signs for Road Works and Temporary Situations Parts 1 and 2.

6. CONSTRUCTION DETAILS

6.1. Enabling Works

22. The onshore construction works will commence with the enabling works, which comprises the establishment of the temporary laydown area (Work No 65) and the access to this from the existing EA ONE access road. The temporary laydown area will be directly northeast of the converter station and will include temporary offices, welfare, car parking, materials and equipment storage. At the start of the works the onshore converter station compound and temporary laydown area will be temporarily fenced in accordance with the Fencing and Enclosures Plan (EA3-GRD-CON-PLN-IBR-000106) and a security cabin will be installed at the main access gate.

23. Following any necessary ecological mitigation, topsoil will be stripped from the access road and temporary laydown area and stored at specific storage locations as to avoid cross contamination with other materials. Topsoil storage and management will be compliant with the recommendations and requirements set out in the Onshore Converter Station Landscape Management Plan (EA3- EA3-GRD-CON-PLN-IBR-000103). Topsoil will be stored to one side of the working area, in such a way that it is not mixed with any subsoil. Typically this would be stored as an earth bund of a maximum height of two metres, to avoid compaction from the weight of the soil. Storage time will be kept to a minimum, to prevent the soil deteriorating in quality and the topsoil bunds seeded to prevent windblow. Topsoil stripped from different fields will be stored separately, as would soil from specific hedgerow banks or woodland strips.

24. The construction of an access road typically involves the placement of suitable graded imported stone material onto a suitable subgrade, potentially with a reinforcing geogrid and/or a geotextile, however other methods such as soil stabilisation may be used if considered appropriate. Following the initial topsoil stripping, the on-site access road will be installed for a width of 6m.

25. The enabling works will also include installation of surface water drainage for the access road and temporary laydown area, in accordance with the Surface Water and Drainage Management Plan (EA3-GRD-CON-PLN-IBR-000107). Foul water drainage during this initial period will be via portable welfare facilities, with a tank that will be emptied on a weekly or bi-weekly basis.

6.2. Construction

26. The EA THREE onshore converter station will be located within a fenced compound (maximum 157m by 186m) (Work No. 67), immediately to the east of the East Anglia ONE Substation and to the north of the existing NG Bramford Substation. The converter station will contain electrical equipment including power transformers, switchgear, reactive compensation equipment, harmonic filters, cables, lightning protection masts, control buildings, communications masts, backup generators, access, fencing and other associated equipment, structures or buildings. The converter station will have a compact layout, with the majority of the equipment contained in buildings not incongruous to their setting.

27. The construction of the converter station will comprise a number of key stages, including: platform upfill to finished level (approx. 54m AOD) foundations and building construction and equipment installation and commissioning.

28. The main site access has already been constructed as part of the EA ONE works, however, an internal service road from this will require installation.

29. The enabling works will include grading and earthworks to remove any unsuitable materials from the converter station area and to build up with suitable fill material to establish a formation level for the converter station construction. The materials excavated will be reused on site as engineering fill or landscaping depending on material properties.

30. Following the completion of the site grading, works will commence with the excavations for ducting and the foundations for the buildings and external plant. The building will largely comprise steel, concrete or masonry and cladding materials. The structural steelwork will be fabricated and prepared off site and delivered to site for erection activities using cranes. The composite or cassette cladding panels (e.g. Kingspan) will be delivered to site ready to erect and be fixed to the steelwork.

31. The civil works will be followed by the installation and commissioning of the electrical equipment. The large transformers will be filled on site. The smaller electrical components will be constructed on site using small mobile plant and lifting apparatus.

6.3. Cable Installation

32. Works No.s 63 and 66 will comprise the installation in open trenches of cables to connect the Converter Station to the nearby National Grid Bramford Substation. Construction activities for the installation of the cable in open trenches will be undertaken within a temporarily fenced strip of land, referred to as the working width.

33. The cable route into the Converter Station from Work No. 64 through Work No 63 was not known at the time of the preparation of the Environmental Statement and it was considered at that time that this may also be installed using open trenches. The ducts have now, however, been installed during the construction works for EA ONE to end within Work No. 67 (the converter station site). There will, therefore, be no requirement, as originally anticipated, to open trench these through Work no. 63 to the Converter Station.

34. Works in Work No. 62 will also include the installation of haul road to reach a jointing bay in the adjacent Work No. 58 (not part of this stage) to the east. This will follow the route of the EA ONE haul road as shown in Figure 2.

35. In addition, all ducts to be used for EA THREE, which were installed during the EA ONE construction works, will require to be 'proved' to ensure that they are intact and free of debris. This will generally be undertaken by the use of foam pigs driven under pressure from jointing bay to jointing bay. Each stretch of duct that was installed using HDD will, however, require duct-proving excavations at each end to allow the use of different diameter foam pigs, due to a difference in the diameter of these compared to the ducting installed using open trench techniques.

6.4. Construction Traffic

6.4.1. HGV Movements

36. Chapter 27 Traffic and Transport of the ES for the East Anglia THREE project has assessed the environmental impact of traffic on the routes within the onshore highway study area across a range of effects, namely:

- Pedestrian amenity;
- Severance;
- Road safety; and
- Driver delay.

37. The ES included peak hour assessments (i.e. between 08:00-09:00 and 17:00-18:00) which gives details of the maximum peak hour HGV movements. The overall assessment concluded that appropriate mitigation measures would ensure that the environmental impacts would not be 'significant'.

38. Following further design works by the selected converter station and cable Principal Contractors (Siemens Energy and NKT respectively), an updated transport assessment (the scope for which is set out in paragraph 39) has now been carried out and is included here as Appendix 2 (the Traffic and Transport Technical Note). The Traffic and Transport Technical Note provides an overview of the changes to the vehicle numbers associated with the construction of the Converter Station Stage and also the Paper Mill Lane Works and nearby cable works in order to consider all project-related traffic on the road network to be used for the Converter Station Stage.

39. The Traffic and Transport Technical Note sets out the following:

- A summary of the assessment assumptions and resulting vehicle numbers associated with the construction of the EA THREE Converter Station Stage, Paper Mill Lane Works and also relevant cable works as identified in the ES;
- A summary of the assessment of vehicular impact associated with the construction of EA THREE , on the highway network in the ES;
- A summary of the potential assessment requirements of vehicular impact associated with the construction of EA THREE connection works on the highway network, following the issue of the DCO;
- A summary of the difference between the vehicle movements identified in the ES and the actual vehicle movements identified by Siemens Energy and NKT, based on a lower car occupancy (1.5) than presented in the ES (2.5), for a robust assessment;
- A summary of the anticipated total vehicle movements associated with the construction of EA THREE including the revised vehicle movements, at the locations potentially requiring assessment on the highway network;

- A review of the likely impacts at the sensitive junctions on the highway network that are likely to be used by traffic associated with the construction of the EA THREE Converter Station Stage and Paper Mill Lane Works (including for relevant cable works).
- A junction capacity assessment is included of the identified sensitive junction (Junction 1: A14/B1113 Claydon Interchange) to test the impact of the confirmed EA THREE traffic data at this junction, using the most recent baseline traffic data available and incorporating vehicle movements associated with various committed developments. The assessment confirmed there would be no capacity issues at the junction with the addition of the EA THREE vehicle movements.
- A review of road safety on the routes that would be used by the construction traffic associated with the construction of the Converter Station Stage, Paper Mill Lane Works and the relevant cable installation works (Sections 8 to 11) shows there are no road safety issues that would be exacerbated by an increase in traffic flows and that no additional traffic management measures are required.

40. The maximum daily and evening peak vehicle movements presented in Appendix 2 are summarised in Table 6-1. This is based on a car occupancy of 1.5, which has been identified from lessons learnt from the East Anglia TWO and East Anglia ONE North Offshore Windfarm' Environmental Statements and DCO Examinations, advice from SCC and through discussions with Siemens Energy, who has suggested that a 2.5 car occupancy is unlikely to be achievable.

Table 6-1 Confirmed Maximum Figures (Siemens Energy and NKT)

	Employees				HGV Movements	
	Number		Vehicle Movements			
	Daily	PM Peak	Daily	PM Peak	Daily	PM Peak
Converter Station Stage	130	130	174	87	68	8
Paper Mill Lane Works including relevant cable installation works (Sections 8 to 11)	60	60	80	40	20	2
	190	**190**	**254**	**127**	**88**	**10**

41. A Construction Access Route Assessment (EA1-CON-E-SPR-00130-0) was undertaken prior to the construction of the EA ONE onshore electrical connection to evaluate the Local Access Routes of the construction road network, which do not form part of the Suffolk Lorry Route Network. The assessment included:

- An on-site engineering survey;
- An assessment and route evaluation of the construction access routes for the delivery of equipment, construction plant, materials; and
- The construction workforce along the Local Access Routes.

42. The assessment determined that the local access roads identified present viable and safe routes for use by the EA ONE construction traffic over the duration of the onshore construction works, subject to the implementation of mitigating measures. This assessment has been reviewed with respect to EA THREE and it has been established that the assessment remains valid. Mitigating measures proposed to address the issues identified within the Construction Access Route Assessment and Transport Assessment have been developed in sufficient detail within the TMP to enable the Highway Authority, and other affected parties, to maintain the safety and level of service upon the existing transport network.

6.4.2. Abnormal Load Movements

43. The construction of the converter station stage will require the delivery of four 300 tonne main converter transformers. Due to their size and weight the transformers will comprise Abnormal Indivisible Loads (AIL). These will be delivered via specialist means and offloaded, for example by use of a mobile crane (see Section 6.3 of the TMP for details of abnormal load transport procedures). Delivery of AIL will be undertaken in consultation with Suffolk Constabulary.

44. A desk-study review has been undertaken of the report setting out the route used by the EA ONE transformer delivery vehicles (Route Report for the Road Transportation of approx. 280 Te Transformer from Ipswich Docks to Burstall Substation, Bullen Lane, Ipswich, Allelys Group, Nov. 2018) and it is confirmed that this document and route are still valid. A new route survey will be undertaken 6 months before transport, in order to consider potential changes of route itself or route conditions. The SCC Highways Structures Team will be consulted to confirm that the highways structures can carry the proposed loads. The EA ONE study did identify that Ostrich Creek Bridge would require temporary overbridging to ensure the structural capacity of the bridge at the time of the transport of the AIL. This was also undertaken for EA ONE during the transport of the transformers.

45. Further detail regarding the management of abnormal loads is set out in Section 3.3.2 and 6.3 of the TMP.

7. ACCESS MANAGEMENT

46. Access to the onshore converter station stage will be served from Bullen Lane, which leads eastwards from the converter station location to the B1113. This road serves the existing Bramford NG substation and the EA ONE Substation and is suitable for use as a means of permanent access. The road is suitable to carry the vehicles which will be associated with the construction of the EA THREE converter station stage, and the alignment of Bullen Lane from its eastern end with the B1113 is suitable to accommodate abnormal loads.

47. Access into the converter station stage will be via the existing access road constructed for the EA ONE Substation which was designed to provide permanent access into the two facilities. The security gates are set back to prevent queuing traffic blocking Bullen Lane. At the temporary laydown compound and converter station site, a manual arm barrier system will be installed inside the perimeter gates to control access and egress to the compound.

48. The main existing access road runs parallel to Bullen Lane and the bridleway to the north of the Bramford NG substation in an east-west direction. The junction of the existing access road with Bullen Lane is located immediately west of the private track to Bullenhall Farm. The access road is 5m wide with two lay-by/waiting areas suitably sized to accommodate vehicles used for the construction and maintenance. The appearance of the access road has been integrated into the landscape by hedgerow planting on either side.

49. A new stone access track will be constructed from the existing EA ONE access road to lead north parallel to the converter station site to the temporary laydown area, as shown on Figure 1. A small link will be installed from this to the north eastern corner of the converter station compound, to allow access from the laydown area directly to the converter station construction works. In addition the haul road to access both the jointing bay in Work No. 58 and the HDD excavation locations will be accessed from this stone track, as shown on Figure 1. Part of this haul road may be constructed using trackmatting due to the presence of underground oil filled cables.

50. A length of the access to the temporary laydown area will be used to allow maintenance staff to reach the SUDS pond during the operational phase. The temporary stone surface will, however, be replaced with a turfstone cellular interlocking concrete paver system (also known as grass-crete). This final grass surface will be installed post-construction once the expected traffic flow will be reduced.

51. A permanent access will be constructed from the existing EA ONE access road to the entrance to the EA THREE converter station as shown on Figure 1. Internal access and service road and car parking area will be constructed within the EA THREE converter station. This will comprise a 6m wide circulation road designed to meet the load bearing capacity of the vehicles delivering the electrical components.

52. Maintenance of the access points will be carried out via daily inspections by the site management team reporting of defects. Regular road sweeping and installation of portable wheel washing facilities (circa 20m from the access from Bullen Lane) shall prevent contamination of the adjacent highways.

53. Provision will be made for emergency charging to avoid electric vehicles becoming stranded on site in accordance with the Suffolk Guidance for Parking, Technical Guidance, 2019.

54. The following procedures shall be adopted to manage the impact of access to the converter station stage during the construction works:

- All access arrangements (including permitted access times) will be included in the briefing to all site staff at induction stage;
- The access route will be given a unique identification number and each will have signage displaying the identification number;

- The access point will have appropriate advance warning signage;
- All gates will be manned or locked daily when there is no construction activity;
- The access point will have grit bins placed at the entrance way;
- Wheel wash facilities will be installed and used when necessary to prevent mud or debris being carried onto the public highway; and
- Drainage will be provided to prevent water flowing from the site access onto the public highway;
- All Contractors will be advised of TMP (EA3-GRD-CON-PLN-IBR-000105) and this AMP prior to engagement by EATL.

55. Following construction (and unless otherwise agreed with SCC and the MSDC) the part of the temporary access in the north that will not be used for maintenance of the SUDS pond, would be reinstated to its original condition.

8. ACCESS AND HIGHWAY IMPROVEMENTS

56. No new access or highway improvements will be required for the EA THREE converter station stage, other than the removal of some road signage equipment along the B1113 and the use of temporary overbridging at Ostrich Creek Bridge both for the transport of abnormal loads (see Section 6.3.2).

57. For EA ONE, the junction of Loraine Way and Bullen Lane was improved, comprising the widening of the Loraine Way road surface to enable the addition of a third lane to the centre of the existing carriageway, protected by two ghost islands to permit traffic turning right into Bullen Lane. This remains in situ.

9. REFERENCES

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APPENDIX 1 CONSTRUCTION ACCESS ROUTE

608000 609000 610000 611000 612000 613000 614000 615000

250000 249000 248000 247000 246000

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

EA THREE DCO Corridor
EA THREE Onshore Converter Station Layout Detail
EA THREE Onshore Converter Station Temporary Site Facilities Detail

EA THREE Converter Substation to National Grid Substation Cable Route
400kV AC Cable - Open Cut Section
400kV AC Cable - Ducted Section

EA THREE Onshore Converter Station Access Roads
Permanent
Temporary

EA THREE Cable Access Road
Haul Road

EA THREE Area to be Reprofiled
EA THREE Onshore Converter Station SUDs Pond
EA ONE Onshore Converter Station Access Road
Construction Access Route

GoBe consultants

Rev	Date	By	Comment
B	05/04/2022	PW	Second Issue
A	25/01/2022	PW	First Issue

Original A3 Plot Scale 1:20,000

0 400 800 Metres

Onshore Converter Station Stage

Appendix: Construction Access Route

Drg No	05356.00006.12.00076.1 Construction Access Route
Rev	2
Date	05/04/2022
Layout	N/A

Document Path: P:\05356 - GoBe Consultants Ltd\00006 East Anglia Three\Tech\GIS\Dwgs\Wking\EA3\Onshore Substation\Doc Ref EA3-GRD-CON-PLN-IBR-000115\5356.00006.12.0076.1 ONCS Construction Access Route.mxd

APPENDIX 2 EAST ANGLIA THREE CONVERTER STATION AND PAPER MILL LANE WORKS TRAFFIC AND TRANSPORT TECHNICAL NOTE

EAST ANGLIA THREE CONVERTER STATION AND PAPER MILL LANE WORKS

Traffic and Transport Technical Note

Prepared for: **ScottishPower Renewables**

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March 2022

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CONTENTS

DOCUMENT REFERENCES

TABLES

1.0 Introduction

1.1 Background

SLR Consulting Ltd. (SLR) has been commissioned by ScottishPower Renewables (SPR) to undertake a review and analysis of the anticipated vehicle movements associated with the construction of the East Anglia THREE (EA3) Converter Station and Paper Mill Lane Works, as per the Development Consent Order (DCO) dated 7th August 2017.

The forecast vehicle movements (personnel and Heavy Goods Vehicles (HGV)) for the construction of the EA3 Converter Station and cable works were set out in Chapter 27 'Traffic and Transport' of the Environmental Statement (ES), which was prepared by Royal HaskoningDHV in support of the DCO submission (Document Reference – 6.1.27)

The vehicle movements identified in the ES, which was prepared in 2015, were estimates based on a set of reasoned assumptions, professional experience and using previous project experience; however, Siemens Energy, who are the appointed Principal Contractor and will be responsible for construction of the EA3 Converter Station, has now confirmed the vehicle movements for the construction programme. NKT, the Principal Contractor for the EA3 cable route works, has provided confirmed vehicle movements associated with the Paper Mill Lane Works. These revised vehicle movements have been incorporated into the analysis presented in this Note.

Whilst this note relates to the construction vehicles associated with the Converter Station and Paper Mill Lane Works, it is acknowledged that during the main construction phase for the cable route in 2024, construction vehicles associated with the wider cable works will also be using the same road network. These vehicle movements, have also, therefore, been incorporated into the analysis presented in this note.

It should be noted that the ES referred to the construction of a substation; however, the proposal is now to construct a converter station. Therefore, all references to the converter station in this note are assumed to replace the references to the substation in the ES.

1.2 Purpose of the Report

The objective of this Technical Note is to provide Suffolk County Council (SCC) with an overview of the changes to the vehicle numbers associated with the construction of the EA3 Converter Station and Paper Mill Lane Works. Vehicle numbers and movements were discussed with SCC at a meeting on the 16th November 2021 and an initial draft of this note was provided following the meeting. The matter was discussed at the EA3 Traffic Working Group meeting on the 15th December 2021 and this note has been updated following the meeting and further discussions with SCC.

This Technical Note therefore sets out the following:

- A summary of the assessment assumptions and resulting vehicle numbers associated with the construction of the EA3 Converter Station, Paper Mill Lane Works and also relevant cable works identified in the ES;
- A summary of the assessment of vehicular impact associated with the construction of EA3, on the highway network in the ES;
- A summary of the potential assessment requirements of vehicular impact associated with the construction of EA3 on the highway network, following the issue of the DCO;
- A summary of the difference between the vehicle movements identified in the ES and the actual vehicle movements identified by Siemens Energy and NKT, based on a lower car occupancy than presented in the ES, for a robust assessment;

- A summary of the anticipated total vehicle movements associated with the construction of EA3 including the revised vehicle movements, at the locations potentially requiring assessment on the highway network;
- A review of the likely impacts at the sensitive junctions on the highway network that are likely to be used by traffic associated with the construction of the EA3 Converter Station and Paper Mill Lane Works (including for relevant cable works); and
- A summary of the above and a conclusion on assessment requirements for the consideration of SCC.

2.0 DCO Submission EA3 Converter Station and Paper Mill Lane Works Traffic Data

2.1 Assessment Assumptions

A brief summary of the assumptions employed to assess the impact of vehicle movements associated with the construction of EA3 is set out as follows:

- The nature of construction works typically requires that employees work longer hours in the summer and shorter hours in the winter to take advantage of the available daylight. Therefore, whilst employees would arrive prior to the morning network peak hour (08:00 to 09:00) throughout the year (and therefore no requirement for assessment during this period), there is the possibility that there would be an overlap between construction employees departing and the network evening peak hour (17:00 to 18:00 observed from traffic counts) i.e. when the daytime construction shift finishes at the same time as the evening network peak (employees would be departing their place of work and HGVs would be returning from making deliveries).
- As a worst case it was assumed that all employee trips would overlap with the evening network peak hour, recognising this scenario is only likely to occur during a two month period before and after the summer months.
- The delivery of materials and plant to the Primary CCSs (in this case Paper Mill Lane Works) would be spread over a ten hour period, whilst onward deliveries to Secondary CCSs or points of access would be scheduled to avoid network peak hours.
- A car occupancy of 2.5 employees per vehicle; and
- To develop a worst case impact scenario on the highway network, the peak traffic demand for each section was added together to create a theoretical 'in-combination worst case' week whereby the peak construction activity for all sections would occur concurrently. This results in the combined traffic flows on the 'A' class road network as over-estimated.

2.2 Trip Generation

The maximum number of employee, employee vehicle movements and HGV movements associated with the construction of the EA3 Converter Station, Paper Mill Lane Works and also relevant cable works identified in the ES as identified in Chapter 27 'Traffic and Transport', are set out in **Table 2-1** below:

Table 2-1
EA3 Converter Station, Paper Mill Lane Works
and relevant cable works Trip Generation (DCO Submission)

	Employees				HGV Movements	
	Number		Vehicle Movements			
	Daily	PM Peak	Daily	PM Peak	Daily	PM Peak
EA3 Converter Station	75	75	60	30	26	3
Paper Mill Lane Works and relevant cable works	150	150	120	60	131	13
Total	**225**	**225**	**180**	**90**	**157**	**16**

2.3 Assessment Requirements

In order to assess if there was any potential for significant impact the evening peak (17:00 to 18:00) on the highway network, the forecast construction traffic generation (EA3 Converter Station and Cable Route Sections 1 to 11) was assigned to the junctions across the agreed study area, to inform the DCO application.

SCC identified 11 junctions across the agreed study area as potentially being susceptible to increases in traffic flow.

In Chapter 27 'Traffic and Transport' it was concluded that the forecast vehicle movements associated with the construction of EA3 (total construction works) were of a magnitude that could potentially lead to significant impacts at the following three sensitive junctions:

- Junction 1: Roundabout junction of the A14 and B1113 (Claydon Interchange);
- Junction 5: Roundabout junction of the A12 and A1214; and
- Junction 11: Roundabout junction of the A12 and B1438.

In the Outline Construction Traffic Management Plan (OCTMP), prepared for the EA3 DCO application, the list of sensitive junctions where the forecast vehicle movements identified as having the potential to lead to significant impacts was as follows:

- Junction 5: Roundabout junction of the A12 and A1214;
- Junction 6: Roundabout junction of the A12 and Newbourne Road;
- Junction 8: Priority junction of the B1079 and Manor Road;
- Junction 11: Roundabout junction of the A12 and B1438; and
- Junction 12: Roundabout junction of the A14 and A12 (south)

The maximum vehicle movements (EA3 Converter Station and total EA3) in the evening peak hour at each of the junctions above (1, 5, 6, 8, 11 and 12) as identified in *Table 27.17 Peak Hour Traffic Flows through Sensitive Junctions* of Chapter 27 'Traffic and Transport', are set out in **Table 2-2**

Table 2-2
Forecast Evening Peak (17:00 – 18:00) Junction Impacts (DCO Submission)

Junction		Total EA3			EA3 Converter Station		
		Cars/LGVs	HGVs	Total	Cars/LGVs	HGVs	Total
1	A14/B1113	80	16	96	30	3	33
5	A12/A1214	88	22	110	0	0	0
6	A12/Newbourne Road	48	22	70	0	0	0
8	B1079/Manor Road	15	0	15	0	0	0
11	A12/B1438	134	22	156	0	0	0
12	A14/A12	52	24	76	11	1	12

As **Table 2-2** shows, vehicle movements associated with the construction of the EA3 Converter Station only impact at Junction 1: A14/B1113 Claydon Interchange and Junction 12: A14/A12.

Capacity assessments were not undertaken at any of the junctions listed above (in Chapter 27 and the OCTMP) as part of the DCO application; however, the following strategy was proposed:

- The junctions identified as having the potential to lead to significant impacts would be subject to detailed analysis through the development of the Traffic Management Plan, post-consent, when a contractor has been appointed and can inform outcomes; and
- Further analysis would seek to quantify the potential significance of these impacts and the scope of mitigation measures. Potential mitigation measures would focus on enhanced travel planning and restricting peak hour movements rather than physical junction improvements.

3.0 Revised EA3 Converter Station and Paper Mill Lane Works Traffic Data

3.1 Introduction

In the context of the strategy set out in **Section 2.3,** and using the assessment assumptions in Chapter 27 'Traffic and Transport', the following text sets out the revised vehicle movements for the construction of EA3 as a result of the EA3 Converter Station vehicle movements anticipated by Siemens Energy and the Paper Mill Lane Works (and relevant cable installation works) vehicle movements anticipated by NKT.

Following discussion and written feedback from SCC provided on the 13th December 2021, the focus of the assessment is at Junction 1: A14/B1113 Claydon Interchange.

The assessment is based on the worst case, which is during the two-week concrete pour for the EA3 Converter Station, when there are a higher number of daily HGVs. The average number of daily HGVs associated with the construction of the EA3 Converter Station is anticipated to be two for the majority of the construction period, which is significantly less than that for the two-week concrete pour period.

3.2 Trip Generation

The revised maximum (daily and evening peak) number of employee, employee vehicle movements and HGV movements associated with the construction of the EA3 Converter Station, Paper Mill Lane Works and the relevant cable installation works (i.e. Sections 8 to 11 of the cable route – see Figure 1 of the Outline Access Management Plan) are set out in **Table 3-1.**

Table 2-1This is based on a car occupancy of 1.5, which has been identified from lessons learnt from the EA2 / EA1N ES and Examination, advice from SCC and through discussions with Siemens Energy, who has suggested that a 2.5 car occupancy is unlikely to be achievable.

Table 3-1
EA3 Confirmed Maximum Figures (Siemens Energy and NKT)

Construction Phase	Employees				HGV Movements	
	Number		Vehicle Movements			
	Daily	PM Peak	Daily	PM Peak	Daily	PM Peak
Converter Station	130	130	174	87	68	8
Paper Mill Lane Works including relevant cable Installation works (Sections 8 to 11)	60	60	80	40	20	2
Total	**190**	**190**	**254**	**127**	**88**	**10**

3.3 Trip Distribution

The data presented in **Table 3-1** has been distributed at Junction 1: A14/B1113 Claydon Interchange) based on the assessment in the ES, which is summarised as follow:

- 97% of employee vehicles using Junction 1;

- 100% of HGVs using Junction 1;
- 78% of employee vehicles from / to A14 South;
- 19% of employee vehicles from / to A14 Nouth;
- 70% of HGVs from / to A14 South; and
- 30% of HGVs from / to A14 North.

Therefore, the maximum number of vehicle movements associated with the construction of the EA3 Converter Station (Siemens Energy data), Paper Mill Lane Works and the relevant cable installation works (Sections 8 to 11) (NKT data) in the evening peak hour at Junction 1 is set out in **Table 3-2.**

Table 3-2
Forecast 17:00 – 18:00 Junction Impacts (Junction 1)

Arm	Converter Station (Siemens Energy)			Paper Mill Lane - Works (and relevant cable installation works (Sections 8 to 11) (NKT)		
	Cars/LGVs	HGVs	Total	Cars/LGVs	HGVs	Total
B1113	84	8	92	0	0	0
A14 North	0	2	2	0	1	1
Ipswich Road	0	0	0	0	0	0
A14 South	0	6	6	0	1	1
Paper Mill Lane	0	0	0	39	2	41

Whilst SCC has confirmed that Junction 1: A14/B1113 Claydon Interchange was not considered a sensitive junction at the time of the DCO submission, there have been a number of consented planning applications since 2015 that have vehicular movements impacting the junction. Therefore, SCC has requested that a capacity assessment is undertaken at Junction 1: A14/B1113 Claydon Interchange to assess the potential impact of the EA3 construction traffic, based on the confirmed vehicle movement data provided by Siemens Energy and NKT, which is set out in **Section 4.0**.

4.0 Assessment of Likely Impacts

4.1 Introduction

This section presents a capacity assessment of Junction 1: A14/B1113 Claydon Interchange to assess the potential impact of the EA3 construction traffic, based on the confirmed vehicle movement data provided by Siemens Energy and NKT.

4.2 Assessment Parameters

The assessment has been based on the following parameters:

- Evening Peak (17:00 to 18:00);
- 2023 assessment year derived from the capacity assessment output in the Transport Assessment submitted in support of the planning application for the extension to Port One Business and Logistics Park (Ref: DC/20/01175);
- Addition of committed development traffic (see **Appendix 01**); and
- Confirmed vehicle movement data provided by Siemens Energy and NKT as set out in **Table 3-2**

4.3 Traffic Flows

The resulting traffic flows for the following assessment scenarios are provided in **Appendix 02:**

- 2023 base + committed development; and
- 2023 base + committed development + EA3

4.4 Capacity Assessment

The ARCADY model presented in the Transport Assessment for DC/20/01175 has been replicated and updated following a review of the junction geometries and additional comments from SCC, and the results of the two assessment scenarios (including a plan showing the junction geometries) identified above are provided in **Appendix 03** and summarised in **Table 4-1** below.

Table 4-1
ARCADY Results (17:00 to 18:00)

Arm	2023 Base + Committed Development		2023 Base + Committed Development + EA3	
	RFC	Maximum Queue	RFC	Maximum Queue
Ipswich Road	0.41	0.7	0.44	0.8
A14 Northbound Off-slip	0.41	0.7	0.43	0.7
Paper Mill Lane	0.10	0.1	0.13	0.2
B1113 Bramford Road	0.64	1.7	0.72	2.5
A14 Southbound Off-slip	0.24	0.3	0.26	0.3

As **Table 4-1** shows, the junction operates well within its theoretical capacity in the base plus committed development scenario and continues to operate within its theoretical capacity with the addition of the EA3 vehicle movements, with negligible queues and spare capacity for additional vehicle movements.

5.0 Road Safety Assessment Review

5.1 Introduction

SCC also requested that the assessment of road safety presented in the ES be updated for the B1113 corridor and Paper Mill Lane, to ascertain if any additional mitigation measures are required and the review is presented in this section.

5.2 Scope

The Crashmap database[1] has been used to compare the number of accidents and any clusters, for the five year period prior to the DCO application (2011 to 2015) and the most recent five year period available excluding 2020 as traffic levels will have been unrepresentative of typical conditions due to the Covid-19 pandemic (2015 to 2019), at the following locations:

- A14/B1113 Claydon Interchange;
- B1113/Somersham Road;
- B1113/Bullen Lane;
- B1113/A1071; and
- Paper Mill Lane

As the images in **Appendix 04** show, there has been a reduction or no change in the number of accidents that have occurred during each five year period at all locations, with the exception of Paper Mill Lane. A further analysis has been provided below.

5.3 Analysis

5.3.1 A14/B1113 Claydon Interchange

The number of accidents at the junction within the most recent five year period is significantly less than the number of accidents in the five year period prior to the submission of the DCO application with a noticeable reduction on the Ipswich Road arm, which will be used by some NKT vehicles accessing Cable Route Section 8:

- 2011 to 2015 - 24 accidents; and
- 2015 to 2019 – 9 accidents

There have been three accidents on the B1113 arm in each of the five year periods. A review of the 2015 to 2019 data shows the three accidents (see the Crashmap reports in **Appendix 05**), which were in the vicinity of the give way line, were due to three separate causation factors; one with no other vehicles involved, one involving an agricultural vehicle and one involving four vehicles, which appears to have been a shunt. Therefore, it can be concluded that there is not a deficiency in the highway layout that an increase in vehicles associated with the construction of EA3 would exacerbate.

5.3.2 B1113/Somersham Road

There has been a reduction in the number of accidents in the vicinity of the B1113/Somersham Road junction, with none occurring in the most recent five year period:

[1] www.crashmap.co.uk

- 2011 to 2015 – 3; and
- 2015 to 2019 – 0

Therefore, it can be concluded that there are no road safety issues at this junction that an increase in vehicles associated with the construction of EA3 would exacerbate.

5.3.3 B1113/Bullen Lane

There have been no accidents at the B113/Bullen Lane junction in either of the five year periods. Therefore, it can be concluded that there are no road safety issues at this junction that an increase in vehicles associated with the construction of EA3 would exacerbate.

5.3.4 B1113/A1071

The number of accidents at the junction within the most recent five year period is half the number of accidents in the five year period prior to the submission of the DCO application:

- 2011 to 2015 – 8; and
- 2015 to 2019 – 4

All four accidents in the most recent five year period occurred in different locations at the junction and therefore there is unlikely to be any deficiencies in the highway layout that an increase in vehicles associated with the construction of EA3 would exacerbate.

Whilst there has been one accident in each five year period that involved a cyclist, given the reduction in the total number of accidents and since only 3% of employee vehicles are forecast to use this junction and no HGVs are permitted to use the junction, it can be concluded that there are no road safety issues at this junction that an increase in vehicles associated with the construction of EA3 would exacerbate.

5.3.5 Paper Mill Lane

The number of accidents at the junction within the most recent five year period has increased from the five year period prior to the submission of the DCO application:

- 2011 to 2015 – 0; and
- 2015 to 2019 – 2

A review of the 2015 to 2019 data (see the reports in **Appendix 05**) shows the accidents occurred in different locations; one accident was a shunt and one involved no other vehicles. Given the low number of accidents and separate locations and causation factors, it can be concluded that there are no road safety issues at this junction that an increase in vehicles associated with the construction of EA3 would exacerbate.

5.4 Summary

The review of road safety in this section would indicate that, in general, there has not been any worsening of road safety since the submission of the DCO application, with a significant improvement at key junctions that will be used by the majority of construction traffic.

Therefore, no changes to the measures proposed in the Traffic Management Plan are considered to be necessary.

6.0 Summary and Conclusion

6.1 Summary

This Technical Note sets out the anticipated maximum number of vehicle movements associated with the construction of the EA3 Converter Station, Paper Mill Lane Works and the relevant cable installation works (Sections 8 to 11) in the evening peak hour at Junction 1: A14/B1113 Claydon Interchange using confirmed data from Siemens Energy and NKT. The assessment is based on a lower (and more realistic) car occupancy of 1.5 employees, compared to the car occupancy of 2.5 used in the ES for the DCO application.

A junction capacity assessment has been undertaken to test the impact of the confirmed EA3 traffic data at Junction 1: A14/B1113 Claydon Interchange, using the most recent baseline traffic data available and incorporating vehicle movements associated with various committed developments. The assessment confirmed there would be no capacity issues at the junction with the addition of the EA3 vehicle movements.

A review of road safety on the routes that would be used by the construction traffic associated with the construction of the EA3 Converter Station, Paper Mill Lane Works and the relevant cable installation works (Sections 8 to 11) shows there are no road safety issues that would be exacerbated by an increase in traffic flows and that no changes to the measures proposed in the EA3 Traffic Management Plan are required.

6.2 Conclusion

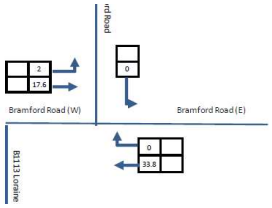
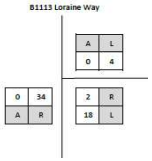
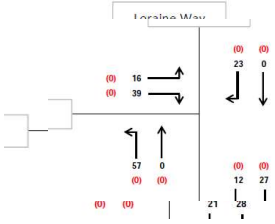
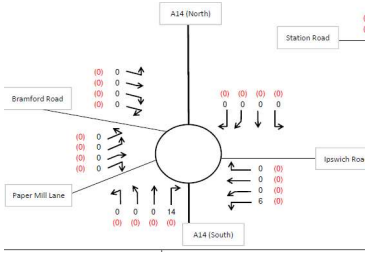
As demonstrated, the impact of the revised EA3 Converter Station and Paper Mill Lane Works construction works traffic data is such that there would be no capacity issues at Junction 1: A14/B1113 Claydon Interchange and no impacts on road safety on the routes used by construction traffic.

In, conclusion, no further assessments on the highway network should be required prior to the commencement of construction associated with the EA3 Converter Station and Paper Mill Lane Works.

A separate Technical Note has been prepared to consider the impact on the highway network of the EA3 Works at Playford Corner and Clappits based on the confirmed traffic data provided by NKT.

APPENDIX 01

Committed Development Traffic Flows

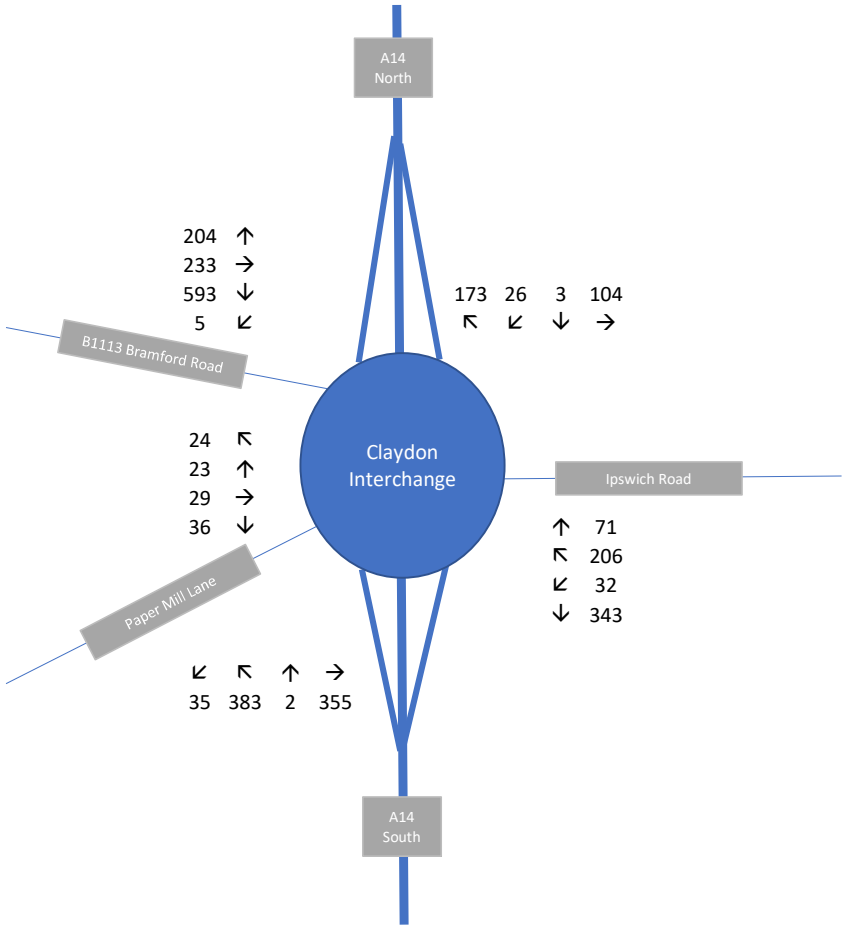
Reference	Comments	Include?	PM Peak Flows
DC/21/04711	Transport and Access Report. No HGVs during peak hours and construction personnel staggered (and not included in the assessment)	No	n/a
DC/21/00060	TMP - negligible vehicle movements	No	n/a
DC/19/01601	Same as DC/21/00060	No	n/a
DC/17/05331	No traffic data required for application	No	n/a
DC/19/03008	No traffic data required for application	No	n/a
DC/18/00233	Transport Assessment available - not assigned at Claydon Interchange, so 50/50 split to and from A14 S/N assumed	Yes	
DC/19/01401	Transport Assessment available - negligible flows (6 two-way) to/from B1113 north	No	
DC/19/00567	Transport Assessment available - not assigned at Claydon Interchange, so 50/50 split to and from A14 S/N assumed	Yes	
1856/17	TA Part 3	Yes	
DC/18/02010	Refused	No	n/a

	Total vehice flows (cars)			
	Departures to		Arrivals from	
	A14 N	A14 S	A14 N	A14 S
B1113 Bramford Road	17	17	28	28
Ipswich Road		6		14

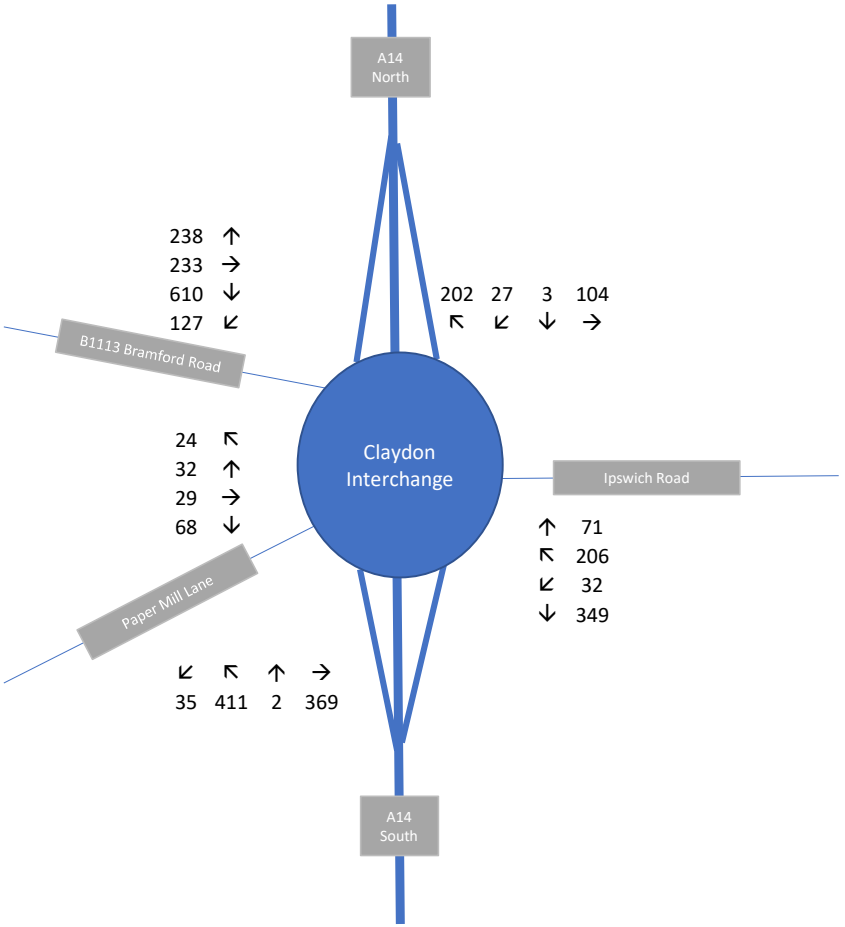
APPENDIX 02

Assessment Scenario Traffic Flows

2023 Base + Committed Development (17:00 to 18:00)

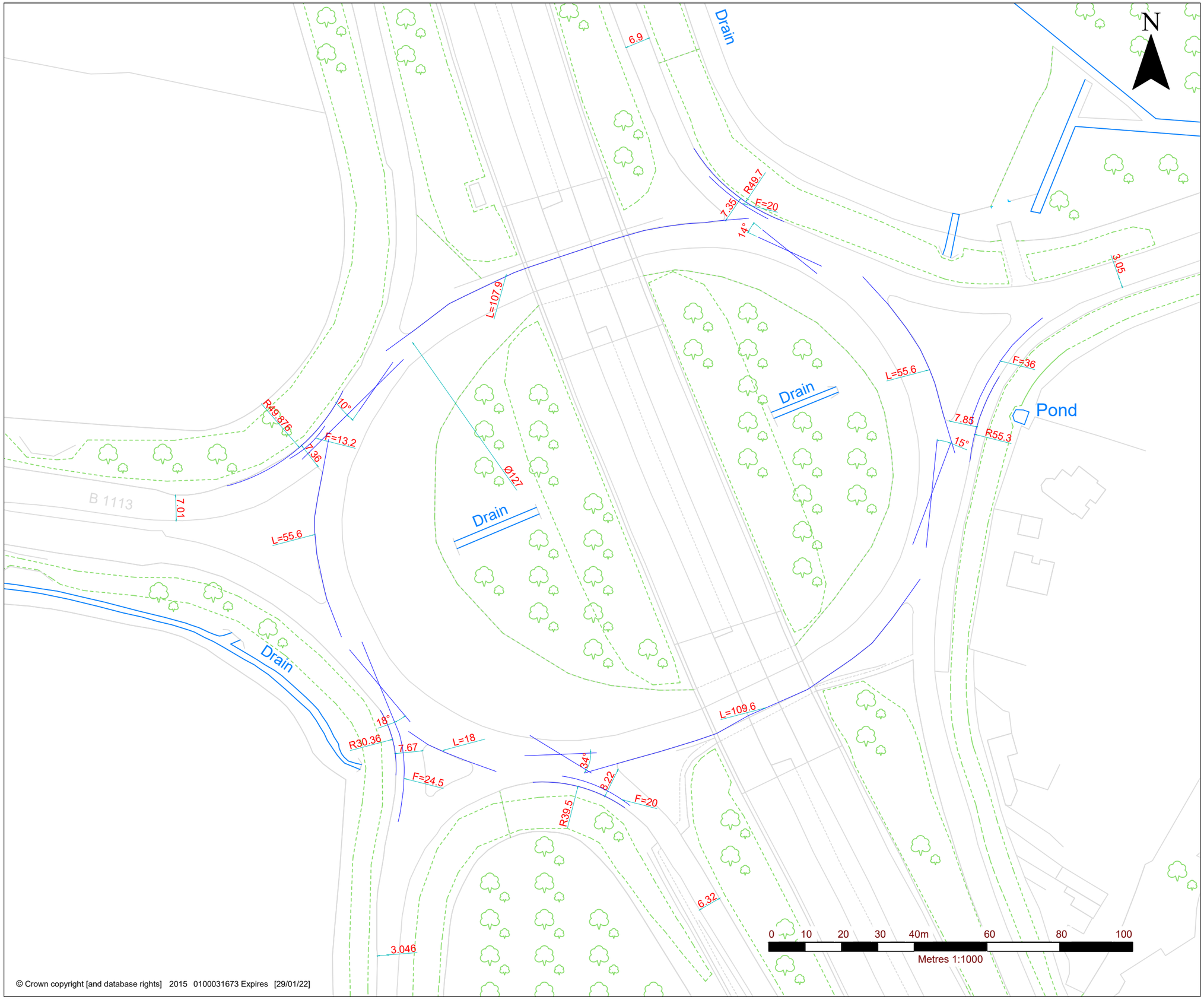


2023 Base + Committed Development + EA3 (17:00 to 18:00)



APPENDIX 03

ARCADY Results



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NOTES

LEGEND

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CLAYDON INTERCHANGE

EAST ANGLIA THREE

ARCADY MEASUREMENTS

SK01

Scale 1:1,000 @ A3

Date FEBRUARY 2022

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462

Filename: 20220208_A14_Claydon_PM_B1113_Single_Lane.j9
Path: \\euafs\SHEFS\SHE\AMA Sheffield\Projects\Scottish Power Renewables - 00481\404.05356.00006 - East Anglia offshore wind farms\EA3\B1113 Corridor TAs
Report generation date: 08/02/2022 13:57:42

Summary of junction performance

	AM					PM				
	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Set ID	Queue (Veh)	Delay (s)	RFC	LOS
	2023 Base									
Arm 1	D1	1.1	4.31	0.52	A	D2	0.7	3.33	0.40	A
Arm 2		0.6	2.86	0.38	A		0.6	2.75	0.38	A
Arm 3		0.1	3.26	0.11	A		0.1	2.99	0.09	A
Arm 4		2.0	8.59	0.67	A		1.6	7.35	0.62	A
Arm 5		0.3	3.35	0.22	A		0.3	3.20	0.21	A
	2023 Base + Com Dev									
Arm 1						D3	0.7	3.49	0.41	A
Arm 2							0.7	2.92	0.41	A
Arm 3							0.1	3.13	0.10	A
Arm 4							1.7	7.69	0.64	A
Arm 5							0.3	3.38	0.24	A
	2023 Base + Com Dev + E3									
Arm 1						D4	0.8	3.89	0.44	A
Arm 2							0.7	3.14	0.43	A
Arm 3							0.2	3.26	0.13	A
Arm 4							2.5	10.12	0.72	B
Arm 5							0.3	3.72	0.26	A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	28/01/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	SLR\llong
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2023 Base	AM	ONE HOUR	07:45	09:15	15	✓
D2	2023 Base	PM	ONE HOUR	16:45	18:15	15	✓
D3	2023 Base + Com Dev	PM	ONE HOUR	16:45	18:15	15	✓
D4	2023 Base + Com Dev + E3	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2023 Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A14 Claydon Interchange	Large Roundabout		1, 2, 3, 4, 5	5.02	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Ipswitch Road	
2	A14 Northbound Offslip	
3	Paper Mill Lane	
4	Bramford Road	
5	A14 Southbound Offslip	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	3.05	7.85	36.0	55.3	127.0	15.0	
2	6.32	8.22	20.0	39.5	127.0	34.0	
3	3.05	7.67	24.5	30.4	127.0	18.0	
4	3.60	3.60	0.0	49.9	127.0	10.0	
5	6.90	7.35	20.0	49.7	127.0	14.0	

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1	1032	55.60
2	718	109.60
3	1373	18.00
4	646	55.60
5	1469	107.90

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.906	2615
2	1.012	2848
3	0.784	2412
4	0.751	1794
5	0.886	2703

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2023 Base	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		ONE HOUR	✓	838	100.000
2		ONE HOUR	✓	699	100.000
3		ONE HOUR	✓	128	100.000
4		ONE HOUR	✓	777	100.000
5		ONE HOUR	✓	278	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	512	35	201	90
	2	305	0	23	369	2
	3	38	30	0	39	21
	4	233	490	43	11	0
	5	107	2	16	153	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	2	0	2	1
	2	3	0	13	13	0
	3	5	10	0	13	10
	4	3	11	0	24	27
	5	3	0	13	13	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.52	4.31	1.1	A	769	1153
2	0.38	2.86	0.6	A	641	962
3	0.11	3.26	0.1	A	117	176
4	0.67	8.59	2.0	A	713	1069
5	0.22	3.35	0.3	A	255	383

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	631	158	558	2017	0.313	629	513	0.0	0.5	2.590	A
2	526	132	412	2218	0.237	525	775	0.0	0.3	2.126	A
3	96	24	849	1550	0.062	96	88	0.0	0.1	2.475	A
4	585	146	365	1396	0.419	582	580	0.0	0.7	4.407	A
5	209	52	862	1731	0.121	209	85	0.0	0.1	2.365	A

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	753	188	669	1908	0.395	753	613	0.5	0.6	3.113	A
2	628	157	493	2138	0.294	628	928	0.3	0.4	2.383	A
3	115	29	1016	1422	0.081	115	105	0.1	0.1	2.754	A
4	699	175	437	1345	0.519	697	694	0.7	1.1	5.545	A
5	250	62	1032	1583	0.158	250	101	0.1	0.2	2.699	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	923	231	817	1761	0.524	921	750	0.6	1.1	4.274	A
2	770	192	603	2030	0.379	769	1135	0.4	0.6	2.853	A
3	141	35	1244	1246	0.113	141	128	0.1	0.1	3.255	A
4	855	214	534	1274	0.671	852	850	1.1	2.0	8.445	A
5	306	77	1262	1384	0.221	306	124	0.2	0.3	3.338	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	923	231	820	1759	0.525	923	752	1.1	1.1	4.305	A
2	770	192	604	2029	0.379	770	1138	0.6	0.6	2.857	A
3	141	35	1245	1245	0.113	141	129	0.1	0.1	3.259	A
4	855	214	535	1274	0.672	855	851	2.0	2.0	8.593	A
5	306	77	1266	1381	0.222	306	124	0.3	0.3	3.349	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	753	188	673	1904	0.396	755	616	1.1	0.7	3.136	A
2	628	157	495	2137	0.294	629	933	0.6	0.4	2.390	A
3	115	29	1018	1420	0.081	115	106	0.1	0.1	2.758	A
4	699	175	438	1344	0.520	702	696	2.0	1.1	5.639	A
5	250	62	1038	1578	0.158	250	102	0.3	0.2	2.710	A

09:00 - 09:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	631	158	562	2014	0.313	632	515	0.7	0.5	2.608	A
2	526	132	414	2216	0.237	527	780	0.4	0.3	2.131	A
3	96	24	852	1548	0.062	96	88	0.1	0.1	2.479	A
4	585	146	366	1395	0.419	586	583	1.1	0.7	4.459	A
5	209	52	867	1726	0.121	209	85	0.2	0.1	2.373	A

2023 Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A14 Claydon Interchange	Large Roundabout		1, 2, 3, 4, 5	4.31	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1	1032	55.60
2	718	109.60
3	1373	18.00
4	646	55.60
5	1469	107.90

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2023 Base	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		ONE HOUR	✓	646	100.000
2		ONE HOUR	✓	722	100.000
3		ONE HOUR	✓	112	100.000
4		ONE HOUR	✓	736	100.000
5		ONE HOUR	✓	274	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	343	32	200	71
	2	355	0	35	330	2
	3	29	36	0	24	23
	4	204	480	48	4	0
	5	104	3	26	141	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	2	3	3	1
	2	3	0	15	9	0
	3	0	6	0	17	0
	4	2	5	2	75	6
	5	3	0	0	12	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.40	3.33	0.7	A	593	889
2	0.38	2.75	0.6	A	663	994
3	0.09	2.99	0.1	A	103	154
4	0.62	7.35	1.6	A	675	1013
5	0.21	3.20	0.3	A	251	377

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	486	122	553	2036	0.239	485	519	0.0	0.3	2.319	A
2	544	136	392	2285	0.238	542	647	0.0	0.3	2.064	A
3	84	21	828	1632	0.052	84	106	0.0	0.1	2.325	A
4	554	139	388	1433	0.387	552	525	0.0	0.6	4.072	A
5	206	52	867	1775	0.116	206	72	0.0	0.1	2.294	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	581	145	662	1933	0.300	580	621	0.3	0.4	2.661	A
2	649	162	469	2208	0.294	649	774	0.3	0.4	2.308	A
3	101	25	991	1504	0.067	101	127	0.1	0.1	2.564	A
4	662	165	464	1377	0.481	660	628	0.6	0.9	5.016	A
5	246	62	1038	1629	0.151	246	86	0.1	0.2	2.603	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	711	178	810	1794	0.397	710	761	0.4	0.7	3.319	A
2	795	199	574	2103	0.378	794	947	0.4	0.6	2.750	A
3	123	31	1213	1329	0.093	123	155	0.1	0.1	2.985	A
4	810	203	568	1300	0.623	808	769	0.9	1.6	7.267	A
5	302	75	1270	1430	0.211	301	106	0.2	0.3	3.189	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	711	178	812	1792	0.397	711	762	0.7	0.7	3.331	A
2	795	199	575	2102	0.378	795	949	0.6	0.6	2.753	A
3	123	31	1214	1328	0.093	123	155	0.1	0.1	2.987	A
4	810	203	568	1300	0.624	810	770	1.6	1.6	7.353	A
5	302	75	1273	1427	0.211	302	106	0.3	0.3	3.197	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	581	145	666	1930	0.301	582	623	0.7	0.4	2.673	A
2	649	162	470	2207	0.294	650	777	0.6	0.4	2.312	A
3	101	25	993	1503	0.067	101	127	0.1	0.1	2.569	A
4	662	165	464	1376	0.481	664	629	1.6	0.9	5.076	A
5	246	62	1042	1625	0.152	247	86	0.3	0.2	2.612	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	486	122	557	2033	0.239	487	522	0.4	0.3	2.330	A
2	544	136	393	2284	0.238	544	650	0.4	0.3	2.069	A
3	84	21	831	1630	0.052	84	106	0.1	0.1	2.328	A
4	554	139	389	1432	0.387	555	527	0.9	0.6	4.112	A
5	206	52	872	1771	0.116	206	72	0.2	0.1	2.300	A

2023 Base + Com Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A14 Claydon Interchange	Large Roundabout		1, 2, 3, 4, 5	4.50	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1	1032	55.60
2	718	109.60
3	1373	18.00
4	646	55.60
5	1469	107.90

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2023 Base + Com Dev	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		ONE HOUR	✓	652	100.000
2		ONE HOUR	✓	764	100.000
3		ONE HOUR	✓	112	100.000
4		ONE HOUR	✓	749	100.000
5		ONE HOUR	✓	302	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	349	32	200	71
	2	369	0	35	358	2
	3	29	36	0	24	23
	4	204	497	48	0	0
	5	104	3	26	169	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	2	3	3	1
	2	3	0	15	9	0
	3	0	6	0	17	0
	4	2	5	2	75	6
	5	3	0	0	12	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.41	3.49	0.7	A	598	897
2	0.41	2.92	0.7	A	701	1052
3	0.10	3.13	0.1	A	103	154
4	0.64	7.69	1.7	A	687	1031
5	0.24	3.38	0.3	A	277	416

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	491	123	584	2008	0.244	490	530	0.0	0.3	2.368	A
2	575	144	410	2267	0.254	574	664	0.0	0.3	2.124	A
3	84	21	878	1594	0.053	84	106	0.0	0.1	2.384	A
4	564	141	398	1430	0.394	561	564	0.0	0.6	4.130	A
5	227	57	887	1752	0.130	227	72	0.0	0.1	2.360	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	586	147	699	1900	0.309	586	634	0.3	0.4	2.740	A
2	687	172	490	2187	0.314	686	794	0.3	0.5	2.400	A
3	101	25	1050	1458	0.069	101	127	0.1	0.1	2.651	A
4	673	168	476	1372	0.491	672	675	0.6	1.0	5.131	A
5	271	68	1062	1604	0.169	271	86	0.1	0.2	2.702	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	718	179	855	1753	0.410	717	776	0.4	0.7	3.472	A
2	841	210	600	2077	0.405	840	972	0.5	0.7	2.911	A
3	123	31	1286	1272	0.097	123	155	0.1	0.1	3.131	A
4	825	206	583	1293	0.638	822	826	1.0	1.7	7.584	A
5	333	83	1299	1402	0.237	332	106	0.2	0.3	3.363	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	718	179	858	1750	0.410	718	777	0.7	0.7	3.485	A
2	841	210	601	2076	0.405	841	974	0.7	0.7	2.915	A
3	123	31	1287	1271	0.097	123	155	0.1	0.1	3.135	A
4	825	206	584	1293	0.638	825	827	1.7	1.7	7.686	A
5	333	83	1302	1399	0.238	333	106	0.3	0.3	3.375	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	586	147	703	1896	0.309	587	636	0.7	0.4	2.751	A
2	687	172	492	2185	0.314	688	798	0.7	0.5	2.405	A
3	101	25	1052	1456	0.069	101	127	0.1	0.1	2.657	A
4	673	168	477	1372	0.491	676	676	1.7	1.0	5.200	A
5	271	68	1067	1599	0.170	272	86	0.3	0.2	2.712	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	491	123	588	2005	0.245	491	532	0.4	0.3	2.381	A
2	575	144	412	2266	0.254	576	667	0.5	0.3	2.132	A
3	84	21	881	1591	0.053	84	106	0.1	0.1	2.388	A
4	564	141	399	1429	0.395	565	566	1.0	0.7	4.173	A
5	227	57	892	1748	0.130	228	72	0.2	0.1	2.369	A

2023 Base + Com Dev + E3, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A14 Claydon Interchange	Large Roundabout		1, 2, 3, 4, 5	5.50	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

[same as above]

Roundabout Geometry

[same as above]

Large Roundabout Data

Arm	Circulating flow (PCU/hr)	Entry-to-exit separation (m)
1	1032	55.60
2	718	109.60
3	1373	18.00
4	646	55.60
5	1469	107.90

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2023 Base + Com Dev + E3	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1		ONE HOUR	✓	652	100.000
2		ONE HOUR	✓	771	100.000
3		ONE HOUR	✓	153	100.000
4		ONE HOUR	✓	823	100.000
5		ONE HOUR	✓	304	100.000

Origin-Destination Data

Demand (Veh/hr)

		To				
		1	2	3	4	5
From	1	0	349	32	200	71
	2	369	0	36	364	2
	3	29	68	0	24	32
	4	204	497	122	0	0
	5	104	3	27	170	0

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1	2	3	4	5
From	1	0	2	3	3	1
	2	3	0	15	9	0
	3	0	4	0	17	3
	4	2	5	2	75	6
	5	3	0	0	12	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.44	3.89	0.8	A	598	897
2	0.43	3.14	0.7	A	707	1061
3	0.13	3.26	0.2	A	140	211
4	0.72	10.12	2.5	B	755	1133
5	0.26	3.72	0.3	A	279	418

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	491	123	665	1935	0.254	490	530	0.0	0.3	2.488	A
2	580	145	467	2211	0.263	579	688	0.0	0.4	2.203	A
3	115	29	883	1597	0.072	115	163	0.0	0.1	2.429	A
4	620	155	429	1410	0.440	616	569	0.0	0.8	4.522	A
5	229	57	966	1686	0.136	228	79	0.0	0.2	2.467	A

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	586	147	796	1812	0.323	586	634	0.3	0.5	2.933	A
2	693	173	559	2120	0.327	693	823	0.4	0.5	2.522	A
3	138	34	1056	1460	0.094	137	195	0.1	0.1	2.722	A
4	740	185	513	1347	0.549	738	681	0.8	1.2	5.895	A
5	273	68	1157	1524	0.179	273	94	0.2	0.2	2.877	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	718	179	972	1647	0.436	717	775	0.5	0.8	3.866	A
2	849	212	683	1995	0.425	848	1006	0.5	0.7	3.134	A
3	168	42	1293	1272	0.132	168	238	0.1	0.2	3.260	A
4	906	227	628	1262	0.718	901	833	1.2	2.5	9.849	A
5	335	84	1414	1306	0.256	334	115	0.2	0.3	3.703	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	718	179	976	1643	0.437	718	777	0.8	0.8	3.891	A
2	849	212	685	1994	0.426	849	1010	0.7	0.7	3.143	A
3	168	42	1295	1271	0.133	168	239	0.2	0.2	3.264	A
4	906	227	629	1261	0.719	906	835	2.5	2.5	10.123	B
5	335	84	1419	1301	0.257	335	116	0.3	0.3	3.723	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	586	147	802	1807	0.324	587	637	0.8	0.5	2.956	A
2	693	173	561	2118	0.327	694	828	0.7	0.5	2.532	A
3	138	34	1059	1458	0.094	138	196	0.2	0.1	2.727	A
4	740	185	514	1346	0.550	745	683	2.5	1.2	6.037	A
5	273	68	1164	1518	0.180	274	95	0.3	0.2	2.896	A

18:00 - 18:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	491	123	669	1931	0.254	491	532	0.5	0.3	2.503	A
2	580	145	469	2209	0.263	581	692	0.5	0.4	2.213	A
3	115	29	886	1594	0.072	115	164	0.1	0.1	2.435	A
4	620	155	430	1409	0.440	621	571	1.2	0.8	4.583	A
5	229	57	973	1681	0.136	229	79	0.2	0.2	2.479	A

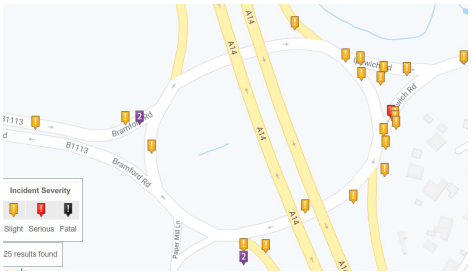
APPENDIX 04

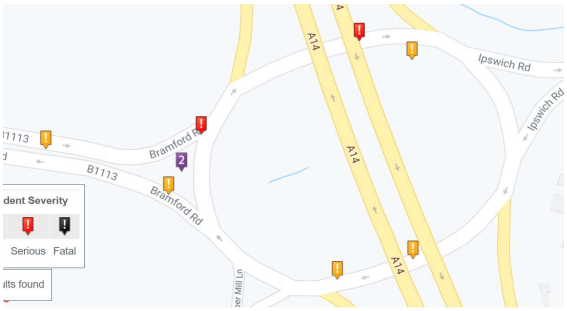
Crashmap Screenshots

2011 - 2015

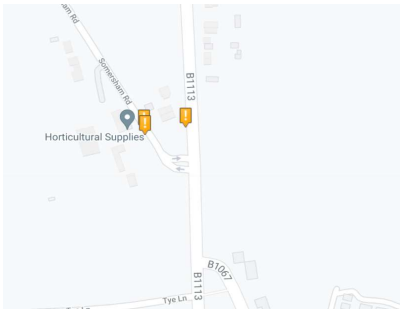
2016 -2020

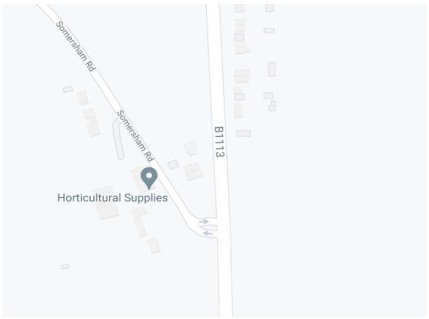
Claydon Interchange





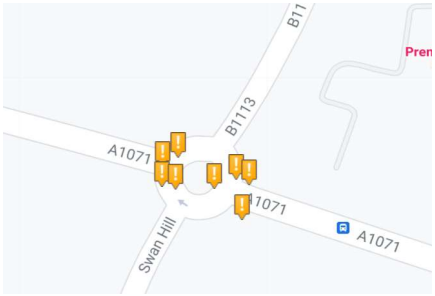
B1113 / Somersham Road

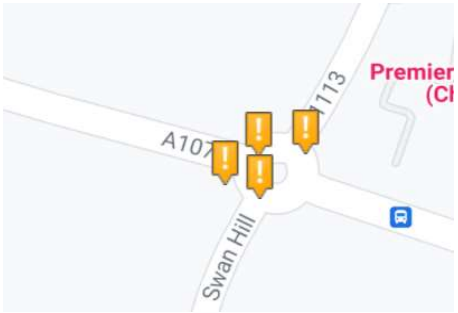




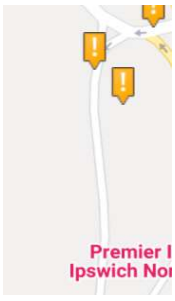
B1113 / Bullen Lane

B1113 / A1071

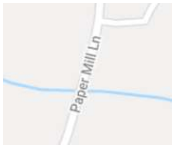




Paper Mill Lane




Paper Mill Ln


Paper Mill Ln

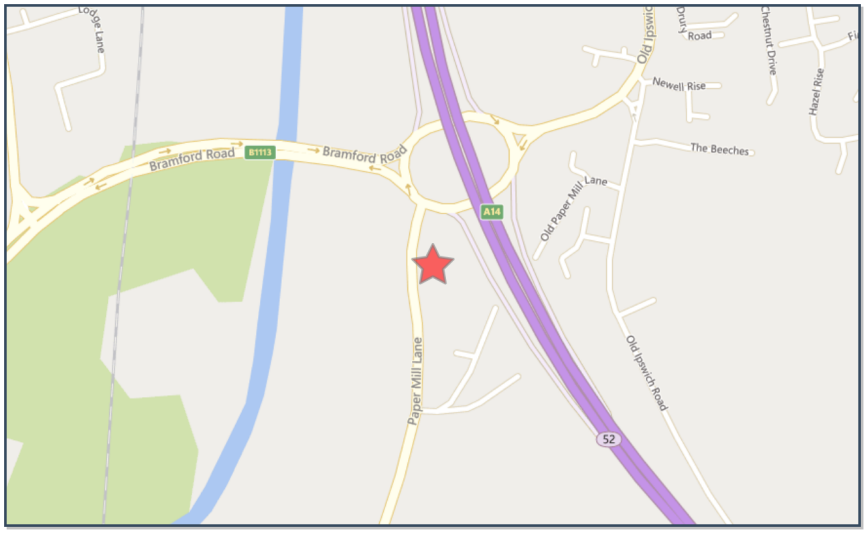
APPENDIX 05

Crashmap Reports

crashmap.co.uk

Validated Data

Crash Date:	Wednesday, November 09, 2016	**Time of Crash:**	10:43:00 PM	**Crash Reference:**	**2016370132278**
Highest Injury Severity:	Slight	**Road Number:**	U0	**Number of Casualties:**	1
Highway Authority:	Suffolk			**Number of Vehicles:**	1
Local Authority:	Mid Suffolk District			**OS Grid Reference:**	612880 249408
Weather Description:	Fine without high winds				
Road Surface Description:	Wet or Damp				
Speed Limit:	70				
Light Conditions:	Darkness: street lights present and lit				
Carriageway Hazards:	None				
Junction Detail:	Not at or within 20 metres of junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Dual carriageway				
Junction Control:	Not Applicable				



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Validated Data

Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	15	Male	46 - 55	Vehicle proceeding normally along the carriageway, not on a bend	Front	Other	None	None

Casualties

Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Vehicle or pillion passenger	Female	36 - 45	Unknown or other	Unknown or other

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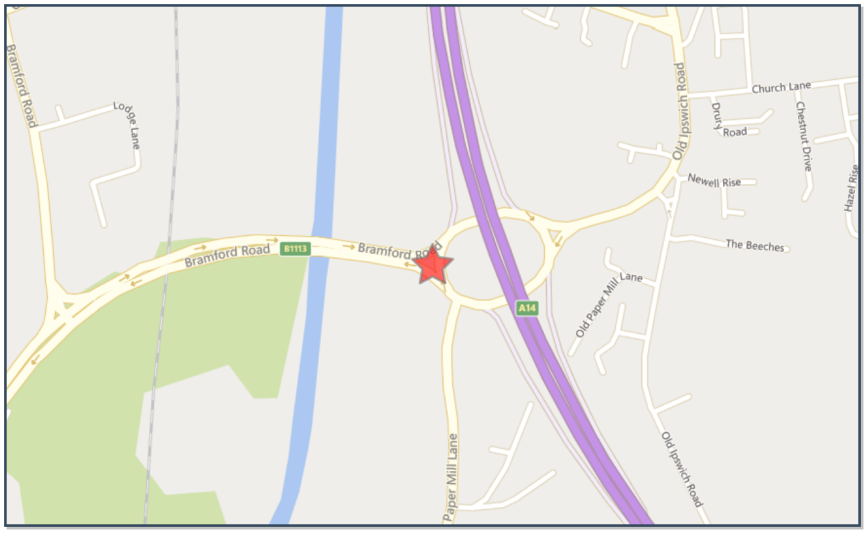
Validated Data

Crash Date:	Monday, August 21, 2017	**Time of Crash:**	5:50:00 PM	**Crash Reference:**	**2017370218598**

Highest Injury Severity:	Slight	**Road Number:**	B1113	**Number of Casualties:**	1
Highway Authority:	Suffolk			**Number of Vehicles:**	4
Local Authority:	Mid Suffolk District			**OS Grid Reference:**	612819 249547
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	40				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Not at or within 20 metres of junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Single carriageway				
Junction Control:	Not Applicable				



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Validated Data

Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Van or goods vehicle 3.5 tonnes mgw and under	10	Male	26 - 35	Vehicle proceeding normally along the carriageway, not on a bend	Front	Other	None	None
2	Car (excluding private hire)	18	Male	16 - 20	Vehicle is slowing down or stopping	Front	Other	None	None
3	Car (excluding private hire)	12	Male	56 - 65	Vehicle is slowing down or stopping	Back	Other	None	None
4	Car (excluding private hire)	9	Female	26 - 35	Vehicle is slowing down or stopping	Back	Commuting to/from work	None	None

Casualties

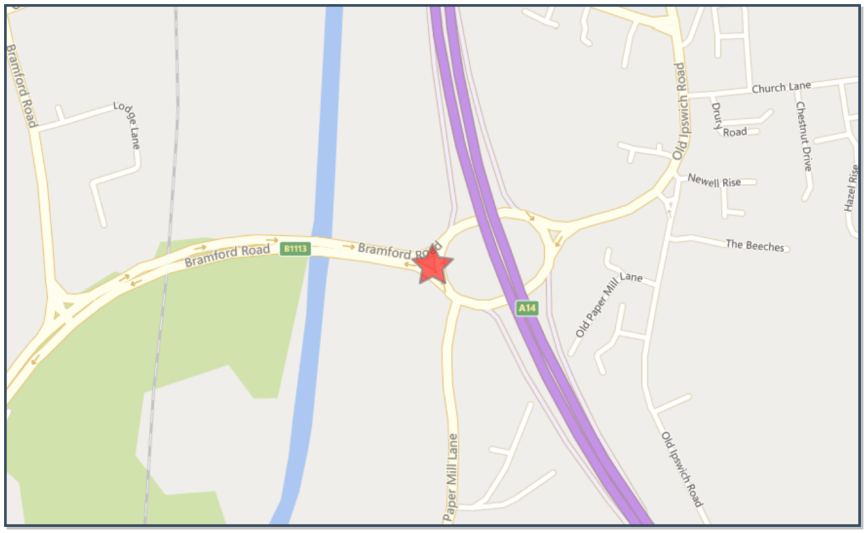
Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Driver or rider	Male	26 - 35	Unknown or other	Unknown or other

crashmap.co.uk

Validated Data

Crash Date:	Friday, July 20, 2018	**Time of Crash:**	7:26:00 AM	**Crash Reference:**	**2018370319130**

Highest Injury Severity:	Slight	**Road Number:**	B1113	**Number of Casualties:**	1
Highway Authority:	Suffolk			**Number of Vehicles:**	2
Local Authority:	Mid Suffolk District			**OS Grid Reference:**	612819 249547
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	30				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Other junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Single carriageway				
Junction Control:	Give way or uncontrolled				



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Validated Data

Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	2	Male	46 - 55	Vehicle proceeding normally along the carriageway, not on a bend	Front	Journey as part of work	None	Wall or fence
2	Agricultural vehicle	4	Male	26 - 35	Vehicle proceeding normally along the carriageway, not on a bend	Offside	Journey as part of work	None	None

Casualties

Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Driver or rider	Male	46 - 55	Unknown or other	Unknown or other

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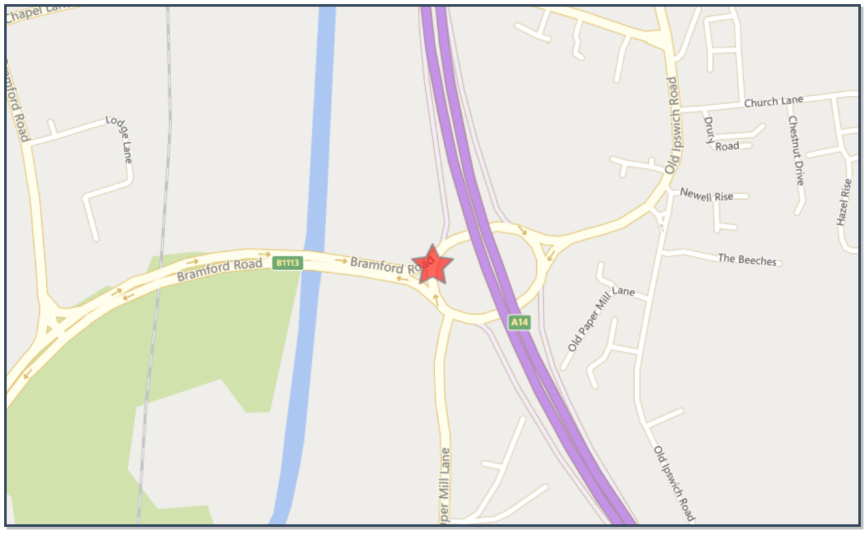
Validated Data

Crash Date:	Thursday, July 19, 2018	**Time of Crash:**	5:45:00 AM	**Crash Reference:**	**2018370336188**

Highest Injury Severity:	Serious	**Road Number:**	B1113	**Number of Casualties:**	1
Highway Authority:	Suffolk			**Number of Vehicles:**	1
Local Authority:	Mid Suffolk District			**OS Grid Reference:**	612829 249569
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	70				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Roundabout				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Dual carriageway				
Junction Control:	Give way or uncontrolled				



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Validated Data

Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Motorcycle over 50cc and up to 125cc	11	Male	36 - 45	Vehicle proceeding normally along the carriageway, not on a bend	Nearside	Commuting to/from work	None	None

Casualties

Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Serious	Driver or rider	Male	36 - 45	Unknown or other	Unknown or other

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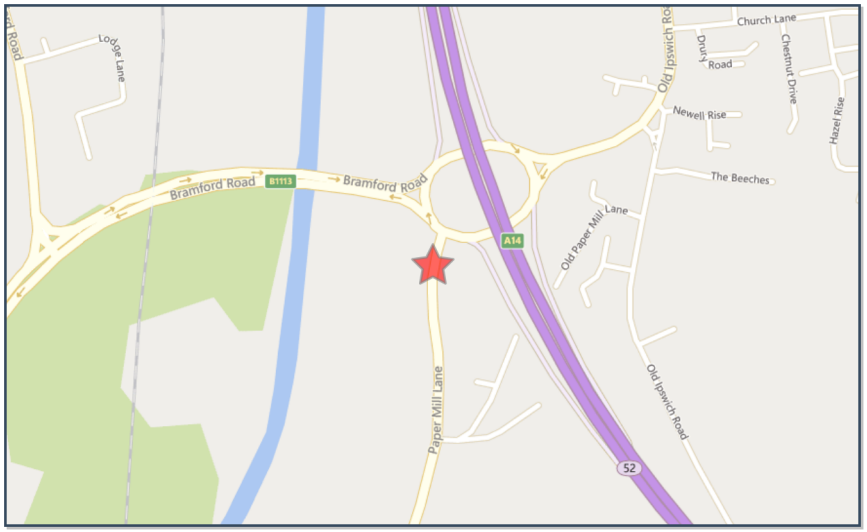
Validated Data

Crash Date:	Friday, October 05, 2018	**Time of Crash:**	8:27:00 AM	**Crash Reference:**	**2018370338860**

Highest Injury Severity:	Slight	**Road Number:**	U0	**Number of Casualties:**	2
Highway Authority:	Suffolk			**Number of Vehicles:**	2
Local Authority:	Mid Suffolk District			**OS Grid Reference:**	612846 249443
Weather Description:	Fine without high winds				
Road Surface Description:	Wet or Damp				
Speed Limit:	60				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Roundabout				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Single carriageway				
Junction Control:	Give way or uncontrolled				



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Validated Data

Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	11	Female	36 - 45	Vehicle is moving off	Front	Commuting to/from work	None	None
2	Car (excluding private hire)	14	Female	46 - 55	Vehicle is waiting to proceed normally but is held up	Back	Commuting to/from work	None	None

Casualties

Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Driver or rider	Female	36 - 45	Unknown or other	Unknown or other
2	2	Slight	Vehicle or pillion passenger	Male	36 - 45	Unknown or other	Unknown or other

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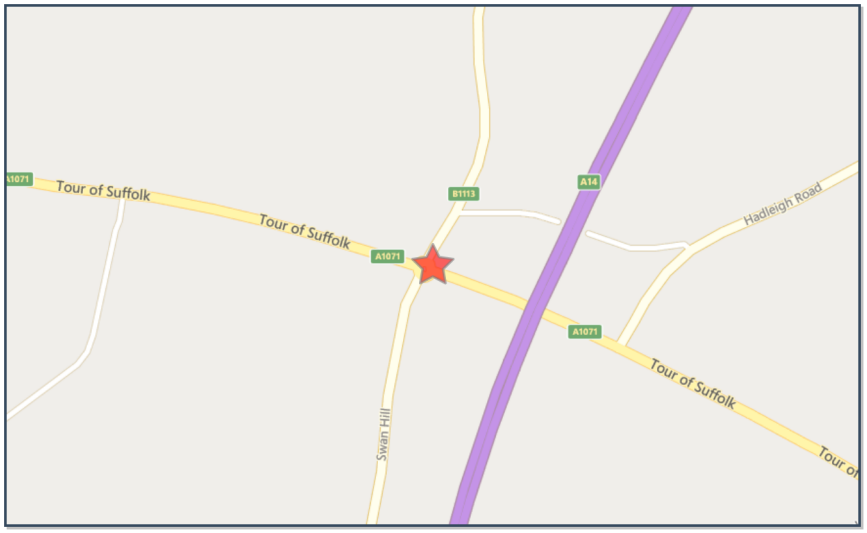
Validated Data

Crash Date:	Thursday, November 28, 2019	**Time of Crash:**	6:35:00 PM	**Crash Reference:**	**2019370927135**

Highest Injury Severity:	Slight	**Road Number:**	A1071	**Number of Casualties:**	1
Highway Authority:	Suffolk			**Number of Vehicles:**	2
Local Authority:	Babergh District			**OS Grid Reference:**	612358 243647
Weather Description:	Raining without high winds				
Road Surface Description:	Wet or Damp				
Speed Limit:	30				
Light Conditions:	Darkness: street lights present and lit				
Carriageway Hazards:	None				
Junction Detail:	Roundabout				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Single carriageway				
Junction Control:	Give way or uncontrolled				



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Validated Data

Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	3	Female	26 - 35	Vehicle proceeding normally along the carriageway, not on a bend	Nearside	Journey as part of work	None	None
2	Car (excluding private hire)	8	Male	46 - 55	Vehicle is in the act of turning right	Offside	Other	None	None

Casualties

Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Driver or rider	Female	26 - 35	Unknown or other	Unknown or other

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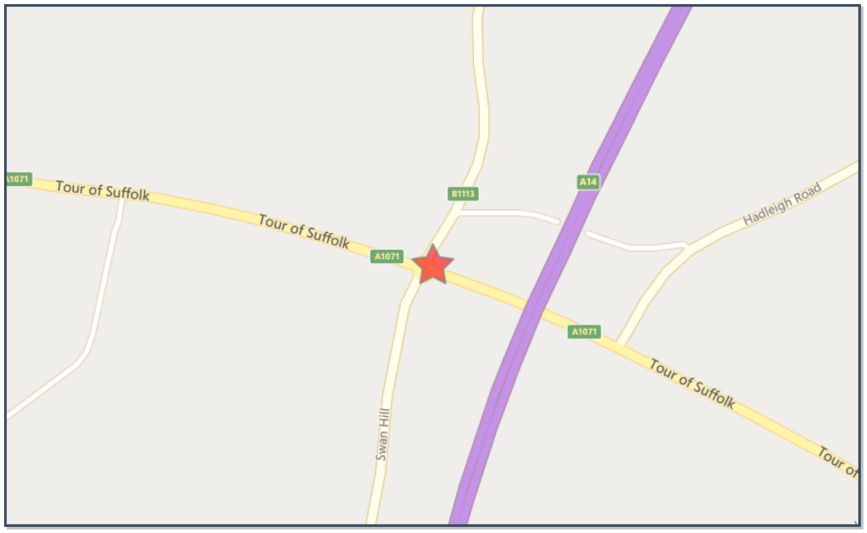
Validated Data

Crash Date:	Sunday, November 08, 2020	**Time of Crash:**	12:00:00 PM	**Crash Reference:**	**2020371003468**

Highest Injury Severity:	Slight	**Road Number:**	A1071	**Number of Casualties:**	1
Highway Authority:	Suffolk			**Number of Vehicles:**	2
Local Authority:	Babergh District			**OS Grid Reference:**	612360 243642
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	30				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Roundabout				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Roundabout				
Junction Control:	Give way or uncontrolled				



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Validated Data

Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	8	Male	46 - 55	Vehicle proceeding normally along the carriageway, not on a bend	Front	Other	None	None
2	Pedal cycle	-1	Male	46 - 55	Vehicle proceeding normally along the carriageway, not on a bend	Nearside	Other	None	None

Casualties

Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
2	1	Slight	Driver or rider	Male	46 - 55	Unknown or other	Unknown or other

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609000 609500 610000 610500

246500 246000

Track Track Track BULLEN LANE BULLEN LANE Track Track

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

Works No.s Overview

Tye Lane Woodlands Farm Black Cottage Tye Lane Bullen Hall Farm Channel Hill Farm Burstallhill

69 65 64 67 62 63 66 68

EA THREE DCO Corridor
EA THREE Onshore Converter Station Layout Detail
EA THREE Onshore Converter Station Temporary Site Facilities Detail

EA THREE Converter Substation to National Grid Substation Cable Route
400kV AC Cable - Open Cut Section
400kV AC Cable - Ducted Section

EA THREE Onshore Converter Station Access Roads
Permanent
Temporary

EA THREE Cable Access Road
Haul Road
EA THREE Onshore Converter Station SUDs Pond
EA THREE Area to be Reprofiled

EA ONE Onshore Converter Station Access Road

Works No.s
65 62 66 63 67 64 68 69

GoBe consultants

Rev	Date	By	Comment
B	04/04/2022	PW	Second Issue
A	31/03/2022	JRS	First Issue

Original A3 Plot Scale 1:5,000

0 100 200 Metres

Onshore Converter Station Stage

Figure 1: Site Context Plan

Drg No	05356.00006.12.0001.1 ONCS Site Context Plan
Rev	2
Date	04/04/2022
Layout	N/A

Document Path: P:\05356 - GoBe Consultants Ltd\00006 East Anglia Three\Tech\GIS\Dwgs\Wking\EA3\Onshore Substation\ONCS and Commencement Master\5356.00006.12.0020.1 ONCS Site Context.mxd