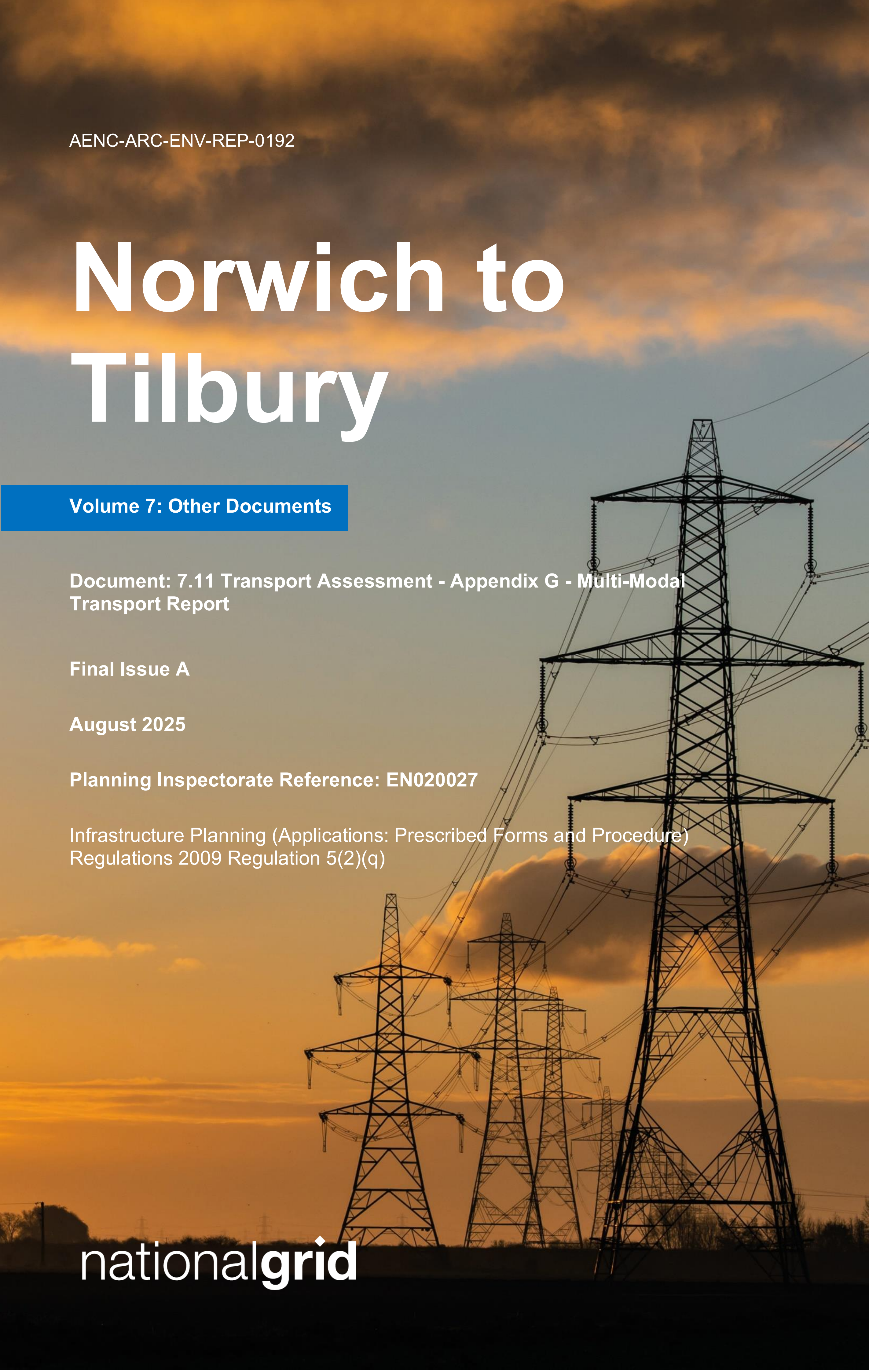

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Contents

Appendix G
Multi-modal Strategy

G.1 Introduction

G.1.1 This document has been produced as an appendix to the Transport Assessment (TA) (document reference 7.11) for Norwich to Tilbury (the 'Project'), submitted as part of the Development Consent Order (DCO) application.

G.1.2 This Appendix consists of two parts: Multi-Modal Transport Report and Multi-Modal Assessment Sensitivity Test.

G.2 Multi-Modal Transport Report

Please refer to Annex A. This report informs and therefore should be read before G.3.

G.3 Multi-modal Assessment Sensitivity Test

G.3.1 The multi-modal assessment analyses the traffic impacts associated with the transportation of construction materials for the Project planned works from ports / sidings to the construction Primary Access Sites. There are two scenarios to be analysed.

- Scenario 1: This scenario assumes a 'just-in-time' delivery profile, aligned with the anticipated construction program. Materials are assumed to be delivered at a consistent rate to match the needs of each construction activity. It does not account for the stockpiling of materials within the proposed construction laydown areas or the construction corridor
- Scenario 2: This scenario assumes a 'front-loaded' delivery profile, based on the anticipated construction program. Under this scenario, materials are delivered at the maximum feasible rate, as determined by the credible throughput capacity of multi-modal facilities (e.g., ports and rail sidings). Deliveries commence with the first activity at each Primary Access Route (PAR) and continue until the full quantity of material required for that PAR has been supplied.

G.3.2 As defined in the Multi-Mode Transport Report the construction vehicles that will be analysed are maximum legal Heavy Goods Vehicles (HGV) size and weights, excluding abnormal indivisible load vehicles that are assessed in the Appendix A within the Outline Construction Traffic Management Plan (CTMP) (document reference 7.3). The traffic assessment of the multi-modal scenarios has assumed that the Light Goods Vehicles (LGV) movements and routeing remain consistent across both options and are the same as the ones considered for the Transport Assessment.

G.3.3 The multi-modal routes from the ports / sidings to each PAR are listed in Table G.1 below. The routes on the Strategic Road Network (SRN) / Majo Road Network (MRN) and the location of the ports / sidings are shown on Figure 6: Transport Assessment – Multi-Modal Routeing in Appendix I.

Table G.1 Multi-modal routes

Port / Siding	PAR	Route
Trowse Newton	H01-A1	A1054 / A146 / A47 / Link PAR 1 - A140 Ipswich Road / Link PAR 2 - Mangreen Lane
	H01-A2	A1054 / A146 / A47 / A11 / Link PAR 3 - Stansfield Road / Wymondham Road / Link PAR 4 - B1113 / Link PAR 5 - Wymondham Road
	H02-A1	A1054 / A146 / A47 / A11 / Link PAR 3 - Stansfield Road / Wymondham Road / Link PAR 4 - B1113 / Link PAR 6 - Fundenhall Road
Port of Great Yarmouth	H03-A1	A1243 / A1154 / A47 / A11 / Link PAR 3 - Stansfield Road / Wymondham Road / Link PAR 4 - B1113 / Link PAR 6 - Fundenhall Road
	H03-A2 H04-A1	A1243 / A1154 / A47 / Link PAR 1 - A140 Ipswich Road / Link PAR 7 - B1134 Station Road / B1134 Long Row
	H04-A2 H05-A1	A1243 / A1154 / A47 / Link PAR 1 - A140 Ipswich Road / Link PAR 8 – A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road
	H05-A2	A1243 / A1154 / A47 / Link PAR 1 - A140 Ipswich Road / Link PAR 10 - A143 Old Bury Road / Link PAR 11 - Lion Road
	H06-A1	A1243 / A1154 / A47 / Link PAR 1 - A140 Ipswich Road / Link PAR 10 - A143 Old Bury Road
	H06-A2	A1243 / A1154 / A47 / Link PAR 1 - A140 Ipswich Road / Link PAR 10 - A143 Old Bury Road / Link PAR 12 - B1113 Finningham Road / B1113 Walsham Road / Link PAR 13 - Wickham Road / Link PAR 14 - Eastland Lane / Link PAR 15 - Thornham Road
	H07-A1	A1243 / A1154 / A47 / Link PAR 1 - A140 Ipswich Road / Link PAR 10 - A143 Old Bury Road / Link PAR 12 - B1113 Finningham Road / B1113 Walsham Road / Link PAR 13 - Wickham Road
Kennett Sidings	H07-A2 H08-A1	Icknield Wy / A14 / Link PAR 16 - A1120 Church Road / A1120 Bell’s Lane
	H09-A1	Icknield Wy / A14 / Link PAR 17 - A1120 south of A14 J50 / Link PAR 18 - Mill Lane
	H10-A1	Icknield Wy / A14 / Link PAR 17 - A1120 south of A14 J50 / Link PAR 19 - B1113 Needham Road / B1113 Stowmarket Road

Port / Siding	PAR	Route
Barham Sidings	H10-A2 H11-A1	Pesthouse Lane / Norwich Rd / A140 / A14 / Link PAR 20 - B1113 Bramford Road / B1113 Loraine Way / Link PAR 21 - Bullen Lane
Port of Ipswich Siding	H11-A2 H12-A1	A137 / A14 / Link PAR 22 - A1214 London Road / Link PAR 23 - A1071
	H12-A2 H13-A1	A137 / A14 / A12 / Link PAR 24 - B1070 (A12 access) / Link PAR 25 - B1070 Hadleigh Road
	H14-A1	A137 / A14 / A12 / Link PAR 26 - Ipswich Road
	H15-A1	A137 / A14 / A12 / Link PAR 27 - Birchwood Road / Link PAR 28 - Wick Road / Grove Hill / Link PAR 29 - Perry Lane
	H16-A1	A137 / A14 / A12 / Link PAR 27 - Birchwood Road
Port of Harwich	H17-A2	A136 / A120 / Link PAR 30 - Bentley Road / Link PAR 31 - Ardleigh Road / Little Bromley Road
	H18-A1	A136 / A120 / A12 / Link PAR 33 - Old Ipswich Road / Link PAR 32 - Wick Lane
	H19-A1	A136 / A120 / A12 / Link PAR 33 - Old Ipswich Road / Link PAR 34 - Turnpike Close
	H19-A2 H20-A1	A136 / A120 / A12 / Link PAR 35 - A1341 Via Urbis Romanae / Link PAR 36 - A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway
	H20-A2	A136 / A120 / A12 / Link PAR 37 - A1124 Halsted Road / Link PAR 38 - Mill Road
	H21-A1 H22-A1	A136 / A120 / A12 / Link PAR 37 - A1124 Halsted Road
	H25-A1	A136 / A120 / A12 / Link PAR 42 - B1389 Hatfield Road / Link PAR 43 - Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill
Marks Tey Sidings	H23-A1	A136 / A120 / A12 / A120 / Link PAR 39 - Great Tey Road
	H24-A1	A136 / A120 / A12 / A120
	H24-A2	A136 / A120 / A12 / A120 / Link PAR 41 - B1018 Braintree Road / B1018 Witham Road
	H25-A2	A136 / A120 / A12 / A120 / Link PAR 44 - A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road

Port / Siding	PAR	Route
	H26-A1	A136 / A120 / A12 / A120 / Link PAR 44 - A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road / Link PAR 45 - B1008 Essex Regiment Way
	H27-A1	A136 / A120 / A12 / A120 / Link PAR 44 - A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road / Link PAR 46 - B1008 Braintree Road / B1008 Main Road / Link PAR 47 - Chatham Hall Lane
	H28-A1	A136 / A120 / A12 / A120 / Link PAR 44 - A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road / Link PAR 46 - B1008 Braintree Road / B1008 Main Road / Link PAR 48 - Chelmsford Road
Chelmsford Sidings	H28-A2	B1008 / A1016 / A1060 / Link PAR 51 - A1060 Rainsford Road / A1060 Roxwell Road
	H29-A1	B1008 / A1016 / A1060 / Link PAR 51 - A1060 Rainsford Road / A1060 Roxwell Road / Link PAR 52 - Vicarage road
	H29-A2 H30-A1	B1008 / A1016 / Link PAR 50 - A1016 Waterhouse Lane / A1016 Rainsford Lane / Link PAR 53 - A414 Greenbury Way / A414 Ongar Road
Port of Tilbury	H30-A2	A1089 / A13 / M25 / A12 / Link PAR 54 - B1002 Main Road / Link PAR 55 - Wantz Road / Link PAR 56 - Ivy Barns Lane
	H31-A1 H32-A1	A1089 / A13 / M25 / A12 / Link PAR 54 - B1002 Main Road / Link PAR 57 - Church Lane
	H33-A1	A1089 / A13 / Link PAR 63 - A128 Brentwood Road / A127 / Link PAR 58 - A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road / Link PAR 59 - A129 Sun Street / A129 London Road / A129 Rayleigh Road
	H33-A2	A1089 / A13 / Link PAR 63 - A128 Brentwood Road / A127 / Link PAR 60 - Dunton Road / Brentwood Road
	H34-A1	A1089 / A13 / Link PAR 63 - A128 Brentwood Road / A127 / Link PAR 61 - B148 West Mayne / Link PAR 62 - Lower Dunton Road
	H35-A1	A1089 / A13 / Link PAR 63 - A128 Brentwood Road
	H36-A1	A1089 / A13 / Link PAR 64 - A1013 Stanford Road (east of Orsett Cock Roundabout) / Link PAR 65 - Buckingham Hill Road
	H37-A1	A1089 / A13 / Link PAR 66 - Brentwood Road

Port / Siding	PAR	Route
	H38-A1	A1089 / A13 / Link PAR 67 - A1013 Stanford Road (west of Orsett Cock Roundabout)
	H39-A1	A1089 / A13 / Link PAR 67 - A1013 Stanford Road (west of Orsett Cock Roundabout) / Link PAR 68 - Heath Road
	H40-A1	A1089 / A126 / Link PAR 69 - Chadwell Hill / Link PAR 70 - Linford Road / Link PAR 71 - Muckingford Road

G.3.4 The multi-modal route scenarios have been analysed to determine the potential increases in traffic volumes, particularly HGV movements, and assess the capacity of affected road networks to accommodate these changes. The analysis focuses on the SRN, MRN, PARs and local roads that access the multi-modal ports / sidings impacted by the construction logistics.

Strategic Road Network / Major Road Network

G.3.5 In the Multi-modal Scenario 1 the maximum increase in HGV and total traffic remains below the 30% threshold across all the SRN and MRN assessed routes. This suggests that this scenario maintain manageable traffic impacts during construction.

G.3.6 In contrast, Multi-modal Scenario 2 demonstrates significant increases in HGV volumes on several key routes such as the A47 (between A140 and A146), A140 (between A47 and A143) and A120 (between B1035 and A133), exceeding the 30% threshold. These increases are projected for durations ranging from one to 160 weeks, potentially causing impacts on traffic flow and road user experience. In this scenario, measures such as traffic management plans and scheduling strategies would be critical to minimise disruption during the construction period.

Primary Access Routes

G.3.7 The analysis of the local roads on the PARs shows that in the Multi-modal Scenario 1 the HGV movements are overall more evenly distributed over a longer period of time with durations between 4 months and 3 years. This results in similar or lower peak HGV traffic volumes compared to the TA scenario, where HGV trips are more concentrated within shorter timeframes. Therefore, this would cause a reduction in traffic impacts, making it potentially less disruptive to the local road network during the construction period. The temporary impact of the construction flows on the road links forming the PARs during the AM and PM peak hours are listed in Table G.2 and Table G.3 below.

G.3.8 The percentage increases in some of the roads are significantly high despite of low construction traffic volumes, i.e. Eastland Lane (Link PAR 14) or Church Lane (Link PAR 57). This is mainly due to the low future baseline traffic.

G.3.9 On sensitive roads where the traffic increases over 10%, i.e. Wick Road (Link PAR 28) or A1013 Stanford Road (east of Orsett Cock Roundabout) (Link PAR 66), the total future flows in these road links are not expected to have a material impact as generally occur over a short duration (one week).

G.3.10 The largest increase in traffic is expected on the route along Bentley Road and Ardleigh Road / Little Bromley Road with an increase of 175 construction vehicles per hour (162 LGVs and 13 HGVs). This is expected to have a maximum duration of one week.

G.3.11 In the Multi-modal Scenario 2 the overall number of HGVs is in general higher than in the TA scenario. This increase is due to the fact that the HGV movements are concentrated on a shorter period of time (2027-2028) with durations between two weeks and 12 months. The shorter timeframe in the Multi-modal Scenario 2 would lead to higher short-term impacts on the PARs. The impact of the construction flows on the road links forming the PARs during the AM and PM peak hours are listed in Table G.4 and Table G.5.

G.3.12 In this scenario, the percentage increases in the PARs are higher than in the Multi-modal Scenario 1. There are additional sensitive roads with traffic increases over 10%, i.e. B1113 Finningham Road / B1113 Walsham Road (Link PAR 12) or B1002 Main Road (Link PAR 54). It is expected that the duration in these road links is between one and four weeks.

G.3.13 The duration of the peak in A143 Old Bury Road (Link PAR 10) is of 160 weeks. The analysis of the peak construction traffic volumes in this link shows that the maximum number of LGV movements is higher than the HGVs (maximum of 56 HGVs with a duration of one week) . As a result, it is the LGV traffic that contributes more significantly to the estimation of the worst-case construction traffic and these LGV movements are expected to be more extended in time than the HGV movements.

G.3.14 A comparison of the multi-modal scenarios and the TA scenario for the PARs are presented in Table G.6 for the AM peak and Table G.7 for the PM peak.

Table G.2 AM peak (various) net increase of construction traffic – multi-modal scenario 1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Norfolk	Link PAR 1	A140 Ipswich Road	2028	2,262	2,929	3,024	95	95	0	3%	3
	Link PAR 2	Mangreen Lane	2028	52	80	132	52	52	0	65%	3
	Link PAR 3	Stansfield Road / Wymondham Road	2027	631	631	657	26	0	26	4%	13
	Link PAR 4	B1113	2027	566	566	581	15	0	15	3%	13
	Link PAR 5	Wymondham Road	2027	157	157	167	11	0	11	7%	22
	Link PAR 6	Fundenhall Road	2027	220	220	235	15	0	15	7%	13
	Link PAR 7	B1134 Station Road / B1134 Long Row	2028	360	360	390	30	6	24	8%	1
	Link PAR 8	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road	2028	822	822	837	15	0	15	2%	1
	Link PAR 9	A1066 High Road / A1066 Low Road / A1066 Diss Road /A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road	2028	635	635	650	15	0	15	2%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
		(alternative to PAR 8)									
Suffolk	Link PAR 10	A143 Old Bury Road	2027	651	651	750	99	80	19	15%	1
	Link PAR 11	Lion Road	2027	346	346	354	8	0	8	2%	4
	Link PAR 12	B1113 Finningham Road / B1113 Walsham Road	2028	290	290	308	19	0	19	6%	21
	Link PAR 13	Wickham Road	2028	217	217	236	19	0	19	9%	21
	Link PAR 14	Eastland Lane	2028	4	4	13	8	0	8	198%	21
	Link PAR 15	Thornham Road	2028	122	122	127	6	0	6	5%	21
	Link PAR 16	A1120 Church Road / A1120 Bell's Lane	2028	1,228	1,349	1,374	25	6	19	2%	13
	Link PAR 17	A1120 south of A14 J50	2028	1,618	1,618	1,632	15	0	15	1%	13
	Link PAR 18	Mill Lane	2028	139	139	142	3	0	3	2%	13
	Link PAR 19	B1113 Needham Road / B1113 Stowmarket Road	2028	992	997	1,009	11	0	11	1%	32
	Link PAR 20	B1113 Bramford Road / B1113 Loraine Way	2028	620	625	699	74	62	12	12%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 21	Bullen Lane	2028	11	16	89	74	62	12	474%	1
	Link PAR 22	A1214 London Road	2028	1,249	1,375	1,411	37	0	37	3%	15
	Link PAR 23	A1071	2028	1,059	1,168	1,205	37	0	37	3%	15
	Link PAR 24	B1070 (A12 access)	2029	563	577	635	59	56	3	10%	1
	Link PAR 25	B1070 Hadleigh Road	2029	708	722	781	59	56	3	8%	1
Essex	Link PAR 26	Ipswich Road	2029	207	207	249	42	40	2	20%	1
	Link PAR 27	Birchwood Road	2028	373	373	405	32	26	6	9%	5
	Link PAR 28	Wick Road / Grove Hill	2030	28	28	34	6	6	0	21%	1
	Link PAR 29	Perry Lane	2030	12	12	18	6	6	0	51%	1
	Link PAR 30	Bentley Road	2028	142	280	454	175	162	13	62%	1
	Link PAR 31	Ardleigh Road / Little Bromley Road	2028	22	46	221	175	162	13	381%	1
	Link PAR 32	Wick Lane	2028	138	138	147	10	0	10	7%	22
	Link PAR 33	Old Ipswich Road	2028	246	376	393	17	0	17	4%	22

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 34	Turnpike Close	2028	54	61	68	7	0	7	12%	22
	Link PAR 35	A1341 Via Urbis Romanae	2028	1,411	1,411	1,514	103	76	27	7%	1
	Link PAR 36	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	2028	1,231	1,231	1,333	103	76	27	8%	1
	Link PAR 37	A1124 Halsted Road	2027	2,060	2,060	2,071	11	0	11	1%	22
	Link PAR 38	Mill Road	2028	213	213	217	4	0	4	2%	3
	Link PAR 39	Great Tey Road	2027	239	239	255	15	6	9	6%	23
	Link PAR 40	A120 Colchester Road	2028	1,976	2,030	2,123	92	48	44	5%	1
	Link PAR 41	B1018 Braintree Road / B1018 Witham Road	2028	1,098	1,187	1,198	11	0	11	1%	5
	Link PAR 42	B1389 Hatfield Road	2027	1,260	1,260	1,273	13	0	13	1%	9
	Link PAR 43	Spinks Lane / Highfields Road / Spa Road / Flora	2027	737	737	750	13	0	13	2%	9

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
		Road / Faulkbourne Road / Church Hill									
	Link PAR 44	A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road	2028	1,621	1,871	1,993	123	106	17	7%	1
	Link PAR 45	B1008 Essex Regiment Way	2027	1,249	1,249	1,251	2	0	2	0%	18
	Link PAR 46	B1008 Braintree Road / B1008 Main Road	2028	1,205	1,226	1,240	14	0	14	1%	19
	Link PAR 47	Chatham Hall Lane	2028	75	75	79	4	0	4	5%	19
	Link PAR 48	Chelmsford Road	2028	497	497	508	11	0	11	2%	21
	Link PAR 49	A414 Three Mile Hill / A1114 London Road	2028	2,093	2,093	2,115	21	0	21	1%	21
	Link PAR 50	A1016 Waterhouse Lane / A1016 Rainsford Lane	2028	1,416	1,416	1,428	12	0	12	1%	21
	Link PAR 51	A1060 Rainsford Road / A1060 Roxwell Road	2028	1,052	1,052	1,064	12	0	12	1%	21
	Link PAR 52	Vicarage road	2028	169	169	172	3	0	3	2%	21

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 53	A414 Greenbury Way / A414 Ongar Road	2028	1,334	1,334	1,344	9	0	9	1%	21
	Link PAR 54	B1002 Main Road	2028	549	549	579	30	0	30	5%	4
	Link PAR 55	Wantz Road	2028	518	518	527	9	0	9	2%	21
	Link PAR 56	Ivy Barns Lane	2028	122	122	131	9	0	9	8%	21
	Link PAR 57	Church Lane	2028	5	5	26	21	0	21	390%	16
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road	2028	1,397	1,397	1,410	13	0	13	1%	16
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (one-way system)	2028	525	525	532	6	0	6	1%	16
	Link 0PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road (one-way system)	2028	1,005	1,005	1,011	6	0	6	1%	16
	Link PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road	2028	1,069	1,069	1,082	13	0	13	1%	16

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 60	Dunton Road / Brentwood Road	2028	1,122	1,122	1,131	10	0	10	1%	16
	Link PAR 61	B148 West Mayne	2028	1,931	1,931	1,945	14	3	11	1%	14
	Link PAR 62	Lower Dunton Road	2028	496	496	510	14	3	11	3%	14
Thurrock	Link PAR 63	A128 Brentwood Road	2028	1,403	1,409	1,440	31	0	31	2%	14
	Link PAR 64	A1013 Stanford Rd (east of Orsett Cock Roundabout)	2028	735	809	891	83	82	1	10%	1
	Link PAR 65	Buckingham Hill Rd	2028	665	805	888	83	82	1	10%	1
	Link PAR 66	Brentwood Rd	2028	1,126	1,184	1,269	85	82	3	7%	1
	Link PAR 67	A1013 Stanford Rd (west of Orsett Cock Roundabout)	2028	1,421	1,438	1,534	96	36	60	7%	1
	Link PAR 68	Heath Rd	2028	288	288	371	83	30	53	29%	2
	Link PAR 69	Chadwell Hill	2028	569	575	604	29	29	0	5%	1
	Link PAR 70	Linford Rd	2028	712	775	804	29	29	0	4%	1
	Link PAR 71	Muckingford Rd	2028	290	351	380	29	29	0	8%	1

Table G.3 PM peak (various) net increase of construction traffic – multi-modal scenario 1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Norfolk	Link PAR 1	A140 Ipswich Road	2028	2,289	3,002	3,097	95	95	0	3%	3
	Link PAR 2	Mangreen Lane	2028	66	94	146	52	52	0	55%	3
	Link PAR 3	Stansfield Road / Wymondham Road	2027	589	589	615	26	0	26	4%	13
	Link PAR 4	B1113	2027	434	434	450	15	0	15	4%	13
	Link PAR 5	Wymondham Road	2027	157	157	168	11	0	11	7%	22
	Link PAR 6	Fundenhall Road	2027	214	214	230	15	0	15	7%	13
	Link PAR 7	B1134 Station Road / B1134 Long Row	2028	351	351	381	30	6	24	9%	1
	Link PAR 8	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road	2028	889	889	904	15	0	15	2%	1
	Link PAR 9	A1066 High Road / A1066 Low Road / A1066 Diss Road /A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road	2028	694	694	709	15	0	15	2%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
		(alternative to PAR 8)									
Suffolk	Link PAR 10	A143 Old Bury Road	2027	654	654	754	99	80	19	15%	1
	Link PAR 11	Lion Road	2027	318	318	326	8	0	8	2%	4
	Link PAR 12	B1113 Finningham Road / B1113 Walsham Road	2028	287	287	305	19	0	19	6%	21
	Link PAR 13	Wickham Road	2028	210	210	229	19	0	19	9%	21
	Link PAR 14	Eastland Lane	2028	3	3	12	8	0	8	248%	21
	Link PAR 15	Thornham Road	2028	113	113	119	6	0	6	5%	21
	Link PAR 16	A1120 Church Road / A1120 Bell's Lane	2028	1,155	1,268	1,293	25	6	19	2%	13
	Link PAR 17	A1120 south of A14 J50	2028	1,603	1,603	1,618	15	0	15	1%	13
	Link PAR 18	Mill Lane	2028	91	91	94	3	0	3	4%	13
	Link PAR 19	B1113 Needham Road / B1113 Stowmarket Road	2028	1,130	1,135	1,146	11	0	11	1%	32
	Link PAR 20	B1113 Bramford Road / B1113 Loraine Way	2028	635	640	713	74	62	12	11%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 21	Bullen Lane	2028	11	16	89	74	62	12	474%	1
	Link PAR 22	A1214 London Road	2028	1,519	1,639	1,676	37	0	37	2%	15
	Link PAR 23	A1071	2028	1,223	1,330	1,366	37	0	37	3%	15
	Link PAR 24	B1070 (A12 access)	2029	530	545	604	59	56	3	11%	1
	Link PAR 25	B1070 Hadleigh Road	2029	710	725	783	59	56	3	8%	1
Essex	Link PAR 26	Ipswich Road	2029	183	183	225	42	40	2	23%	1
	Link PAR 27	Birchwood Road	2028	349	349	382	32	26	6	9%	5
	Link PAR 28	Wick Road / Grove Hill	2030	28	28	34	6	6	0	21%	1
	Link PAR 29	Perry Lane	2030	16	16	22	6	6	0	38%	1
	Link PAR 30	Bentley Road	2028	93	231	406	175	162	13	76%	1
	Link PAR 31	Ardleigh Road / Little Bromley Road	2028	17	41	215	175	162	13	430%	1
	Link PAR 32	Wick Lane	2028	154	154	163	10	0	10	6%	22
	Link PAR 33	Old Ipswich Road	2028	214	349	366	17	0	17	5%	22

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 34	Turnpike Close	2028	81	107	114	7	0	7	7%	22
	Link PAR 35	A1341 Via Urbis Romanae	2028	1,514	1,514	1,616	103	76	27	7%	1
	Link PAR 36	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	2028	1,206	1,206	1,309	103	76	27	9%	1
	Link PAR 37	A1124 Halsted Road	2027	2,037	2,037	2,048	11	0	11	1%	22
	Link PAR 38	Mill Road	2028	214	214	217	4	0	4	2%	3
	Link PAR 39	Great Tey Road	2027	240	240	255	15	6	9	6%	23
	Link PAR 40	A120 Colchester Road	2028	1,934	1,990	2,082	92	48	44	5%	1
	Link PAR 41	B1018 Braintree Road / B1018 Witham Road	2028	1,352	1,423	1,434	11	0	11	1%	5
	Link PAR 42	B1389 Hatfield Road	2027	1,481	1,481	1,494	13	0	13	1%	9
	Link PAR 43	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill	2027	932	932	945	13	0	13	1%	9

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 44	A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road	2028	1,904	2,172	2,295	123	106	17	6%	1
	Link PAR 45	B1008 Essex Regiment Way	2027	833	833	835	2	0	2	0%	18
	Link PAR 46	B1008 Braintree Road / B1008 Main Road	2028	1,163	1,184	1,198	14	0	14	1%	19
	Link PAR 47	Chatham Hall Lane	2028	93	93	97	4	0	4	4%	19
	Link PAR 48	Chelmsford Road	2028	491	491	502	11	0	11	2%	21
	Link PAR 49	A414 Three Mile Hill / A1114 London Road	2028	2,424	2,424	2,445	21	0	21	1%	21
	Link PAR 50	A1016 Waterhouse Lane / A1016 Rainsford Lane	2028	1,536	1,536	1,548	12	0	12	1%	21
	Link PAR 51	A1060 Rainsford Road / A1060 Roxwell Road	2028	963	963	975	12	0	12	1%	21
	Link PAR 52	Vicarage road	2028	169	169	173	3	0	3	2%	21
	Link PAR 53	A414 Greenbury Way / A414 Ongar Road	2028	1,330	1,330	1,339	9	0	9	1%	21

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 54	B1002 Main Road	2028	470	470	500	30	0	30	6%	4
	Link PAR 55	Wantz Road	2028	320	320	329	9	0	9	3%	21
	Link PAR 56	Ivy Barns Lane	2028	105	105	115	9	0	9	9%	21
	Link PAR 57	Church Lane	2028	4	4	24	21	0	21	513%	16
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road	2028	1,380	1,380	1,393	13	0	13	1%	16
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (one-way system)	2028	678	678	685	6	0	6	1%	16
	Link 0PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road (one-way system)	2028	822	822	828	6	0	6	1%	16
	Link PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road	2028	1,164	1,164	1,177	13	0	13	1%	16
	Link PAR 60	Dunton Road / Brentwood Road	2028	893	893	903	10	0	10	1%	16
	Link PAR 61	B148 West Mayne	2028	2,109	2,109	2,123	14	3	11	1%	14

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 62	Lower Dunton Road	2028	461	461	475	14	3	11	3%	14
Thurrock	Link PAR 63	A128 Brentwood Road	2028	1,381	1,387	1,417	31	0	31	2%	14
	Link PAR 64	A1013 Stanford Rd (east of Orsett Cock Roundabout)	2028	923	997	1,079	83	82	1	8%	1
	Link PAR 65	Buckingham Hill Rd	2028	749	889	972	83	82	1	9%	1
	Link PAR 66	Brentwood Rd	2028	1,141	1,199	1,283	85	82	3	7%	1
	Link PAR 67	A1013 Stanford Rd (west of Orsett Cock Roundabout)	2028	1,204	1,220	1,316	96	36	60	8%	1
	Link PAR 68	Heath Rd	2028	356	356	439	83	30	53	23%	2
	Link PAR 69	Chadwell Hill	2028	766	772	801	29	29	0	4%	1
	Link PAR 70	Linford Rd	2028	851	914	943	29	29	0	3%	1
	Link PAR 71	Muckingford Rd	2028	382	443	472	29	29	0	7%	1

Table G.4 AM peak (various) net increase of construction traffic – multi-modal scenario 2

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Norfolk	Link PAR 1	A140 Ipswich Road	2028	2,262	2,929	3,024	95	95	0	3%	3
	Link PAR 2	Mangreen Lane	2028	52	80	132	52	52	0	65%	3
	Link PAR 3	Stansfield Road / Wymondham Road	2027	631	631	663	32	0	32	5%	1
	Link PAR 4	B1113	2027	566	566	598	32	0	32	6%	1
	Link PAR 5	Wymondham Road	2027	157	157	178	22	0	22	14%	7
	Link PAR 6	Fundenhall Road	2027	220	220	252	32	0	32	15%	1
	Link PAR 7	B1134 Station Road / B1134 Long Row	2027	357	357	421	64	6	58	18%	2
	Link PAR 8	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road	2027	814	814	863	48	0	48	6%	2
	Link PAR 9	A1066 High Road / A1066 Low Road / A1066 Diss Road /A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road	2027	629	629	677	48	0	48	8%	2

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
		(alternative to PAR 8)									
Suffolk	Link PAR 10	A143 Old Bury Road	2027	651	651	731	80	80	0	12%	160
	Link PAR 11	Lion Road	2027	346	346	375	28	0	28	8%	1
	Link PAR 12	B1113 Finningham Road / B1113 Walsham Road	2027	288	288	346	58	0	58	20%	3
	Link PAR 13	Wickham Road	2027	216	216	274	58	0	58	27%	3
	Link PAR 14	Eastland Lane	2027	4	4	36	32	0	32	769%	1
	Link PAR 15	Thornham Road	2027	121	121	143	21	0	21	18%	1
	Link PAR 16	A1120 Church Road / A1120 Bell's Lane	2027	1,221	1,342	1,378	36	6	30	3%	6
	Link PAR 17	A1120 south of A14 J50	2027	1,608	1,608	1,640	32	0	32	2%	1
	Link PAR 18	Mill Lane	2027	138	138	149	11	0	11	8%	6
	Link PAR 19	B1113 Needham Road / B1113 Stowmarket Road	2027	986	991	1,023	32	0	32	3%	1
	Link PAR 20	B1113 Bramford Road / B1113 Loraine Way	2028	620	625	729	104	66	38	17%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 21	Bullen Lane	2028	11	16	119	104	66	38	670%	1
	Link PAR 22	A1214 London Road	2028	1,249	1,375	1,446	71	0	71	5%	1
	Link PAR 23	A1071	2028	1,059	1,168	1,239	71	0	71	6%	1
	Link PAR 24	B1070 (A12 access)	2029	563	577	633	56	56	0	10%	1
	Link PAR 25	B1070 Hadleigh Road	2029	708	722	778	56	56	0	8%	1
Essex	Link PAR 26	Ipswich Road	2028	206	206	249	43	28	15	21%	1
	Link PAR 27	Birchwood Road	2028	373	373	413	41	26	15	11%	1
	Link PAR 28	Wick Road / Grove Hill	2027	28	28	42	14	2	12	52%	1
	Link PAR 29	Perry Lane	2027	11	11	26	14	2	12	125%	1
	Link PAR 30	Bentley Road	2028	142	280	442	162	162	0	58%	1
	Link PAR 31	Ardleigh Road / Little Bromley Road	2028	22	46	208	162	162	0	353%	1
	Link PAR 32	Wick Lane	2027	137	137	175	38	0	38	28%	1
	Link PAR 33	Old Ipswich Road	2027	244	374	422	48	0	48	13%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 34	Turnpike Close	2027	53	60	84	24	0	24	39%	1
	Link PAR 35	A1341 Via Urbis Romanae	2027	1,402	1,402	1,480	78	2	76	6%	4
	Link PAR 36	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	2027	1,223	1,223	1,301	78	2	76	6%	4
	Link PAR 37	A1124 Halsted Road	2027	2,060	2,060	2,110	51	0	51	2%	2
	Link PAR 38	Mill Road	2027	212	212	232	20	0	20	9%	1
	Link PAR 39	Great Tey Road	2027	239	239	264	25	6	19	10%	1
	Link PAR 40	A120 Colchester Road	2028	1,976	2,030	2,108	78	48	30	4%	1
	Link PAR 41	B1018 Braintree Road / B1018 Witham Road	2027	1,091	1,180	1,195	15	0	15	1%	7
	Link PAR 42	B1389 Hatfield Road	2027	1,260	1,260	1,297	38	0	38	3%	1
	Link PAR 43	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill	2027	737	737	775	38	0	38	5%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 44	A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road	2027	1,611	1,861	2,022	161	86	75	9%	3
	Link PAR 45	B1008 Essex Regiment Way	2027	1,249	1,249	1,254	5	0	5	0%	8
	Link PAR 46	B1008 Braintree Road / B1008 Main Road	2027	1,197	1,218	1,233	15	0	15	1%	6
	Link PAR 47	Chatham Hall Lane	2027	75	75	81	6	0	6	7%	5
	Link PAR 48	Chelmsford Road	2027	494	494	509	15	0	15	3%	6
	Link PAR 49	A414 Three Mile Hill / A1114 London Road	2028	2,093	2,093	2,118	25	0	25	1%	17
	Link PAR 50	A1016 Waterhouse Lane / A1016 Rainsford Lane	2028	1,416	1,416	1,441	25	0	25	2%	1
	Link PAR 51	A1060 Rainsford Road / A1060 Roxwell Road	2028	1,052	1,052	1,077	25	0	25	2%	1
	Link PAR 52	Vicarage road	2028	169	169	177	8	0	8	5%	1
	Link PAR 53	A414 Greenbury Way / A414 Ongar Road	2028	1,334	1,334	1,347	13	0	13	1%	14

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 54	B1002 Main Road	2027	546	546	606	60	0	60	11%	1
	Link PAR 55	Wantz Road	2027	515	515	537	22	0	22	4%	4
	Link PAR 56	Ivy Barns Lane	2027	121	121	143	22	0	22	18%	4
	Link PAR 57	Church Lane	2027	5	5	65	60	0	60	1155%	1
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road	2027	1,388	1,388	1,413	25	0	25	2%	1
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (one-way system)	2027	522	522	535	13	0	13	2%	1
	Link 0PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road (one-way system)	2027	999	999	1,011	13	0	13	1%	1
	Link PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road	2027	1,062	1,062	1,088	25	0	25	2%	1
	Link PAR 60	Dunton Road / Brentwood Road	2027	1,115	1,115	1,137	22	0	22	2%	2
	Link PAR 61	B148 West Mayne	2027	1,919	1,919	1,944	25	3	22	1%	4

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 62	Lower Dunton Road	2027	493	493	518	25	3	22	5%	4
Thurrock	Link PAR 63	A128 Brentwood Road	2027	1,390	1,396	1,461	65	0	65	5%	1
	Link PAR 64	A1013 Stanford Rd (east of Orsett Cock Roundabout)	2028	735	809	891	82	82	0	10%	1
	Link PAR 65	Buckingham Hill Rd	2028	665	805	887	82	82	0	10%	1
	Link PAR 66	Brentwood Rd	2028	1,126	1,184	1,266	82	82	0	7%	1
	Link PAR 67	A1013 Stanford Rd (west of Orsett Cock Roundabout)	2027	1,413	1,429	1,559	130	14	116	9%	1
	Link PAR 68	Heath Rd	2027	286	286	413	128	12	116	45%	1
	Link PAR 69	Chadwell Hill	2028	569	575	604	29	29	0	5%	1
	Link PAR 70	Linford Rd	2028	712	775	804	29	29	0	4%	1
	Link PAR 71	Muckingford Rd	2028	290	351	380	29	29	0	8%	1

Table G.5 PM peak (various) net increase of construction traffic – multi-modal scenario 2

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
Norfolk	Link PAR 1	A140 Ipswich Road	2028	2,289	3,002	3,097	95	95	0	3%	3
	Link PAR 2	Mangreen Lane	2028	66	94	146	52	52	0	55%	3
	Link PAR 3	Stansfield Road / Wymondham Road	2027	589	589	621	32	0	32	5%	1
	Link PAR 4	B1113	2027	434	434	466	32	0	32	7%	1
	Link PAR 5	Wymondham Road	2027	157	157	179	22	0	22	14%	7
	Link PAR 6	Fundenhall Road	2027	214	214	247	32	0	32	15%	1
	Link PAR 7	B1134 Station Road / B1134 Long Row	2027	348	348	412	64	6	58	18%	2
	Link PAR 8	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road	2027	880	880	928	48	0	48	5%	2
	Link PAR 9	A1066 High Road / A1066 Low Road / A1066 Diss Road /A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road	2027	688	688	736	48	0	48	7%	2

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
		(alternative to PAR 8)									
Suffolk	Link PAR 10	A143 Old Bury Road	2027	654	654	734	80	80	0	12%	160
	Link PAR 11	Lion Road	2027	318	318	346	28	0	28	9%	1
	Link PAR 12	B1113 Finningham Road / B1113 Walsham Road	2027	285	285	343	58	0	58	20%	3
	Link PAR 13	Wickham Road	2027	209	209	267	58	0	58	28%	3
	Link PAR 14	Eastland Lane	2027	3	3	35	32	0	32	961%	1
	Link PAR 15	Thornham Road	2027	112	112	134	21	0	21	19%	1
	Link PAR 16	A1120 Church Road / A1120 Bell's Lane	2027	1,148	1,261	1,297	36	6	30	3%	6
	Link PAR 17	A1120 south of A14 J50	2027	1,593	1,593	1,625	32	0	32	2%	1
	Link PAR 18	Mill Lane	2027	90	90	102	11	0	11	12%	6
	Link PAR 19	B1113 Needham Road / B1113 Stowmarket Road	2027	1,123	1,128	1,160	32	0	32	3%	1
	Link PAR 20	B1113 Bramford Road / B1113 Loraine Way	2028	635	640	744	104	66	38	16%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 21	Bullen Lane	2028	11	16	119	104	66	38	670%	1
	Link PAR 22	A1214 London Road	2028	1,519	1,639	1,710	71	0	71	4%	1
	Link PAR 23	A1071	2028	1,223	1,330	1,401	71	0	71	5%	1
	Link PAR 24	B1070 (A12 access)	2029	530	545	601	56	56	0	10%	1
	Link PAR 25	B1070 Hadleigh Road	2029	710	725	781	56	56	0	8%	1
Essex	Link PAR 26	Ipswich Road	2028	181	181	224	43	28	15	24%	1
	Link PAR 27	Birchwood Road	2028	349	349	390	41	26	15	12%	1
	Link PAR 28	Wick Road / Grove Hill	2027	28	28	42	14	2	12	52%	1
	Link PAR 29	Perry Lane	2027	16	16	30	14	2	12	92%	1
	Link PAR 30	Bentley Road	2028	93	231	393	162	162	0	70%	1
	Link PAR 31	Ardleigh Road / Little Bromley Road	2028	17	41	203	162	162	0	398%	1
	Link PAR 32	Wick Lane	2027	153	153	191	38	0	38	25%	1
	Link PAR 33	Old Ipswich Road	2027	213	348	395	48	0	48	14%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 34	Turnpike Close	2027	81	107	131	24	0	24	22%	1
	Link PAR 35	A1341 Via Urbis Romanae	2027	1,503	1,503	1,581	78	2	76	5%	4
	Link PAR 36	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	2027	1,198	1,198	1,276	78	2	76	6%	4
	Link PAR 37	A1124 Halsted Road	2027	2,037	2,037	2,088	51	0	51	2%	2
	Link PAR 38	Mill Road	2027	212	212	232	20	0	20	9%	1
	Link PAR 39	Great Tey Road	2027	240	240	264	25	6	19	10%	1
	Link PAR 40	A120 Colchester Road	2028	1,934	1,990	2,067	78	48	30	4%	1
	Link PAR 41	B1018 Braintree Road / B1018 Witham Road	2027	1,343	1,414	1,429	15	0	15	1%	7
	Link PAR 42	B1389 Hatfield Road	2027	1,481	1,481	1,519	38	0	38	3%	1
	Link PAR 43	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill	2027	932	932	970	38	0	38	4%	1

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 44	A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road	2027	1,891	2,160	2,321	161	86	75	7%	3
	Link PAR 45	B1008 Essex Regiment Way	2027	833	833	838	5	0	5	1%	8
	Link PAR 46	B1008 Braintree Road / B1008 Main Road	2027	1,155	1,176	1,191	15	0	15	1%	6
	Link PAR 47	Chatham Hall Lane	2027	93	93	98	6	0	6	6%	5
	Link PAR 48	Chelmsford Road	2027	488	488	503	15	0	15	3%	6
	Link PAR 49	A414 Three Mile Hill / A1114 London Road	2028	2,424	2,424	2,449	25	0	25	1%	17
	Link PAR 50	A1016 Waterhouse Lane / A1016 Rainsford Lane	2028	1,536	1,536	1,561	25	0	25	2%	1
	Link PAR 51	A1060 Rainsford Road / A1060 Roxwell Road	2028	963	963	988	25	0	25	3%	1
	Link PAR 52	Vicarage road	2028	169	169	178	8	0	8	5%	1
	Link PAR 53	A414 Greenbury Way / A414 Ongar Road	2028	1,330	1,330	1,342	13	0	13	1%	14

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 54	B1002 Main Road	2027	467	467	527	60	0	60	13%	1
	Link PAR 55	Wantz Road	2027	318	318	340	22	0	22	7%	4
	Link PAR 56	Ivy Barns Lane	2027	105	105	127	22	0	22	21%	4
	Link PAR 57	Church Lane	2027	4	4	64	60	0	60	1517%	1
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road	2027	1,371	1,371	1,396	25	0	25	2%	1
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (one-way system)	2027	674	674	686	13	0	13	2%	1
	Link 0PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road (one-way system)	2027	817	817	829	13	0	13	2%	1
	Link PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road	2027	1,156	1,156	1,181	25	0	25	2%	1
	Link PAR 60	Dunton Road / Brentwood Road	2027	887	887	910	22	0	22	2%	2
	Link PAR 61	B148 West Mayne	2027	2,095	2,095	2,120	25	3	22	1%	4

Region	Link ID	Road link	Peak Year	Future Baseline	Future Baseline + Cum Dev	Future Baseline + Cum Dev + Project	Net increase (Total)	Net increase (LGV)	Net increase (HGV)	% Increase	Duration Peak [weeks]
	Link PAR 62	Lower Dunton Road	2027	458	458	483	25	3	22	5%	4
Thurrock	Link PAR 63	A128 Brentwood Road	2027	1,371	1,377	1,442	65	0	65	5%	1
	Link PAR 64	A1013 Stanford Rd (east of Orsett Cock Roundabout)	2028	923	997	1,079	82	82	0	8%	1
	Link PAR 65	Buckingham Hill Rd	2028	749	889	971	82	82	0	9%	1
	Link PAR 66	Brentwood Rd	2028	1,141	1,199	1,281	82	82	0	7%	1
	Link PAR 67	A1013 Stanford Rd (west of Orsett Cock Roundabout)	2027	1,191	1,208	1,338	130	14	116	11%	1
	Link PAR 68	Heath Rd	2027	353	353	480	128	12	116	36%	1
	Link PAR 69	Chadwell Hill	2028	766	772	801	29	29	0	4%	1
	Link PAR 70	Linford Rd	2028	851	914	943	29	29	0	3%	1
	Link PAR 71	Muckingford Rd	2028	382	443	472	29	29	0	7%	1

G.3.15 In the multi-modal transport Scenario 1, the increases of traffic are similar to the ones assessed in the road-only strategy. However, it must be noted that the duration of the peak traffic are longer than in the road-only scenario with increases of even 5-6 months in some of the PARs, such as

Table G.6 AM peak (various) net increase of construction traffic – multi-modal scenario comparison

Region	Link ID	Road link	Construction traffic flows, per day (road only)				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
Norfolk	Link PAR 1	A140 Ipswich Road	110	95	15	1	-14	0	-14	2	-15	0	-15	2
	Link PAR 2	Mangreen Lane	64	52	12	1	-12	0	-12	2	-12	0	-12	2
	Link PAR 3	Stansfield Road / Wymondham Road	41	0	41	2	-15	0	-15	11	-9	0	-9	-1
	Link PAR 4	B1113	28	0	28	1	-13	0	-13	12	4	0	4	0
	Link PAR 5	Wymondham Road	14	0	14	1	-4	0	-4	21	8	0	8	6
	Link PAR 6	Fundenhall Road	28	0	28	1	-13	0	-13	12	4	0	4	0
	Link PAR 7	B1134 Station Road / B1134 Long Row	34	6	28	1	-4	0	-4	0	30	0	30	1
	Link PAR 8	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road	31	0	31	3	-16	0	-16	-2	17	0	17	-1
	Link PAR 9	A1066 High Road / A1066 Low Road / A1066 Diss Road /A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road (alternative to PAR 8)	31	0	31	3	-16	0	-16	-2	17	0	17	-1
Suffolk	Link PAR 10	A143 Old Bury Road	107	80	27	1	-8	0	-8	0	-27	0	-27	159
	Link PAR 11	Lion Road	17	0	17	4	-9	0	-9	0	11	0	11	-3
	Link PAR 12	B1113 Finningham Road / B1113 Walsham Road	26	0	26	2	-8	0	-8	19	32	0	32	1
	Link PAR 13	Wickham Road	26	0	26	2	-8	0	-8	19	32	0	32	1
	Link PAR 14	Eastland Lane	13	0	13	22	-4	0	-4	-1	20	0	20	-21
	Link PAR 15	Thornham Road	8	0	8	22	-3	0	-3	-1	13	0	13	-21
	Link PAR 16	A1120 Church Road / A1120 Bell's Lane	34	6	28	1	-9	0	-9	12	2	0	2	5

Region	Link ID	Road link	Construction traffic flows, per day (road only)				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
	Link PAR 17	A1120 south of A14 J50	28	0	28	1	-13	0	-13	12	4	0	4	0
	Link PAR 18	Mill Lane	14	0	14	2	-10	0	-10	11	-3	0	-3	4
	Link PAR 19	B1113 Needham Road / B1113 Stowmarket Road	16	0	16	9	-4	0	-4	23	17	0	17	-8
	Link PAR 20	B1113 Bramford Road / B1113 Loraine Way	90	62	28	1	-16	0	-16	0	14	4	10	0
	Link PAR 21	Bullen Lane	90	62	28	1	-16	0	-16	0	14	4	10	0
	Link PAR 22	A1214 London Road	25	0	25	11	12	0	12	4	46	0	46	-10
	Link PAR 23	A1071	25	0	25	11	12	0	12	4	46	0	46	-10
	Link PAR 24	B1070 (A12 access)	74	48	26	1	-16	8	-24	0	-18	8	-26	0
	Link PAR 25	B1070 Hadleigh Road	74	48	26	1	-16	8	-24	0	-18	8	-26	0
Essex	Link PAR 26	Ipswich Road	60	40	20	1	-18	0	-18	0	-17	-12	-5	0
	Link PAR 27	Birchwood Road	54	28	26	1	-22	-2	-20	4	-13	-2	-11	0
	Link PAR 28	Wick Road / Grove Hill	18	6	12	1	-12	0	-12	0	-4	-4	0	0
	Link PAR 29	Perry Lane	18	6	12	1	-12	0	-12	0	-4	-4	0	0
	Link PAR 30	Bentley Road	187	162	25	1	-13	0	-13	0	-25	0	-25	0
	Link PAR 31	Ardleigh Road / Little Bromley Road	187	162	25	1	-13	0	-13	0	-25	0	-25	0
	Link PAR 32	Wick Lane	13	0	13	4	-3	0	-3	18	25	0	25	-3
	Link PAR 33	Old Ipswich Road	25	0	25	4	-9	0	-9	18	22	0	22	-3
	Link PAR 34	Turnpike Close	13	0	13	4	-6	0	-6	18	11	0	11	-3

Region	Link ID	Road link	Construction traffic flows, per day (road only)				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
	Link PAR 35	A1341 Via Urbis Romanae	118	74	44	1	-15	2	-17	0	-41	-72	32	3
	Link PAR 36	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	118	74	44	1	-15	2	-17	0	-41	-72	32	3
	Link PAR 37	A1124 Halsted Road	42	0	42	1	-31	0	-31	21	9	0	9	1
	Link PAR 38	Mill Road	16	0	16	7	-12	0	-12	-4	5	0	5	-6
	Link PAR 39	Great Tey Road	20	6	14	3	-5	0	-5	20	5	0	5	-2
	Link PAR 40	A120 Colchester Road	104	48	56	1	-11	0	-11	0	-26	0	-26	0
	Link PAR 41	B1018 Braintree Road / B1018 Witham Road	16	0	16	4	-5	0	-5	1	-1	0	-1	3
	Link PAR 42	B1389 Hatfield Road	17	0	17	2	-4	0	-4	7	21	0	21	-1
	Link PAR 43	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill	17	0	17	2	-4	0	-4	7	21	0	21	-1
	Link PAR 44	A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road	150	104	46	1	-28	2	-30	0	11	-18	29	2
	Link PAR 45	B1008 Essex Regiment Way	13	0	13	10	-11	0	-11	8	-8	0	-8	-2
	Link PAR 46	B1008 Braintree Road / B1008 Main Road	26	0	26	1	-12	0	-12	18	-11	0	-11	5
	Link PAR 47	Chatham Hall Lane	13	0	13	22	-9	0	-9	-3	-7	0	-7	-17
	Link PAR 48	Chelmsford Road	13	0	13	1	-3	0	-3	20	2	0	2	5
	Link PAR 49	A414 Three Mile Hill / A1114 London Road	53	0	53	1	-32	0	-32	20	-28	0	-28	16
	Link PAR 50	A1016 Waterhouse Lane / A1016 Rainsford Lane	27	0	27	1	-15	0	-15	20	-2	0	-2	0
	Link PAR 51	A1060 Rainsford Road / A1060 Roxwell Road	27	0	27	1	-15	0	-15	20	-2	0	-2	0
	Link PAR 52	Vicarage road	13	0	13	2	-10	0	-10	19	-5	0	-5	-1

Region	Link ID	Road link	Construction traffic flows, per day (road only)				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
	Link PAR 53	A414 Greenbury Way / A414 Ongar Road	28	0	28	1	-18	0	-18	20	-15	0	-15	13
	Link PAR 54	B1002 Main Road	26	0	26	5	4	0	4	-1	35	0	35	-4
	Link PAR 55	Wantz Road	14	0	14	2	-5	0	-5	19	8	0	8	2
	Link PAR 56	Ivy Barns Lane	14	0	14	2	-5	0	-5	19	8	0	8	2
	Link PAR 57	Church Lane	13	0	13	6	7	0	7	10	47	0	47	-5
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road	15	0	15	7	-2	0	-2	9	11	0	11	-6
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (one-way system)	7	0	7	7	-1	0	-1	9	5	0	5	-6
	Link 0PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road (one-way system)	7	0	7	7	-1	0	-1	9	5	0	5	-6
	Link PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road	15	0	15	7	-2	0	-2	9	11	0	11	-6
	Link PAR 60	Dunton Road / Brentwood Road	12	0	12	15	-2	0	-2	1	10	0	10	-13
	Link PAR 61	B148 West Mayne	16	3	13	2	-2	0	-2	12	10	0	10	2
	Link PAR 62	Lower Dunton Road	16	3	13	2	-2	0	-2	12	10	0	10	2
Thurrock	Link PAR 63	A128 Brentwood Road	13	0	13	9	17	0	17	5	51	0	51	-8
	Link PAR 64	A1013 Stanford Rd (east of Orsett Cock Roundabout)	88	74	14	1	-5	8	-13	0	-6	8	-14	0
	Link PAR 65	Buckingham Hill Rd	88	74	14	1	-5	8	-13	0	-6	8	-14	0
	Link PAR 66	Brentwood Rd	86	74	12	1	-2	8	-10	0	-4	8	-12	0
	Link PAR 67	A1013 Stanford Rd (west of Orsett Cock Roundabout)	78	36	42	2	19	0	19	-1	53	-22	75	-1

Region	Link ID	Road link	Construction traffic flows, per day (road only)				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
	Link PAR 68	Heath Rd	67	30	37	2	16	0	16	0	60	-19	79	-1
	Link PAR 69	Chadwell Hill	29	29	0	1	0	0	0	0	0	0	0	0
	Link PAR 70	Linford Rd	29	29	0	1	0	0	0	0	0	0	0	0
	Link PAR 71	Muckingford Rd	29	29	0	1	0	0	0	0	0	0	0	0

Table G.7 PM peak (various) net increase of construction traffic – multi-modal scenario comparison

Region	Link ID	Road link	Construction traffic flows, per day				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
Norfolk	Link PAR 1	A140 Ipswich Road	110	95	15	1	-14	0	-14	2	-15	0	-15	2
	Link PAR 2	Mangreen Lane	64	52	12	1	-12	0	-12	2	-12	0	-12	2
	Link PAR 3	Stansfield Road / Wymondham Road	41	0	41	2	-15	0	-15	11	-9	0	-9	-1
	Link PAR 4	B1113	28	0	28	1	-13	0	-13	12	4	0	4	0
	Link PAR 5	Wymondham Road	14	0	14	1	-4	0	-4	21	8	0	8	6
	Link PAR 6	Fundenhall Road	28	0	28	1	-13	0	-13	12	4	0	4	0
	Link PAR 7	B1134 Station Road / B1134 Long Row	34	6	28	1	-4	0	-4	0	30	0	30	1
	Link PAR 8	A1066 / A1066 Victoria Road / A1066 Park Road / A1066 High Road	31	0	31	3	-16	0	-16	-2	17	0	17	-1
	Link PAR 9	A1066 High Road / A1066 Low Road / A1066 Diss Road /A1066 The Street / A1066 Thetford Road / A1066 Hurth Way / A1066 Mundford Road (alternative to PAR 8)	31	0	31	3	-16	0	-16	-2	17	0	17	-1
Suffolk	Link PAR 10	A143 Old Bury Road	107	80	27	1	-8	0	-8	0	-27	0	-27	159
	Link PAR 11	Lion Road	17	0	17	4	-9	0	-9	0	11	0	11	-3
	Link PAR 12	B1113 Finningham Road / B1113 Walsham Road	26	0	26	2	-8	0	-8	19	32	0	32	1
	Link PAR 13	Wickham Road	26	0	26	2	-8	0	-8	19	32	0	32	1
	Link PAR 14	Eastland Lane	13	0	13	22	-4	0	-4	-1	20	0	20	-21
	Link PAR 15	Thornham Road	8	0	8	22	-3	0	-3	-1	13	0	13	-21
	Link PAR 16	A1120 Church Road / A1120 Bell's Lane	34	6	28	1	-9	0	-9	12	2	0	2	5
	Link PAR 17	A1120 south of A14 J50	28	0	28	1	-13	0	-13	12	4	0	4	0

Region	Link ID	Road link	Construction traffic flows, per day				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
	Link PAR 18	Mill Lane	14	0	14	2	-10	0	-10	11	-3	0	-3	4
	Link PAR 19	B1113 Needham Road / B1113 Stowmarket Road	16	0	16	9	-4	0	-4	23	17	0	17	-8
	Link PAR 20	B1113 Bramford Road / B1113 Loraine Way	90	62	28	1	-16	0	-16	0	14	4	10	0
	Link PAR 21	Bullen Lane	90	62	28	1	-16	0	-16	0	14	4	10	0
	Link PAR 22	A1214 London Road	25	0	25	11	12	0	12	4	46	0	46	-10
	Link PAR 23	A1071	25	0	25	11	12	0	12	4	46	0	46	-10
	Link PAR 24	B1070 (A12 access)	74	48	26	1	-16	8	-24	0	-18	8	-26	0
	Link PAR 25	B1070 Hadleigh Road	74	48	26	1	-16	8	-24	0	-18	8	-26	0
Essex	Link PAR 26	Ipswich Road	60	40	20	1	-18	0	-18	0	-17	-12	-5	0
	Link PAR 27	Birchwood Road	54	28	26	1	-22	-2	-20	4	-13	-2	-11	0
	Link PAR 28	Wick Road / Grove Hill	18	6	12	1	-12	0	-12	0	-4	-4	0	0
	Link PAR 29	Perry Lane	18	6	12	1	-12	0	-12	0	-4	-4	0	0
	Link PAR 30	Bentley Road	187	162	25	1	-13	0	-13	0	-25	0	-25	0
	Link PAR 31	Ardleigh Road / Little Bromley Road	187	162	25	1	-13	0	-13	0	-25	0	-25	0
	Link PAR 32	Wick Lane	13	0	13	4	-3	0	-3	18	25	0	25	-3
	Link PAR 33	Old Ipswich Road	25	0	25	4	-9	0	-9	18	22	0	22	-3
	Link PAR 34	Turnpike Close	13	0	13	4	-6	0	-6	18	11	0	11	-3
	Link PAR 35	A1341 Via Urbis Romanae	118	74	44	1	-15	2	-17	0	-41	-72	32	3

Region	Link ID	Road link	Construction traffic flows, per day				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
	Link PAR 36	A134 Northern Approach Road / A134 Wildeve Avenue / A134 Nayland Road / A134 The Causeway	118	74	44	1	-15	2	-17	0	-41	-72	32	3
	Link PAR 37	A1124 Halsted Road	42	0	42	1	-31	0	-31	21	9	0	9	1
	Link PAR 38	Mill Road	16	0	16	7	-12	0	-12	-4	5	0	5	-6
	Link PAR 39	Great Tey Road	20	6	14	3	-5	0	-5	20	5	0	5	-2
	Link PAR 40	A120 Colchester Road	104	48	56	1	-11	0	-11	0	-26	0	-26	0
	Link PAR 41	B1018 Braintree Road / B1018 Witham Road	16	0	16	4	-5	0	-5	1	-1	0	-1	3
	Link PAR 42	B1389 Hatfield Road	17	0	17	2	-4	0	-4	7	21	0	21	-1
	Link PAR 43	Spinks Lane / Highfields Road / Spa Road / Flora Road / Faulkbourne Road / Church Hill	17	0	17	2	-4	0	-4	7	21	0	21	-1
	Link PAR 44	A131 Great Notley Bypass / A131 Great Leighs Bypass / A131 Braintree Road	150	104	46	1	-28	2	-30	0	11	-18	29	2
	Link PAR 45	B1008 Essex Regiment Way	13	0	13	10	-11	0	-11	8	-8	0	-8	-2
	Link PAR 46	B1008 Braintree Road / B1008 Main Road	26	0	26	1	-12	0	-12	18	-11	0	-11	5
	Link PAR 47	Chatham Hall Lane	13	0	13	22	-9	0	-9	-3	-7	0	-7	-17
	Link PAR 48	Chelmsford Road	13	0	13	1	-3	0	-3	20	2	0	2	5
	Link PAR 49	A414 Three Mile Hill / A1114 London Road	53	0	53	1	-32	0	-32	20	-28	0	-28	16
	Link PAR 50	A1016 Waterhouse Lane / A1016 Rainsford Lane	27	0	27	1	-15	0	-15	20	-2	0	-2	0
	Link PAR 51	A1060 Rainsford Road / A1060 Roxwell Road	27	0	27	1	-15	0	-15	20	-2	0	-2	0
	Link PAR 52	Vicarage road	13	0	13	2	-10	0	-10	19	-5	0	-5	-1
	Link PAR 53	A414 Greenbury Way / A414 Ongar Road	28	0	28	1	-18	0	-18	20	-15	0	-15	13

Region	Link ID	Road link	Construction traffic flows, per day				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
	Link PAR 54	B1002 Main Road	26	0	26	5	4	0	4	-1	35	0	35	-4
	Link PAR 55	Wantz Road	14	0	14	2	-5	0	-5	19	8	0	8	2
	Link PAR 56	Ivy Barns Lane	14	0	14	2	-5	0	-5	19	8	0	8	2
	Link PAR 57	Church Lane	13	0	13	6	7	0	7	10	47	0	47	-5
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road	15	0	15	7	-2	0	-2	9	11	0	11	-6
	Link PAR 58	A176 Noak Hill Road / A176 Laindon Road / A129 Southend Road (one-way system)	7	0	7	7	-1	0	-1	9	5	0	5	-6
	Link 0PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road (one-way system)	7	0	7	7	-1	0	-1	9	5	0	5	-6
	Link PAR 59	A129 Sun Street / A129 London Road / A129 Rayleigh Road	15	0	15	7	-2	0	-2	9	11	0	11	-6
	Link PAR 60	Dunton Road / Brentwood Road	12	0	12	15	-2	0	-2	1	10	0	10	-13
	Link PAR 61	B148 West Mayne	16	3	13	2	-2	0	-2	12	10	0	10	2
	Link PAR 62	Lower Dunton Road	16	3	13	2	-2	0	-2	12	10	0	10	2
Thurrock	Link PAR 63	A128 Brentwood Road	13	0	13	9	17	0	17	5	51	0	51	-8
	Link PAR 64	A1013 Stanford Rd (east of Orsett Cock Roundabout)	88	74	14	1	-5	8	-13	0	-6	8	-14	0
	Link PAR 65	Buckingham Hill Rd	88	74	14	1	-5	8	-13	0	-6	8	-14	0
	Link PAR 66	Brentwood Rd	86	74	12	1	-2	8	-10	0	-4	8	-12	0
	Link PAR 67	A1013 Stanford Rd (west of Orsett Cock Roundabout)	78	36	42	2	19	0	19	-1	53	-22	75	-1
	Link PAR 68	Heath Rd	67	30	37	2	16	0	16	0	60	-19	79	-1

Region	Link ID	Road link	Construction traffic flows, per day				Multi-modal Scenario 1 – Project				Multi-modal Scenario 2 – Project			
			Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]	Total Vehicles	LGV	HGV	Duration [weeks]
	Link PAR 69	Chadwell Hill	29	29	0	1	0	0	0	0	0	0	0	0
	Link PAR 70	Linford Rd	29	29	0	1	0	0	0	0	0	0	0	0
	Link PAR 71	Muckingford Rd	29	29	0	1	0	0	0	0	0	0	0	0

Access roads to ports / sidings

G.3.16 It is expected that the proposed accesses to the ports and sidings, including the road links and junctions, have been designed to accommodate the maximum operational movements anticipated for the ports / sidings future activity levels.

G.3.17 Traffic count surveys were undertaken in May 2025 on those road links that access the ports and sidings for the assessment where existing survey data was not available. This included:

- A1154 (between Herring Bridge and Williams Adam Way)
- Bracondale (between Bracondale Bridge and A1054)
- Iknield Way (between A14 and railway line)
- Pesthouse Lane (between A14 and Norwich Road)
- Norwich Road (between Sandy Lane and A140)
- Station Road (between A120 and North Lane)
- Brook Street (between B1008 New Street and sidings access)
- B1008 New Street (between Brook Street and B1008 Rectory Lane)
- B1008 Rectory Lane (between B1008 New Street and A1016 Parkway).

G.3.18 The traffic surveys collected classified daily traffic volumes over a seven-day period and were all undertaken during school term time.

G.3.19 The traffic increases on the proposed accesses are associated with HGV movements only and are summarised in Table G.8 and Table G.9 for Multi-modal Scenario 1 and Scenario 2 respectively.

G.3.20 In the Multi-modal Scenario 1 the large percentage increases of HGV traffic is primarily due to low future baseline traffic levels. However, the expected increase of traffic is considered to be low, between seven and 26 HGVs during the peak hour, and typically occur over a short period (i.e. one week).

G.3.21 On those road links with longest durations of increased activity, some do not have presence of sensitive receptors i.e. Iknield Way (between A14 and railway line) to access Kennett Sidings or Pesthouse Ln (between A14 and Norwich Rd) to access Barham Sidings.

G.3.22 For those roads with sensitive receptors and longer durations, i.e. the B1008 New Street (between Brook St and B1008 Rectory Ln), B1008 Rectory Lane (between B1008 New St and A1016 Parkway) and A1016 Parkway (between B1008 Rectory Lane and A1060 Rainsford Rd) to access Chelmsford Sidings the peak activity is expected to last 21 weeks. During this period the maximum increase of HGVs is 7 HGVs/h that is approximately one HGV every 9 minutes.

G.3.23 Therefore, a significant impact on the operation of performance of the road links accessing the ports / sidings is not expected.

G.3.24 In the Multi-modal Scenario 2 traffic increases are in general greater than in the Scenario 1, with longer durations. As a result, this scenario is expected to have a more impact on the road operation and performance than Scenario 1.

G.3.25 The largest number of construction vehicles is expected in the accesses to Port of Yarmouth (A1243 South Denes Rd (between Herring Bridge and Main Cross Rd) and A1154 (between Herring Bridge and Williams Adam Way)) with 75 HGVs during the AM and PM peak hours, and in the access to Port of Tilbury (A1089 St Andrew's Road (between Asda Roundabout and Ferry Road)) with an increase of 60 HGVs during the AM and PM peak hours. The duration of the peak activity in those accesses is expected for one week.

G.3.26 For those roads with longest durations of increased activity, the expected increase of traffic is between eight and 51 HGVs during the peak hour, that is approximately one vehicle every 1 to 8 minutes depending on the traffic levels for a duration between nine and 18 weeks. The future baseline traffic in those roads is expected to be low so no capacity issues are expected.

Table G.8 Peak net increase of construction traffic in access to ports / sidings – multi-modal scenario 1

Peak period	Multi-modal port / siding	Location	Survey site	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
AM Peak	Trowse Newton	Bracondale (between Bracondale Bridge and A1054)	ATC6	2028	375	7	9	0	9	2.42%	125.56%	1
		A1054 Martineau Ln (between Bracondale and A146)	8756	2028	2,476	42	9	0	9	0.37%	21.85%	1
		A146 Loddon Rd (between A1054 and A47)	6690	2028	2,865	44	9	0	9	0.32%	20.54%	1
	Port of Great Yarmouth	A1243 South Denes Rd (between Herring Bridge and Main Cross Rd)	57026	2027	365	49	26	0	26	7.04%	52.67%	1
		A1154 (between Herring Bridge and Williams Adam Way)	LCC1	2027	1,218	62	26	0	26	2.11%	41.26%	1
	Kennett Sidings	Iknield Way (between A14 and railway line)	ATC7	2028	34	1	11	0	11	32.79%	1053.79%	13
	Barham Sidings	Pesthouse Ln (between A14 and Norwich Rd)	ATC8	2028	59	11	13	0	13	21.58%	121.12%	9
		Norwich Rd (between Sandy Ln and A140)	ATC9	2028	137	6	13	0	13	9.30%	203.74%	9
	Port of Ipswich Siding	A137 Wherstead Rd (between A14 and B1456)	7966	2028	1,513	83	16	0	16	1.03%	18.64%	1
	Port of Harwich	A136 Parkeston Bypass (between Port of Harwich and Dovercourt Dock River)	92007	2028	237	2	20	0	20	8.40%	1014.02%	1
	Marks Tey Sidings	Station Rd (between A120 and North Lane)	ATC10	2027	207	2	19	0	19	9.38%	917.82%	1
	Chelmsford Sidings	B1008 New Street (between Brook St and B1008 Rectory Ln)	ATC12	2028	650	9	7	0	7	1.09%	77.60%	21

Peak period	Multi-modal port / siding	Location	Survey site	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
		B1008 Rectory Lane (between B1008 New St and A1016 Parkway)	ATC11	2028	744	10	7	0	7	0.96%	71.20%	21
		A1016 Parkway (between B1008 Rectory Lane and A1060 Rainsford Rd)	77250	2028	1,738	43	7	0	7	0.41%	16.43%	21
	Port of Tilbury	A1089 St Andrew's Rd (between Asda Roundabout and Ferry Rd)	16644	2028	367	127	34	0	34	9.39%	27.15%	1
PM peak	Trowse Newton	Bracondale (between Bracondale Bridge and A1054)	ATC6	2028	405	3	9	0	9	2.24%	290.04%	1
		A1054 Martineau Ln (between Bracondale and A146)	8756	2028	2,712	46	9	0	9	0.33%	19.95%	1
		A146 Loddon Rd (between A1054 and A47)	6690	2028	3,138	48	9	0	9	0.29%	18.76%	1
	Port of Great Yarmouth	A1243 South Denes Rd (between Herring Bridge and Main Cross Rd)	57026	2027	400	53	26	0	26	6.43%	48.08%	1
		A1154 (between Herring Bridge and Williams Adam Way)	LCC1	2027	1,582	29	26	0	26	1.62%	88.69%	1
	Kennett Sidings	Iknield Way (between A14 and railway line)	ATC7	2028	39	1	11	0	11	28.82%	926.57%	13
	Barham Sidings	Pesthouse Ln (between A14 and Norwich Rd)	ATC8	2028	58	6	13	0	13	22.01%	202.00%	9
		Norwich Rd (between Sandy Ln and A140)	ATC9	2028	159	4	13	0	13	8.02%	285.44%	9
	Port of Ipswich Siding	A137 Wherstead Rd (between A14 and B1456)	7966	2028	1,656	91	16	0	16	0.94%	17.03%	1

Peak period	Multi-modal port / siding	Location	Survey site	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
	Port of Harwich	A136 Parkeston Bypass (between Port of Harwich and Dovercourt Dock River)	92007	2028	260	2	20	0	20	7.68%	926.57%	1
	Marks Tey Sidings	Station Rd (between A120 and North Lane)	ATC10	2027	241	2	19	0	19	8.08%	1034.78%	1
	Chelmsford Sidings	B1008 New Street (between Brook St and B1008 Rectory Ln)	ATC12	2028	728	7	7	0	7	0.98%	99.67%	21
		B1008 Rectory Lane (between B1008 New St and A1016 Parkway)	ATC11	2028	768	5	7	0	7	0.93%	130.82%	21
		A1016 Parkway (between B1008 Rectory Lane and A1060 Rainsford Rd)	77250	2028	1,902	47	7	0	7	0.37%	15.02%	21
	Port of Tilbury	A1089 St Andrew's Rd (between Asda Roundabout and Ferry Rd)	16644	2028	402	139	34	0	34	8.56%	24.76%	1

Table G.9 Peak net increase of construction traffic in access to ports / sidings – multi-modal scenario 2

Peak period	Multi-modal port / siding	Location	Survey site	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
AM Peak	Trowse Newton	Bracondale (between Bracondale Bridge and A1054)	ATC6	2027	372	7	15	0	15	3.92%	203.35%	12
		A1054 Martineau Ln (between Bracondale and A146)	8756	2027	2,453	41	15	0	15	0.59%	35.41%	12
		A146 Loddon Rd (between A1054 and A47)	6690	2027	2,838	44	15	0	15	0.51%	33.30%	12
	Port of Great Yarmouth	A1243 South Denes Rd (between Herring Bridge and Main Cross Rd)	57026	2027	365	49	75	0	75	20.56%	153.83%	1

Peak period	Multi-modal port / siding	Location	Survey site	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
		A1154 (between Herring Bridge and Williams Adam Way)	LCC1	2027	1,218	62	75	0	75	6.16%	120.52%	1
	Kennett Sidings	Iknield Way (between A14 and railway line)	ATC7	2027	34	1	15	0	15	44.07%	1416.21%	18
	Barham Sidings	Pesthouse Ln (between A14 and Norwich Rd)	ATC8	2028	59	11	13	0	13	21.44%	120.32%	17
		Norwich Rd (between Sandy Ln and A140)	ATC9	2028	137	6	13	0	13	9.24%	202.40%	17
	Port of Ipswich Siding	A137 Wherstead Rd (between A14 and B1456)	7966	2027	1,505	83	25	0	25	1.64%	29.79%	13
	Port of Harwich	A136 Parkeston Bypass (between Port of Harwich and Dovercourt Dock River)	92007	2027	236	2	51	0	51	21.44%	2587.62%	10
	Marks Tey Sidings	Station Rd (between A120 and North Lane)	ATC10	2027	207	2	25	0	25	12.06%	1180.06%	9
	Chelmsford Sidings	B1008 New Street (between Brook St and B1008 Rectory Ln)	ATC12	2028	650	9	8	0	8	1.28%	90.94%	17
		B1008 Rectory Lane (between B1008 New St and A1016 Parkway)	ATC11	2028	744	10	8	0	8	1.12%	83.44%	17
		A1016 Parkway (between B1008 Rectory Lane and A1060 Rainsford Rd)	77250	2028	1,738	43	8	0	8	0.48%	19.26%	17
	Port of Tilbury	A1089 St Andrew's Rd (between Asda Roundabout and Ferry Rd)	16644	2027	363	126	60	0	60	16.60%	48.01%	1
PM peak	Trowse Newton	Bracondale (between Bracondale Bridge and A1054)	ATC6	2027	401	3	15	0	15	3.63%	469.91%	12
		A1054 Martineau Ln (between Bracondale and A146)	8756	2027	2,687	45	15	0	15	0.54%	32.33%	12

Peak period	Multi-modal port / siding	Location	Survey site	Peak Year	Future Baseline Total Traffic	Future Baseline HGVs	Peak construction Traffic (Total)	Peak construction Traffic (LGVs)	Peak construction Traffic (HGVs)	% Increase Total Traffic	% Increase HGVs	Duration peak [weeks]
		A146 Loddon Rd (between A1054 and A47)	6690	2027	3,109	48	15	0	15	0.47%	30.40%	12
	Port of Great Yarmouth	A1243 South Denes Rd (between Herring Bridge and Main Cross Rd)	57026	2027	400	53	75	0	75	18.77%	140.43%	1
		A1154 (between Herring Bridge and Williams Adam Way)	LCC1	2027	1,582	29	75	0	75	4.74%	259.04%	1
	Kennett Sidings	Iknield Way (between A14 and railway line)	ATC7	2027	39	1	15	0	15	38.74%	1245.53%	18
	Barham Sidings	Pesthouse Ln (between A14 and Norwich Rd)	ATC8	2028	58	6	13	0	13	21.86%	200.68%	17
		Norwich Rd (between Sandy Ln and A140)	ATC9	2028	159	4	13	0	13	7.97%	283.57%	17
	Port of Ipswich Siding	A137 Wherstead Rd (between A14 and B1456)	7966	2027	1,647	91	25	0	25	1.50%	27.22%	13
	Port of Harwich	A136 Parkeston Bypass (between Port of Harwich and Dovercourt Dock River)	92007	2027	258	2	51	0	51	19.57%	2362.19%	10
	Marks Tey Sidings	Station Rd (between A120 and North Lane)	ATC10	2027	241	2	25	0	25	10.39%	1330.43%	9
	Chelmsford Sidings	B1008 New Street (between Brook St and B1008 Rectory Ln)	ATC12	2028	728	7	8	0	8	1.14%	116.80%	17
		B1008 Rectory Lane (between B1008 New St and A1016 Parkway)	ATC11	2028	768	5	8	0	8	1.09%	153.30%	17
		A1016 Parkway (between B1008 Rectory Lane and A1060 Rainsford Rd)	77250	2028	1,902	47	8	0	8	0.44%	17.60%	17
	Port of Tilbury	A1089 St Andrew's Rd (between Asda Roundabout and Ferry Rd)	16644	2027	398	138	60	0	60	15.14%	43.78%	1

Junction preliminary assessment

G.3.27 The preliminary assessment of the junctions has been carried out on those junctions where there is an increase of traffic compared to the road-only scenario. The list of these junctions are summarised in Table G.10.

Table G.10 Multi-modal capacity preliminary assessment

Region	Junction ID	Location	Junction type	Preliminary Assessment Scenario 1	Preliminary Assessment Scenario 2	Comments	Modelled
Norfolk	Site 1	A47 Norwich Southern Bypass/ A140 Ipswich Rd	Grade Separated Roundabout	No	No	Grade separated roundabouts need to be modelled to estimate queues and if these queues impact the mainline traffic	Yes
Norfolk	Site 2	A140 Ipswich Rd / Mangreen Lane	Priority T-junction	No	Yes	Model required, capacity issues identified	Yes
Norfolk	Site 4	A140 Ipswich Rd / B1134 Station Road	Roundabout	No	Yes	No issues identified	No
Norfolk	Site 5	A140 Ipswich Rd / A1066 Diss Road	Roundabout	No	Yes	No issues identified	No
Norfolk	Site 12	A11 Thetford Bypass / A1066 Mundford Road	Roundabout	No	No	Modelling required as part of the Diss strategy. Increase of traffic lower or equal to 10 PCUs in Scenario 1, therefore no impact expected.	Yes (Scenario 2 only)
Suffolk	Site 16	A140 Ipswich Rd / A143 Old Bury Rd	Roundabout	No	Yes	No issues identified	No
Suffolk	Site 17	A143 Old Bury Rd / B1077 Stunston Rd	Roundabout	No	Yes	No issues identified	No

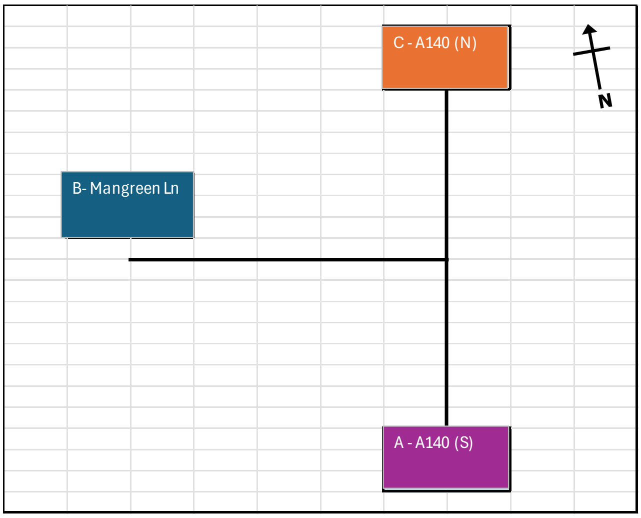
Region	Junction ID	Location	Junction type	Preliminary Assessment Scenario 1	Preliminary Assessment Scenario 2	Comments	Modelled
Suffolk	Site 18	A143 Old Bury Rd / Lion Rd	Priority T-junction	Yes	Yes	Increase of traffic lower or equal to 10 PCUs in Scenario 1, therefore no impact expected.	Yes (Scenario 2 only)
Suffolk	Site 19	A143 / B1113 Finningham Rd	Priority T-junction	Yes	Yes	No issues identified. Increase of traffic lower or equal to 10 PCUs in Scenario 1, therefore no impact expected	No
Suffolk	Site 29	A14 J55 Copdock Interchange	Signalised roundabout	No	No	Signalised or partially signalised junctions need to be modelled to test any potential optimisation	Yes
Essex	Site 38	A120 Ardleigh Crown Interchange	Partially Signalised Roundabout	No	No	Signalised or partially signalised junctions need to be modelled to test any potential optimisation.	Yes
Essex	Site 39	A120 Harwick Road / Bentley Road	Offslip and onslip road	No	No	Needs to be modelled to estimate if length of slip road sufficient	Yes
Essex	Site 47	A120 Coggeshall Rd / Great Tey Rd	Priority T-junction	Yes	No	Increase of traffic lower or equal to 10 PCUs in Scenario 1, therefore no impact expected	No
Essex	Site 48	A120 Braintree Bypass / B1018 Braintree Rd	Roundabout	Yes	No	Increase of traffic lower or equal to 10 PCUs in Scenario 1, therefore no impact expected	No

Region	Junction ID	Location	Junction type	Preliminary Assessment Scenario 1	Preliminary Assessment Scenario 2	Comments	Modelled
Essex	Site 56	A120 Braintree Bypass / A131 Great Notley Bypass	Grade separated Roundabout	No	No	Grade separated roundabouts need to be modelled to estimate queues and if these queues impact the mainline traffic. Increase of traffic lower or equal to 10 PCUs in Scenario 1, therefore no impact expected	Yes (Scenario 2 only)
Essex	Site 63	A414 Three Mile Hill / A1114 London Rd	Roundabout	Yes	Yes	No issues identified. No issues identified. Increase of traffic lower or equal to 10 PCUs. No impact expected.	No
Essex	Site 68	A1016 Waterhouse Ln / A1060 Rainsford Rd	Signalised	No	No	Increase of traffic lower or equal to 10 PCUs. No impact expected.	No
Essex	Site 72	B1002 Main Rd / Wantz Rd	Priority crossroad	No	Yes	No issues identified. Increase of traffic lower or equal to 10 PCUs. No impact expected.	No
Essex	Site 84	A127 Southend Arterial Rd /A128 Tilbury Road	Grade separated Roundabout	No	No	Grade separated roundabouts need to be modelled to estimate queues and if these queues impact the mainline traffic	Yes
Thurrock	Site 88	A1013 Stanford Road / Buckingham Hill Road	Signalised	No	No	Signalised or partially signalised junctions need to be modelled to test any potential optimisation	Yes

Site 2 - A140 Ipswich Road / Mangreen Lane - Multi-modal Scenario 2

Site 2
A140 Ipswich Road / Mangreen Lane

Site 2 - A140 Ipswich Road / Mangreen Lane



Follow-up and critical gap times

	tc	tf
Major RT	4	2
Minor LT	6	3
Minor Straight	6	4
Minor RT	7	4

Major 1	C
Major 2	A
Minor	B

	Main movement		Opposing	
	Origin	**Destination**	**Origin**	**Destination**
Major 1 RT	C	B	A	C
Minor LT	B	C	A	C
Minor Straight	-	-	-	-
Minor RT	B	A	C	A
			C	B
			A	C
Major 2 LT	A	B		
Major 2 Straight	A	C		
Major 1 Straight	C	A		

Peak year 2028

Capacity estimation

AM 07:15

	A	B	c	Total
A	0	5	**1462**	**1467**
B	1	0	87	**88**
C	1101	274	0	**1375**
Total	**1102**	**280**	**1549**	**2931**

	Main flow	Opposing	Estimated Capacity AM
Major 1 RT	274	1462	355
Minor LT	87	1462	105
Minor Straight	-	-	
Minor RT	1	2837	4
Major 2 LT	5	-	
Major 2 Straight	1462	-	
Major 1 Straight	1101	-	

PM 16:30

	A	B	C	Total
A	0	5	1112	**1117**
B	4	0	284	**288**
C	**1383**	94	0	**1477**
Total	**1388**	**99**	**1396**	**2883**

	Main flow	Opposing	Estimated Capacity PM
Major 1 RT	94	1112	523
Minor LT	284	1112	188
Minor Straight	-	-	
Minor RT	4	2589	6
Major 2 LT	5	-	
Major 2 Straight	1112	-	
Major 1 Straight	1383	-	

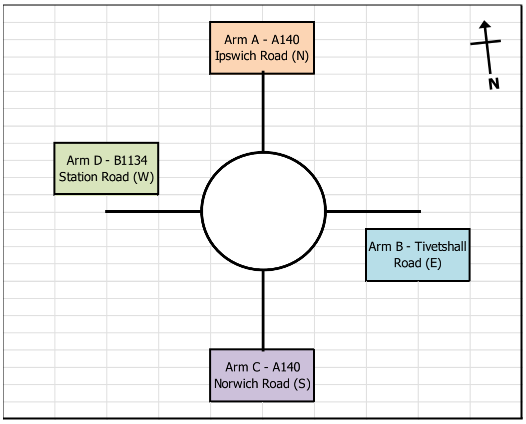
Detailed Early Junction Performance Assessment
Site 2 - A140 Ipswich Road / Mangreen Lane

Approach/Moveme	Entry/Opposing	Lanes	Dedicatec RT lane	No. Lanes Crossing	AM Flow (PCU/h)	AM RFC	PM Flow (PCU/h)	PM RFC
Major 2-Ahead	Opposing	1		0	-		-	
	Entry	1		-	1462	0.81	1112	0.62
Major 2-Left Turn	Opposing	1		0	-		-	
	Entry	1		-	5		5	
Minor-Left Turn	Opposing	1		1	1462		1112	
	Entry	1		-	87	0.83	284	1.51
Minor-Right Turn	Opposing	2		3	2837		2589	
	Entry	1		-	1	0.29	4	0.71
Major 1 - Ahead	Opposing	1		0	-		-	
	Entry	1	1.0	-	1101	0.61	1383	0.77
Major 1 -Right Turn	Opposing	1		1	1462		1112	
	Entry	1		-	274	0.77	94	0.18

Site 4 - A140 Ipswich Road / B1134 Station Road – Multi-modal Scenario 2

Site 4
A140 Ipswich Road / Tivetshall Road / A140 Norwich Road / B1134 Station Road

Site 4 - A140 Ipswich Road / Tivetshall Road / A140 Norwich Road / B1134 Station Road



Opposing traffic

Arm						
A	B-B	C-B	C-C	D-B	D-C	D-D
B	A-A	A-C	A-D	C-C	D-C	D-D
C	A-A	A-D	B-A	B-B	B-D	D-D
D	A-A	B-A	B-B	C-A	C-B	C-C

Peak year 2028

AM 07:15

	A	B	c	D	Total	Total	Opposing
A	1	79	**772**	34	**886**	**886**	180
B	80	0	72	**78**	**230**	**230**	891
C	758	39	3	54	**854**	**854**	193
D	25	58	**80**	0	**163**	**163**	881
Total	**864**	**176**	**927**	**166**	**2133**		

PM 16:30

	A	B	C	D	Total	Total	Opposing
A	4	84	656	21	**765**	**765**	148
B	85	0	40	64	**190**	**190**	716
C	**787**	66	0	**74**	**926**	**926**	175
D	**109**	47	35	0	**191**	**191**	942
Total	**985**	**197**	**731**	**159**	**2072**	**4144**	1133

Detailed Early Roundabout Performance Assessment

Site 4 - A140 Ipswich Road / Tivetshall Road / A140 Norwich Road / B1134 Station Road

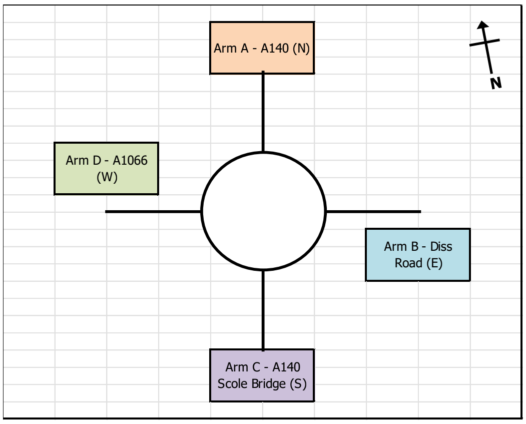
ARM	Entry/Circulating	Lanes	AM Flow (PCU/h)	AM Capacity	AM RFC	PM Flow (PCU/h)	PM Capacity	PM RFC
Arm A	Circulating	2	180			148		
	Entry	3	886	1412	0.63	765	1426	0.54
Arm B	Circulating	2	891			716		
	Entry	2	230	953	0.24	190	1029	0.18
Arm C	Circulating	2	193			175		
	Entry	2	854	1406	0.61	926	1414	0.65
Arm D	Circulating	2	881			942		
	Entry	2	163	876	0.19	191	850	0.22

	Geometry						DMRB Parameters							
	v	e	l'	r	D	ϕ	k	F	fc	td	M	x2	S	k
Arm A	3	7.5	40	6	61	60.00	0.782	1911.574	0.588	1.238	1.105	6.309	0.180	0.782
Arm B	3	6.5	35	6	61	60.00	0.782	1712.409	0.554	1.238	1.105	5.652	0.160	0.782
Arm C	3	7.5	40	6	61	60.00	0.782	1911.574	0.588	1.238	1.105	6.309	0.180	0.782
Arm D	3	6.5	20	6	61	60.00	0.782	1588.808	0.532	1.238	1.105	5.244	0.280	0.782

Site 5 - A140 Ipswich Road / A1066 Diss Road – Multi-modal Scenario 2

Site 5
A140 / Diss Road / A140 Scole Bridge / A1066

Site 5 - A140 / Diss Road / A140 Scole Bridge / A1066



Opposing traffic

Arm						
A	B-B	C-B	C-C	D-B	D-C	D-D
B	A-A	A-C	A-D	C-C	D-C	D-D
C	A-A	A-D	B-A	B-B	B-D	D-D
D	A-A	B-A	B-B	C-A	C-B	C-C

Peak year 2028

AM

	A	B	c	D	Total	Total	Opposing
A	0	9	745	248	1002	1002	249
B	23	0	77	208	307	307	1145
C	591	26	4	166	787	787	481
D	177	71	146	2	396	396	644
Total	790	106	972	624	2492		

PM 16:15

	A	B	C	D	Total	Total	Opposing
A	3	39	623	150	815	815	442
B	1	1	30	96	128	128	1006
C	711	45	0	205	960	960	252
D	291	165	230	1	687	687	761
Total	1006	250	882	451	2590	5180	1448

Detailed Early Roundabout Performance Assessment

Site 5 - A140 / Diss Road / A140 Scole Bridge / A1066

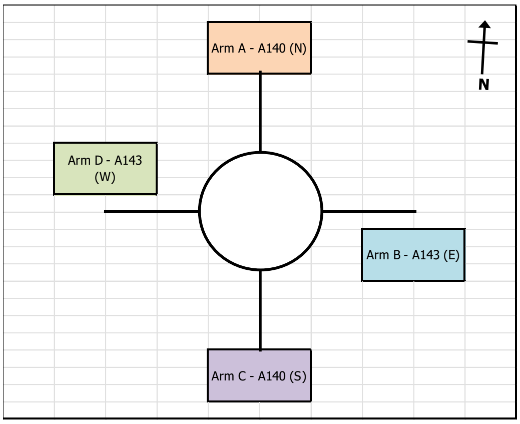
			AM			PM		
ARM	Entry/Circulating	Lanes	Flow (PCU/h)	Capacity	RFC	Flow (PCU/h	Capacity	RFC
Arm A	Circulating	2	249			442		
	Entry	3	1002	2270	0.44	815	2165	0.38
Arm B	Circulating	2	1145			1006		
	Entry	2	307	926	0.33	128	980	0.13
Arm C	Circulating	2	481			252		
	Entry	2	787	1919	0.41	960	2035	0.47
Arm D	Circulating	2	644			761		
	Entry	2	396	1048	0.38	687	1004	0.68

	Geometry						DMRB Parameters							
	v	e	l'	r	D	ϕ	k	F	fc	td	M	x2	S	k
Arm A	7.5	11	35	6	75	60.00	0.782	3075.909	0.694	1.091	4.482	10.152	0.160	0.782
Arm B	3	8	20	6	75	60.00	0.782	1750.667	0.494	1.091	4.482	5.778	0.400	0.782
Arm C	7.5	10	15	6	75	60.00	0.782	2766.522	0.648	1.091	4.482	9.130	0.267	0.782
Arm D	3	7	20	6	75	60.00	0.782	1648.024	0.478	1.091	4.482	5.439	0.320	0.782

Site 16 - A140 Ipswich Road / A143 Old Bury Road – Multi-modal Scenario 2

Site 16
A140 / A143

Site 16 - A140 / A143



Opposing traffic

Arm						
A	B-B	C-B	C-C	D-B	D-C	D-D
B	A-A	A-C	A-D	C-C	D-C	D-D
C	A-A	A-D	B-A	B-B	B-D	D-D
D	A-A	B-A	B-B	C-A	C-B	C-C

Peak year 2028

AM 07:30

	A	B	c	D	Total	Total	Opposing
A	17	104	**663**	166	**951**	**951**	931
B	169	0	264	**304**	**737**	**737**	1273
C	631	155	8	86	**880**	**880**	674
D	215	348	**401**	18	**982**	**982**	981
Total	**1032**	**608**	**1336**	**574**	**3549**		

PM 16:15

	A	B	C	D	Total	Total	Opposing
A	24	155	533	134	**845**	**845**	881
B	124	3	180	**275**	**581**	**581**	941
C	**674**	239	11	70	**994**	**994**	570
D	218	**389**	228	11	**845**	**845**	1075
Total	**1039**	**786**	**952**	**490**	**3266**	**6532**	1920

Detailed Early Roundabout Performance Assessment

Site 16 - A140 / A143

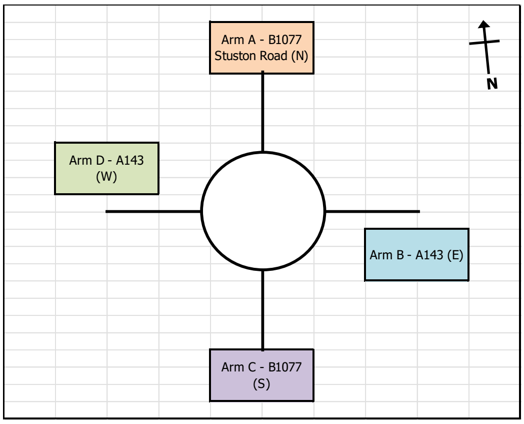
ARM	Entry/Circulating	Lanes	AM Flow (PCU/h)	AM Capacity	AM RFC	PM Flow (PCU/h	PM Capacity	PM RFC
Arm A	Circulating	2	931			881		
	Entry	3	951	2040	0.47	845	2076	0.41
Arm B	Circulating	2	1273			941		
	Entry	2	737	1186	0.62	581	1380	0.42
Arm C	Circulating	2	674			570		
	Entry	2	880	1801	0.49	994	1868	0.53
Arm D	Circulating	2	981			1075		
	Entry	2	982	1358	0.72	845	1303	0.65

	Geometry						DMRB Parameters							
	v	e	l'	r	D	ϕ	k	F	fc	td	M	x2	S	k
Arm A	8.64	8.64	0	20.66	62.6	20.00	1.036	2617.920	0.698	1.218	1.297	8.640	0.000	1.036
Arm B	3.89	7.55	23.17	27.63	62.6	32.00	1.007	1915.298	0.579	1.218	1.297	6.321	0.253	1.007
Arm C	5.36	7.6	21.15	22.92	62.6	17.50	1.050	2130.999	0.615	1.218	1.297	7.033	0.169	1.050
Arm D	3.56	8.01	20.77	18.76	62.6	20.00	1.031	1878.601	0.573	1.218	1.297	6.200	0.343	1.031

Site 17 - A143 Old Bury Road / B1077 Stunston Road – Multi-modal Scenario 2

Site 17
A143 Old Bury Rd / B1077 Stunston Rd

Site 17 - A143 Old Bury Rd / B1077 Stunston Rd



Opposing traffic

Arm						
A	B-B	C-B	C-C	D-B	D-C	D-D
B	A-A	A-C	A-D	C-C	D-C	D-D
C	A-A	A-D	B-A	B-B	B-D	D-D
D	A-A	B-A	B-B	C-A	C-B	C-C

Peak year 2028

AM 07:45

	A	B	c	D	Total	Total	Opposing
A	0	**354**	63	27	**444**	**444**	525
B	124	4	20	**448**	**596**	**596**	104
C	214	26	1	51	**293**	**293**	603
D	46	**480**	13	0	**540**	**540**	369
Total	**384**	**864**	**97**	**526**	**1872**		

PM 16:15

	A	B	C	D	Total	Total	Opposing
A	0	253	89	54	**396**	**396**	524
B	119	1	12	**350**	**483**	**483**	153
C	**260**	10	0	51	**321**	**321**	525
D	55	**502**	9	1	**568**	**568**	390
Total	**434**	**767**	**111**	**456**	**1767**	**3535**	958

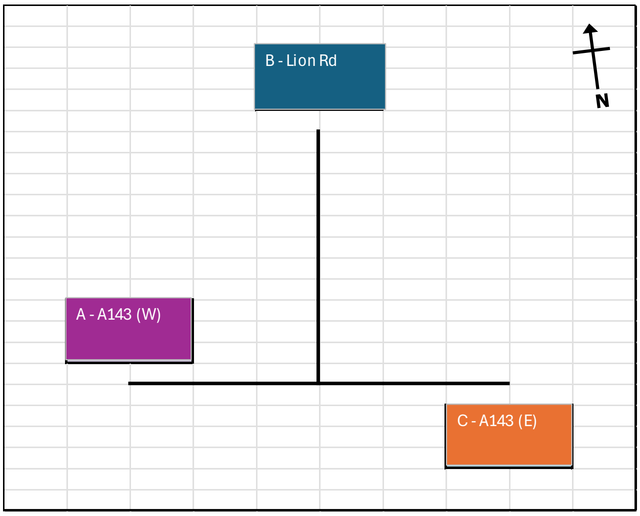
Detailed Early Roundabout Performance Assessment
Site 17 - A143 Old Bury Rd / B1077 Stunston Rd

			AM			PM		
ARM	**Entry/Circulating**	**Lanes**	**Flow (PCU/h)**	**Capacity**	**RFC**	**Flow (PCU/h**	**Capacity**	**RFC**
Arm A	Circulating	2	525			524		
	Entry	3	444	1242	0.36	396	1242	0.32
Arm B	Circulating	2	104			153		
	Entry	2	596	1957	0.30	483	1924	0.25
Arm C	Circulating	2	603			525		
	Entry	2	293	1194	0.25	321	1240	0.26
Arm D	Circulating	2	369			390		
	Entry	2	540	1809	0.30	568	1794	0.32

Site 18 - A143 Old Bury Road / Lion Road – Multi-modal Scenario 1

Site 18
Lion Road / A143 Old Bury Road / A143 Bury Road

Site 18 - Lion Road / A143 Old Bury Road / A143 Bury Road



Follow-up and critical gap times

	tc	tf
Major RT	4	2
Minor LT	6	3
Minor Straight	6	4
Minor RT	7	4

Major 1	C
Major 2	A
Minor	B

	Main movement		Opposing	
	Origin	**Destination**	**Origin**	**Destination**
Major 1 RT	C	B	A	C
Minor LT	B	C	A	C
Minor Straight	-	-	-	-
Minor RT	B	A	C	A
			C	B
			A	C
Major 2 LT	A	B		
Major 2 Straight	A	C		
Major 1 Straight	C	A		

Peak year 2028

Capacity estimation

AM 08:00

	A	B	C	Total
A	0	189	355	**544**
B	164	0	2	**166**
C	**421**	3	0	**424**
Total	**585**	**192**	**357**	**1133**

	Main flow	Opposing	Estimated Capacity AM
Major 1 RT	3	355	1213
Minor LT	2	355	664
Minor Straight	-	-	
Minor RT	164	779	198
Major 2 LT	189	-	
Major 2 Straight	355	-	
Major 1 Straight	421	-	

PM 16:00

	A	B	C	Total
A	0	179	**452**	**632**
B	136	0	3	**139**
C	335	4	0	**339**
Total	**471**	**183**	**455**	**1110**

	Main flow	Opposing	Estimated Capacity PM
Major 1 RT	4	452	1089
Minor LT	3	452	565
Minor Straight	-	-	
Minor RT	136	792	193
Major 2 LT	179	-	
Major 2 Straight	452	-	
Major 1 Straight	335	-	

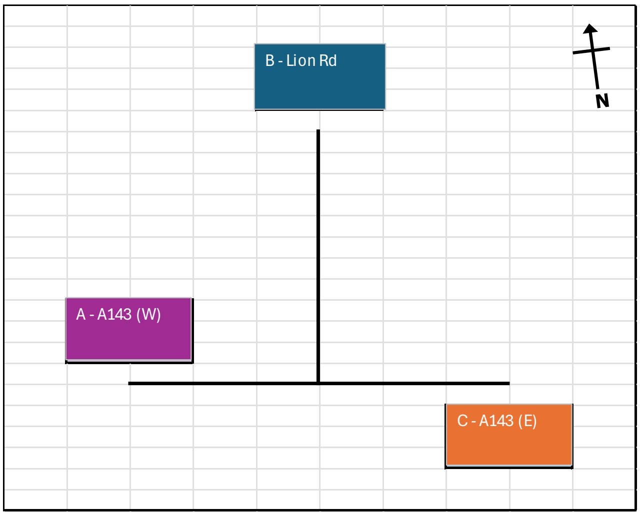
Detailed Early Junction Performance Assessment
Site 18 - Lion Road / A143 Old Bury Road / A143 Bury Road

					AM		PM	
Approach/Moveme	**Entry/Opposing**	**Lanes**	**Dedicatec RT lane**	**No. Lanes Crossing**	**Flow (PCU/h)**	**RFC**	**Flow (PCU/h)**	**RFC**
Major 2-Ahead	Opposing	1		0	-		-	
	Entry	1		-	355	0.20	452	0.25
Major 2-Left Turn	Opposing	1		0	-		-	
	Entry	1		-	189		179	
Minor-Left Turn	Opposing	1		1	355		452	
	Entry	1		-	2	0.00	3	0.01
Minor-Right Turn	Opposing	2		3	779		792	
	Entry	1		-	164	0.83	136	0.70
Major 1 - Ahead	Opposing	1		0	-		-	
	Entry	1	1.0	-	421	0.23	335	0.19
Major 1 -Right Turn	Opposing	1		1	355		452	
	Entry	1		-	3	0.00	4	0.00

Site 18 - A143 Old Bury Road / Lion Road – Multi-modal Scenario 2

Site 18
Lion Road / A143 Old Bury Road / A143 Bury Road

Site 18 - Lion Road / A143 Old Bury Road / A143 Bury Road



Follow-up and critical gap times

	tc	tf
Major RT	4	2
Minor LT	6	3
Minor Straight	6	4
Minor RT	7	4

Major 1	C
Major 2	A
Minor	B

	Main movement		Opposing	
	Origin	**Destination**	**Origin**	**Destination**
Major 1 RT	C	B	A	C
Minor LT	B	C	A	C
Minor Straight	-	-	-	-
Minor RT	B	A	C	A
			C	B
			A	C
Major 2 LT	A	B		
Major 2 Straight	A	C		
Major 1 Straight	C	A		

Peak year 2028

Capacity estimation

AM 08:00

	A	B	C	Total
A	0	188	371	**558**
B	163	0	14	**177**
C	**436**	15	0	**451**
Total	**599**	**203**	**385**	**1187**

	Main flow	Opposing	Estimated Capacity AM
Major 1 RT	15	371	1192
Minor LT	14	371	647
Minor Straight	-	-	
Minor RT	163	822	182
Major 2 LT	188	-	
Major 2 Straight	371	-	
Major 1 Straight	436	-	

PM 16:00

	A	B	C	Total
A	0	178	**468**	**646**
B	135	0	15	**150**
C	351	16	0	**367**
Total	**487**	**194**	**483**	**1164**

	Main flow	Opposing	Estimated Capacity PM
Major 1 RT	16	468	1070
Minor LT	15	468	550
Minor Straight	-	-	
Minor RT	135	835	177
Major 2 LT	178	-	
Major 2 Straight	468	-	
Major 1 Straight	351	-	

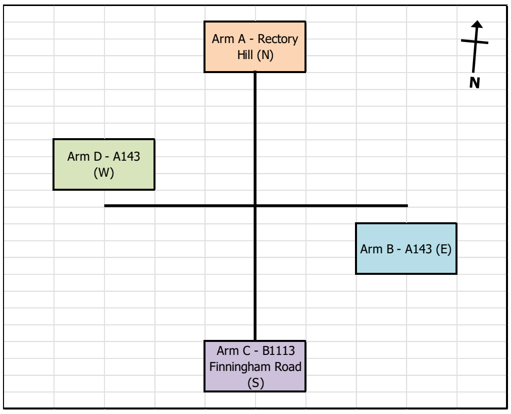
Detailed Early Junction Performance Assessment
Site 18 - Lion Road / A143 Old Bury Road / A143 Bury Road

Approach/Moveme	Entry/Opposing	Lanes	Dedicatec RT lane	No. Lanes Crossing	AM Flow (PCU/h)	AM RFC	PM Flow (PCU/h)	PM RFC
Major 2-Ahead	Opposing	1		0	-		-	
	Entry	1		-	371	0.21	468	0.26
Major 2-Left Turn	Opposing	1		0	-		-	
	Entry	1		-	188		178	
Minor-Left Turn	Opposing	1		1	371		468	
	Entry	1		-	14	0.02	15	0.03
Minor-Right Turn	Opposing	2		3	822		835	
	Entry	1		-	163	0.90	135	0.76
Major 1 - Ahead	Opposing	1		0	-		-	
	Entry	1	1.0	-	436	0.24	351	0.20
Major 1 -Right Turn	Opposing	1		1	371		468	
	Entry	1		-	15	0.01	16	0.02

Site 19 - A143 / B1113 Finningham Road – Multi-modal Scenario 1

Site 19
Rectory Hill / A143 / B1113 Finningham Road

Site 19 - Rectory Hill / A143 / B1113 Finningham Road



Follow-up and critical gap times

	tc	tf
Major RT	4	2
Minor LT	6	3
Minor Straight	6	4
Minor RT	7	4

Major 1	B
Major 2	D
Minor 1	A
Minor 2	C

	Main movement		Opposing	
	Origin	Destination	Origin	Destination
Major 1 RT	B	A	D	B
Major 1 Straight	B	D		
Major 1 LT	B	C		
Minor 1 LT	A	B	D	B
Minor 1 Straight	A	C	B	D
			D	B
Minor 1 RT	A	D	B	D
			D	B
			C	A
			C	D
Major 2 RT	D	C	B	D
Major 2 Straight	D	B		
Major 2 LT	D	A		
Minor 2 LT	C	D	B	D
Minor 2 Straight	C	A	B	D
			D	B
Minor 2 RT	C	B	B	D
			D	B
			A	C
			A	B

Peak year 2028

AM 07:30

	A	B	c	D	Total
A	0	22	32	3	57
B	5	0	100	435	541
C	29	66	0	50	145
D	2	369	44	0	416
Total	36	457	177	489	1159

PM 16:15

	A	B	C	D	Total
A	0	11	35	2	49
B	8	0	68	293	369
C	54	66	0	45	165
D	4	445	50	0	499
Total	66	523	153	340	1082

Capacity estimation

	Main flow	Opposing	Estimated Capacity AM
Major 1 RT	5	369	1790
Major 1 Straight	435	-	
Major 1 LT	100	-	
Minor 1 LT	22	369	1157
Minor 1 Straight	32	805	853
Minor 1 RT	3	884	895
Major 2 RT	44	435	1713
Major 2 Straight	369	-	
Major 2 LT	2	-	
Minor 2 LT	50	435	1103
Minor 2 Straight	29	805	858
Minor 2 RT	66	858	791

	Main flow	Opposing	Estimated Capacity PM
Major 1 RT	8	445	1784
Major 1 Straight	293	-	
Major 1 LT	68	-	
Minor 1 LT	11	445	1177
Minor 1 Straight	35	738	849
Minor 1 RT	2	837	896
Major 2 RT	50	293	1703
Major 2 Straight	445	-	
Major 2 LT	4	-	
Minor 2 LT	45	293	1113
Minor 2 Straight	54	738	823
Minor 2 RT	66	785	791

Detailed Early Junction Performance Assessment

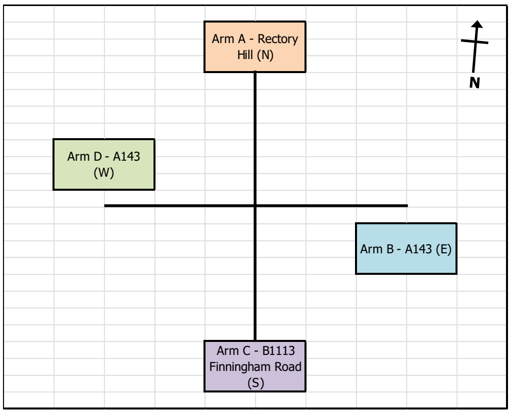
Site 19 - Rectory Hill / A143 / B1113 Finningham Road

Approach/Movement	Entry/Opposing	Lanes	Dedicated RT lane	No. Lanes Crossing	AM Flow (PCU/h)	AM RFC	PM Flow (PCU/h)	PM RFC
Major 1 -Right turn	Opposing	1		2	369		445	
	Entry	1		-	5	0.00	8	0.00
Major 1 -Ahead	Opposing	1		0	-		-	
	Entry	1	0	-	435	0.24	293	0.16
Major 1 -Left Turn	Opposing	1		0	-		-	
	Entry	1		-	100		68	
Minor 1 -Left Turn	Opposing	1		1	369		445	
	Entry	1		-	22	0.02	11	0.01
Minor 1 -Ahead	Opposing	2		2	805		738	
	Entry	1		-	32	0.04	35	0.04
Minor 1 -Right Turn	Opposing	1		2	884		837	
	Entry	1		-	3	0.00	2	0.00
Major 2 -Right turn	Opposing	1		1	435		293	
	Entry	1		-	44	0.03	50	0.03
Major 2 -Ahead	Opposing	1		0	-		-	
	Entry	1	0	-	369	0.21	445	0.25
Major 2 -Left Turn	Opposing	1		0	-		-	
	Entry	1		-	2		4	
Minor 2 -Left Turn	Opposing	1		1	435		293	
	Entry	1		-	50	0.05	45	0.04
Minor 2 -Ahead	Opposing	2		2	805		738	
	Entry	1		-	29	0.03	54	0.07
Minor 2 -Right Turn	Opposing	1		2	858		785	
	Entry	1		-	66	0.08	66	0.08

Site 19 - A143 / B1113 Finningham Road – Multi-modal Scenario 2

Site 19
Rectory Hill / A143 / B1113 Finningham Road

Site 19 - Rectory Hill / A143 / B1113 Finningham Road



Peak year 2028

AM 07:30

	A	B	c	D	Total
A	0	22	32	3	57
B	5	0	118	433	556
C	29	66	0	69	164
D	2	367	44	0	413
Total	36	454	195	505	1190

PM 16:15

	A	B	C	D	Total
A	0	11	35	2	48
B	8	0	87	291	386
C	54	66	0	64	183
D	4	442	49	0	496
Total	66	520	171	357	1114

Follow-up and critical gap times

	tc	tf
Major RT	4	2
Minor LT	6	3
Minor Straight	6	4
Minor RT	7	4

Major 1 B
Major 2 D
Minor 1 A
Minor 2 C

	Main movement		Opposing	
	Origin	Destination	Origin	Destination
Major 1 RT	B	A	D	B
Major 1 Straight	B	D		
Major 1 LT	B	C		
Minor 1 LT	A	B	D	B
Minor 1 Straight	A	C	B	D
			D	B
Minor 1 RT	A	D	B	D
			D	B
			C	A
			C	D
Major 2 RT	D	C	B	D
Major 2 Straight	D	B		
Major 2 LT	D	A		
Minor 2 LT	C	D	B	D
Minor 2 Straight	C	A	B	D
			D	B
Minor 2 RT	C	B	B	D
			D	B
			A	C
			A	B

Capacity estimation

	Main flow	Opposing	Estimated Capacity AM
Major 1 RT	5	367	1790
Major 1 Straight	433	-	
Major 1 LT	118	-	
Minor 1 LT	22	367	1158
Minor 1 Straight	32	800	853
Minor 1 RT	3	898	895
Major 2 RT	44	433	1714
Major 2 Straight	367	-	
Major 2 LT	2	-	
Minor 2 LT	69	433	1069
Minor 2 Straight	29	800	858
Minor 2 RT	66	853	792

	Main flow	Opposing	Estimated Capacity PM
Major 1 RT	8	442	1784
Major 1 Straight	291	-	
Major 1 LT	87	-	
Minor 1 LT	11	442	1178
Minor 1 Straight	35	734	849
Minor 1 RT	2	851	896
Major 2 RT	49	291	1704
Major 2 Straight	442	-	
Major 2 LT	4	-	
Minor 2 LT	64	291	1079
Minor 2 Straight	54	734	823
Minor 2 RT	66	780	792

Detailed Early Junction Performance Assessment

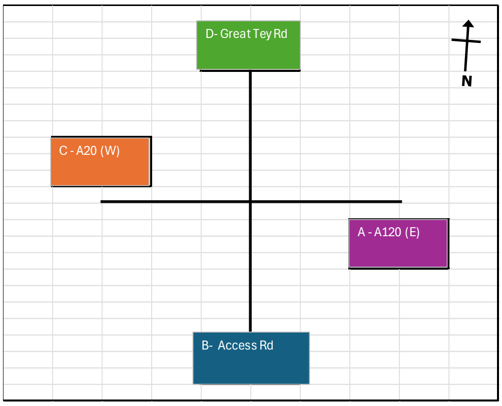
Site 19 - Rectory Hill / A143 / B1113 Finningham Road

Approach/Movement	Entry/Opposing	Lanes	Dedicated RT lane	No. Lanes Crossing	AM Flow (PCU/h)	AM RFC	PM Flow (PCU/h)	PM RFC
Major 1 -Right turn	Opposing	1		2	367		442	
	Entry	1		-	5	0.00	8	0.00
Major 1 -Ahead	Opposing	1		0	-		-	
	Entry	1	0	-	433	0.24	291	0.16
Major 1 -Left Turn	Opposing	1		0	-		-	
	Entry	1		-	118		87	
Minor 1 -Left Turn	Opposing	1		1	367		442	
	Entry	1		-	22	0.02	11	0.01
Minor 1 -Ahead	Opposing	2		2	800		734	
	Entry	1		-	32	0.04	35	0.04
Minor 1 -Right Turn	Opposing	1		2	898		851	
	Entry	1		-	3	0.00	2	0.00
Major 2 -Right turn	Opposing	1		1	433		291	
	Entry	1		-	44	0.03	49	0.03
Major 2 -Ahead	Opposing	1		0	-		-	
	Entry	1	0	-	367	0.20	442	0.25
Major 2 -Left Turn	Opposing	1		0	-		-	
	Entry	1		-	2		4	
Minor 2 -Left Turn	Opposing	1		1	433		291	
	Entry	1		-	69	0.06	64	0.06
Minor 2 -Ahead	Opposing	2		2	800		734	
	Entry	1		-	29	0.03	54	0.06
Minor 2 -Right Turn	Opposing	1		2	853		780	
	Entry	1		-	66	0.08	66	0.08

Site 47 - A120 Coggeshall Road / Great Tey Road – Multi-modal Scenario 1

Site 47
Great Tey Road / A120 Coggeshall Road

Site 47 - Great Tey Road / A120 Coggeshall Road



Follow-up and critical gap times

	tc	tf
Major RT	4	2
Minor LT	6	3
Minor Straight	6	4
Minor RT	7	4

Major 1	A
Major 2	C
Minor 1	D
Minor 2	B

	Main movement Origin	Main movement Destination	Opposing Origin	Opposing Destination
Major 1 RT	A	D	C	A
Major 1 Straight	A	C		
Major 1 LT	A	B		
Minor 1 LT	D	A	C	A
Minor 1 Straight	D	B	A	C
			C	A
Minor 1 RT	D	C	A	C
			C	A
			B	D
			B	C
Major 2 RT	C	B	A	C
Major 2 Straight	C	A		
Major 2 LT	C	D		
Minor 2 LT	B	C	A	C
Minor 2 Straight	B	D	A	C
			C	A
Minor 2 RT	B	A	A	C
			C	A
			D	B
			D	A

Peak year 2030

AM 08:30

	A	B	c	D	Total
A	0	6	1278	79	1363
B	0	0	6	0	6
C	998	0	0	54	1053
D	67	0	54	0	120
Total	1065	6	1338	133	2542

PM 16:30

	A	B	C	D	Total
A	0	0	1069	102	1171
B	3	0	0	0	3
C	1021	0	0	37	1058
D	85	0	31	0	116
Total	1109	0	1100	139	2348

Capacity estimation

	Main flow	Opposing	Estimated Capacity AM
Major 1 RT	79	998	1649
Major 1 Straight	1278	-	
Major 1 LT	6	-	
Minor 1 LT	67	998	1074
Minor 1 Straight	0	2277	900
Minor 1 RT	54	2283	810
Major 2 RT	0	1278	1800
Major 2 Straight	998	-	
Major 2 LT	54	-	
Minor 2 LT	6	1278	1188
Minor 2 Straight	0	2277	900
Minor 2 RT	0	2343	900

	Main flow	Opposing	Estimated Capacity PM
Major 1 RT	102	1021	1608
Major 1 Straight	1069	-	
Major 1 LT	0	-	
Minor 1 LT	85	1021	1041
Minor 1 Straight	0	2090	900
Minor 1 RT	31	2090	847
Major 2 RT	0	1069	1800
Major 2 Straight	1021	-	
Major 2 LT	37	-	
Minor 2 LT	0	1069	1200
Minor 2 Straight	0	2090	900
Minor 2 RT	3	2175	895

Detailed Early Junction Performance Assessment

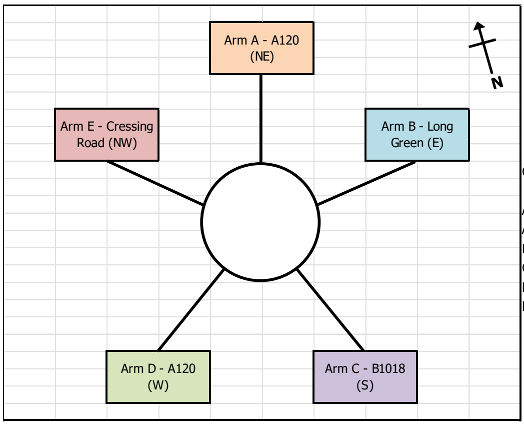
Site 47 - Great Tey Road / A120 Coggeshall Road

Approach/Movement	Entry/Opposing	Lanes	Dedicated RT lane	No. Lanes Crossing	AM Flow (PCU/h)	AM RFC	PM Flow (PCU/h)	PM RFC
Major 1 - Right turn	Opposing	1		2	998		1021	
	Entry	1		-	79	0.05	102	0.06
Major 1 - Ahead	Opposing	1		0	-		-	
	Entry	1	0	-	1278	0.71	1069	0.59
Major 1 - Left Turn	Opposing	1		0	-		-	
	Entry	1		-	6		0	
Minor 1 - Left Turn	Opposing	1		1	998		1021	
	Entry	1		-	67	0.06	85	0.08
Minor 1 - Ahead	Opposing	2		2	2277		2090	
	Entry	1		-	0	0.00	0	0.00
Minor 1 - Right Turn	Opposing	1		2	2283		2090	
	Entry	1		-	54	0.07	31	0.04
Major 2 - Right turn	Opposing	1		1	1278		1069	
	Entry	1		-	0	0.00	0	0.00
Major 2 - Ahead	Opposing	1		0	-		-	
	Entry	1	0	-	998	0.55	1021	0.57
Major 2 - Left Turn	Opposing	1		0	-		-	
	Entry	1		-	54		37	
Minor 2 - Left Turn	Opposing	1		1	1278		1069	
	Entry	1		-	6	0.01	0	0.00
Minor 2 - Ahead	Opposing	2		2	2277		2090	
	Entry	1		-	0	0.00	0	0.00
Minor 2 - Right Turn	Opposing	1		2	2343		2175	
	Entry	1		-	0	0.00	3	0.00

Site 48 - A120 Braintree Bypass / B1018 Braintree Road – Multi-modal Scenario 1

Site 48
Galleys Corner

Site 48 - Galleys Corner



Opposing traffic

Arm										
A	B-B	C-B	C-C	D-B	D-C	D-D	E-B	E-C	E-D	E-E
B	A-A	A-C	A-D	A-E	C-C	D-C	D-D	E-C	E-D	E-E
C	A-A	A-D	A-E	B-A	B-B	B-D	B-E	D-D	E-D	E-E
D	A-A	A-E	B-A	B-B	B-E	C-A	C-B	C-C	C-E	E-E
E	A-A	B-A	B-B	C-A	C-B	C-C	D-A	D-B	D-C	D-D

Peak year 2028

AM 07:30

	A	B	C	D	E	Total	Opposing
A	7	102	223	1178	17	**1526**	965
B	56	0	44	313	30	**443**	2243
C	204	14	1	271	49	**540**	1908
D	1087	113	450	0	123	**1772**	378
E	184	20	60	307	0	**572**	1932
Total	**1539**	**248**	**778**	**2070**	**218**	**4853**	

PM 16:00

	A	B	C	D	E	Total	Opposing
A	7	139	434	857	37	**1474**	830
B	63	0	51	140	47	**299**	2013
C	372	28	2	445	57	**904**	1352
D	1133	107	421	1	93	**1755**	613
E	149	17	54	201	0	**420**	2134
Total	**1724**	**291**	**961**	**1643**	**234**	**4853**	

Detailed Early Roundabout Performance Assessment

Site 48 - Galleys Corner

AM

ARM	Entry/Circulating	Lanes	AM Flow (PCU/h)	AM Capacity	AM RFC	PM Flow (PCU	PM Capacity	PM RFC
Arm A	Circulating	2	965			830		
	Entry	3	1526	1803	0.85	1474	1908	0.77
Arm B	Circulating	2	2243			2013		
	Entry	2	443	73	6.08	299	195	1.53
Arm C	Circulating	2	1908			1352		
	Entry	2	540	717	0.75	904	1109	0.82
Arm D	Circulating	2	378			613		
	Entry	2	1772	2307	0.77	1755	2117	0.83
Arm E	Circulating	2	1932			2134		
	Entry	2	572	298	1.92	420	186	2.26

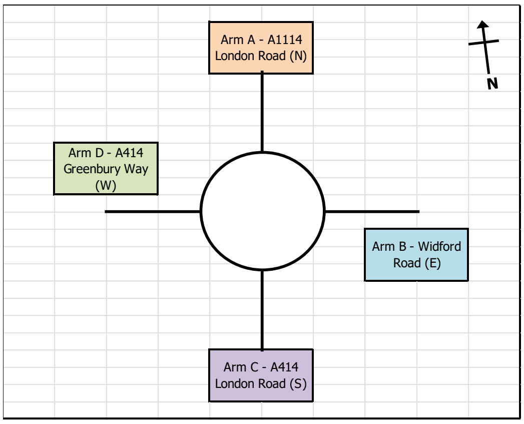
Geometry

	Geometry						DMRB Parameters							
	v	e	l'	r	D	ϕ	k	F	fc	td	M	x2	S	k
Arm A	9.3	9.3	1	42.3	65	45.00	0.906	2817.900	0.857	1.427	0.170	9.300	0.000	0.906
Arm B	3.7	5.9	7.2	23.9	65	17.00	0.870	1458.145	0.613	1.487	0.027	4.812	0.489	0.870
Arm C	7.4	8.9	1.3	11.3	65	21.00	0.881	2339.061	0.799	1.496	0.008	7.720	1.846	0.881
Arm D	9.9	9.9	1	23.2	65	17.50	0.872	2999.700	0.931	1.488	0.025	9.900	0.000	0.872
Arm E	3.7	10.2	6.3	18	65	17.50	0.872	1578.954	0.640	1.493	0.015	5.211	1.651	0.872

Site 63 - A414 Three Mile Hill / A1114 London Road – Multi-modal Scenario 1

Site 63
Widford Roundabout

Site 63 - Widford Roundabout



Opposing traffic

Arm						
A	B-B	C-B	C-C	D-B	D-C	D-D
B	A-A	A-C	A-D	C-C	D-C	D-D
C	A-A	A-D	B-A	B-B	B-D	D-D
D	A-A	B-A	B-B	C-A	C-B	C-C

Peak year 2028

AM 07:15

	A	B	c	D	Total		Total	Opposing
A	0	103	832	**659**	**1594**		**1594**	241
B	93	1	43	35	**172**		**172**	1665
C	**939**	23	11	173	**1145**		**1145**	788
D	**507**	43	163	0	**713**		**713**	1066
Total	**1538**	**170**	**1049**	**867**	**3625**			

PM 16:30

	A	B	C	D	Total		Total	Opposing
A	1	75	**1156**	**276**	**1507**		**1507**	357
B	101	1	27	19	**148**		**148**	1758
C	930	17	24	131	**1102**		**1102**	398
D	**525**	14	302	0	**841**		**841**	1074
Total	**1558**	**107**	**1508**	**426**	**3598**		**7196**	1915

Detailed Early Roundabout Performance Assessment
Site 63 - Widford Roundabout

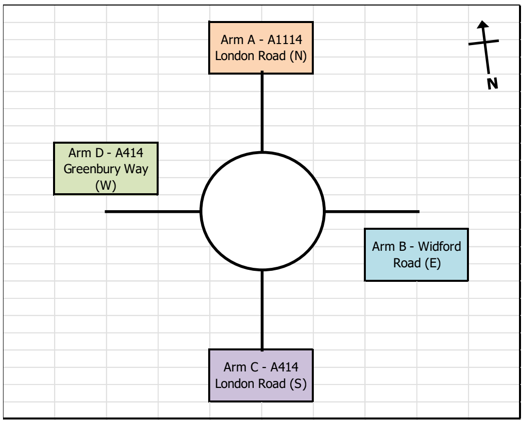
			AM			**PM**		
ARM	**Entry/Circulating**	**Lanes**	**Flow (PCU/h)**	**Capacity**	**RFC**	**Flow (PCU/h**	**Capacity**	**RFC**
Arm A	Circulating	2	241			357		
	Entry	3	1594	2076	0.77	1507	1997	0.75
Arm B	Circulating	2	1665			1758		
	Entry	2	172	1362	0.13	148	1293	0.11
Arm C	Circulating	2	788			398		
	Entry	2	1145	1963	0.58	1102	2254	0.49
Arm D	Circulating	2	1066			1074		
	Entry	2	713	1085	0.66	841	1080	0.78

	Geometry						DMRB Parameters							
	v	e	l'	r	D	ϕ	k	F	fc	td	M	x2	S	k
Arm A	6.7	7.9	3.3	16.7	55.6	21.50	1.020	2198.150	0.671	1.304	0.644	7.255	0.582	1.020
Arm B	8.6	8.6	1	12.4	55.6	22.00	0.998	2605.800	0.745	1.304	0.644	8.600	0.000	0.998
Arm C	6	8.9	24.9	16.8	55.6	16.50	1.038	2458.130	0.718	1.304	0.644	8.113	0.186	1.038
Arm D	4.2	7.4	10.8	27.4	55.6	47.00	0.954	1770.303	0.594	1.304	0.644	5.843	0.474	0.954

Site 63 - A414 Three Mile Hill / A1114 London Road – Multi-modal Scenario 2

Site 63
Widford Roundabout

Site 63 - Widford Roundabout



Opposing traffic

Arm						
A	B-B	C-B	C-C	D-B	D-C	D-D
B	A-A	A-C	A-D	C-C	D-C	D-D
C	A-A	A-D	B-A	B-B	B-D	D-D
D	A-A	B-A	B-B	C-A	C-B	C-C

Peak year 2028

AM 07:15

	A	B	c	D	Total	Total	Opposing
A	0	103	832	**660**	**1595**	**1595**	241
B	93	1	43	35	**172**	**172**	1666
C	**939**	23	11	173	**1145**	**1145**	789
D	**508**	43	163	0	**714**	**714**	1066
Total	**1539**	**170**	**1049**	**868**	**3627**		

PM 16:30

	A	B	C	D	Total	Total	Opposing
A	1	75	**1156**	**277**	**1508**	**1508**	357
B	101	1	27	19	**148**	**148**	1759
C	930	17	24	131	**1102**	**1102**	399
D	**526**	14	302	0	**842**	**842**	1074
Total	**1559**	**107**	**1508**	**427**	**3600**	**7200**	1916

Detailed Early Roundabout Performance Assessment

Site 63 - Widford Roundabout

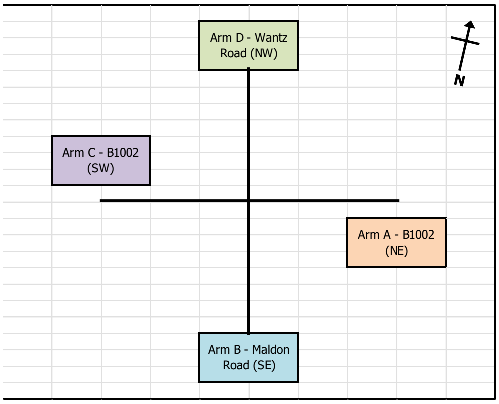
			AM			PM		
ARM	**Entry/Circulating**	**Lanes**	**Flow (PCU/h)**	**Capacity**	**RFC**	**Flow (PCU/h**	**Capacity**	**RFC**
Arm A	Circulating	2	241			357		
	Entry	3	1595	2076	0.77	1508	1997	0.76
Arm B	Circulating	2	1666			1759		
	Entry	2	172	1361	0.13	148	1293	0.11
Arm C	Circulating	2	789			399		
	Entry	2	1145	1963	0.58	1102	2253	0.49
Arm D	Circulating	2	1066			1074		
	Entry	2	714	1085	0.66	842	1080	0.78

	Geometry						DMRB Parameters							
	v	e	l'	r	D	ϕ	k	F	fc	td	M	x2	S	k
Arm A	6.7	7.9	3.3	16.7	55.6	21.50	1.020	2198.150	0.671	1.304	0.644	7.255	0.582	1.020
Arm B	8.6	8.6	1	12.4	55.6	22.00	0.998	2605.800	0.745	1.304	0.644	8.600	0.000	0.998
Arm C	6	8.9	24.9	16.8	55.6	16.50	1.038	2458.130	0.718	1.304	0.644	8.113	0.186	1.038
Arm D	4.2	7.4	10.8	27.4	55.6	47.00	0.954	1770.303	0.594	1.304	0.644	5.843	0.474	0.954

Site 72 - B1002 Main Road / Wantz Road – Multi-modal Scenario 2

Site 72
B1002 / Maldon Road / Wantz Road

Site 72 - B1002 / Maldon Road / Wantz Road



Follow-up and critical gap times

	tc	tf
Major RT	4	2
Minor LT	6	3
Minor Straight	6	4
Minor RT	7	4

Major 1	A
Major 2	C
Minor 1	D
Minor 2	B

	Main movement		Opposing	
	Origin	**Destination**	**Origin**	**Destination**
Major 1 RT	A	D	C	A
Major 1 Straight	A	C		
Major 1 LT	A	B		
Minor 1 LT	D	A	C	A
Minor 1 Straight	D	B	A	C
			C	A
Minor 1 RT	D	C	A	C
			C	A
			B	D
			B	C
Major 2 RT	C	B	A	C
Major 2 Straight	C	A		
Major 2 LT	C	D		
Minor 2 LT	B	C	A	C
Minor 2 Straight	B	D	A	C
			C	A
Minor 2 RT	B	A	A	C
			C	A
			D	B
			D	A

Peak year 2028

AM 08:15

	A	B	c	D	Total
A	0	21	212	**238**	**471**
B	23	0	46	70	**139**
C	177	24	0	60	**260**
D	108	35	43	0	**186**
Total	**308**	**79**	**302**	**367**	**1056**

PM 16:15

	A	B	C	D	Total
A	0	20	174	53	**247**
B	9	0	31	25	**65**
C	**200**	60	0	49	**309**
D	68	70	36	0	**174**
Total	**277**	**149**	**241**	**128**	**794**

Capacity estimation

	Main flow	Opposing	Estimated Capacity AM
Major 1 RT	238	177	1382
Major 1 Straight	212 -		
Major 1 LT	21 -		
Minor 1 LT	108	177	1002
Minor 1 Straight	35	389	849
Minor 1 RT	43	505	828
Major 2 RT	24	212	1753
Major 2 Straight	177 -		
Major 2 LT	60 -		
Minor 2 LT	46	212	1111
Minor 2 Straight	70	389	801
Minor 2 RT	23	533	861

	Main flow	Opposing	Estimated Capacity PM
Major 1 RT	53	200	1696
Major 1 Straight	174 -		
Major 1 LT	20 -		
Minor 1 LT	68	200	1072
Minor 1 Straight	70	374	801
Minor 1 RT	36	429	839
Major 2 RT	60	174	1685
Major 2 Straight	200 -		
Major 2 LT	49 -		
Minor 2 LT	31	174	1140
Minor 2 Straight	25	374	864
Minor 2 RT	9	512	884

Detailed Early Junction Performance Assessment

Site 72 - B1002 / Maldon Road / Wantz Road

					AM		PM	
Approach/Movement	**Entry/Opposing**	**Lanes**	**Dedicated RT lane**	**No. Lanes Crossing**	**Flow (PCU/h)**	**RFC**	**Flow (PCU/h)**	**RFC**
Major 1 -Right turn	Opposing	1		2	177		200	
	Entry	1		-	238	0.17	53	0.03
Major 1 -Ahead	Opposing	1		0	-		-	
	Entry	1	0	-	212	0.12	174	0.10
Major 1 -Left Turn	Opposing	1		0	-		-	
	Entry	1		-	21		20	
Minor 1 -Left Turn	Opposing	1		1	177		200	
	Entry	1		-	108	0.11	68	0.06
Minor 1 -Ahead	Opposing	2		2	389		374	
	Entry	1		-	35	0.04	70	0.09
Minor 1 -Right Turn	Opposing	1		2	505		429	
	Entry	1		-	43	0.05	36	0.04
Major 2 -Right turn	Opposing	1		1	212		174	
	Entry	1		-	24	0.01	60	0.04
Major 2 -Ahead	Opposing	1		0	-		-	
	Entry	1	0	-	177	0.10	200	0.11
Major 2 -Left Turn	Opposing	1		0	-		-	
	Entry	1		-	60		49	
Minor 2 -Left Turn	Opposing	1		1	212		174	
	Entry	1		-	46	0.04	31	0.03
Minor 2 -Ahead	Opposing	2		2	389		374	
	Entry	1		-	70	0.09	25	0.03
Minor 2 -Right Turn	Opposing	1		2	533		512	
	Entry	1		-	23	0.03	9	0.01

Abbreviations

Abbreviation	Full Reference
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
MRN	Major Road Network
PAR	Primary Access Routes
SRN	Strategic Road Network
TA	Transport Assessment

Glossary

Term	Definition
Development Consent Order	A statutory instrument which grants consents and other rights to build a Nationally Significant Infrastructure Project, as defined by the Planning Act 2008.
Major Road Network	Middle tier of the country’s busiest and most economically important local authority ‘A’ roads, sitting between the national Strategic Road Network and the rest of the local road network.
Primary Access Routes	Access routes on the public highway designated for use by construction vehicles (typically for HGVs) to travel from the strategic road network / major road network to the site access point.
Strategic Road Network	Network of motorways and major A roads managed by National Highways
Transport Assessment	Transport Assessment is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be taken to deal with the anticipated transport effects of the Project. It is separate to Chapter 16: Traffic and Transport (document reference 6.16).

Annex A. Multi-Modal Transport Report

nationalgrid

Contents

Executive Summary

Purpose of this Report

This document has been prepared to identify and assess opportunities to make use of alternative transport modes to supply materials for the construction of the Project. This includes examination of these opportunities potentially being utilised to supplement the Construction Routeing Strategy set out in the Outline CTMP, and to support a shift towards the use of more sustainable transportation modes.

Scope of the Assessment

The focus of this assessment is the supply of materials into the region surrounding the Project alignment by rail and water-borne transport. Detailed assessments of movements within the region, specific distributions of trips on the road network and cumulative impact of trips are covered within Chapter 16 (Traffic and Transport) of the Environmental Statement (ES).

It is assumed that the ‘last mile’ of any delivery using rail or water-borne transport will need to be made by road, using the public highway and/or construction haul roads as required. Therefore, it is appropriate for rail and water-borne transport modes to consider deliveries to a number of railhead and port locations rather than necessarily directly to the Project alignment by those modes.

Results of the Assessment

Multiple sustainable transport modal options have been assessed for their appropriateness in delivering the materials required for the Project. This assessment has been undertaken in accordance with NPS EN-1 (Department for Energy Security and Net Zero, 2024), which emphasises the importance of minimising environmental impacts and promoting sustainable logistics solutions.

A total of 15 potential facilities have been identified for the delivery of materials for the Project by either rail or water-borne transportation. All of the options identified would utilise an already established facility, with a number of different operators across the region. Of these facilities, 12 have been identified as suitable for bulk materials and eight for abnormally large and/or heavy items.

However, several key elements of the Project remain to be finalised, including the detailed design, construction programme, and commercial agreements for the procurement of material quantities. The outcome of this process will be to confirm sources of material supply and associated transport logistics, and to identify whether alternative transport modes are feasible, commercially viable and operationally reasonable.

In the event that development consent is granted for the Project, National Grid, in collaboration with the appointed Main Works Contractor(s), will pursue the exploration and implementation (where feasible, commercially viable and operationally reasonable) of alternative transport modes to deliver materials and large and/or heavy items.

1. Introduction

1.1 Background

1.1.1 Norwich to Tilbury (referred to as 'the Project') comprises reinforcement of the transmission network between the existing Norwich Main Substation in Norfolk and Tilbury Substation in Essex, via Bramford Substation, the new East Anglia Connection Node (EACN) and the new Tilbury North Substation.

1.1.2 The Construction Routeing Strategy for the Project is presented in Section 6.4 of the Outline Construction Traffic Management Plan (CTMP) (document reference 7.3). This strategy indicates that construction traffic would make use of the Strategic Road Network (SRN) and Major Road Network (MRN) to access the region, and subsequently utilise prescribed construction access routes – termed Primary Access Routes (PARs) – to access the construction areas.

1.1.3 This document has been prepared to identify and assess opportunities to make use of alternative transport modes to supply materials for the construction of the Project. This includes examination of these opportunities potentially being utilised to supplement the Construction Routeing Strategy set out in the Outline CTMP, and hence support a shift towards the use of more sustainable transportation modes.

1.1.4 To this end, ports and railway sidings in the vicinity of the Project alignment have been identified, and sifting undertaken to determine which facilities could provide feasible options for Project use.

1.1.5 Where feasible ports and railway sidings have been identified, further investigation has been undertaken to determine types and rate at which materials could credibly be supplied to the Project via each location. The rate at which Project materials could be delivered through each identified feasible port or railway siding has been evaluated as 'credible throughput', in terms of material tonnage per week.

1.1.6 These credible throughputs have been utilised to derive trip generation data for maximum onward movements by road from each port or railway siding.

1.2 Policy and Guidance

1.2.1 The Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy Security and Net Zero, 2024) sets out the basis under which an energy sector Nationally Significant Infrastructure Project (NSIP) will be considered during the Development Consent Order (DCO) application process. In particular, EN-1 Section 5.14 discusses transport impacts.

1.2.2 Within this section, Paragraph 5.14.4 sets out the need to consider and mitigate transport impacts:

‘The consideration and mitigation of transport impacts is an essential part of Government’s wider policy objectives for sustainable development as set out in Section 2.6 of this NPS’.

1.2.3 Paragraph 5.14.11 suggests approaches to mitigating transport impacts, and refers to the use of alternative transport modes:

'Where mitigation is needed, possible demand management measures must be considered. This could include identifying opportunities to:

- *reduce the need to travel by consolidating trips*
- *locate development in areas already accessible by active travel and public transport*
- *provide opportunities for shared mobility*
- *re-mode by shifting travel to a sustainable mode that is more beneficial to the network*
- *travel outside of known peak times*
- *reroute to use parts of the network that are less busy.'*

1.2.4 Paragraph 5.14.12 expands on this, stating that:

'If feasible and operationally reasonable, such mitigation should be required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts. All stages of the project should support and encourage a modal shift of freight from road to more environmentally sustainable alternatives, such as rail, cargo bike, maritime and inland waterways, as well as making appropriate provision for and infrastructure needed to support the use of alternative fuels including charging for electric vehicles'.

1.2.5 Hence, a requirement is set out to consider the utilisation of transport modes other than by road for the delivery of project materials, where this is feasible and operationally reasonable. This includes a preference for more sustainable modes, in comparison to road transport, a stance which is reiterated in Paragraph 5.14.15:

'The Secretary of State should have regard to the cost-effectiveness of demand management measures compared to new transport infrastructure, as well as the aim to secure more sustainable patterns of transport development when considering mitigation measures'.

1.2.6 Further to this, Paragraph 5.14.16 specifies guidance which should be considered specifically for the movement of Abnormal Indivisible Loads (AILs) which seeks to minimise impacts on the road network of AILs by using alternative transport modes, such as water:

'Applicants should consider the DfT policy guidance "Water Preferred Policy Guidelines for the movement of abnormal indivisible loads" when preparing their application.'

1.2.7 Whilst Paragraph 5.14.15 indicates a regard for cost-effectiveness, Paragraph 5.14.17 clarifies that cost – in and of itself – cannot be used as sole justification for the omission of any particular requirements:

'*If an applicant suggests that the costs of meeting any obligations or requirements would make the proposal economically unviable this should not in itself justify the relaxation by the Secretary of State of any obligations or requirements needed to secure the mitigation*'.

1.2.8 Finally, Paragraph 5.14.21 sets out the reasons for which development consent refusal on highways grounds should be considered:

'The Secretary of State should only consider refusing development on highways grounds if there would be an unacceptable impact on highway safety, residual cumulative impacts on the road network would be severe, or it does not show how consideration has been given to the provision of adequate active, public or shared transport access and provision'.

2. Methodology

2.1 Assessment Overview

2.1.1 As established in Section 1, this document is intended identify and assess options to utilise rail and water-borne transport modes to support the construction of the Project. To achieve this, it is important to understand both the transportation infrastructure in the region and the materials which are required to be transported.

2.1.2 The methodology outlined in Image 2.1 has been utilised to accomplish this intended outcome. This was a bespoke arrangement developed specifically for the Project, and sought to form a holistic understanding of the specific logistical challenges and opportunities associated with construction of the Project in the context of regional geography and transportation infrastructure. As such, this methodology incorporated three overarching components:

- Definition of transport requirements
- Determination of mode feasibility
- Transport infrastructure capacity assessment.

Image 2.1 Methodology flowchart

Define Transport Requirements	Determine Mode Feasibility	Infrastructure Capacity Assessment
• Define material types for project works; • Establish the suitability of each material for rail and water-borne transport; and • Quantify requirements for material deliveries based on draft construction programme and materials estimates.	• Investigate the feasibility for delivering the required materials by rail and water-borne transport; • Identify possible facilities for the supply, transport, and handling of the required materials by each mode; and • Engage with relevant stakeholders to ascertain outline feasibility of facility use.	• Determine the number and delivery quantities of movements by rail and water-borne transport at identified facilities; • Investigate requirements and opportunities for materials handling and storage; and • Hence define a 'credible throughput' for materials through each identified facility.

2.1.3 Assessments determining the feasibility of transport modes and associated infrastructure capacity have been undertaken and are presented in the respective sections for rail and water-borne transport. Further assessment of road access arrangements were subsequently undertaken for each rail or water-borne delivery location identified to be feasible. Assessment of road access arrangements considered routeing between the facility and the SRN only, and did not include specific assessment of traffic impacts.

2.1.4 The output of this is a set of feasible options for delivering construction materials by rail and water-borne transport modes, along with a credible throughput for material deliveries associated with each option. This forms a basis for further optioneering with regards to the specific balance of material deliveries between modes and available facilities, which will be developed in collaboration with the appointed Main Works Contractor(s).

2.2 Assessment Scope and Assumptions

2.2.1 The primary focus of this assessment is the supply of materials into the region surrounding the Project alignment by rail and water-borne transport. Detailed assessments of movements within the region, specific distributions of trips on the road network and cumulative impact of trips are covered within Chapter 16 (Traffic and Transport) of the Environmental Statement (ES).

2.2.2 It is assumed that the 'last mile' of any delivery using rail or water-borne transport will need to be made by road, using the public highway and/or construction haul roads as required. Therefore, it is appropriate for rail and water-borne transport modes to consider deliveries to a number of railhead and port locations rather than necessarily directly to the Project alignment by those modes.

2.2.3 On this basis, the scope for this assessment is as follows:

- Assessment of material delivery requirements on the basis of outline materials and programme information in line with the information utilised to produce the Trip Generation set out in Section 6 of the Transport Assessment
- Outline identification of potential material source locations for use with multi-modal delivery solutions
- Assessment of existing and disused railway siding locations to determine the feasibility of utilising these to support Project delivery
- Assessment of materials delivery capacity for any existing or disused railway siding locations determined to be feasible, including analysis of railway network capacity and engagement with relevant facility owners or operators
- Assessment of ports and inland waterways to determine the feasibility of utilising these to support Project delivery
- Assessment of materials delivery capacity for any ports or inland waterways determined to be feasible, including engagement with relevant facility owners or operators
- Assessment of highway connections between identified suitable ports and railway sidings to the SRN for suitability to accommodate construction vehicles other than AILs. Movement of AILs on the public highway is discussed within the AIL Access Strategy (appended to the Outline Construction Traffic Management Plan (CTMP) (document reference 7.3)).

2.3 Project Transport Requirements

2.3.1 The outline materials transportation requirements for the Project are discussed in Annex A. These may be approximated as follows:

- Approximately 3.04 million tonnes of bulk materials at a maximum cumulative rate of approximately 65,000 tonnes per week in February 2028, including:
  - 2.96 million tonnes of Type 1 aggregates

- 79,500 tonnes of Cement Bound Sand
- 62,875 tonnes of concrete components (sand, cement, and aggregates)

- 16,530 tonnes of Overhead Line pylon steel components at a maximum cumulative rate of 657 tonnes per week
- 1,920 Overhead Line conductor drums at a maximum cumulative rate of 59 drums per week
- 442 Underground Cable conductor drums at a maximum cumulative rate of 35 drums per week
- 18 items of large electrical equipment to be delivered as required.

These are summarised in Table 2.1, with approximate quantities and weights provided.

Table 2.1 Project transport requirements summary

Material Type	Quantity Required	Peak Delivery Rate Required	Anticipated Transport Arrangement	Annex Reference
Bulk materials (Type 1, Cement Bound Sand, and Concrete)	3,040,000 tonnes	65,000 tonnes per week	Loose bulk aggregates	Sections A.1, A.2, and A.3 of Annex A
Overhead Line pylon steel components	16,530 tonnes	657 tonnes per week	Loose or containerised steel components	Section A.4 of Annex A
Overhead Line conductor drums	1,920 drums (max. 6 tonnes per drum)	59 drums per week	Individual drums	Section A.5 of Annex A
Underground Cable conductor drums	442 drums (max. 60 tonnes per drum)	35 drums per week	Individual drums (abnormal load)	Section A.6 of Annex A
Large electrical equipment	18 items (128 to 217 tonnes per item)	*As required*	Individual items (abnormal load)	Section A.7 of Annex A

2.3.2 As the Underground Cable conductor drums and large electrical equipment items detailed above are of significant size and weight, these are defined as AILs when travelling on the roads. Therefore, the movement of these items on the public highway is assessed within the AIL Access Strategy (appended to the Outline CTMP (document reference 7.3)).

3. Assessment of Rail Transport

3.1 Project Transport Requirements

3.1.1 The range of items which can be transported by rail is limited by the loading gauge of the network, which is the allowable height and width of loads which can be accommodated without posing a risk of clashing with structures alongside or over the track. In East Anglia, the existing rail network is up to a maximum of Network Rail W10 standard, allowing loads up to 9'6" (approximately 2.9 m) in height and 2.5 m in width to be accommodated. As detailed in Annex A, both the Underground Cable conductor drums and items of large electrical equipment are anticipated to exceed these dimensions, and therefore would not be suitable for transportation by rail.

3.1.2 Overhead Line conductor drums and Overhead Line pylon steel components could plausibly be carried by rail with a suitable carriage arrangement (e.g. containerised), however the Project materials assessment detailed in Annex A did not indicate any suitable rail-connected suppliers in the UK. As such these items have been excluded from further consideration under the assessment of rail transport.

3.1.3 On the basis of the constraints identified under 3.1.1 and 3.1.2, bulk aggregates are the only materials considered as part of the assessment of rail transport. Several potential suppliers of this material type are available in the UK, as identified in Annex A, predominantly located in Leicestershire and Derbyshire.

3.1.4 Each train can transport between approximately 1,000 and 1,600 tonnes of bulk aggregates, the equivalent of approximately 50 to 80 Heavy Goods Vehicle (HGV) loads, depending upon the number of wagons included in the train. Larger trains are typically preferable in terms of transport efficiency, although limitations in network capacity and at some sidings can restrict train size in certain locations.
The assessment of available train paths is included in Annex C.

3.1.5 Based on information received during consultation with the siding operators, it is understood that loading and unloading is typically undertaken using a front-end loader (referred to as a 'shovel'). A single 'shovel' has been indicated to have a handling rate of approximately 300 tonnes of material per hour. On this basis, assuming one 'shovel' is allocated to each activity:

- Unloading of each train would take between 3.5 and 5.5 hours. Therefore, two to three train deliveries could be accommodated within a 12-hour working day with one 'shovel' working on unloading only. Additional capacity could be achieved with the use of additional shovels, space allowing, or the extension of working hours at the siding;
- Therefore, a maximum of approximately 15 HGVs could be loaded per hour with one 'shovel' working on loading only. Additional capacity could be achieved with the use of additional shovels, space allowing.

3.1.6 This assumes the use of a 'virtual quarry' delivery approach, wherein bulk aggregates are delivered to the sidings by train and unloaded into an adjacent stockpile at the siding site, before being loaded onto HGVs for onward transport by road when required. This approach would decouple the delivery of aggregates to the siding by rail and subsequent export by road, although would require the use of storage areas at the siding. Therefore, both the availability of storage areas within the siding site and working space for the use of additional 'shovels' will form part of the rail transport capacity assessment, in addition to the availability of train paths.

3.2 Rail Delivery Locations

Location Optioneering

3.2.1 A total of 20 potential rail delivery locations, including 16 existing sidings and four former siding sites, have been identified near the Project alignment. An initial sifting exercise has been undertaken to determine the feasibility of using each of these for the delivery of bulk aggregates for the Project. The results of this are set out in Table 3.1, below. Further details on this sifting assessment are available in Annex B.

Table 3.1 Rail sidings sifting assessment

Siding Location	Existing Facility	Feasibility Sifting Assessment	Sifting Outcome
Trowse Newton, Norfolk, NR1 2EG	Commercial aggregates plant (Tarmac Trowse Newton Asphalt Plant)	Established facilities for aggregate import, with known existing usage for this purpose. Existing deliveries utilising similar rail transport arrangements to those which would be required for the Project. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Wymondham, Norfolk, NR18 9NA	No existing facility	Site with rail sidings only, and no additional associated infrastructure or highway access. Provision of access through, and usage on land associated with, Wymondham Quarry would be required in order to bring this site into use for aggregate imports. Usage anticipated to be disruptive to existing quarry operations.	Suggested to be discounted
Kimberley Park, Norfolk, NR18, 9HB	No existing facility	Site with rail sidings only, and no additional associated infrastructure or highway access. Existing usage appears to be locomotive stabling associated with Mid-Norfolk Railway, a heritage organisation. Usage anticipated to be disruptive to existing railway operations, and highway connections not suitable for use by construction traffic.	Suggested to be discounted
Snetterton, Norfolk, NR16 2JU	Snetterton Business Park	Sidings associated with Snetterton Business Park, including connection to warehousing units and apparent existing aggregates site. Small size of existing	Suggested to be discounted

Siding Location	Existing Facility	Feasibility Sifting Assessment	Sifting Outcome
		aggregates site and proximity to residential properties in Eccles not conducive to significant materials throughput.	
Diss, Norfolk, IP22 4HN	Diss Station Sidings	Sidings associated with Diss Station. No existing working area associated with bulk aggregate deliveries, and limited space to provide this due to proximity to Diss Station and adjacent Frontier Agriculture industrial site.	Suggested to be discounted
Brandon, Suffolk, IP27 0BA	Commercial Aggregates Plant (Rory J Holbrook Ltd Brandon Railhead)	Established facilities for aggregate import, with known existing usage for this purpose. Existing deliveries utilising similar rail transport arrangements to those which would be required for the Project. Suitability of local highway network connections through Brandon considered to be less preferable than those associated with the nearby Kennett Sidings.	Suggested for further consideration
Kennett, Suffolk, CB8 7TQ	Commercial Aggregates Plant (Tarmac Higham Asphalt Plant)	Established facilities for aggregate import, with known existing usage for this purpose. Existing deliveries utilising similar rail transport arrangements to those which would be required for the Project. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Bury St Edmunds, Suffolk, IP32 6AD	No existing facility	Former facility for aggregate import located a short distance to the west of Bury St Edmunds Station. Railhead appears to be out of service presently, although available information suggests this site was operational until approximately 2018. Access to the A14 is in close proximity to the site, although would require traffic passing through the northern part of Bury St Edmunds town centre. Current site ownership is unknown. Redevelopment of adjacent plots into residential suggest it may not be preferable to reactivate this site if suitable alternative sites exist.	Suggested to be discounted
Stowmarket, Suffolk,	Stowmarket Station Sidings	Sidings associated with Stowmarket Station. Small existing working area associated with Network Rail operational	Suggested to be discounted

Siding Location	Existing Facility	Feasibility Sifting Assessment	Sifting Outcome
IP14 1RQ	(Network Rail Operational Use)	activities, though possible scope for expansion into adjacent former industrial site on Iron Foundry Road. Access and working area arrangements would be significantly limited without expansion onto Iron Foundry Road site.	
Saxmundham, Suffolk, IP17 1AL	No existing facility	Site with rail sidings only, and no additional associated infrastructure or highway access. No practicable means for the provision of suitable site access or working areas due to the constraint imposed by the adjacent residential development.	Suggested to be discounted
Barham, Suffolk, IP6 0PF	Commercial aggregates plant (Tarmac Barham Asphalt Plant)	Established facilities for aggregate import, with known existing usage for this purpose. Existing deliveries utilising similar rail transport arrangements to those which would be required for the Project. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Ipswich, Suffolk, IP2 0AD	Commercial freight sidings (Freightliner)	Established rail freight facility, though without any existing bulk aggregates usage. Due to the site being constrained between the railway and adjacent residential areas, it would not be possible to provide aggregates handling areas alongside the existing freight facility.	Not feasible; suggested to be discounted
Port of Ipswich, Suffolk, IP2 8LY	Commercial aggregates plant (Brett Aggregates and Brett Concrete)	Established facilities for aggregate export, with known use for this purpose. From engagement with the operator, existing intermodal aggregates operation at the Port of Ipswich are for export only by rail, with materials presently imported to this location by sea only. Potential utility considered in this role for the Project, if suitable siding locations are identified to receive additional train movements from this location.	Suggested for further consideration
Colchester, Essex, CO4 5AD	Railway maintenance depot	Sidings adjacent to Colchester Station, predominantly utilised for passenger train storage, for rail access to a maintenance depot, and as a turning loop for the station. Available goods siding area is of limited size, and any bulk aggregates handling or storage would be required to	Suggested to be discounted

Siding Location	Existing Facility	Feasibility Sifting Assessment	Sifting Outcome
		take place in the existing station car park, with residential areas in close proximity. Limited road access would also be via the station car park and through the centre of Colchester.	
Marks Tey, Essex, CO6 1ED	Commercial aggregates sidings (Tarmac Marks Tey)	Established aggregates handling facility operated by Tarmac. The site area is constrained due to location between the railway and the A12, though capacity is still estimated to be sufficient to provide useful output for Project deliveries.	Suggested for further consideration
Wakes Colne, Essex, CO6 2DS	Heritage use (East Anglian Railway Museum)	Former goods sidings accessed from the Sudbury Branch Line adjacent to Chappel & Wakes Colne Station, currently occupied by the East Anglian Railway Museum. Return to commercial usage is considered not to be compatible with existing museum operations, and highway connections would be disruptive to surrounding residential areas.	Suggested to be discounted
Chelmsford, Essex, CM1 1SU	Rail freight and aggregates depot	Established aggregates handling facility and depot site utilised for Network Rail Greater Anglia Overhead Lines Projects. Sidings connected by rail to lines via London only. Located in the centre of Chelmsford, construction traffic likely to not be suitable with respect to impacts on Chelmsford city centre.	Suggested for further consideration
Pitsea, Essex, SS16 4UH	Railway maintenance depot	Sidings adjacent to Pitsea Station serving as a depot for Network Rail maintenance operations. Limited space within the sidings area, use of which for aggregates delivery purposes is likely to impede railway operations. Extension of the sidings site would require the removal of adjacent wooded areas to the south of the existing sidings.	Suggested to be discounted
Port of Tilbury, Essex, RM18 7AE	Commercial aggregates sidings (Port of Tilbury)	Sidings located within the Port of Tilbury site – including within the old Tilbury Dock and adjacent to the Euromix Concrete plant on the Tilbury 2 terminal area – with known existing aggregates use. Arranged for typical export of materials from the port into London, though could also plausibly be utilised for the import of materials into Tilbury via London.	Suggested for further consideration

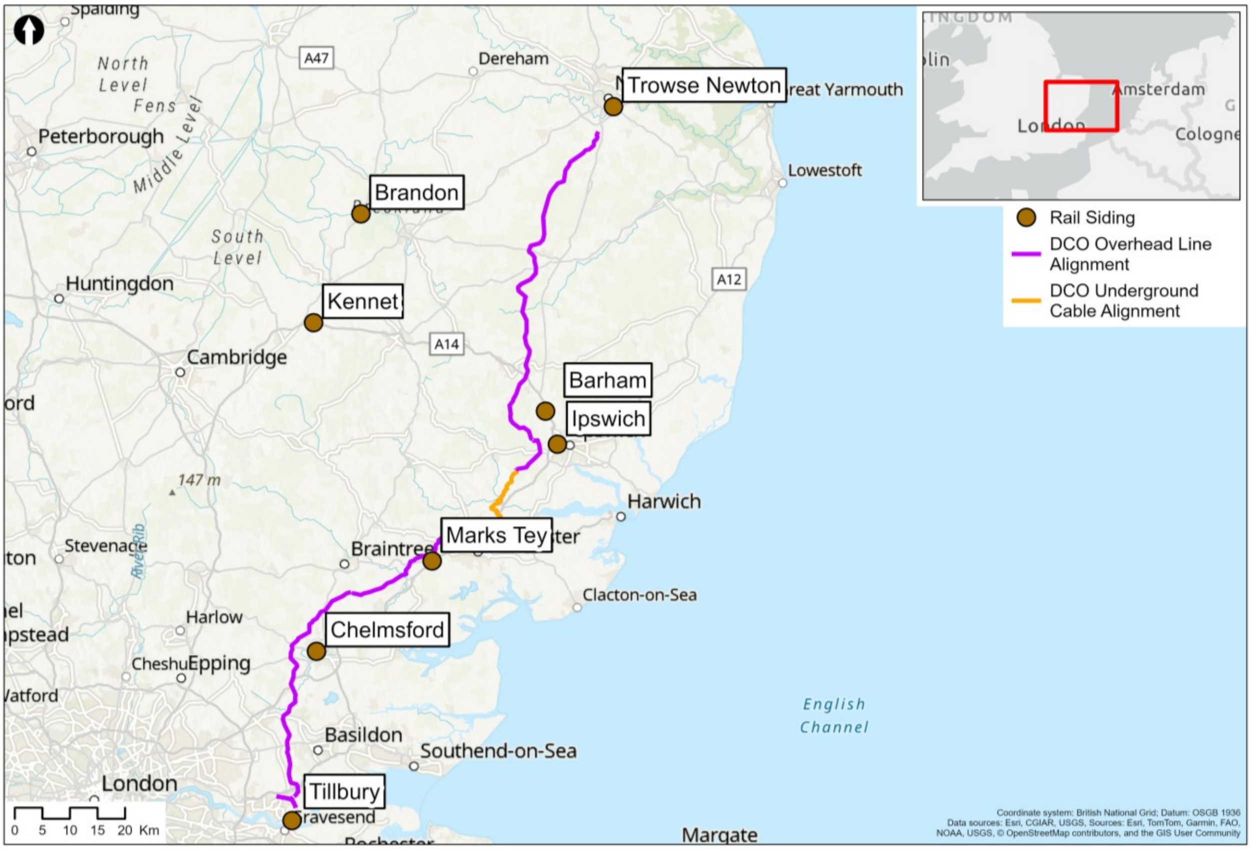
Siding Location	Existing Facility	Feasibility Sifting Assessment	Sifting Outcome
Barking, Greater London, IG11 0SB	Commercial freight sidings	Sidings located to the west of Dagenham Dock Station in Barking. Existing usage appears to include both containerised cargo and bulk materials, though there is no known aggregates import operation in this location currently. Highways access would be to the A13. Congestion is considered to be a significant issue in this area, particularly around peak times.	Suggested to be discounted

Preferred Locations

3.2.2 Of the 20 rail siding locations considered, eight of these sites were suggested for further consideration with regards to use for the delivery of bulk aggregates for the Project. These are as shown in Image 3.1, below, and additional information regarding each of these locations is presented in the following Sections 3.2.4 to 3.2.27.

3.2.3 Further information around the assessment of rail network capacity utilised in the assessment of achievable deliveries by rail to each of these sites is shown in Annex C. Additionally, assessment information for the highways access routes for each of these sites is shown in Annex E, confirming that the access arrangements in each case are anticipated to be suitable for construction traffic.

Image 3.1 Feasible rail delivery sidings for further assessment



Trowse Newton, Norfolk

3.2.4 The existing sidings at Trowse Newton are located off Bracondale in Trowse Newton, Norfolk, approximately 2 km south-east of Norwich city centre. This location is the site of an existing, established commercial asphalt plant operated by Tarmac (CRH Company). The railway sidings are currently used for the import of aggregates.

Credible Throughput

3.2.5 Based on an assessment of the available rail network capacity (see Annex C), it is estimated that a credible throughput of one train with approximately 1,500 tonnes of aggregates could be delivered to this location each day.

Storage Capacity

3.2.6 The existing working area associated with the sidings is approximately 8,500 m^2. The operator has indicated the facility possesses an existing total storage capacity of approximately 65,000 tonnes of bulk aggregates. The operator further suggested that there may be scope to provide additional material storage in this location if required. Storage capacity would not be a significant concern in this location.

Access Arrangements

3.2.7 Access to the SRN from the sidings is via the existing access point on Bracondale to the A47 Norwich Southern Bypass. This route is approximately 1.6 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Brandon, Suffolk

3.2.8 The existing sidings at Brandon are located off the A1065 Mundford Road in Brandon, Suffolk, adjacent to Brandon Station and approximately 0.8 km north of Brandon town centre. This location is the site of an established commercial aggregates plant operated by Rory J Holbrook Ltd. The railway sidings are currently used for the import of aggregates.

Credible Throughput

3.2.9 Based on an assessment of the available rail network capacity (see Annex C), it is estimated that a credible throughput of one train with approximately 1,800 tonnes of aggregates could be delivered to this location each day.

Storage Capacity

3.2.10 The existing working area associated with the sidings is approximately 8,900 m^2. The operator has indicated that the facility possesses an existing total storage capacity of approximately 120,000 tonnes. The operator has also indicated that they have three additional storage sites available in the vicinity:

- Roudham – indicated 50,000 tonnes storage capacity
- Lakenheath – indicated 500,000 tonnes storage capacity
- Wangford Road – indicated 250,000 tonnes storage capacity.

3.2.11 Usage of any of these three additional sites would require movements of material by road from the sidings at Brandon, as the additional sites are not themselves rail connected. As discussed in Annex E, the route through Brandon on the A1065 is not necessarily appropriate, and therefore access from the Brandon Sidings to the additional storage sites would need to be via the SRN, using the access arrangement discussed below.

Access Arrangements

3.2.12 Access to the SRN from the sidings is via the A1065 Mundford Road, proceeding north-east to the A134 junction in Mundford, and then south to the A11. This route is approximately 17 km in length. No significant highway constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Kennett, Suffolk

3.2.13 The existing sidings at Kennett are located off Icknield Way, between Newmarket and Bury St Edmunds. The site is presently operated by Tarmac (CRH Company) as part of Higham Aggregates Plant, which is currently operated primarily as an asphalt plant and recycling centre. The location is connected a short distance to the north of the A14.

Credible Throughput

3.2.14 Based on an assessment of the available rail network capacity (see Annex C), it is estimated that a credible throughput of 1no. train with approximately 1,800 tonnes of aggregates could be delivered to this location each day Tuesday to Sunday. It is assumed there is no capacity for deliveries by rail to this location on a Monday.

Storage Capacity

3.2.15 The existing working area associated with the sidings is approximately 22,000 m^2. The plant has extensive handling facilities and storage capacity in its current operation and existing rail integrated aggregate handling facility. It can handle the required frequency and materials required for the Project. Engagement with the facility operator has indicated that the site at Kennett has approximately 5,000 tonnes of storage available currently, with potential scope to increase this to between 10,000 to 15,000 tonnes.

Access Arrangements

3.2.16 Access to the Strategic Road Network from the sidings is via the existing access point on Icknield Way to the A14. This route is approximately 1.2km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Barham, Suffolk

3.2.17 The existing sidings at Barham are located between the villages of Barham and Great Blakenham, approximately 8 km to the north of Ipswich town centre. This location is the site of an existing commercial aggregates railhead operated by Tarmac (CRH Company).

Credible Throughput

3.2.18 Based on an assessment of the available rail network capacity (see Annex C), it is estimated that a credible throughput for the Project of one train with approximately 1,300 tonnes of aggregates could be delivered to this location each day.

Storage Capacity

3.2.19 The existing working area associated with the sidings is approximately 10,000 m^2. The operator has indicated the facility possesses an existing total storage capacity of approximately 24,000 tonnes of bulk aggregates. Storage capacity would not be a significant concern in this location.

Access Arrangements

3.2.20 Access to the SRN from the sidings is via the existing access point on Pesthouse Lane to the A14. This route is approximately 4.6 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Port of Ipswich, Suffolk

3.2.21 The Port of Ipswich Sidings are located within the West Bank Terminal of the Port of Ipswich, as part of an existing aggregate export facility operated by Brett Aggregates. In this location, the existing aggregate operation has access both to the railhead and nearby quay space for receiving materials deliveries by sea. This port facility is discussed in further detail in Section 4.2.4.

Credible Throughput

3.2.22 Based on an assessment of the available rail network capacity (see Annex C), no train paths for material import have been identified for this location.

3.2.23 It is, however, estimated that up to two trains with approximately 1,000 tonnes of aggregates each could be operated per day, six days per week, between this location and the sidings at Marks Tey (detailed in Section 3.2.6, following). Therefore, if the Port of Ipswich is utilised for material imports by sea, this rail link may be employed to transfer additional aggregates to the sidings at Marks Tey, discussed under 3.2.26 to 3.2.29.

Storage Capacity

3.2.24 Ipswich Sidings currently has 30,000 tonnes of storage capacity available spread across the site. Following conversations with Brett Aggregates, they have advised that they are looking to expand the size of their site and increase storage and facilities.

Access Arrangements

3.2.25 Access to the SRN from the sidings is via the existing Port of Ipswich West Bank Terminal gate on Wherstead Road to the A14. This route is approximately 1.6 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Marks Tey, Essex

3.2.26 The sidings at Marks Tey are located a short distance to the east of Marks Tey Station. They are part of an existing aggregate transhipment facility operated by Tarmac (CRH Company). The facility is in close proximity to the A12 and A120.

Credible Throughput

3.2.27 Based on an assessment of the available rail network capacity (see Annex C), it is estimated that a credible throughput for the Project of one train with approximately 1,000 tonnes of aggregates could be delivered to this location each day, up to six days per week (Tuesday to Sunday). There is scope to increase this by an additional two trains a day if material is also received from the Port of Ipswich via the sidings described in Section 3.2.5, above.

Storage Capacity

3.2.28 The existing working area associated with the sidings is approximately 10,000 m^2. Due to the constrained width of the site between the railway to the north and the A12 to the south, giving a working area of approximately 400 m in length but only approximately 25 m in width, the storage capacity indicated by the operator is only sufficient for approximately 15,000 tonnes of aggregates.

Access Arrangements

3.2.29 Access to the SRN from the sidings is via the existing railhead access on North Lane to the A12/A120. This route is approximately 0.3 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Chelmsford, Essex

3.2.30 The sidings in Chelmsford are located approximately 0.7 km north-west of Chelmsford Station. They are part of an existing facility operated by Holcim (trading as Aggregate Industries prior to March 2025).

Credible Throughput

3.2.31 Based on an assessment of the available rail network capacity (see Annex C), it is estimated that a credible throughput for the Project of one train with approximately 1,200 tonnes of aggregates could be delivered to this location each day, up to six days per week (Tuesday to Sunday).

Storage Capacity

3.2.32 The existing working area associated with the sidings is approximately 5,400 m^2. Holcim (trading as Aggregate Industries prior to March 2025) have advised that there is storage for up to 10,000 tonnes of bulk aggregates.

Access Arrangements

3.2.33 Access to the SRN from the sidings is via the existing railhead access on Brook Street to Junction 15 of the A12. This route is approximately 7.0 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Tilbury, Essex

3.2.34 Tilbury Sidings are located to the west of Tilbury Town Station and operated by Tarmac (CRH Company) and others. It is an existing port siding located within the Port of Tilbury site.

Credible Throughput

3.2.35 Based on an assessment of the available rail network capacity (see Annex C), no train paths for material import have been identified for this location.

Storage Capacity

3.2.36 There are two siding locations within the Port of Tilbury site: one in the northern part of Tilbury Docks, and the other to the north of the Tilbury 2 Port Terminal. The existing working area associated with these sidings is approximately 8,000 m^2. Tarmac has advised that there is storage for 80,000 tonnes of bulk aggregates.

Access Arrangements

3.2.37 Access to the SRN from the sidings is via either of the existing access points on the Tilbury Port terminal access road to the A1089. The routes are up to approximately 2.0 km in length. No constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

3.3 Credible Throughput

3.3.1 As set out in Section 3.1, the only materials which are under consideration for transportation by rail are the bulk aggregates. For each site identified for further consideration in Section 3.2, a ‘credible throughput’ has been determined based on engagement with the relevant facility operators, and an assessment of the rail network capacity detailed in Annex C. This represents the quantity of material which it is considered may credibly be delivered with consistent throughput at each location, based on existing conditions on the railway network.

3.3.2 These throughputs are based on the use of the ‘virtual quarry’ approach. Under this approach, a working stockpile of material would be maintained at the siding. Materials arriving by rail would be unloaded into the stockpile, and HGVs transporting material onwards would be loaded from the same stockpile, rather than directly from the trains. This would allow the import of material by rail to be decoupled from the export of material by road, provided a sufficient working stockpile is maintained to allow material imports and exports to be balanced across the week.

3.3.3 Credible throughputs for each of the preferred rail delivery locations are summarised in Table 3.2, below. Maximum weekly two-way movements on the routes between these sidings and the SRN, as shown in Annex E, would be anticipated to be double the number of Equivalent HGV Deliveries (i.e. one-way movements) shown here:

Table 3.2 Summary of assessed credible throughput by rail siding

Delivery Location	Assessed Train Path Availability	Credible Throughput by Rail (Weekly)	Equivalent HGV Deliveries (Weekly)
Trowse Newton	1no. path for 1,500 tonne aggregates load per day, Monday-Sunday	1,500 tonnes per delivery; 7 deliveries per week; **Therefore 10,500 t/wk**	Throughput 10,500 t/wk; Typical 20 t per HGV; **Therefore 525 Deliveries**
Brandon	1no. path for 1,800 tonne aggregates load per day, Monday-Sunday	1,800 tonnes per delivery; 7 deliveries per week; **Therefore 12,600 t/wk**	Throughput 12,600 t/wk; Typical 20 t per HGV; **Therefore 630 Deliveries**
Kennett	1no. path for 1,800 tonne aggregates load per day, Tuesday-Sunday	1,800 tonnes per delivery; 6 deliveries per week; **Therefore 10,800 t/wk**	Throughput 10,800 t/wk; Typical 20 t per HGV; **Therefore 540 Deliveries**
Barham	1no. path for 1,300 tonne aggregates load per day, Monday-Sunday	1,300 tonnes per delivery; 7 deliveries per week; **Therefore 9,100 t/wk**	Throughput 9,100 t/wk; Typical 20 t per HGV; **Therefore 455 Deliveries**
Port of Ipswich	*No material import train paths identified*	-	-
Marks Tey	1no. path for 1,000 tonne aggregates load per day, Tuesday-Sunday 2no. additional paths for 1,000 tonne aggregates load per day in conjunction with Port of Ipswich, Tuesday-Sunday	<u>Using Existing Paths Only:</u> 1,000 tonnes per delivery; 6 deliveries per week; **Therefore 6,000 t/wk** <u>Including Additional Paths:</u> 1,000 tonnes per delivery; 18 deliveries per week; **Therefore 18,000 t/wk**	<u>Using Existing Paths Only:</u> Throughput 6,000 t/wk Typical 20 t per HGV **Therefore 300 Deliveries** <u>Including Additional Paths:</u> Throughput 18,000 t/wk Typical 20 t per HGV **Therefore 900 Deliveries**
Chelmsford	1no. path for 1,200 tonne aggregates load per day, Tuesday-Sunday	1,200 tonnes per delivery; 6 deliveries per week; Therefore 7,200 t/wk	Throughput 7,200 t/wk; Typical 20 t per HGV; Therefore 360 Deliveries
Tilbury	*No material import train paths identified*	-	-

3.3.4 As noted in Section 3.1, engagement with the facility operators has indicated that a single front-end loader (or 'shovel') has a typical handling rate of approximately 300 tonnes of materials per hour. Across an indicative 10-hour day and 6-day week, this would represent approximately 18,000 tonnes of materials which could be either loaded or unloaded by a single 'shovel'. If the same 'shovel' was to be utilised for both loading and unloading, the double handing required to make use of the 'virtual quarry' approach would limit the credible throughput to half of this, or approximately 9,000 tonnes per week.

3.3.5 On this basis, the credible throughputs given in Table 3.2 would typically require two 'shovels' working concurrently to achieve total credible throughputs of between 9,000 and 18,000 tonnes per week. This is considered to be achievable in all locations identified, although due to limited working space it is not necessarily considered practicable to provide additional 'shovels' to increase throughput beyond this number. Under this arrangement, the maximum number of HGV loads leaving the siding within the working week would be 900, assuming a typical load of 20 tonnes per vehicle. Therefore, it is considered that the arrangement at Marks Tey utilising the additional train paths from the Port of Ipswich represents the maximum credible throughput from a single siding location.

3.3.6 Provision of the additional train deliveries from the Port of Ipswich to Marks Tey, for a total of three 1,000 tonne deliveries by rail a week into Marks Tey, would require this additional stone to be imported by sea into the Port of Ipswich before being transferred by rail between the Port of Ipswich and Marks Tey. This is discussed further in Section 4. As no train paths have been identified for the import of materials into the Port of Ipswich Sidings, this usage to provide additional deliveries to Marks Tey is the only identified usage for this facility in relation to the Project.

4. Assessment of Water-Borne Transport

4.1 Basis of Assessment

4.1.1 Due to the size and cargo capacity of seagoing vessels, it is anticipated that any material required for the Project – as set out in Section 2.3 and explained in Annex A could feasibly be delivered by water-borne transport. Indeed, many materials required for the Project, including Underground Cable conductor drums and items of large electrical equipment, will need to be delivered into the UK by water because these items are not available from UK manufacturers. These larger items, the Underground Cable conductor drums and large electrical equipment, are termed 'project cargo' in a port operations context.

4.1.2 As the specific transport capacity of a cargo ship depends on the size and displacement of the vessel, there is a wide range in the quantity of cargo which may be delivered in a single shipment. The types of ship which can be unloaded from any given port are constrained by the physical size of, and depth of water at, port facilities, as well as how often these are available during typical operation. These are examined in detail for each preferred facility in Annex D.

4.1.3 As with the assessment of rail transport, the delivery of bulk materials assumed the use of a 'virtual quarry' delivery approach. Under this approach, bulk aggregates are delivered to the port by ship and unloaded into an adjacent stockpile within the port site, before being loaded onto HGVs for onward transport by road when required. This approach would decouple the delivery of aggregates to the port by ship and subsequent export by road, although would require the use of storage areas at the port. Therefore, both the availability of storage areas within the port site and working space for loading and unloading has formed part of the water-borne transport capacity assessment.

4.2 Port Delivery Locations

Location Optioneering

4.2.1 A total of nine existing port locations were identified along the East Coast of England and considered for use by the Project. An initial sifting exercise has been undertaken to determine the feasibility of utilising each of these for the delivery of bulk aggregates and cargo for the Project. The results of this are set out in Table 4.1, below. Further details on the ports sifting assessment are available in Annex D.

Table 4.1 Ports sifting assessment

Port Location	Existing Facility	Feasibility Sifting Assessment	Sifting Outcome
King's Lynn, Norfolk, PE30 2HF	Commercial river port (Associated British Ports (ABP))	Small established port on the River Great Ouse with facilities for handling both bulk and project cargo. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration

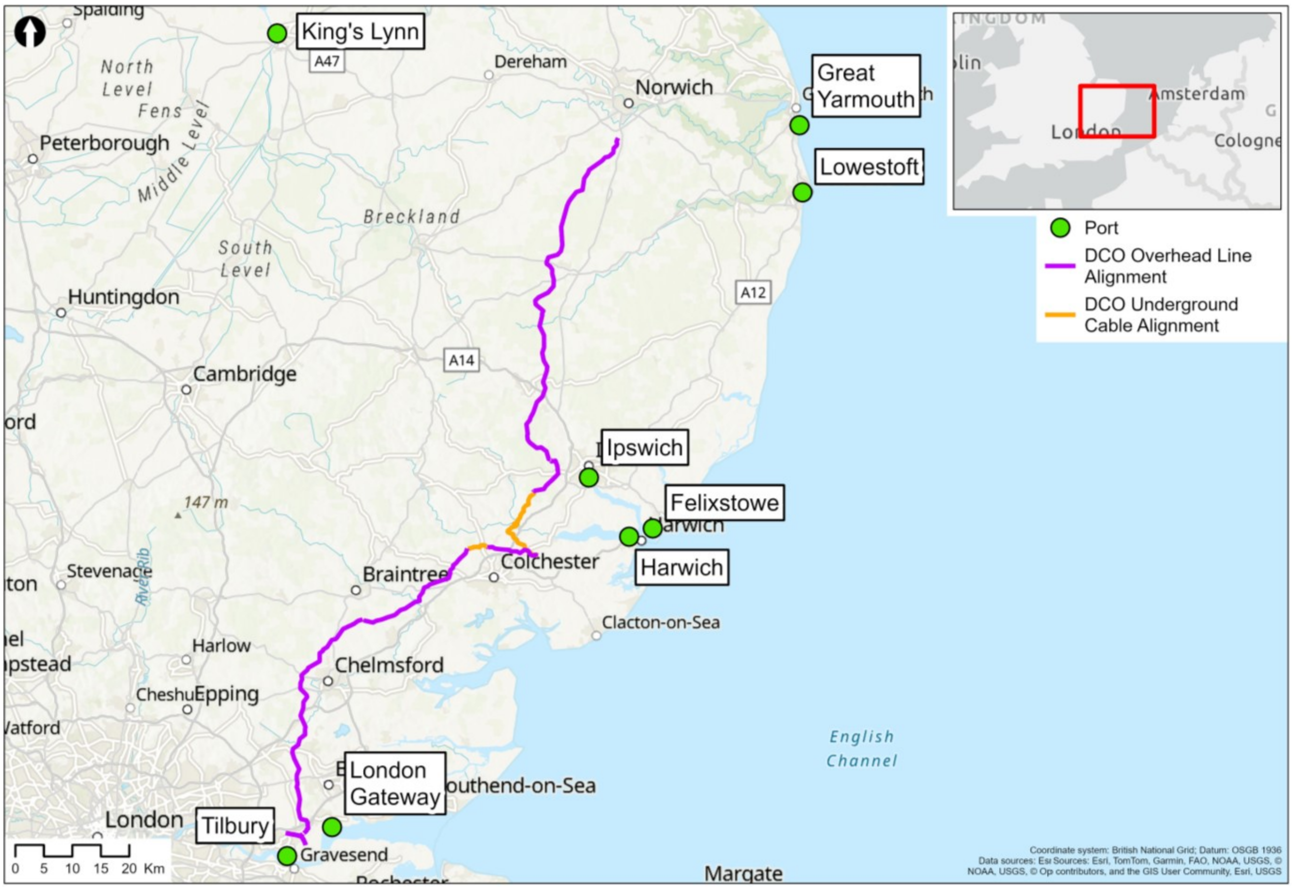
Port Location	Existing Facility	Feasibility Sifting Assessment	Sifting Outcome
Great Yarmouth, Norfolk, NR30 3QA	Commercial port and river port (Peel Ports)	Established port with both outer harbour (sea port) and inner harbour (river port on the River Yare) components. Facilities for handling both bulk and project cargo. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Lowestoft, Suffolk, NR32 1BA	Commercial port and river port (ABP)	Established port with both outer harbour (sea port) and inner harbour (river port on Lake Lothing) components. Facilities for handling both bulk and project cargo. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Ipswich, Suffolk, IP2 8NB	Commercial river port (ABP)	Established port on the River Orwell with facilities for handling both bulk and project cargo. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Felixstowe, Suffolk, IP11 3SY	Commercial port (Hutchinson Ports)	Major established container port. Facilities for handling project and containerised cargo only. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Harwich, Essex, CO12 4SR	Commercial port (Hutchinson Ports)	Major established port. Facilities for handling both bulk and project cargo. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Mistley, Essex, CO11 1HB	Commercial river port (TW Logistics Limited)	Small established port on the River Stour with facilities for handling limited quantities of cargo. Existing premises has spatial constraints, limited existing unloading facilities compared to nearby alternatives, and less suitable highway access. Estimated insufficient capacity to provide useful output for Project deliveries.	Suggested to be discounted
London Gateway, Essex, SS17 9DY	Commercial port (DP World)	Major established container port. Facilities for handling project and containerised cargo only. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration
Tilbury, Essex, RM18 7EH	Commercial port (Forth Ports)	Major established port. Facilities for handling both bulk and project cargo. Estimated sufficient capacity to provide useful output for Project deliveries.	Suggested for further consideration

Preferred Locations

4.2.2 Of the nine identified port locations, only one – Mistley – has been suggested to be discounted for any Project use. Two further ports, Felixstowe and London Gateway, are capable of handling large project cargo items or containerised cargo only. All remaining identified ports in the region have suitable facilities to accommodate either large items of Project cargo, or bulk cargo like aggregates. These are as shown in Image 4.1, and additional information regarding each of these locations is presented in the following Sections 4.2.4 to 4.2.40.

4.2.3 Further information around the assessment of the technical aspects of these ports is shown in Annex D. Additionally, assessment information for the highways access routes for each of these sites is shown in Annex E, confirming that the access arrangements in each case are anticipated to be suitable for construction traffic.

Image 4.1 Feasible port delivery locations for further assessment



King's Lynn, Norfolk

4.2.4 The Port of King's Lynn is a small commercial port handling steel and other metals, timber, fuel, project and bulk cargo, construction, and agricultural products. It lies two miles south-south-east of the entrance to Lynn Cut, which is the artificially straightened mouth of the River Great Ouse.

Credible Throughput

4.2.5 Port of King's Lynn has facilities to handle both bulk aggregates and project cargo. It can take vessels of up to 140x20x6 m in size and up to a maximum of 5,000 deadweight tonnage (dwt), subject to which part of the port the vessel is berthed. It handles a current annual aggregate throughput of 32,000 tonnes due to limited local demand. Credible throughput based on facility size and availability is estimated at approximately two shipments each of approximately 4,450 tonnes of cargo per week, for a total delivery tonnage of 8,900 tonnes per week.

Storage Capacity

4.2.6 The port facility has existing storage areas totalling approximately 1.5 hectares (15,000 m^2) across three storage area packages. From initial engagement with the port operator, it has been indicated that approximately 30,000 tonnes of bulk materials can be stored at the port currently.

Access Arrangements

4.2.7 Access to the SRN from the port is via the existing port access on the A1078 Edward Benefer Way to the A47. The route is approximately 12 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Great Yarmouth, Norfolk

4.2.8 Port of Great Yarmouth is located on the seaward side of the South Denes peninsula adjacent to the mouth of the River Yare. It is a commercial port with inland navigation process, with facilities to handle both single large items and bulk materials. The port has the capabilities to handle complex cargo over 200 tonnes and has substantial existing storage infrastructure.

Credible Throughput

4.2.9 Port of Great Yarmouth has facilities to handle both bulk aggregates and project cargo. It can take vessels of up to 166x25x10.5 m in size and up to a maximum of 18,000 dwt, subject to which part of the port the vessel is berthed. It also handles a current annual total throughput of 1,900,000 tonnes, which includes both cargo and bulk aggregates.

Storage Capacity

4.2.10 The port facility has existing storage areas totalling approximately 3.0 hectares (30,000 m^2). From initial engagement with the port operator, it has been indicated that an additional 20 to 30 hectares, approximately, of port land are available for use currently. On this basis, it is not anticipated that storage capacity would be a constraining factor in this location.

Access Arrangements

4.2.11 Access to the SRN from the port is via the existing Outer Harbour North Gate on South Beach Parade to the A47. The route is approximately 2.1 km in length. No constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Lowestoft, Suffolk

4.2.12 The Port of Lowestoft is an artificial port and is located six miles south of Great Yarmouth, on banks of Lake Lothing. It is a commercial and fishing port and a base for supply ships servicing the offshore oil and gas industry or servicing offshore wind farms.

Credible Throughput

4.2.13 The Port of Lowestoft has facilities to handle both bulk aggregates and project cargo. It can take vessels of up to 125x6 m in size, subject to which part of the port the vessel is berthed. The dwt of cargo and the quantity of throughput of cargo and bulk aggregates is unknown, and to be further confirmed with the port operator.

Storage Capacity

4.2.14 The port facility has existing storage areas totalling 5.0 hectares (50,000 m^2). From initial engagement with the port operator, it has been indicated that a significant volume of bulk aggregates – to the order of several hundred thousand tonnes – could be accommodated in storage areas at the port.

Access Arrangements

4.2.15 Access to the SRN from the port is via the existing access on Commercial Road to the A47. The route is approximately 4.7 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Ipswich, Suffolk

4.2.16 The Port of Ipswich is a commercial port which can handle both project cargo and bulk materials. This port facility has previously been used in the delivery of large transformers in October 2023 as part of the Progress Power Station project at Eye Airfield, undertaken by Drax Group.

Credible Throughput

4.2.17 The Port of Ipswich has facilities to handle both bulk aggregates and project cargo. It can take vessels of up to 134x22.6x8.2 m in size and up to a maximum of 18,000 dwt, subject to which part of the port the vessel is berthed. It also handles a current annual aggregate throughput in excess of 1,000,000 tonnes.

Storage Capacity

4.2.18 The port facility has existing available storage areas totalling 1.5 hectares (15,000 m^2). In addition to these, from initial engagement with the port operator it has been indicated that the existing Brett Aggregates site within the port utilises approximately 10 acres (approximately 4 hectares, or 40,000 m^2), and that additional areas totalling approximately 50 acres (approximately 20 hectares, or 200,000 m^2) have been set aside for use by the Sizewell C Nuclear Power Station.

Access Arrangements

4.2.19 Access to the SRN from the port is via the existing Port of Ipswich West Bank Terminal Gate to the A14. The route is approximately 1.6 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Felixstowe

4.2.20 The Port of Felixstowe is an existing commercial seaport located within the town of Felixstowe, to the south-west of the town centre.

Credible Throughput

4.2.21 The Port of Felixstowe predominantly handles containerised cargo. No bulk materials facilities are available at this port. The maximum vessel size and the quantity of throughput of cargo is unknown, and to be further confirmed with the port operator.

Storage Capacity

4.2.22 The port facility has existing storage areas sufficient to accommodate 152,000 twenty-foot equivalent units (TEUs) of containerised cargo. The port currently does not handle bulk materials as there are no available storage areas for these materials.

Access Arrangements

4.2.23 There are two points of access at the Port of Felixstowe: one existing access gate adjacent to the Trinity Avenue roundabout to access the western part of the port, and one existing access gate on Dock Road to access the eastern part of the port. Access to the SRN would be from either of these access points to the A14. These routes range up to approximately 0.6 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Harwich, Suffolk

4.2.24 The Port of Harwich is located on the south bank of the River Stour, west of its confluence with River Orwell. The port is operated by Hutchinson Ports.

Credible Throughput

4.2.25 The Port of Harwich has facilities to handle both bulk aggregates and project cargo. It can take vessels of up to 190x8 m in size, subject to which part of the port the vessel is berthed. The quantity of throughput of cargo and bulk aggregates is unknown and to be further confirmed with the port operator.

4.2.26 From initial discussions with the port, there are capabilities to handle complex project cargo as per Project requirements. Although the port has previously handled aggregate imports, consistently large volumes of throughput would be required for a viable operation.

Storage Capacity

4.2.27 The port facility has existing storage areas totalling approximately 9.25 hectares (92,500 m^2). It should be noted that aggregates and project cargo cannot be stored at their quayside facilities as there is a limitation of 4 tonnes per square metre on the quay deck and would need to be transported elsewhere on-site where storage is available.

Access Arrangements

4.2.28 There are two points of access at the Port of Harwich: via the existing mini roundabout on E Dock Road to access the western part of the port, and one existing access gate on Phoenix Road to access the eastern part of the port. Access to the SRN would be from either of these access points to the A120. These routes range up to approximately 0.9 km in length. No significant constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

London Gateway Port

4.2.29 London Gateway Port is an existing commercial port on the Thames Estuary. As a purpose-built logistics facility, the port is located away from residential areas.

Credible Throughput

4.2.30 London Gateway Port is located to the south-east of the town of Stanford-le-Hope, on the north bank of the River Thames. It predominantly handles containerised cargo. No bulk materials facilities are available at this port. The credible throughput of cargo in dwt. is unknown and is to be further confirmed with the port operator; however, it is known that the maximum cargo dimensions accepted in the terminal are 20x6 m.

Storage Capacity

4.2.31 The port facility has existing storage areas sufficient to accommodate 2.4 million TEUs of containerised cargo. As the port does not handle bulk materials currently, there are no available storage areas for these materials.

Access Arrangements

4.2.32 Access to the SRN from the port is via the existing access gate to the west of the port to the A13. The route is approximately 3.8 km in length. No constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

Port of Tilbury, Essex

4.2.33 The Port of Tilbury forms the largest multi-modal port in the South East and London's major port located on the north bank of the River Thames.

Credible Throughput

4.2.34 The Port of Tilbury has facilities to handle both bulk aggregates and project cargo. It can take vessels of up to 250x13.5 m in size, subject to which part of the port the vessel is berthed. The total combined annual throughput (including both cargo and bulk aggregates) is approximately 16,000,000 tonnes.

4.2.35 It is a major aggregate hub for London and South East industries, further strengthened by the recent addition of the Construction Material and Aggregate Terminal (CMAT) as a part of the port expansion. The new CMAT facility is able to unload aggregates onto a conveyor to stockpiling at a rate of 4,000 tonnes per hour. Furthermore, there are three large cranes available on the quayside to support the millions of tonnes of aggregate throughput. These facilities are currently being used by multiple aggregate suppliers, which the Project will also be able to utilise.

4.2.36 From initial discussions with the port, there are no concerns with regards to the handling of AILs at the Port of Tilbury as the port has managed similar requirements in the past.

Storage Capacity

4.2.37 The facility's storage capacity is the same as discussed in Section 3.2.8.

4.2.38 The port facility has existing storage areas totalling approximately 3.8 hectares (38,000 m^2). There are two siding locations within the Port of Tilbury site: one in the northern part of the Port of Tilbury, and the other to the north of the Port of Tilbury 2 Terminal. The existing working area associated with these sidings is approximately 8,000 m^2. Tarmac has advised that there is storage for 80,000 tonnes of bulk aggregates.

Access Arrangements

4.2.39 The facility's access arrangements are the same as discussed in Section 3.2.8.

4.2.40 Access to the SRN from the sidings is via either of the existing access points on the Port of Tilbury terminal access road to the A1089. The routes are up to approximately 2.0 km in length. No constraints have been identified during the route assessment. Further details on the road connections can be found in Annex E.

4.3 Credible Throughput

4.3.1 As set out in Section 4.1, any of the construction materials required for the Project could potentially be transported by water-borne transport. As discussed in Section 2.3, these include both bulk volume materials – including large quantities of aggregates, steel components for Overhead Line pylon construction, and Overhead Line conductor drums – as well as a number of larger items such as Supergrid Transformers. As the requirements for handling these two broad types of cargo at the identified ports differ, they will be discussed separately in the following sections.

Bulk Materials

4.3.2 Credible throughputs of bulk materials for each of the port locations identified to be suitable for handling these are summarised in Table 4.2. For further information on the derivation of this information, please refer to the detailed ports assessment in Annex D. All assessment vessel recommendations below are made in line with PIANC standard WG 235: Ship Dimensions and Data for Design of Marine Infrastructure (2022) Annex A.

4.3.3 These throughputs are based on the use of the 'virtual quarry' approach. Under this approach, a working stockpile of material would be maintained at the port. Materials arriving by sea would be unloaded into the stockpile, and then onto HGVs; material being transported onwards would be loaded from the same stockpile, rather than directly from the vessels. This would allow the import of material by sea to be decoupled from the export of material by road, provided a sufficient working stockpile is maintained to allow material imports and exports to be balanced across the week.

4.3.4 Furthermore, maximum weekly two-way movements on the routes between these ports and the SRN, as shown in Annex E, would be anticipated to be double the number of Equivalent HGV Deliveries (i.e. one-way movements) shown in Table 4.2

Table 4.2 Water-borne transport bulk materials credible throughput

Delivery Location	Assessment Vessel Recommendation	Credible Throughput by Sea (Weekly)	Equivalent HGV Deliveries (Weekly)
King's Lynn	Handy Size – 4,450 tonne cargo capacity	4,450 tonnes per delivery; 2 deliveries per week; **Therefore 8,900 t/wk**	Throughput 8,900 t/wk; Typical 20 t per HGV; **Therefore 445 Deliveries**
Great Yarmouth	Handy Size – 18,000 tonne cargo capacity	18,000 tonnes per delivery; 2 deliveries per week; **Therefore 36,000 t/wk**	Throughput 36,000 t/wk; Typical 20 t per HGV; **Therefore 1,800 Deliveries**
Lowestoft	Handy Size – 4,450 tonne cargo capacity	4,450 tonnes per delivery; 2 deliveries per week; **Therefore 8,900 t/wk**	Throughput 8,900 t/wk; Typical 20 t per HGV; **Therefore 445 Deliveries**
Ipswich	Handy Size – 8,900 tonne cargo capacity	8,900 tonnes per delivery; 2 deliveries per week; **Therefore 17,800 t/wk**	Throughput 17,800 t/wk; Typical 20 t per HGV; **Therefore 890 Deliveries**
Harwich	Post Panamax (Wide) – 18,200 tonne cargo capacity	18,200 tonnes per delivery; 2 deliveries per week; **Therefore 36,400 t/wk**	Throughput 36,400 t/wk; Typical 20 t per HGV; **Therefore 1,820 Deliveries**
Tilbury	Post Panamax (Wide) – 37,200 tonne cargo capacity	37,200 tonnes per delivery; 1 delivery per week; **Therefore 37,200 t/wk**	Throughput 37,200 t/wk; Typical 20 t per HGV; **Therefore 1,860 Deliveries**

4.3.5 Engagement with the port operators has indicated that unloading from the vessels is typically undertaken utilising dockside equipment, with handling rates varying between approximately 400 tonnes per hour for a dockside crane fitted with a clam shell attachment and 4,000 tonnes per hour for an unloading conveyor. Details of known equipment is shown in Annex D. On this basis it is considered reasonable to unload a full shipment within a single shift. For the Port of Harwich this assumes that appropriate unloading equipment is deployed.

4.3.6 So long as a working stockpile is maintained, and the material arriving at the port in a given week matches the material moved off to site by road, then the rate limiting factor for credible throughput at the ports is considered to be the rate at which material can be loaded onto HGVs and moved off. This is understood to utilise a similar shovel to the loading/unloading of railway wagons, as discussed in Section 3.3, with an approximate materials handling rate of 300 tonnes per hour per machine.

4.3.7 If, to provide a comparative assessment to the process utilised to the discussion of railway transport, an indicative working week of six days with 10 working hours per day is assumed, each front-end loader could provide a credible maximum output of 18,000 tonnes per week. This would represent approximately 900 HGV deliveries, at a typical 20 tonne load per vehicle. For the higher throughput ports, therefore, two front-end loaders would be required to load HGVs concurrently in order to match the rate at which material can be delivered into the port. Given the working space available within each of the ports, such an arrangement is considered to be reasonable, assuming a sufficient availability of HGVs so that neither front-end loader is sat idle for a significant period of time.

4.3.8 For the Port of Tilbury, in particular, it is plausible that an additional shipment per week could be accommodated based on the assessment of the port facilities in isolation. However, given that the total anticipated peak material demand for the whole Project set out in Section 2.3 is approximately 65,000 tonnes per week, and that the additional usage of port space for stockpiling and front-end loader equipment would be a substantial extra demand upon the port facility, accommodation of this additional shipment is not considered to be credible for the purpose of this assessment. Therefore, the credible throughput for the Port of Tilbury shown in Table 4.2 is based on only one shipment per week, whilst in all other cases two shipments per week are considered to be credible.

4.3.9 Maximum weekly two-way movements on the routes between these ports and the SRN, as shown in Annex E, would be anticipated to be double the number of Equivalent HGV Deliveries (i.e. one-way movements) shown in Table 4.2.

Project Cargo

4.3.10 Due to the specialist nature of project cargo transportation, the number of items which can be delivered in a single shipment will be dependent upon the specific allowable loading arrangements of available suitable shipping. The following ports have been identified as suitable to receive Project cargo deliveries:

- King's Lynn
- Great Yarmouth
- Lowestoft
- Ipswich
- Felixstowe
- Harwich
- London Gateway
- Tilbury

5. Summary and Implementation

5.1 Summary

5.1.1 A number of multimodal transportation options have been assessed for the construction of the Project, in line with NPS EN-1 (Department for Energy Security and Net Zero, 2024). This assessment has identified a number of opportunities to potentially make use of rail and water-borne transport infrastructure to deliver materials for the Project. These findings are summarised in Table 5.1, with identified facilities listed from North to South.

Table 5.1 Summary of identified opportunities to utilise multi-modal facilities

Identified Facility	Bulk Materials Credible Throughput	Abnormal Loads Capability	Comments
Port of King's Lynn	2no. 4,450 tonne deliveries per week; **Total: 8,900 t/wk;** (Equivalent 445 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port on the River Great Ouse with facilities for handling both bulk cargo and abnormal loads, operated by ABP.
Trowse Newton Sidings	7no. 1,500 tonne deliveries per week; **Total: 10,500 t/wk;** (Equivalent 525 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead serving Tarmac Trowse Newton Asphalt Plant.
Port of Great Yarmouth	2no. 18,000 tonne deliveries per week; **Total 36,000 t/wk;** (Equivalent 1,800 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port at the mouth of the River Yare with facilities for handling both bulk cargo and abnormal loads, operated by Peel Ports.
Port of Lowestoft	2no. 4,450 tonne deliveries per week; **Total: 8,900 t/wk;** (Equivalent 445 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling both bulk cargo and abnormal loads, operated by ABP.
Brandon Sidings	7no. 1,800 tonne deliveries per week; **Total 12,600 t/wk;** (Equivalent 630 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead operated by Rory J Holbrook Ltd.
Kennett Sidings	6no. 1,800 tonne deliveries per week; **Total: 10,800 t/wk;** (Equivalent 540 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead serving Tarmac Higham Asphalt Plant.

Identified Facility	Bulk Materials Credible Throughput	Abnormal Loads Capability	Comments
Barham Sidings	7no. 1,300 tonne deliveries per week; **Total: 9,100 t/wk;** (Equivalent 455 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead serving Tarmac Barham Asphalt Plant.
Port of Ipswich	2no. 8,900 tonne deliveries per week; **Total 17,800 t/wk;** (Equivalent 890 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port on the River Orwell with facilities for handling both bulk cargo and abnormal loads, operated by ABP. Option to export material by rail from this location to the Marks Tey Sidings via the Port of Ipswich Sidings, discussed overleaf.
Port of Ipswich Sidings	*No material import train paths identified*	No – abnormal loads not suitable for rail infrastructure	Established aggregates export railhead operated by Brett Aggregates within the Port of Ipswich. No materials import capacity. Identified usage for transfer of additional materials imported by sea from the Port of Ipswich to the Marks Tey Sidings only. See Marks Tey Sidings discussion for details.
Port of Felixstowe	*Not suitable for bulk materials import – facilities for handling containerised loads and project cargo only*	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling containerised cargo and abnormal loads only, operated by Hutchinson Ports.
Port of Harwich	2no. 18,200 tonne deliveries per week; **Total: 36,400 t/wk** (Equivalent 1,820 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling both bulk cargo and abnormal loads, operated by Hutchinson Ports.
Marks Tey Sidings	<u>Using Existing Paths Only</u>: 6no. 1,000 tonne deliveries per week; **Total: 6,000 t/wk;** (Equivalent 300 HGVs/wk) <u>Including Additional Throughput from Ipswich</u>:	No – abnormal loads not suitable for rail infrastructure	Established aggregates handling facility operated by Tarmac. Potential option to provide additional throughput by rail in this location using transfers from the Port of Ipswich. If making use of this additional throughput from Ipswich, approximately

Identified Facility	Bulk Materials Credible Throughput	Abnormal Loads Capability	Comments
	18no. 1,000 tonne deliveries per week; **Total: 18,000 t/wk;** (Equivalent 900 HGVs/wk)		12,000 tonnes per week of material would be required to be delivered through the port to provide the additional throughput at Marks Tey.
Chelmsford Sidings	6no. 1,200 tonne deliveries per week; **Total 7,200 t/wk;** (Equivalent 360 HGVs/wk)	No – abnormal loads not suitable for rail infrastructure	Established aggregates delivery railhead operated by Holcim (trading as Aggregate Industries prior to March 2025).
London Gateway Port	*Not suitable for bulk materials import – facilities for handling containerised loads and project cargo only*	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling containerised cargo and abnormal loads only, operated by DP World.
Port of Tilbury	1no. 37,200 tonne delivery per week; **Total: 37,200 t/wk** (Equivalent 1,860 HGVs/wk)	Yes – abnormal loads suitable for port infrastructure	Established commercial port with facilities for handling both bulk cargo and abnormal loads, operated by Forth Ports.

5.1.2 All of the 15 options identified in the table above would utilise an already established facility, with a number of different operators across the region. Of these, 12 could be utilised for the import of bulk materials – as set out in Section 2.3, the bulk materials required for this Project are predominantly Type 1 aggregates – and eight for the import of abnormally large and/or heavy items, namely Underground Cable conductor drums and large electrical equipment.

5.1.3 Only one facility identified above, the Port of Ipswich Sidings, lacks any capacity to import either bulk materials or abnormal loads. Rather, this facility has been identified on the basis that it provides an opportunity to transfer materials from the Port of Ipswich to the sidings at Marks Tey by rail. Therefore, if this facility was to be utilised to its fullest capacity, then the credible throughput of 18,000 tonnes per week at Marks Tey would be achieved, and the volume of materials leaving the Port of Ipswich by road would be reduced by 12,000 tonnes per week to 5,800 tonnes per week.

5.1.4 The total cumulative credible throughput for bulk materials across the identified facilities is 201,400 tonnes per week. For comparison, the peak demand for bulk materials on the Project identified in Section 2.3 is 65,000 tonnes per week. Therefore, the Project would require at most approximately 32% of the region's multi-modal capacity identified in Table 5.1, for the delivery of bulk materials.

5.1.5 Each of the ports identified could potentially be used for the import of abnormal loads. Due to the specific issues around moving loads of this size and weight by road, the ports to which these are delivered will be determined to a large extent by highway constraints. Further consideration of these requirements is undertaken within the AIL Access Strategy (appended to the Outline CTMP (document reference 7.3)).

5.2 Implementation

5.2.1 A number of options for the delivery of bulk materials by rail or water-borne transport have been summarised in Section 5.1. The following approach was undertaken to implement these multi-modal delivery options into the wider transport planning for the Project.

Local Impact Assessments

5.2.2 An assessment of multi-modal transport was undertaken to examine opportunities to utilise rail and water-borne transport modes to transport materials for the construction of the proposed works within the region. This identified options to reduce distances travelled by HGVs on the SRN in the delivery of the Project.

5.2.3 This included the potential use of the River Stour and the River Waveney. However, it was found that neither of the waterways, which intersect the Project alignment, are considered feasible at this stage of Project development to use for the transport of construction materials. Further details can be found within the Outline CTMP (document reference 7.3).

5.2.4 Ports and railway sidings in the vicinity of the Project alignment have been identified and sifted to determine options which would be suitable for use. This included engaging with existing operators to determine a credible throughput in each location. These credible throughputs have been utilised to derive trip generation data for onwards movements by road in each location.

5.2.5 It has been assumed that the 'last mile' of any delivery utilising rail or water-borne transport will be made by road, using the public highway (along the PAR) and/or construction haul roads as required.

5.2.6 For ease of reference, the quantum of HGV movements associated with the multi-modal facilities identified as suitable to accommodate bulk materials throughput is summarised in Table 5.2. Local highway links for the identified facilities listed are provided in Annex E.

Table 5.2 Summary of HGV movements associated with multi-modal deliveries

Identified Facility	Max. Bulk Material Credible Throughput (Tonnes per Week)	Approximate Equivalent HGV Deliveries (No. per Week)	Derived Local Two-Way HGV Movements (No. per Week)
Port of King's Lynn	8,900 t/wk	445	890
Trowse Newton Sidings	10,500 t/wk	525	1,050
Port of Great Yarmouth	36,000 t/wk	1,800	3,600
Port of Lowestoft	8,900 t/wk	445	890

Identified Facility	Max. Bulk Material Credible Throughput (Tonnes per Week)	Approximate Equivalent HGV Deliveries (No. per Week)	Derived Local Two-Way HGV Movements (No. per Week)
Brandon Sidings	12,600 t/wk	630	1,260
Kennett Sidings	10,800 t/wk	540	1,080
Barham Sidings	9,100 t/wk	455	910
Port of Ipswich	17,800 t/wk	890	1,780
Port of Harwich	36,400 t/wk	1,820	3,640
Marks Tey Sidings	18,000 t/wk	900	1,800
Chelmsford Sidings	7,200 t/wk	360	720
Port of Tilbury	37,200 t/wk	1,860	3,720

5.2.7 Further to the information presented above, the calculated bulk materials peak demand for the Project is 65,000 tonnes per week, equivalent to approximately 3,250 HGV deliveries per week assuming a typical load of 20 tonnes per HGV. It should be understood on this basis that the full capacities of all the identified facilities shown in Table 5.2, above, would not be required concurrently for the purpose of assessing the wider network impacts. However, in the case of the local highway links in the vicinity of the ports and sidings identified, the credible throughputs and derived HGV movements shown above do represent the reasonable worst-case basis for assessing the construction traffic impacts on these routes.

Development of Test Scenarios

5.2.8 As part of sensitivity testing which is outlined within Appendix G2 the multi-modal route options have been analysed to determine the potential increases in traffic volumes, particularly HGV movements, and assess the capacity of affected road networks to accommodate these changes. The analysis focuses on the SRN, MRN, and local roads that access the multi-modal ports/sidings impacted by the construction logistics. The routes assessed between the ports/sidings and the SRN/MRN junctions connecting to the Project PARs are presented on Image 6: Multi-modal Routeing.

5.2.9 The analysis is based on two primary delivery scenarios:

- Multi-modal transport involving rail or sea and HGV road trips from ports/sidings to the PARs
- Road-only transport using HGVs from quarries to the construction PARs

5.2.10 Within the assessment two scenarios were analysed:

- Scenario 1: This scenario assumes a 'just-in-time' delivery profile, aligned with the anticipated construction programme. Materials are assumed to be delivered at a consistent rate to match the needs of each construction activity. It does not account for the stockpiling of materials within the proposed construction laydown areas or the Order Limits
- Scenario 2: This scenario assumes a 'front-loaded' delivery profile, based on the anticipated construction programme. Under this scenario, materials are delivered at the maximum feasible rate, as determined by the credible throughput capacity of multi-modal facilities (e.g., ports and rail sidings), and are stockpiled on site within the proposed construction laydown areas. Deliveries commence with the first activity at each PAR and continue until the full quantity of material required for that PAR has been supplied.

Assessment Conclusions

5.2.11 It was found that overall construction-related traffic flows do not substantially alter the volume to capacity (V/C) ratios on the access roads to and from the ports and sidings, in both Scenarios 1 and 2. In most locations the network retains sufficient capacity to accommodate the proposed increases in traffic volumes, in both Scenarios 1 and 2. In those locations at capacity or over capacity, the increase in the traffic volumes do not change the operational status of each link.

5.2.12 The A1016 Waterhouse Lane in Chelmsford is already over capacity and the preliminary capacity analysis for the junctions on this road indicates that several junctions are already operating at capacity in the baseline year (2024). Any additional traffic would likely cause these junctions to exceed their capacity. Junction capacity assessment has been undertaken along the corridor to identify potential mitigation measures.

5.2.13 In the multi-modal transport Scenario 1 and the road-only transport, the maximum increase in HGV traffic remains below the 30% threshold across all assessed routes. This suggests that both scenarios maintain manageable traffic impacts during construction.

5.2.14 In contrast, Scenario 2 demonstrates significant increases in HGV volumes on several key routes, exceeding the 30% threshold. These increases are projected for durations ranging from 7 to 10 weeks, potentially causing impacts on traffic flow and road user experience. In this scenario, measures such as traffic management plans and scheduling strategies will be critical to minimise disruption during the construction period.

5.2.15 Where junctions have been identified as being at or over capacity, junction modelling has been undertaken to identify the potential impact of additional construction traffic from the ports, as detailed within Appendix G2 of the Transport Assessment.

5.3 Main Works Contractor Handover

5.3.1 It is anticipated that information collated by National Grid as regard the Project's proposed approach to the use of multi-modal transport and associated planning information will be included in the handover to the Main Works Contractor(s). As part of this, engagement with the relevant multi-modal facility operators will be continued, and specific commercial arrangements will need to be sought in order to secure quantities of material through facilities which are selected to be taken forwards by the Main Works Contractor(s). For the purpose of supporting the development of these agreements, the following context regarding engagement with the facility operators will be included with the handover to the Main Works Contractor(s):

- Engagement to date with the facility operators has been with respect to outline feasibility only, and the credible throughputs for each facility set out in Table 5.2 have been established on the basis of these initial discussions and technical assessments discussed in Sections 3 and 4.
- Initial discussions to date with facility operators have not included any formal Agreements in Principle or other commercial commitments from any party. Therefore, the credible throughputs set out in Table 5.2 are not commercially secured, and throughputs which can be achieved during the delivery of the Project may vary.

5.3.2 Therefore, the Main Works Contractor(s) will engage with the relevant operator for each facility which is selected to be taken forwards and seek to secure appropriate commercial agreements on the materials and quantities which will be supplied from that location.

5.4 Conclusion

5.4.1 Multiple sustainable transport modal options have been assessed for their appropriateness in delivering the materials required for the Project. This assessment has been undertaken in accordance with NPS EN-1 (Department for Energy Security and Net Zero, 2024), which emphasises the importance of minimising environmental impacts and promoting sustainable logistics solutions.

5.4.2 A total of 15 potential facilities have been identified for delivery of materials for the Project by either rail or water-borne transportation. All of the 15 options identified would utilise an already established facility, with a number of different operators across the region. Of these facilities, 12 have been identified as suitable for bulk materials and eight for abnormally large and/or heavy items.

5.4.3 However, several key elements of the Project remain to be finalised, including the detailed design, construction programme, and commercial agreements for the procurement of material quantities. The outcome of this process will be to confirm sources of material supply and associated transport logistics, and to identify whether use of alternative transport modes is feasible, commercially viable and operationally reasonable.

5.4.4 In the event that development consent is granted for the Project, National Grid, in collaboration with the appointed Main Works Contractor(s), will pursue the exploration and implementation (where feasible, commercially viable and operationally reasonable) of alternative transport modes to deliver materials and large and/or heavy items.

Abbreviations

Abbreviation	Full Reference
ABP	Associated British Ports
AIL	Abnormal indivisible load
BTNO	Bramford to Twinstead Reinforcement
CCTV	Closed-circuit Television
CMAT	Construction Material and Aggregate Terminal
CoCP	Code of Construction Practice
CSE	Cable Sealing End
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DfT	Department for Transport
DGL	Down Goods Loop
DM	Down Main
DMRB	Design Manual for Roads and Bridges
EACN	East Anglia Connection Node
EIA	Environmental Impact Assessment
EN-1	Overarching National Policy Statement for Energy
EN-5	National Policy Statement for Electricity Networks Infrastructure
ES	Environmental Statement
FEU	Forty-foot Equivalent Unit
HGV	Heavy Goods Vehicle
HW	High Water
LGV	Light Goods Vehicle
LHA	Local Highway Authority
LoA	Length Overall
LRN	Local Road Network
LTC	Lower Thames Crossing
LW	Low Water
m	Metre

Abbreviation	Full Reference
mph	Miles per hour
MRN	Major Road Network
NMU	Non-Motorised Users
NPS	National Policy Statement
PAR	Primary Access Route
PRoW	Public Rights of Way
Ro-Ro	Roll-on/Roll-off
SAP	Site access point
SRN	Strategic Road Network
TA	Transport Assessment
TEU	Twenty-foot Equivalent Units
The Project	Norwich to Tilbury
V/C	Volume to Capacity

Glossary

Term	Definition
Abnormal Indivisible Load Abnormal indivisible load	A large load which cannot 'without undue expense or risk of damage' be divided into two or more smaller loads for the purposes of being transported by road, and which exceeds limits set out in terms of weight (>44 tonnes), length (>18.65 m), and width (>2.9 m).
Aggregate	Granular material (e.g. sand and gravel or crushed rock) that can be used for building and/or civil engineering purposes (e.g. for concrete production).
Alignment	The proposed overhead line and underground cable route.
Bellmouth	A flared vehicular access point connecting a construction site to the public highway, designed to accommodate turning movements by large vehicles.
Cable	An insulated conductor designed for underground installation.
Cable circuit	A set of wires along which current flows and returns. It is necessary to have a complete circuit for current to flow. The National Grid standard for overhead lines operating at 400 kV is for pylons to carry two circuits, each consisting of three phases, i.e. a double circuit configuration.
Cable Sealing End	Structures used to transfer transmission circuits between underground cables and overhead lines.
Cable Sealing End compound	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Code of Construction Practice	A code of construction practice sets out the standards and procedures to which a developer (and its contractors) must adhere in order to manage the potential impacts of construction works.
Construction Traffic Management Plan	Plan detailing the procedures, requirements and standards necessary for managing the traffic effects during construction of the Project so that safe, adequate and convenient facilities for local movements by all transport modes are maintained throughout the construction process.
Construction Worker Travel Plan	Plan that sets out the framework and principles proposed for the management of construction worker travel to mitigate potential impacts and encourage more sustainable modes of transport.
Crossover points	Locations where haul roads cross the local road network, but are not generally proposed for construction HGVs to transition to or from the local road network

Term	Definition
Development Consent Order	A statutory instrument which grants consents and other rights to build a Nationally Significant Infrastructure Project, as defined by the Planning Act 2008.
Environmental Statement (ES)	The main output from the EIA process, an ES is the report required to accompany an application for development consent (under the Infrastructure Planning (EIA) Regulations 2017) to inform public and stakeholder consultation and the decision on whether a project should be allowed to proceed. The EIA Regulations set out specific requirements for the contents of an ES for Nationally Significant Infrastructure Projects.
Forty-foot Equivalent Unit (FEU)	A standardised container used in international shipping, measuring 40 x 8 x 8.5 feet (approximately 12 x 2.4 x 2.6 m). One FEU is equivalent to two Twenty-foot Equivalent Units (TEUs).
Heavy Goods Vehicle	Goods vehicles weighing more than 3,500 kg.
High Water (HW)	High tide
Kilometre	1,000 metres
Length Overall (LoA)	The overall length of a ship.
Light Goods Vehicles	Goods vehicle weighing 3,500 kg or less.
Limits of Deviation (LoD)	LoD allow for adjustment to the final positioning of the permanent features, for example to avoid localised constraints or unknown or unforeseeable issues that may arise. This could include previously unidentified poor ground conditions which require a pylon to be moved slightly for geotechnical reasons, such as ground stability. The horizontal LoD define the parameters within which the position on the ground of proposed permanent features may deviate from the position shown on the plans. This applies to both linear (for example overhead lines and underground cables) and non-linear (for example the new EACN Substation and CSE compounds) proposed infrastructure. Vertical LoD limit the maximum vertical height, or the depth below ground, of any new infrastructure.
Local Planning Authority	The public authority whose duty it is to carry out specific planning functions for a particular area.
Low Water (LW)	Low tide
Major Road Network	Middle tier of the country's busiest and most economically important local authority 'A' roads, sitting between the national Strategic Road Network and the rest of the local road network.
Main Works Contractor(s)	Contractor(s) appointed by National Grid to construct the Project.
Nationally Significant Infrastructure Project	Typically a large scale development of national importance that requires development consent from the Secretary of State, under the Planning Act 2008.

Term	Definition
Order Limits	The maximum extent of land within which the authorised development may take place.
Overhead line	Conductor (wire) carrying electric current, strung from pylon to pylon.
Permanent access	Access required to infrastructure during the operational phase of the Project, for operational and maintenance purposes.
Primary Access Routes	These are the roads on the local road network that would be used by construction vehicles between the strategic road network and the access points within the Order Limits.
Project Section	Geographical ‘sections’ have been identified that break the Project down into smaller units for ease of description within the documentation. These Project Sections are broken down into eight sections based largely on Local Planning Authority boundaries.
Public Right of Way	A footpath, bridleway or byway accessible to all members of the public.
Pylon	Structures that support the overhead line (conductors).
Roll-on/Roll-off (Ro-Ro)	A type of cargo ship where wheeled cargo or vehicles can be loaded and unloaded by being wheeled or rolled on and off the ship via ramps.
Scoping	Scoping is the process of determining the content and extent of matters that should be covered in the Environmental Impact Assessment.
Scoping Report	Report determining the content and extent of matters that should be covered in the Environmental Impact Assessment.
Site access points	A location connecting a construction site to the public highway
Strategic Road Network	Network of motorways and major A roads managed by National Highways
Substation	Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses.
Temporary construction compounds	Temporary compounds installed during the construction phase of the Project. Each compound may contain storage areas including laydown areas, soils storage and areas for equipment and fuel, drainage, generators, car parking and offices and welfare areas (portacabins).
Transport Assessment	Transport Assessment is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be taken to deal with the anticipated

Term	Definition
	transport effects of the Project. It is separate to Chapter 16: Traffic and Transport (document reference 6.16).
Transport Coordinators	The Transport Coordinators will be responsible for the monitoring and management of measures recorded within the CTMP. The Transport Coordinators would liaise with the Travel Plan Coordinator (TPC) to help identify initiatives to limit vehicle movements. They would also liaise with the LHAs to provide monitoring reports for the CTMP.
Travel Plan Coordinator	A person or role appointed to develop, implement, monitor, and promote a Travel Plan for a development. The Travel Plan Coordinator acts as the main point of contact between the developer, local planning authority, and transport stakeholders. Their responsibilities include encouraging sustainable travel choices (e.g. walking, cycling, public transport), collecting travel data, and ensuring compliance with planning obligations related to transport.
Twenty-foot Equivalent Unit (TEU)	A standardised container used in international shipping, measuring 20 x 8 x 8.5 feet (approximately 6 x 2.4 x 2.6 m). Two TEUs are equivalent to one Forty-foot Equivalent Units (FEUs).
Underground cable	An insulated conductor carrying electric current designed for underground installation. Underground cables link together two Cable Sealing End compounds.
Visibility splay	Areas of tree/vegetation removal, typically where access points are, to enable a driver to see down the road and know when the road is clear.
Working area	Working area required to construct elements of the Project, such as pylons, underground cables, CSE compounds.

References

Department for Energy Security and Net Zero (2024) *Overarching National Policy Statement for Energy (EN-1)*

Standards for Highways (2021) *Manual of Contract Documents for Highway Works (MCHW) Volume 1: Specification for Highway Works – Series 800 Road Pavements – Unbound, Cement and Other Hydraulically Bound Mixtures*

Annex A
Project Materials Requirements

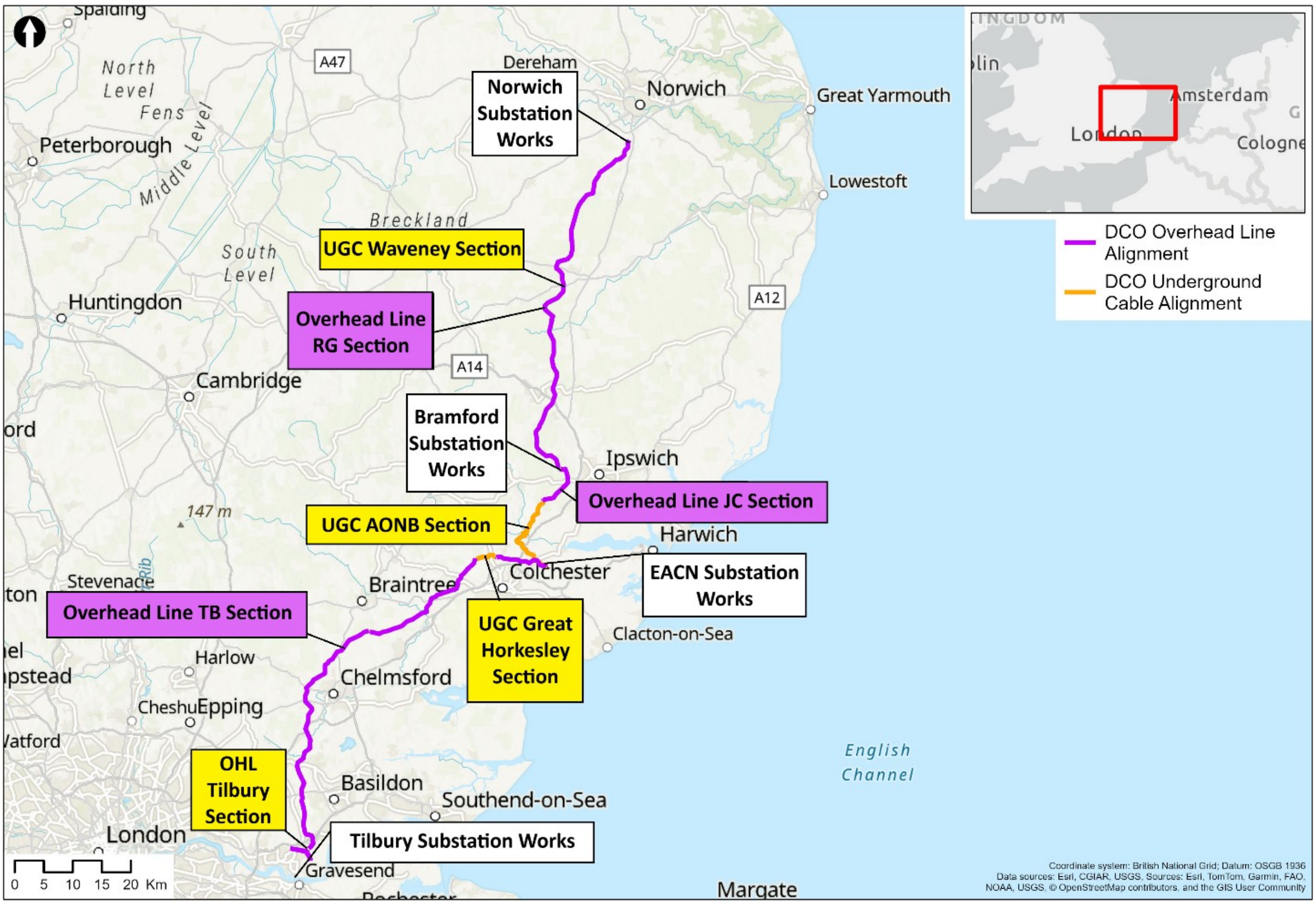
Annex A
Project Materials Requirements

A.1.1 Transport requirements for the Project are defined on the basis of the materials required for the various construction types along the alignment. These construction types and materials include:

- Overhead line, requiring:
  - Granular aggregates for compounds, haul roads, and working platforms
  - Mass concrete for Overhead Line pylon foundations
  - Pylon steel components for assembling the Overhead Line pylon superstructures
  - Overhead Line conductor drums for the stringing of overhead lines.
- Underground Cable, requiring:
  - Granular aggregates for compounds, haul roads, and working platforms
  - Granular and fine aggregates for Underground Cable installation and bedding
  - Mass concrete for Cable Sealing End compound foundations and superstructure works
  - Underground Cable conductor drums for the installation of underground cables.
- Substations, requiring:
  - Granular aggregates for compounds, haul roads, and working platforms
  - Mass concrete for substation foundations and superstructure works
  - Large electrical equipment, including transformers and shunt reactors.

A.1.2 These construction types are distributed along the Project alignment as shown in Annex Image A.1.

Annex Image A.1 Project alignment construction sections



A.1.3 Quantity and programme requirements for each of these construction and material types have been assessed based on outline information regarding materials and programme, in line with the information utilised to produce the Trip Generation set out in Section 6 of the Transport Assessment, namely:

- Overhead Line design material types and quantities;
- Underground cabling design material types and quantities;
- Substation design material types and quantities; and
- Construction programme information, as set out in Section 6 of the Transport Assessment.

A.1.4 These sources are summarised in the following sections.

Granular Aggregates for Compounds, Haul Roads, and Working Platforms

A.1.5 Granular aggregates will be required for the construction of infrastructure – including compounds, haul roads, and working platforms – across all sections of the Project. As set out in the Typical Haul Road Cross Section within 2.6.3 Design and Layout Plans – Traffic and Transport, these granular aggregates are anticipated to be Type 1 Unbound Mixture, as defined by the Manual of Contract Documents for Highway Works (MCHW) Clause 803 (*Standards for Highways, 2021*).

A.1.6 Although materials would be resourced from within the region where practicable, East Anglia lacks substantial reserves of suitable rock material for the production of this type of aggregates. It is therefore not anticipated that significant quantities of these granular aggregates will be sourced from within the region. Hence, it is assumed as the most onerous case for the purpose of this assessment that transportation will be required from outside of the region for all granular aggregates required for the construction of the haul roads and working platforms. Both rail and water-borne transportation modes would be suitable for this purpose. Use of these would require the aggregates to be sourced from quarries with facilities to export materials by rail or water. A number of quarries with such existing facilities have been identified, and these are summarised in Annex Table A.1.

Annex Table A.1 Identified sources for granular aggregates by rail or water

Identified Quarry	Location	Approximate Output	Export Facilities
Holcim (trading as Aggregate Industries prior to March 2025), Glensanda	Glensanda, Oban, Scotland, PA80 5QB	9 million tonnes per annum	Water
Mibau Stema Norge AS, Jelsa Quarry	Jelsa, Rogaland, Norway, 4234	12 million tonnes per annum	Water
Cemex UK, Dove Holes	Dove Holes, Derbyshire, England, SK17 8BH	7 million tonnes per annum	Rail
Aggregates Industries, Bardon Hill	Coalville, Leicestershire, England, LE67 1TL	4 million tonnes per annum	Rail
Tarmac CRH, Buxton Quarries	Buxton, Derbyshire, England, SK17 8TG	6 million tonnes per annum	Rail
Tarmac CRH, Mountsorrel Quarry	Mountsorrel, Leicestershire, England, LE12 8GE	4 million tonnes per annum	Rail
Heidelberg Materials, Whatley Quarry	Frome, Somerset, England, BA11 3LF	2.5 million tonnes per annum	Rail

A.1.7 For comparison, the indicative granular aggregates requirements for compound, haul road, and working platform construction are set out in Annex Table A.2. This also shows an approximate import rate based on the draft programme for the activities, without any prepositioning of materials.

Annex Table A.2 Granular aggregates requirements for compounds, haul roads and working platforms

Works Section	Total Requirement (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H01-A1	54664	04/10/2027 – 06/03/2028 (22 weeks)	2485
H01-A2	57372	04/10/2027 – 06/03/2028 (22 weeks)	2608

Works Section	Total Requirement (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H02-A1	16753	04/10/2027 – 06/03/2028 (22 weeks)	761
H03-A1	63307	04/10/2027 – 06/03/2028 (22 weeks)	2878
H03-A2	78616	19/04/2027 – 06/03/2028 (46 weeks)	1709
H04-A1	55738	04/10/2027 – 21/02/2028 (20 weeks)	2787
H04-A2	55712	04/10/2027 – 21/02/2028 (20 weeks)	2786
H05-A1	16723	04/10/2027 – 21/02/2028 (20 weeks)	836
H05-A2	31499	04/10/2027 – 21/02/2028 (20 weeks)	1575
H06-A1	103026	19/04/2027 – 17/07/2028 (65 weeks)	1585
H06-A2	70206	11/10/2027 – 17/07/2028 (40 weeks)	1755
H07-A1	53164	21/02/2028 – 17/07/2028 (21 weeks)	2532
H07-A2	73389	11/10/2027 – 05/06/2028 (34 weeks)	2159
H08-A1	43329	31/05/2027 – 05/06/2028 (53 weeks)	818
H09-A1	18201	11/10/2027 – 05/06/2028 (34 weeks)	535
H10-A1	88371	06/03/2027 – 05/06/2028 (32 weeks)	2762
H10-A2	124524	10/01/2028 – 16/10/2028 (40 weeks)	3113
H11-A1	30901	05/06/2028 – 18/09/2028 (15 weeks)	2060
H11-A2	35913	05/06/2028 – 18/09/2028 (15 weeks)	2394
H12-A1	104705	05/06/2028 – 18/09/2028 (15 weeks)	6980

Works Section	Total Requirement (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H12-A2	73156	06/12/2027 – 27/08/2029 (90 weeks)	813
H14-A1	37742	06/12/2027 – 22/10/2029 (98 weeks)	385
H15-A1	3888	06/12/2027 – 27/03/2028 (16 weeks)	243
H16-A1	37645	06/12/2027 – 19/03/2029 (67 weeks)	562
H17-A2	132814	22/11/2027 – 21/08/2028 (39 weeks)	3405
H18-A1	53234	07/02/2028 – 10/07/2028 (22 weeks)	2420
H19-A1	38788	07/02/2028 – 10/07/2028 (22 weeks)	1763
H19-A2	78590	10/01/2028 – 22/10/2029 (93 weeks)	845
H20-A1	26400	07/02/2028 – 10/07/2028 (22 weeks)	1200
H20-A2	31750	04/10/2027 – 10/07/2028 (40 weeks)	794
H21-A1	9738	04/10/2027 – 13/03/2028 (23 weeks)	423
H22-A1	31743	04/10/2027 – 13/03/2028 (23 weeks)	1380
H23-A1	62441	19/04/2027 – 13/03/2028 (47 weeks)	1329
H24-A1	68082	04/10/2027 – 13/03/2028 (23 weeks)	2960
H24-A2	59119	04/10/2027 – 13/03/2028 (23 weeks)	2570
H25-A1	58804	04/10/227 – 07/02/2028 (18 weeks)	3267
H25-A2	132451	19/04/2027 – 12/06/2028 (60 weeks)	2208
H26-A1	9475	04/10/2027 – 07/02/2028 (18 weeks)	526

Works Section	Total Requirement (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H27-A1	17852	13/03/2028 – 07/08/2028 (21 weeks)	850
H28-A1	56084	13/03/2028 – 07/08/2028 (21 weeks)	2671
H28-A2	44803	13/03/2028 – 07/08/2028 (21 weeks)	2133
H29-A1	17430	13/03/2028 – 07/08/2028 (21 weeks)	830
H29-A2	13528	13/03/2028 – 07/08/2028 (21 weeks)	644
H30-A1	35648	13/03/2028 – 07/08/2028 (21 weeks)	1698
H30-A2	48775	13/03/2028 – 07/08/2028 (21 weeks)	2323
H31-A1	83238	10/07/2028 – 30/10/2028 (16 weeks)	5202
H33-A1	52552	10/07/2028 – 30/10/2028 (16 weeks)	3285
H33-A2	38385	10/07/2028 – 30/10/2028 (16 weeks)	2399
H34-A1	49072	31/05/2027 – 13/11/2028 (76 weeks)	646
H35-A1	109523	07/08/2028 – 13/11/2028 (14 weeks)	7823
H36-A1	48673	27/12/2027 – 13/11/2028 (46 weeks)	1058
H37-A1	7430	11/10/2027 – 06/03/2028 (21 weeks)	354
H38-A1	195718	11/10/2027 – 09/07/2029 (91 weeks)	2151
H39-A1	23716	11/10/2027 – 10/01/2028 (13 weeks)	1824

A.2 Granular and Fine Aggregates for Underground Cable Installation and Bedding

A.2.1 In addition to the granular aggregates required for the construction of compounds, haul roads, and working platforms set out in Annex A, further aggregates will be required for the installation and bedding of underground cabled sections. These will be split between:

- Type 1 Unbound Mixture to MCHW Clause 803 (*Standards for Highways, 2021*), a granular aggregate
- Cement Bound Sand, a fine aggregate.

A.2.2 Whilst it may be possible to utilise locally produced fine aggregates for Underground Cable bedding, as a conservative case it is assumed that all aggregates for Underground Cable installation and bedding will need to be imported into the region. Transport by either rail or water would be appropriate for these materials. Indicative requirements are set out in Annex Table A.3.

Annex Table A.3 Fine requirements for UCG installation and bedding

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H12-A2	2156	25/09/2028 – 07/01/2030 (67 weeks)	33
H14-A1	1624	23/04/2029 – 08/07/2030 (63 weeks)	26
H16-A1	346	20/11/2028 – 02/04/2029 (19 weeks)	18
H17-A2	505	17/07/2028 – 04/12/2028 (20 weeks)	26
H19-A2	71487	12/06/2028 – 25/02/2030 (89 weeks)	804
H25-A2	713	19/06/2028 – 02/04/2028 (41 weeks)	18
H38-A1	2614	29/01/2029 – 22/10/2029 (38 weeks)	69

A.2.3 Cumulatively, the indicative requirements set out in Annex Table A.2 and Annex Table A.3 amount to a total of approximately 3.04 million tonnes of aggregates.

A.3 Mass Concrete for Foundations and Superstructure Works

A.3.1 Mass concrete is required for the Overhead Line pylon foundations, as well as foundation and superstructure works at the substation sites. In some locations, it may be preferable for the contractor to source ready-mixed concrete from local suppliers. However, there may also be a preference for project-specific batching to be undertaken, for example due to the lack of existing suppliers in a given area, or preferable cost-efficiency with consistent concrete works.

A.3.2 Therefore, it would be preferable to allow for the delivery of materials for concrete batching on site. The indicative total requirements for these are set out in Annex Table A.4 below. The specific breakdown of these between sand, cement, and aggregates will depend on the specific concrete mixes specified during detailed design. Both rail and water-borne transportation modes would be suitable for these components, although they may require separate transportation arrangements (e.g. specific railway wagons for transporting cement). It is assumed that water for cement production would be piped, rather than transported by tanker.

Annex Table A.4 Mass concrete requirements for foundations and superstructure works

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H01-A1	713	24/07/2028 – 18/09/2028 (8 weeks)	89
H01-A2	842	03/07/2028 – 28/08/2028 (8 weeks)	105
H02-A1	259	03/07/2028 – 31/07/2028 (4 weeks)	65
H03-A1	907	08/05/2028 – 31/07/2028 (12 weeks)	76
H03-A2	972	13/03/2028 – 05/06/2028 (12 weeks)	81
H04-A1	842	14/02/2028 – 10/04/2028 (8 weeks)	105
H04-A2	842	17/01/2028 – 13/03/2028 (8 weeks)	105
H05-A1	259	13/12/2027 – 14/02/2028 (9 weeks)	29
H05-A2	518	13/12/2027 – 17/01/2028 (5 weeks)	104
H06-A1	907	25/09/2028 – 13/11/2028 (7 weeks)	130
H06-A2	972	23/10/2028 – 22/01/2029	324

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
		(3 weeks)	
H07-A1	778	23/10/2028 – 22/01/2029 (13 weeks)	60
H07-A2	1102	11/12/2028 – 19/03/2029 (14 weeks)	79
H08-A1	518	19/02/2029 – 19/03/2029 (4 weeks)	130
H09-A1	259	19/04/2029 – 16/03/2029 (4 weeks)	65
H10-A1	1361	19/04/2029 – 11/06/2026 (12 weeks)	113
H10-A2	1555	14/05/2029 – 06/08/2029 (12 weeks)	130
H11-A1	389	06/08/2029 – 03/09/2029 (4 weeks)	97
H11-A2	648	06/08.2029 – 01/10/2029 (8 weeks)	81
H12-A1	1231	03/09/2029 – 05/11/2029 (9 weeks)	137
H17-A2	518	18/09/2028 – 09/10/2028 (3 weeks)	173
H18-A1	778	21/08/2028 – 09/11/2028 (7 weeks)	111
H19-A1	583	24/07/2028 – 18/09/2028 (8 weeks)	73
H19-A2	324	26/06/2028 – 21/08/2028 (8 weeks)	41
H20-A1	518	26/06/2028 – 24/07/2028 (4 weeks)	130
H20-A2	518	29/05/2028 – 24/07/2028 (8 weeks)	65
H21-A1	130	29/05/2028 – 26/06/2028 (4 weeks)	32
H22-A1	454	01/05/2028 – 26/06/2028 (8 weeks)	57
H23-A1	778	03/04/2028 – 29/05/2028	97

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
		(8 weeks)	
H24-A1	907	06/03/2028 – 01/05/2028 (8 weeks)	113
H24-A2	907	07/02/2028 – 03/04/2028 (8 weeks)	113
H25-A1	1102	29/11/2027 – 07/02/2028 (10 weeks)	110
H25-A2	1102	29/11/2027 – 06/11/2028 (49 weeks)	22
H26-A1	130	16/10/2028 – 06/11/2028 (3 weeks)	43
H27-A1	259	16/10/2028 – 06/11/2028 (3 weeks)	86
H28-A1	713	16/10/2028 – 04/12/2028 (7 weeks)	102
H28-A2	713	06/11/2028 – 15/01/2029 (10 weeks)	71
H29-A1	259	04/12/2028 – 15/01/2029 (6 weeks)	43
H29-A2	194	15/01/2029 – 12/02/2029 (4 weeks)	49
H30-A1	454	15/01/2029 – 12/02/2029 (4 weeks)	113
H30-A2	648	15/01/2029 – 12/03/2029 (8 weeks)	81
H31-A1	1231	12/02/2029 – 07/05/2029 (12 weeks)	103
H33-A1	583	09/04/2029 – 04/06/2029 (8 weeks)	73
H33-A2	713	07/05/2029 – 02/07/2029 (8 weeks)	89
H34-A1	454	04/06/2029 – 02/07/2029 (4 weeks)	113
H35-A1	1490	02/07/2029 – 24/09/2029 (12 weeks)	124
H36-A1	648	27/08/2029 – 24/09/2029	162

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
		(4 weeks)	
H38-A1	2333	08/11/2027 – 31/01/2028 (12 weeks)	194
H39-A1	389	08/11/2027 – 31/01/2028 (12 weeks)	32

A.4 Overhead Line Pylon Steel Components

A.4.1 Steel sections for the construction of Overhead Line pylons may be sourced from manufacturers either in the UK or overseas. In particular, two UK manufacturers have been identified by the Overhead Line Design Team:

- Hab Fab Ltd, based in East Lothian, Scotland, EH33 1RD
- Painter Brothers Ltd, based in Hereford, England, HR3 9SW.

A.4.2 These are understood to be suitable for water-borne transport, though not typically for transport by rail. Based on available design and programme information, the indicative delivery requirements for this material are as shown in Annex Table A.5.

Annex Table A.5 Requirements for steel delivery for Overhead Line construction

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H01-A1	330	05/04/2029 – 09/05/2029 (5 weeks)	66
H01-A2	390	19/02/2029 – 19/03/2029 (4 weeks)	98
H02-A1	120	19/02/2029 – 05/03/2029 (2 weeks)	60
H03-A1	420	15/01/2029 – 05/03/2029 (7 weeks)	60
H03-A2	450	04/12/2029 – 05/02/2029 (9 weeks)	50
H04-A1	390	20/11/2028 – 01/01/2029 (6 weeks)	65
H04-A2	390	06/11/2028 – 04/12/2028 (4 weeks)	98
H05-A1	120	16/10/2028 – 20/11/2028 (5 weeks)	24

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H05-A2	240	16/10/2028 – 06/11/2028 (3 weeks)	80
H06-A1	420	09/04/2029 – 14/05/2029 (5 weeks)	84
H06-A2	450	23/04/2029 – 14/05/2029 (3 weeks)	150
H07-A1	360	14/05/2029 – 11/06/2029 (4 weeks)	90
H07-A2	510	28/05/2029 – 16/07/2029 (7 weeks)	73
H08-A1	240	25/06/2029 – 16/07/2029 (3 weeks)	80
H09-A1	120	16/07/2029 – 06/08/2029 (3 weeks)	40
H10-A1	630	16/07/2029 – 03/09/2029 (7 weeks)	90
H10-A2	720	20/08/2029 – 08/11/2029 (7 weeks)	103
H11-A1	180	08/10/2029 – 22/10/2029 (2 weeks)	90
H11-A2	300	08/10/2029 – 05/11/2029 (4 weeks)	75
H12-A1	570	22/10/2029 – 03/12/2029 (6 weeks)	95
H17-A2	240	12/03/2029 – 19/03/2029 (5 weeks)	48
H18-A1	360	29/01/2029 – 05/03/2029 (5 weeks)	72
H19-A1	270	15/01/2029 – 12/03/2029 (4 weeks)	68
H19-A2	150	15/01/2029 – 29/01/2029 (2 weeks)	75
H20-A1	240	01/01/2029 – 29/01/2029 (4 weeks)	60
H20-A2	240	27/11/2028 – 15/01/2029 (7 weeks)	34
H21-A1	60	27/11/2028 – 01/01/2029 (5 weeks)	12
H22-A1	210	13/11/2028 – 01/01/2029	30

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
		(7 weeks)	
H23-A1	360	30/10/2028 – 27/11/2028 (4 weeks)	90
H24-A1	420	16/10/2028 – 13/11/2028 (4 weeks)	105
H24-A2	420	11/09/2028 – 30/10/2028 (7 weeks)	60
H25-A1	510	14/08/2028 – 25/09/2028 (6 weeks)	85
H25-A2	510	14/08/2028 – 28/08/2028 (2 weeks)	255
H26-A1	60	19/03/2029 – 09/04/2029 (3 weeks)	20
H27-A1	120	19/03/2029 – 09/04/2029 (3 weeks)	40
H28-A1	330	19/03/2029 – 23/04/2029 (5 weeks)	66
H28-A2	330	09/04/2029 – 07/05/2029 (4 weeks)	83
H29-A1	120	23/04/2029 – 21/05/2029 (4 weeks)	30
H29-A2	90	07/05/2029 – 21/05/2029 (2 weeks)	45
H30-A1	210	07/05/2029 – 11/06/2029 (5 weeks)	42
H30-A2	300	21/05/2029 – 25/06/2026 (5 weeks)	60
H31-A1	570	11/06/2029 – 23/07/2029 (6 weeks)	95
H33-A1	270	09/07/2029 – 23/07/2029 (2 weeks)	135
H33-A2	330	23/07/2029 – 27/08/2029 (5 weeks)	66
H34-A1	210	13/08/2029 – 27/08/2029 (2 weeks)	105
H35-A1	690	27/08/2029 – 15/10/2029 (7 weeks)	99
H36-A1	300	24/09/2029 – 15/10/2029 (3 weeks)	100

Works Section	Total Requirements (Tonnes)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Tonnes per Week)
H38-A1	1080	13/03/2028 – 10/04/2028 (4 weeks)	270
H39-A1	180	13/03/2028 – 10/04/2028 (4 weeks)	45

A.5 Overhead Line Conductor Drums

A.5.1 Overhead line conductor drums are not understood to be available from UK manufacturers and hence must be delivered by ship from overseas suppliers. Based on available design and programme information, the indicative delivery requirements for Overhead Line drums are as set out in Annex Table A.6.

Annex Table A.6 Requirements for Overhead Line drum delivery for overhead line construction

Works Section	Total Phase Conductor Requirements (Drums)	Total Earth Wire Requirements (Drums)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Drums per Week)
H01-A1	18	1	11/06/2029 – 06/08/2029 (8 weeks)	2
H01-A2	54	3	14/05/2029 – 09/07/2029 (8 weeks)	7
H02-A1	18	1	14/05/2029 – 11/06/2029 (4 weeks)	5
H03-A1	54	3	12/03/2029 – 11/06/2029 (13 weeks)	4
H03-A2	54	3	12/02/2029 – 16/04/2029 (9 weeks)	6
H04-A1	54	3	15/01/2029 – 12/03/2029 (8 weeks)	7
H04-A2	36	2	04/12/2028 – 12/02/2029 (10 weeks)	4
H05-A1	18	1	06/11/2028 – 15/01/2029 (10 weeks)	2
H05-A2	36	2	06/11/2029 – 03/09/2029 (43 weeks)	1
H06-A1	54	3	06/08/2029 – 03/09/2029 (4 weeks)	14

Works Section	Total Phase Conductor Requirements (Drums)	Total Earth Wire Requirements (Drums)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Drums per Week)
H06-A2	36	2	03/09/2029 – 29/10/2029 (8 weeks)	5
H07-A1	54	3	01/10/2029 – 26/11/2029 (8 weeks)	7
H07-A2	72	4	29/10/2029 – 07/01/2030 (10 weeks)	8
H08-A1	18	1	07/01/2030 – 04/02/2030 (4 weeks)	5
H09-A1	18	1	07/01/2030 – 04/02/2030 (4 weeks)	5
H10-A1	72	4	07/01/2030 – 01/04/2030 (12 weeks)	6
H10-A2	90	5	04/03/2030 – 17/06/2030 (15 weeks)	6
H11-A1	18	1	24/06/2030 – 15/07/2030 (3 weeks)	6
H11-A2	36	2	24/06/2030 – 12/08/2030 (7 weeks)	5
H12-A1	54	3	22/07/2030 – 16/09/2030 (8 weeks)	7
H17-A2	36	2	26/11/2029 – 07/01/2030 (6 weeks)	6
H18-A1	54	3	01/10/2029 – 07/01/2030 (14 weeks)	4
H19-A1	36	2	03/09/2029 – 29/10/2029 (8 weeks)	5
H19-A2	18	1	03/09/2029 – 01/10/2029 (4 weeks)	5
H20-A1	18	1	06/08/2029 – 03/09/2029 (4 weeks)	5
H20-A2	36	2	09/07/2029 – 03/09/2029 (8 weeks)	5
H21-A1	0	0	09/07/2029 – 06/08/2029 (4 weeks)	0
H22-A1	36	2	11/06/2029 – 06/08/2029	5

Works Section	Total Phase Conductor Requirements (Drums)	Total Earth Wire Requirements (Drums)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Drums per Week)
			(8 weeks)	
H23-A1	54	3	14/05/2029 – 09/07/2029 (8 weeks)	7
H24-A1	36	2	12/03/2029 – 11/062029 (13 weeks)	3
H24-A2	54	3	12/03/2029 – 09/04/2029 (4 weeks)	14
H25-A1	36	2	02/10/2028 – 09/04/2029 (27 weeks)	1
H25-A2	54	3	02/10/2028 – 30/10/2028 (4 weeks)	14
H26-A1	0	0	13/08/2029 – 10/09/2029 (4 weeks)	0
H27-A1	0	0	13/08/2029 – 10/09/2029 (4 weeks)	0
H28-A1	54	3	13/08/2029 – 08/10/2029 (8 weeks)	7
H28-A2	36	2	10/09/2029 – 14/01/2030 (18 weeks)	2
H29-A1	18	1	10/12/2029 – 14/01/2030 (5 weeks)	4
H29-A2	0	0	10/12/2029 – 11/02/2030 (9 weeks)	0
H30-A1	36	2	21/01/2029 – 11/02/2030 (3 weeks)	13
H30-A2	54	3	21/01/2030 – 11/03/2030 (7 weeks)	8
H31-A1	54	3	18/02/2030 – 13/05/2030 (12 weeks)	5
H33-A1	36	2	15/04/2030 – 13/05/2030 (4 weeks)	10
H33-A2	36	2	15/04/2030 – 10/06/2030 (8 weeks)	5
H34-A1	36	2	13/05/2030 – 08/07/2030 (8 weeks)	5

Works Section	Total Phase Conductor Requirements (Drums)	Total Earth Wire Requirements (Drums)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (Drums per Week)
H35-A1	72	4	10/06/2030 – 02/09/2030 (12 weeks)	6
H36-A1	54	4	09/09/2030 – 30/09/2030 (3 weeks)	19

A.5.2 The Overhead Line design draft materials are assumed to require a maximum of 2,500 m of line per drum, with a mass of 2.367 kg per metre. On this basis, the maximum Overhead Line drum mass is anticipated to be approximately 5.9 tonnes, which would not be an abnormal load for onwards transport by road. Assuming each drum is up to this maximum weight, a minimum of three such drums are anticipated to be transportable on a single maximum road-legal HGV. On this basis, approximately 640 HGV deliveries are anticipated to be required to transport the total of 1,920 drums required by road once they arrive in the UK.

A.6 Underground Cable Conductor Drums

A.6.1 For the delivery of Underground Cable conductor drums, it is understood that these items are not presently manufactured in the UK, and hence must be delivered by ship from overseas suppliers. These items are anticipated to be of significant size and weight, and with no practical option for further subdivision.

A.6.2 For movements of these items by road, the AIL Access Strategy (appended to the Outline CTMP (document reference 7.3) specifies a ‘Cable Delivery AIL’. Specific discussion of road transport arrangements and routeing of these loads is undertaken within that document and hence is outside the scope of this document.

A.6.3 It is understood that the intended delivery arrangement for these items is for deliveries to begin following the completion of the cabling site compounds, with up to 50% of the total drums required delivered before the commencement of installation. Under this concept, the remaining drums would be delivered concurrently with cable installation being undertaken. The intent of this arrangement would be to smooth the delivery profile of Underground Cable conductor drums, with a steady rate of low-volume deliveries being undertaken each week. On this basis, anticipated delivery requirements for these items are as shown in Annex Table A.7.

Annex Table A.7 Requirements for Underground Cable drum delivery

Works Section	Total Requirements (No.)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (No. per Week)
H12-A2	142	08/01/2029 – 12/08/2030 (83 weeks)	2
H14-A1	102	03/09/2029 – 25/02/2030 (25 weeks)	4

Works Section	Total Requirements (No.)	Draft Programme and Approximate Duration (Weeks)	Approximate Import Rate Required (No. per Week)
H15-A1	3	01/01/2029 – 15/01/2029 (2 weeks)	2
H16-A1	74	09/04/2029 – 17/09/2028 (23 weeks)	3
H17-A2	34	25/09/2028 – 30/10/2028 (5 weeks)	7
H19-A2	74	04/09/2028 – 30/04/2029 (34 weeks)	2
H25-A2	3	26/06/2028 – 31/07/2028 (5 weeks)	1
H38-A1	10	26/03/2029 – 30/04/2029 (5 weeks)	2

A.7 Large Electrical Equipment

A.7.1 For the delivery of large electrical equipment – including 400 kV transformers and shunt reactors – it is understood that these items are not presently manufactured in the UK, and must be delivered by ship from overseas suppliers. These items are anticipated to be of significant size and weight, and with no practicable option for further subdivision.

A.7.2 For movements of these items by road, the AIL Access Strategy (appended to the Outline CTMP (document reference 7.3)) specifies an 'AIL-AL50 Girder Delivery Vehicle' for transporting large electrical equipment by road. Specific discussion of road transport arrangements and routeing of these loads is undertaken within that document and hence is outside the scope of this document.

A.7.3 Anticipated delivery requirements for these items are as set out in Annex Table A.8.

Annex Table A.8 Requirements for large electrical equipment deliveries

Works Section	Total Requirement (No.)	Import Rate Required (No. per Week)
PAR H10-A2 (Bramford Substation)	2	As required
PAR H17-A2 (EACN Substation)	8	As required
PAR H36-A1 (Tilbury North Substation)	11	As required

Annex B
Assessment of Rail Transport

B.1 Delivery Locations Connected to the Rail Network

Existing Sidings

B.1.1 A number of existing sidings are located in the vicinity of the Project alignment. An initial screening of these sites is shown in Annex Table B.1. This considered the feasibility and operational suitability of making use of each site. This screening did consider the proximity of the sites to other feasible rail siding locations.

B.1.2 Facilities which are considered to represent a feasible and operationally suitable option have been suggested for further consideration of cost-effectiveness with respect to overall delivery of the Project. Facilities which are not considered to represent a feasible or operationally suitable option have not been considered further.

Annex Table B.1 Existing rail-connected sidings

Siding Location	Rail Line	Existing Facility	Site Information	Sifting Outcome
Trowse Newton, Norfolk	Great Eastern Main Line	Commercial aggregates plant (Tarmac CRH Company)	Site space and facilities at Trowse Newton are considered capable of handling the materials needed based on the location having received trains similar to the ones required. The site is currently used as an aggregates handling facility, and it is an existing point of delivery for aggregates in the north of the East Anglia area.	Suggested for further consideration
Snetterton, Norfolk	Breckland Line	Industrial surroundings	Limited site space for storage of materials and vehicle movements. There are no known existing material handling facilities.	May be feasible but more suitable alternatives identified
Diss, Norfolk	Great Eastern Main Line	Station sidings with no additional facility evident	Site space at Diss is limited and no known aggregate handling facilities present. The siding's rail head does not meet the length requirements to deliver the volume of materials within the proposed time frame. Due to its size there is no room for stockpiling materials.	Suggested to be discounted
Stowmarket, Suffolk	Great Eastern Main Line	Network Rail sidings with small laydown area	Limited site space for storage of materials and vehicle movements. There are no known existing material handling facilities.	May be feasible but more suitable alternatives identified
Kennett, Suffolk	Ely-Ipswich Line	Commercial asphalt depot	Kennett Sidings connects to Tarmac Higham Asphalt Plant, which has suitable site space, storage and handling facilities. The location has good rail connectivity to the Peak District and its quarries, as well as road connectivity to the A14. Tarmac have advised, given the Project requirements, that this would be a suitable option.	Suggested for further consideration
Brandon, Suffolk	Breckland Line	Commercial aggregates plant (Rory J Holbrook Company)	The site has existing rail connections to quarries in the Peak District and it appears to have adequate space for storage. However, it is not as well connected to the road network as Kennett Sidings, which is located some 15 miles to the south. It has been identified that there are existing concerns	May be feasible but more suitable alternatives identified

Siding Location	Rail Line	Existing Facility	Site Information	Sifting Outcome
			regarding HGVs from the site travelling through Brandon High Street.	
Barham, Suffolk	Great Eastern Main Line	Commercial aggregates plant (Tarmac)	Barham is currently used by aggregate companies and appears to have adequate space for storage. With existing handling facilities, the siding is a feasible option and the rail/road connectivity increases the suitability of the location.	Suggested for further consideration
Colchester, Essex	Great Eastern Main Line	Railway maintenance depot	Colchester Sidings is primarily used for train loops and storage. The portion of the sidings for freight delivery appears to have insufficient space and lacks the existing material handling infrastructure to deal with the Project's material volumes.	May be feasible but more suitable alternatives identified
Marks Tey, Essex	Great Eastern Main Line	Commercial aggregates depot	Marks Tey Sidings is currently operated by Tarmac (CRH Company) for delivery by freight with handling facilities in place capable of dealing with the anticipated material volumes. Marks Tey is limited for stockpile storage which may be a potential bottleneck.	Suggested for further consideration
Wakes Colne, Essex	Sudbury Branch Line	Heritage use (East Anglian Railway Museum)	Limited site space for storage of materials and vehicle movements. The sidings are also used by the Railway Museum and would cause potential conflict within the sidings.	Suggested to be discounted
Chelmsford, Essex	Great Eastern Main Line	Existing rail freight / aggregates depot	Due to the location of the sidings on the rail network, the sidings would need to be accessed by routes via London which could cause issues due to the existing capacity. The site space is sufficient for some storage and vehicle movements, but is not understood to be equipped at present for the handling of aggregates.	May be feasible but more suitable alternatives identified
Pitsea, Essex	London, Tilbury, and Southend Line	Railway maintenance depot (Network Rail)	Pitsea sidings occupy a long strip piece of land to the south of the railhead. The sidings have some space along its south border that could be used as storage, but a minimal amount before manoeuvrability is impeded. Initial investigation	May be feasible but more suitable alternatives identified

Siding Location	Rail Line	Existing Facility	Site Information	Sifting Outcome
			indicates the site is utilised for operations unrelated to bulk material delivery.	
Barking, London	Tilbury Loop Line	Existing rail freight / aggregates depot	Barking Sidings is an existing freight depot between the rails to the east of Dagenham Dock. The space initially appears to contain a large storage facility for aggregates which indicates there is operational capacity and space for aggregate handling. A lack of existing identified handling equipment deceases the suitability of this site.	May be feasible but more suitable alternatives identified
Tilbury, Essex	Tilbury Loop Line	Existing port sidings	Tilbury Sidings are located to the east of Tilbury Town, near the Port of Tilbury. The site is spacious with existing storage and handling facilities for aggregates, as well as interconnectivity between the rail and dock infrastructure. The site also has existing train paths.	Suggested for further consideration

Former/Unused Sidings

B.1.3 Within the East Anglia area there are disused rail sidings that were considered as potential delivery locations. With the locations being unused, there are financial and operational implications to making the sites operational and equipped to handle, store and deliver bulk aggregates. The main focus of this review will be on locations with existing facilities.

B.1.4 Annex Table B.2 lists siding locations that are currently unused and/or have no current operations with potential to be upgraded.

Annex Table B.2 Former/unused sidings

Siding	Location	Site Information	Sifting Outcome
Kimberly Park Sidings	Kimberly	Kimberly Park Sidings are to the west of Kimberly Park Station and consist of three sidings. There is a significant section of land that can be expanded to provide facilities and storage for the site. The site has no existing handling infrastructure and would be costly to generate a temporary site from.	Suggested to be discounted
Wymondham Sidings	Wymondham	Wymondham Sidings are located to the west of Wymondham Station and sit below the Wymondham Quarry. There are spacious amounts of land in the quarry that could be used for storage and delivery due to its close proximity to the railhead; however, there is not presently a direct road access so enabling works would be required.	Suggested for further consideration
Bury St. Edmunds Sidings	Bury St. Edmunds	Bury St. Edmunds has a loop line to the west of the station which runs parallel to a piece of land with a rail head into the site itself that is being used as storage. It is unclear who owns the land, but the site appears to be used as storage for waste and materials. The site may be made suitable for material storage and have room for handling facilities; however, the rail access into the site appears to be disused.	Suggested to be discounted
Saxmundham Sidings	Saxmundham	To the east of Saxmundham Station there are sidings to the south of the main lines. The sidings have no storage space and is bounded by existing trees and vegetation. The site may be made suitable storage and handling; however, the scale of works required are not considered to be appropriate given availability of existing aggregate sidings.	Suggested to be discounted

B.2 Source Locations Connected to the Rail Network

B.2.1 Some source locations/companies have been identified and contacted in regard to the delivery of bulk aggregates. Annex Table B.3 details their locations, ownership and production of aggregate suppliers.

Annex Table B.3 Material source locations

Quarry	Location	Supplier	Materials
Glensanda	Oban, Scotland	Holcim (trading as Aggregate Industries prior to March 2025)	Type 1 and 6F2
Doves Holes	Buxton, Peak District	Cemex UK	Type 1 and 6F2
Brett Quarry	Norway	Brett Aggregates	Type 1
Buxton Quarries	Buxton, Peak District	Tarmac CRH	Type 1 and 6F2
Mountsorrel Quarry	Mountsorrel, Leicestershire	Tarmac CRH	Type 1 and 6F2

Glensanda

B.2.2 Glensanda Quarry is owned by Holcim (trading as Aggregate Industries prior to March 2025) and is located in Oban, Scotland. The quarry supplies material exclusively via water-borne transport due to its location and has been contacted to discuss its operations to the East Anglia area. Holcim delivers to numerous ports along the east coast, including Ipswich and Tilbury, which are connected to the rail network.

Dove Holes

B.2.3 Dove Holes quarry is operated by CEMEX UK and is located in Dove Holes in the Peak District. The quarry has rail handling facilities and is able to produce around 7 million tonnes per year. The quarry is connected to East Anglia by rail.

Brett Quarries (Norway)

B.2.4 Brett Aggregates is an aggregate handling, supplier and delivery company and has been contacted regarding their operations in the East Anglia region. Brett Aggregates have historically imported through Ipswich, being able to source from Norwegian quarries and import to Ipswich Port. It can handle and store aggregates there as well as receive and export via rail.

Buxton Quarries

B.2.5 Buxton Quarries are a group operated by Tarmac (CRH Company) and areis located to the north of Buxton in the Peak District. The group consists of a few quarries in the Buxton area, which collectively produce The quarries collectivelyy produceds 6 million tonnes of aggregate per year with a substantial reserve if needed. The quarries are capable of meeting the forecast demand for the Project and delivering to its rail connected locations such as Trowse Newton, Marks Tey, Barham and Tilbury.

Mountsorrel Quarry

B.2.6 Mountsorrel Quarry is operated by Tarmac (CRH Company) and is located to the north of Mountsorrel in Leicestershire. The quarry produces 4 million tonnes of aggregate per year with a substantial reserve. The quarry is capable of meeting the forecast demand for the Project and is connected by rail to Trowse Newton, Marks Tey, Barham and Tilbury (rail and water). There are existing train paths owned by Tarmac and others available to and from Mountsorrel Quarry.

Annex C
Rail Network Capacity Assessment

C.1.1 In this section an overview of the rail network in East Anglia is presented, focusing on the delivery locations chosen for further consideration.

C.1.2 Freight trains’ access to East Anglia is only via Ely or the London area. Ely is a busy junction where five railway lines converge. It currently operates at full capacity. The main freight route in the London area is via the North London Line with a connection to the Great Eastern Main Line at Stratford, which is a heavily utilised commuter and freight route.

C.1.3 Annex Image C.1 shows a route diagram of the rail network in East Anglia, with Ely and Stratford circled in red. The delivery sidings discussed in this section are also identified.

Annex Image C.1 East Anglia rail routes diagram

Notes to image: 1 Trowse Newton - 2 Kennett - 3 Barham - 4 Marks Tey - 5 Port of Tilbury

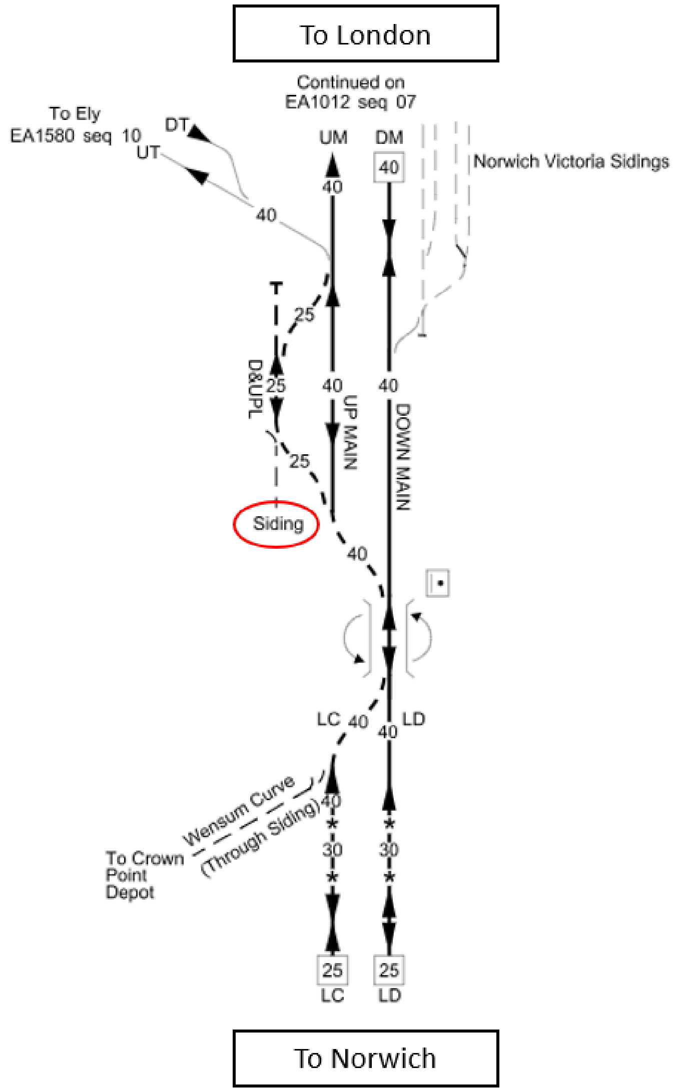
C.1.4 A strategic business plan for the Anglia Route for Control Period 7 (CP7: April 2024 – March 2029): Anglia CP7 Strategic Business Plan was published in March 2024 by Network Rail. The plan includes the provision of additional freight capacity for the construction of Sizewell C. Key to this is the upgrade of Ely Junction to unlock a bottleneck for freight traffic to and from Felixstowe, Sizewell C and Harwich. Having developed a business case for Ely Junction in CP6, Network Rail states that it stands ready to take the scheme forward in CP7.

C.1.5 The network capacity overview presented in this section is based on existing capacity taken from a timetable published at the time the assessment was undertaken (December 2023 Working Timetable) as a baseline. The review focuses on the routes to the rail sidings chosen for further consideration.

Trowse Newton

C.1.6 Annex Image C.2 shows a diagram of the rail network connected to the sidings at Trowse Newton. There is no direct access to the sidings from the Great Eastern Main Line from the south via the Down Main (DM). Trains from outside East Anglia access the site via the Breckland Railway Line, which connects Ely to Norwich.

Annex Image C.2 Trowse Newton Sidings



C.1.7 Annex Table C.1 shows existing paths in the timetable used for assessment. ‘Tunstead Sdgs’ is a rail connection to the quarries in the Peak District. Note that these are paths that run only when required (known as ‘Q’ and ‘Y’ paths). This means that the freight operators have secured access rights, but the paths are only activated when needed.

C.1.8 Due to congestion at Ely, it was not possible to find additional paths in the timetable to the sidings at Trowse Newton.

Annex Table C.1 Existing weekday paths in timetable to Trowse Newton Sidings

Origin	Arrival Time	Trailing Load	Days of Operation	Operator	Headcode
Tunstead Sdgs	06:42	2,000 t	MWTHO	Freightliner Heavy Haul	6L01HA
Tilbury2 Container Tml FL	09:08	1,800 t	MSX	Freightliner Heavy Haul	6P06HA
Mountsorrel Sdgs	11:53	1,800 t	SX	DB Cargo	6L39HB
Mountsorrel Sdgs	13:05	2,000 t	SX	DB Cargo	6L47HC

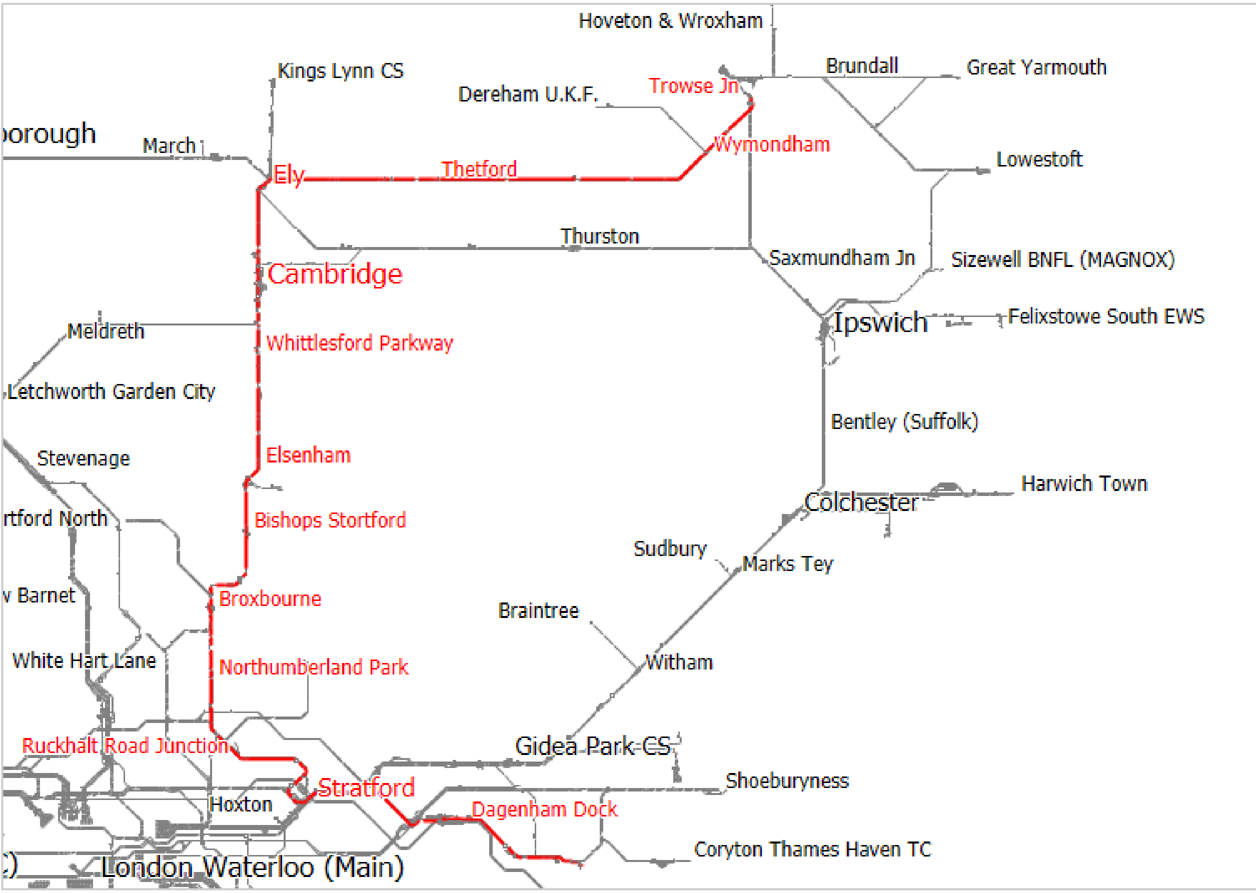
Note to table: SX: every weekday – MSX: every weekday except Monday – MWTHO: Monday, Wednesday, and Thursday Only

C.1.9 The path from the Port of Tilbury is via the West Anglia Main Line and Ely, as there is no direct route from the Great Eastern Main Line (see Annex Image C.3 for an example route highlighted in red).

C.1.10 Although the existing number of paths may suggest that more than one train per day can deliver to the site, this is unlikely to be feasible. Tarmac, which operates the aggregate facilities at Trowse Newton, informed that it can take anything from four to seven hours to unload a train at this specific site, and that it is only able to take one train at a time. Tarmac stated that one train per day may be feasible, highlighting it has had five or six trains a week delivering to the site in the past.

C.1.11 There may also be an opportunity to deliver material to Trowse Newton from the Port of Lowestoft, accessing the site via the Wensum Curve (see Annex Image C.3). New timetable paths would be required. National Grid did not seek to find these paths in the timetable.

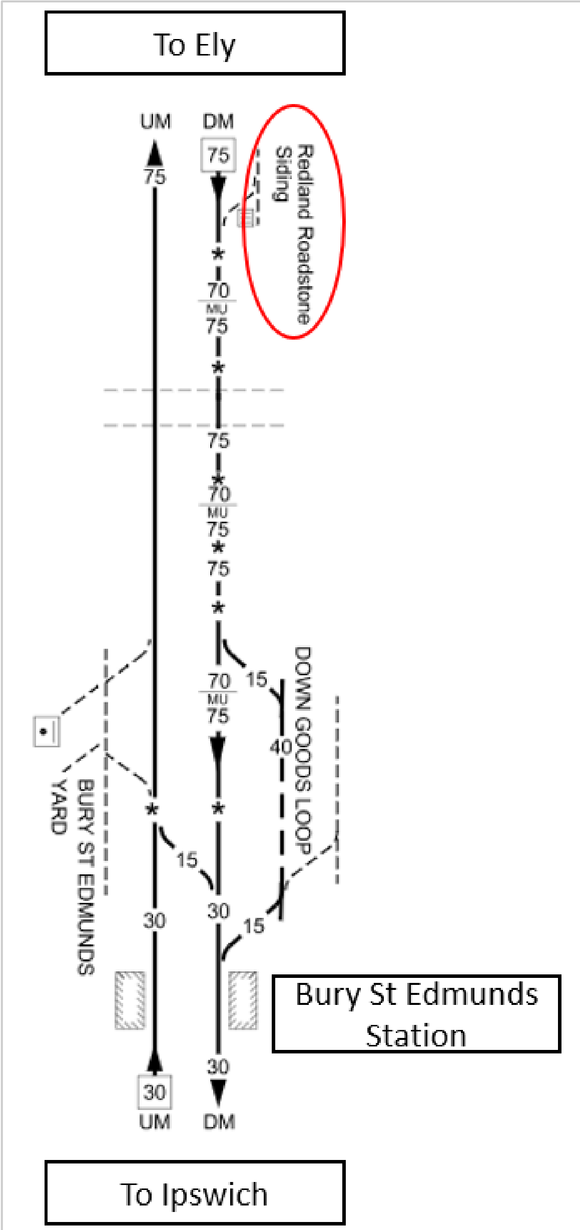
Annex Image C.3 Route from Tilbury to Trowse Newton



C.2 Kennett

C.2.1 Kennett Sidings is located on the Ely-Ipswich Line. Annex Image C.4 shows a diagram of the rail network connection to the sidings. Access to the sidings is from Ely only, with trains reversing on the Down Main (DM). Trains reverse on the Down Goods Loop when exiting the sidings routed back towards Ely.

Annex Image C.4 Kennett Sidings



C.2.2 Annex Table C.2 shows existing paths in the timetable used for assessment.

Annex Table C.2 Existing weekday paths in timetable to Kennett Sidings

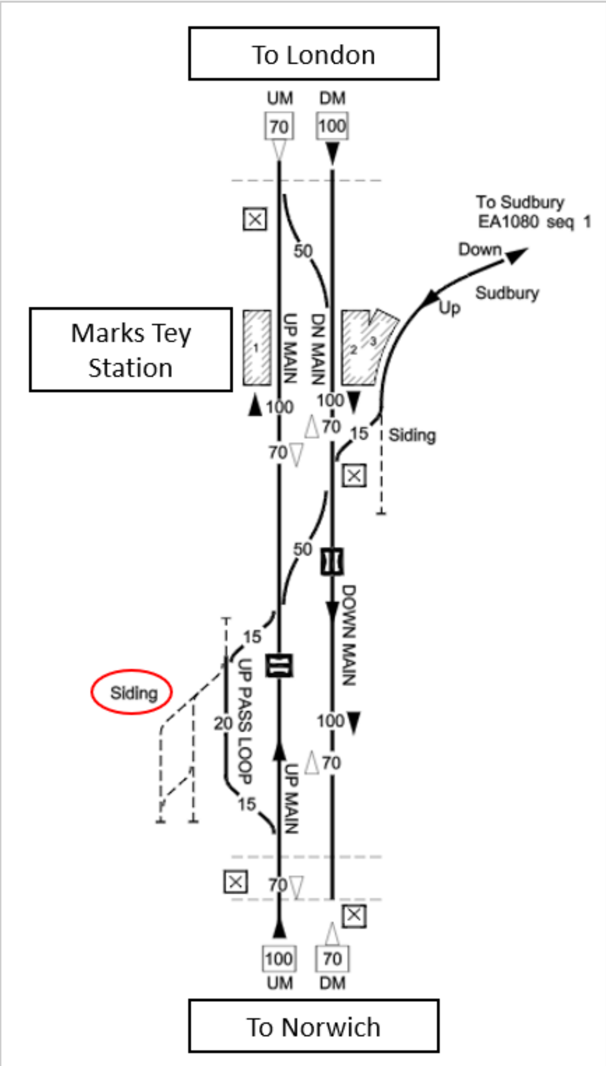
Origin	Arrival Time	Trailing Load	Days of Operation	Operator	Headcode
Tunstead Sdgs	06:59	2,400 t	MSX	Freightliner Heavy Haul	6L82HA

Note to table: MSX: every weekday except Monday

C.3 Marks Tey

C.3.1 Marks Tey Sidings is located on the Great Eastern Main Line with direct access into the sidings from trains travelling in the Down direction (i.e. from London towards Norwich). Annex Image C.5 shows a diagram of the rail network connection to the sidings at Marks Tey.

Annex Image C.5 Marks Tey Sidings



C.3.2 Annex Table C.3 shows paths to the sidings in the timetable used for assessment. These are paths that run only when required (known as 'Q' and 'Y' paths). 'Tunstead Sdgs' is a rail connection to the quarries in the Peak District.

Annex Table C.3 Existing paths in timetable to Marks Tey Sidings

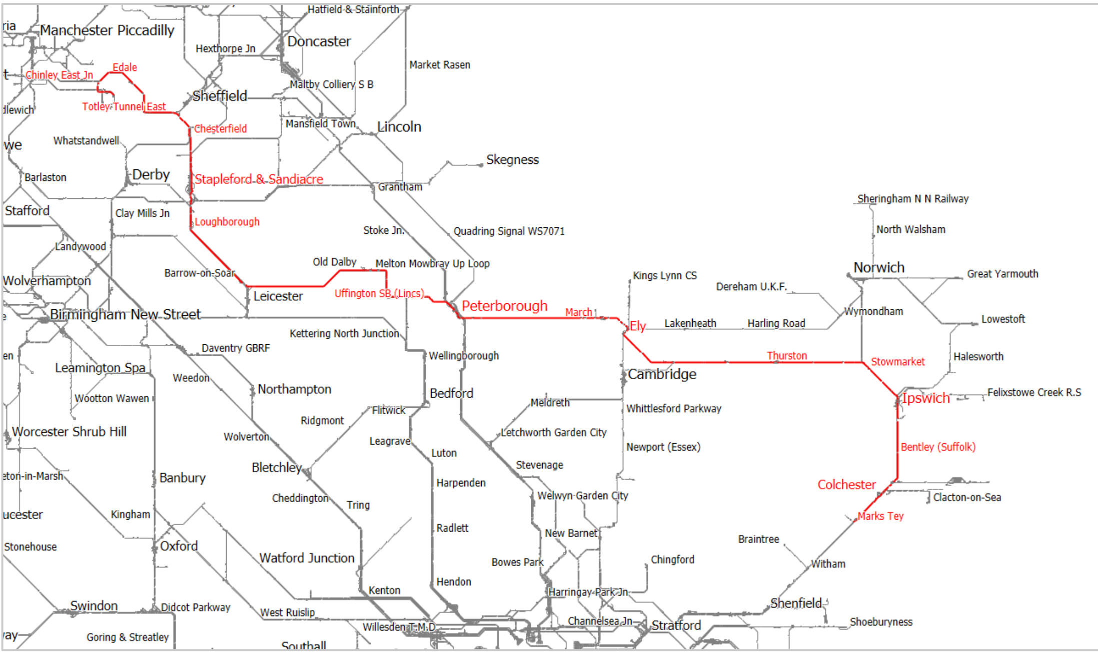
Origin	Arrival Time	Trailing Load	Days of Operation	Operator	Headcode
Tunstead Sdgs	08:35	2,400 t	MSX	Freightliner Heavy Haul	6L80HA

Note to table: MSX: every weekday except Monday

C.3.3 The route is via Ely (highlighted in red in Annex Image C.6), which requires the train to reverse in Platform 1 at Marks Tey Station in order to access the sidings. The scheduled reversal time is only 4.5 minutes, which indicates that the train has locomotives at both ends, for ease of changing directions (known as 'top and tail'). Although pathed with a 2,400 tonne trailing load, this may not be achievable as the length of a freight train reversing at the station is restricted by the signalling configuration.

C.3.4 Tarmac has informed that there are restrictions within the site for rail movement and stopping space. It suggested that the site may be able to receive three trains a week.

Annex Image C.6 Route from Peak District quarries to Marks Tey Sidings

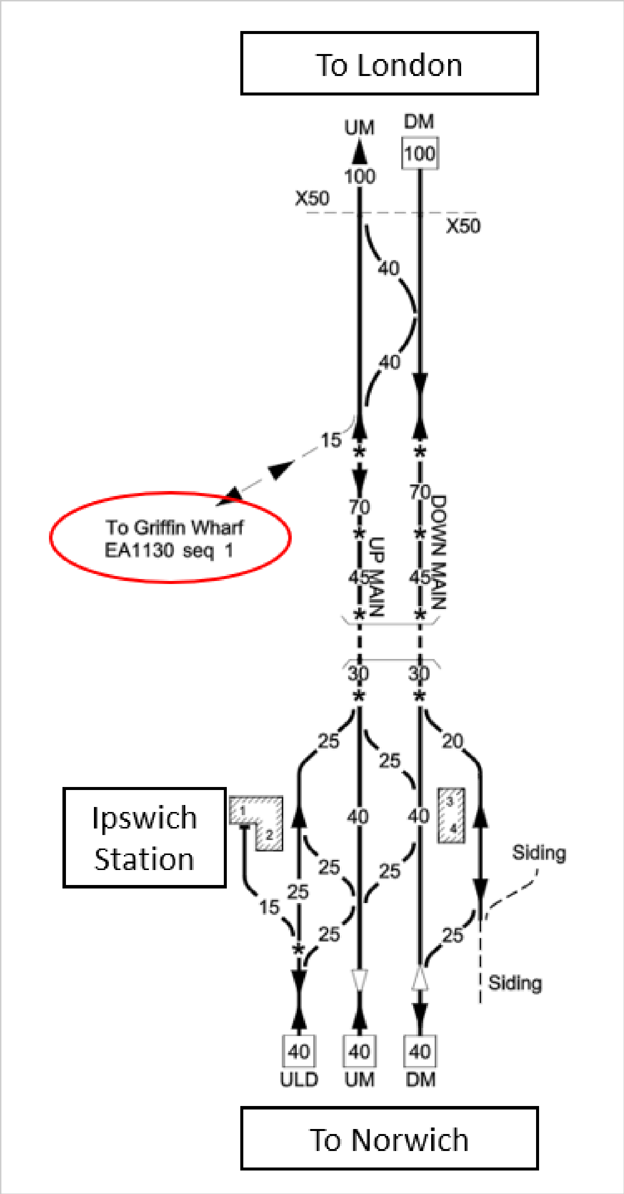


Delivery to Marks Tey Sidings from Port of Ipswich

C.3.5 In this review an option to deliver to Marks Tey Sidings from the Port of Ipswich has been considered.

C.3.6 Brett Aggregates has handling facilities at the port that are connected to the rail network. Annex Image C.7 shows the connection from the port (Griffin Wharf) to the Great Eastern Main Line. The existing crossovers provide direct access to/from Marks Tey Station.

Annex Image C.7 Rail connection to the Port of Ipswich



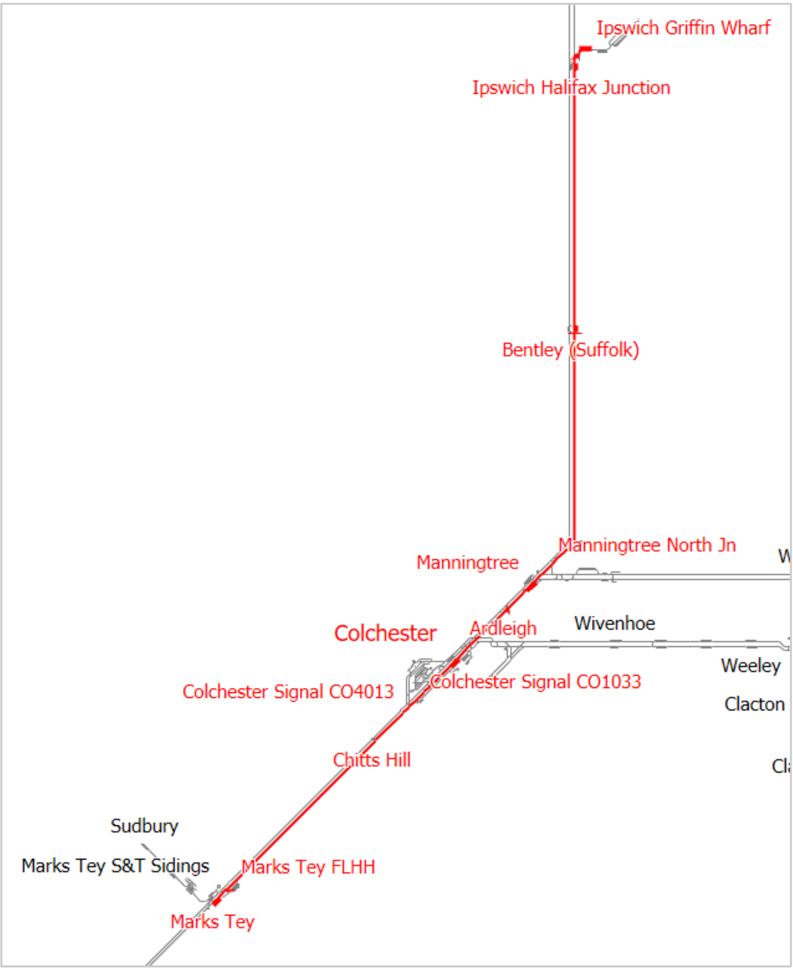
C.3.7 New paths were identified between the port and Marks Tay Station (route highlighted in red in Annex Image C.8). However, access and egress to/from the sidings require trains to reverse at Marks Tey Station.

C.3.8 Signalling restrictions at Marks Tey Station limit the maximum length of the trains reversing at the station, and trains would require locomotives at both ends, for ease of changing directions (known as ‘top and tail’). All considered, the maximum number of wagons in the train is likely to be 14, carrying just over 1,000 tonnes of aggregate per train. This aligns with information provided by Tarmac, who indicated that the maximum quantity of material delivered per train to the site is 1,100 tonnes.

C.3.9 Given the relatively short distance between the two sites, it may be an option for a single train to make two daily trips between the sites. For this to work, a train diagramming plan would need to be developed taking into consideration loading and unloading times. Brett Aggregate suggested allowing 4.5 hours between arrivals and departures at its site. Furthermore, the facilities at Marks Tey would likely need to be enhanced to support this option.

C.3.10 Current storage capacity at Marks Tey is also restricted, meaning that material would likely be required to be moved from the site more frequently than from the other sites considered.

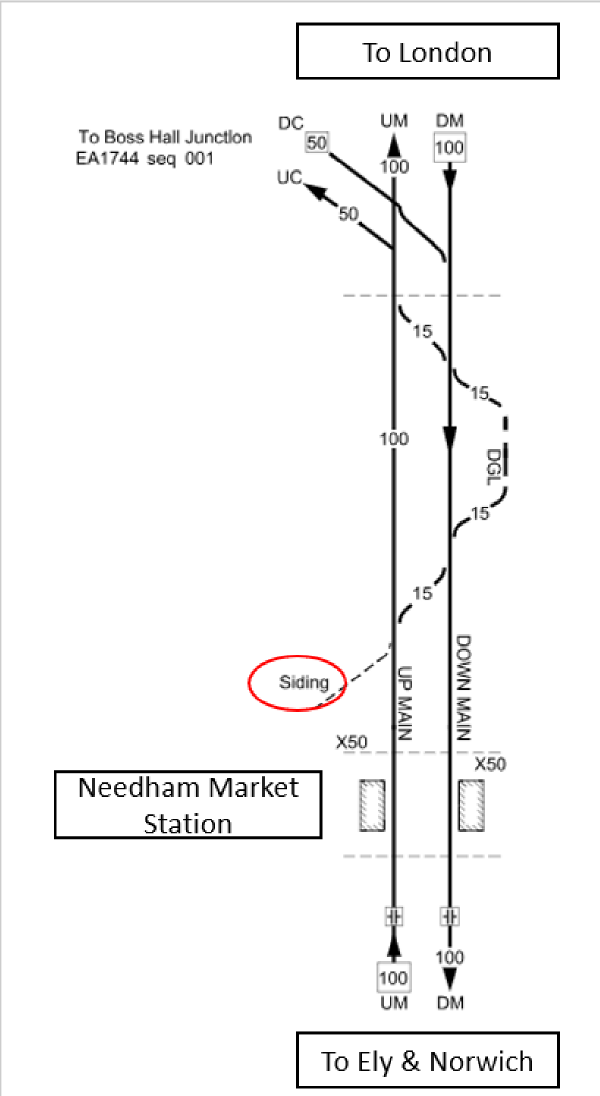
Annex Image C.8 Example route from Port of Ipswich to Marks Tey Sidings



C.4 Barham

C.4.1 The sidings at Barham are connected to the Great Eastern Main Line between Ipswich and Needham Market stations, as shown in Annex Image C.9.

Annex Image C.9 Image Sidings



C.4.2 Annex Table C.4 shows paths to the sidings in the timetable used for assessment. The routeing of all paths shown in the table is via Ely, which requires trains to reverse on Up Main to access the sidings. Exiting the site in the opposite direction, trains reverse on the Down Goods Loop ('DGL' in Annex Image C.9).

Annex Table C.4 Existing paths in timetable to Barham Sidings

Origin	Arrival Time	Trailing Load	Days of Operation	Operator	Headcode
Mountsorrel Sdgs	08:25	1,800 t	MSX	DB Cargo	6L57HA
Mountsorrel Sdgs	10:32	1,800 t	SX	DB Cargo	6L41HB
Mountsorrel Sdgs	14:37	1,800 t	SX	DB Cargo	6L42HD

Note to table: SX: every weekday – MSX: every weekday except Monday

C.4.3 The aggregate handling facilities at Barham are operated by Tarmac. The operator has indicated that the site has capacity to stock up to 24,000 tonnes of a single type of aggregate and that it can receive two trains per day carrying 1,500 tonnes per train.

C.4.4 Signalling constraints for the reversing movements limit the maximum length of trains, and consequently their trailing loads to those included in the existing paths, which is 1,800 tonnes. This includes the weight of the wagon, which when subtracted gives a total of approximately 1,300 tonnes of aggregates per train.

C.4.5 Furthermore, if similar unloading times to those applied at Trowse Newton (from four to seven hours) are assumed and if this site is also only able to take one train at a time, the maximum number of trains delivering to the site may be limited to one per day, especially if using existing train paths.

C.5 Tilbury

C.5.1 Trains from the Port of Tilbury can only access East Anglia via Cambridge and Ely as there is no direct connection to the southern end of the Great Eastern Main Line.

C.5.2 Given the proximity of the port to the southern end of the Project, it would not be necessary for material to be transported by rail for delivery to works in the vicinity.

C.5.3 It may be that aggregates delivered to the port by sea can then transported by rail to serve the other sections of the Project. Although, given the congested nature of the rail routes involved, it is unlikely that new paths exist in the timetable to support this. Therefore, a more likely scenario is the use of existing paths such as the one connecting the port to the sidings at Trowse Newton.

C.6 Brandon

C.6.1 Brandon Sidings is located on the Ely-Norwich Line. Annex Image C.10 shows a diagram of the rail network connection to the sidings. Direct access to the sidings is from Ely only, with trains reversing on the Down Goods Loop (DGL).

Annex Image C.10   Brandon Sidings

C.6.2 The aggregate handling facilities at Brandon are operated by Rory J Holbrook Ltd. The operator has indicated that the site has capacity to stock up to 120,000 tonnes of bulk aggregate. The operator has also informed that it has additional storage capacity in other sites in Norfolk/Suffolk, as follows:

- Roudham Yard: 50,000 tonnes
- Lakenheath Recycling: 500,000 tonnes
- Wangford Road Storage: 250,000 tonnes.

C.6.3 Note that the above sites are not connected to the rail network.

C.6.4 The site has existing rail links with quarries in the Peak District (Tunstead Sidings). Annex Table C.5 shows existing timetable paths to Brandon Sidings.

Annex Table C.5   Existing paths in timetable to Brandon Sidings

Origin	Arrival Time	Trailing Load	Days of Operation	Operator	Headcode
Tunstead Sdgs	06:03	2,400 t	MWTHO	Freightliner Heavy Haul	6L02HA*
Tunstead Sdgs	07:09	2,400 t	MSX	Freightliner Heavy Haul	6P06HA

**Path shared with 6L01HA (to Trowse Newton Sidings) and 6L34HF (to Bow East Sidings)*

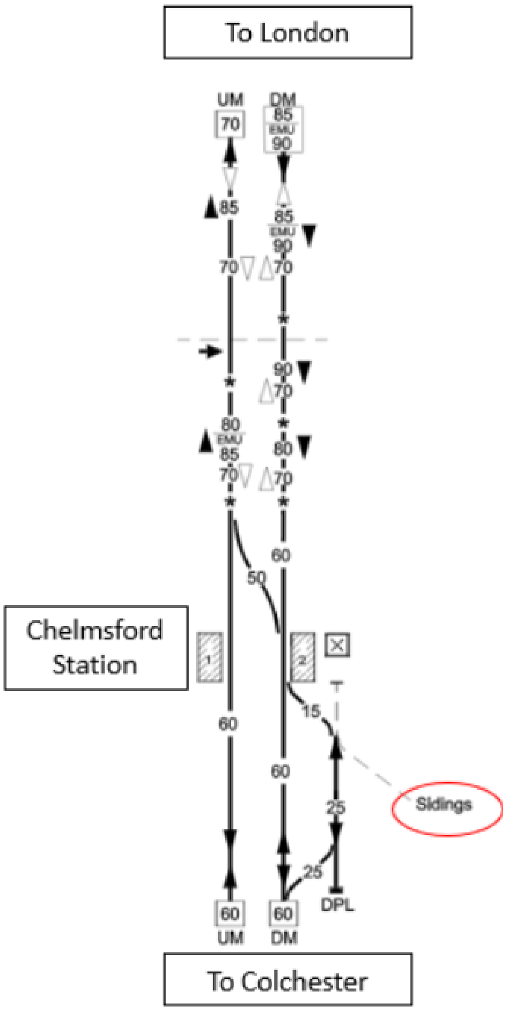
Note to table: MWTHO: Monday, Wednesday, and Thursday Only – MSX: every weekday except Monday

C.6.5 Rory J Holbrook Ltd stated that a maximum of two trains per day each carrying 1,800 tonnes of material can deliver to the site, and that unloading time is between three hours and four hours from start to finish. Note that the existing timetable arrival times at the sidings are likely to preclude two trains per day delivering to the site on consecutive days.

C.7 C.7 Chelmsford

C.7.1 Chelmsford Sidings is located on the Great Eastern Main Line. Annex Image C.11 shows a diagram of the rail network connection to the sidings. Direct access to the sidings is from London.

Annex Image C.11 Chelmsford Sidings



C.7.2 The aggregate handling facilities at Chelmsford are operated by Aggregates Industries. The operator has indicated that the site has capacity to stock up to 10,000 tonnes of bulk aggregate.

C.7.3 The site has existing rail links with Whatley Quarry in Sommerset. Annex Table C.6 shows existing timetable paths to Chelmsford Sidings.

Annex Table C.6 Existing paths in timetable to Chelmsford Sidings

Origin	Arrival Time	Trailing Load	Days of Operation	Operator	Headcode
Whatley F Liner Hh	Between 05:25 and 06:24	1,600 t (weekdays) 2,000 t (Sundays)	MSX	Freightliner Heavy Haul	6L14HA*

**Starts at Hanwell Bridge Loop formed of the longer 6A20 train from Whatley F Liner*
Note to table: MSX: every weekday except Monday

C.7.4 From initial discussion with the siding operator – Holcim (trading as Aggregate Industries prior to March 2025) – an existing usage of approximately three or four deliveries per week at this site has been indicated. The siding operator further indicated that the number of deliveries could be increased to approximately one train per day, which would be supported by the available train paths shown in Annex Table C.6.

C.7.5 The siding operator also noted that deliveries to the site by rail are capped at a maximum of 1,400 tonnes of material per delivery due to the limited rail turnback facilities at the site. This would limit weekend deliveries to 1,400 tonnes of material each, although as the available weekday train paths are limited to trailing loads of 1,600 tonnes each – which would equate to a capacity of approximately 1,200 tonnes of material per delivery – it is the railway network rather than siding facilities which would constrain throughput during the week.

C.7.6 On this basis, a weekly throughput of six deliveries each of 1,200 tonnes of materials is considered to be credible. This would omit the additional 200 tonnes per day which could plausibly be delivered during weekends in order to provide a conservative estimate for potential long-term usage.

C.8 Delivery Locations Summary

C.8.1 Annex Table C.7 summarises the key findings for each location. For details of which timetable is used for assessment, refer to paragraph C.1.5.

Annex Table C.7 Delivery locations summary

Location	Notes
Trowse Newton	Plant operated by Tarmac May be able to receive one train a day carrying 1,500 t Existing paths in the timetable from Mountsorrel, Peak District, and Tilbury Port There may be an option to create new paths from the Port of Lowestoft to the site Storage capacity: 65,000 t
Kennett	Higham plant operated by Tarmac One ‘MSX’ (every weekday except Monday) existing path in the timetable from Peak District Existing train path suggests that train can carry 1,800 t of material Storage capacity: TBC

Location	Notes
Barham	Plant operated by Tarmac Up to three existing daily paths in timetable from Mountsorrel Tarmac suggested two trains a day delivering to the site may be achievable, although one train carrying approximately 1,300 t may be a more realistic number Storage capacity: 24,000 t
Marks Tey	Plant operated by Tarmac One 'MSX' (every weekday except Monday) existing path in the timetable from Peak District Maximum quantity of material per train between 1,000 t and 1,100 t Option to receive material from Port of Tilbury, potentially two trains a day Storage capacity: 15,000 t
Port of Tilbury	No direct rail connection to southern end of the Great Eastern Main Line Preferable to move material by road to supply to access works in the vicinity Utilising existing paths to site at Trowse Newton may be an option Storage Capacity: 80,000 t
Brandon	Plant operated by Rory J Holbrook Ltd One 'MSX' (every weekday except Monday) existing path in the timetable Existing train path suggests that train can carry 1,800 t of material Storage capacity: 120,000 t
Chelmsford	Plant operated by Holcim (trading as Aggregate Industries prior to March 2025) One 'MSX' (every weekday except Monday) existing path in the timetable Existing train path suggests that train can carry 1,200 t of material Storage capacity: 10,000 t

Annex D
Assessment of Water-Borne Transport

D.1 Assessment Considerations

Materials

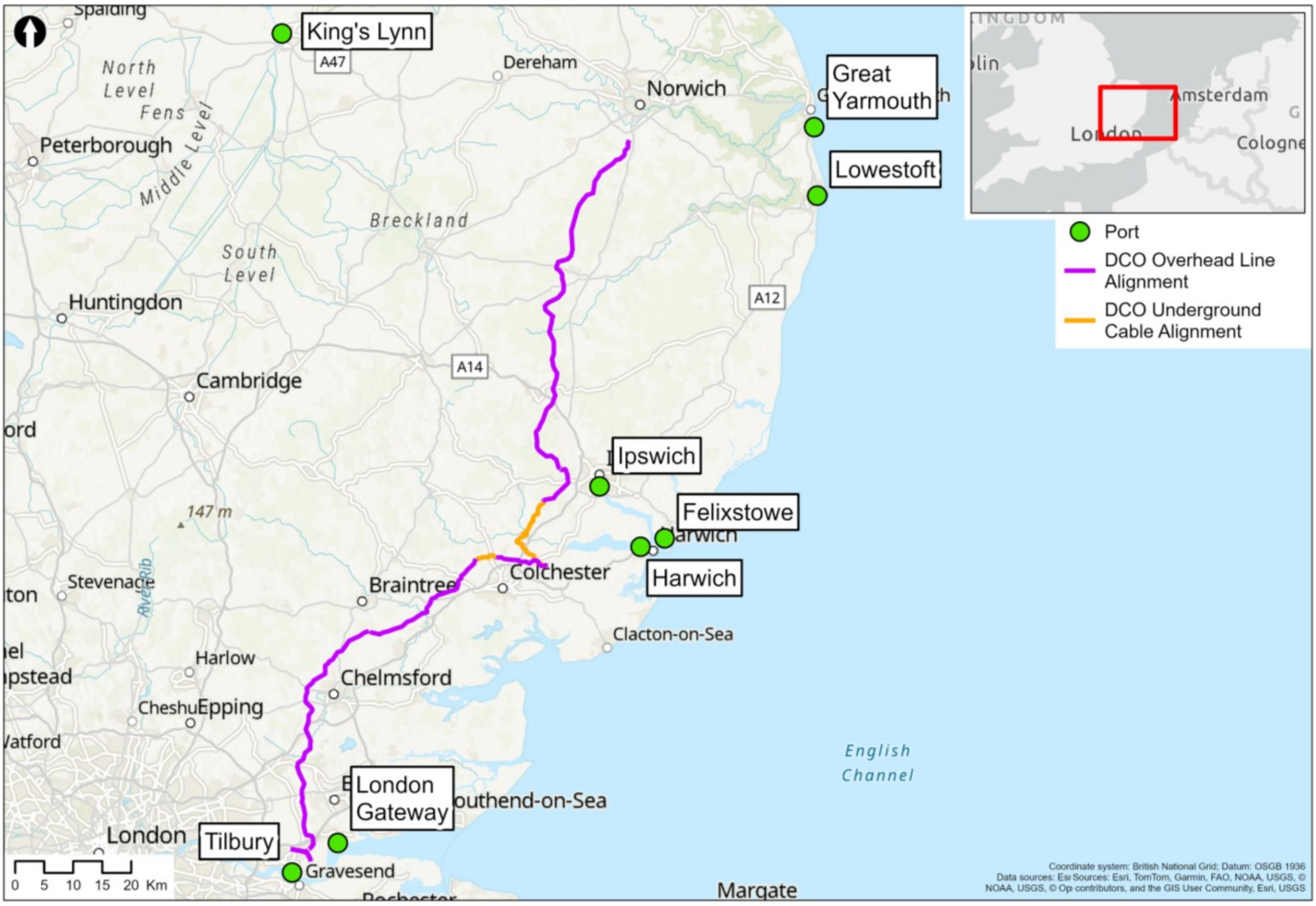
D.1.1 Materials delivered by water-borne transport include:

- Granular aggregates
- Overhead Line pylon steels
- Overhead Line conductor drums
- Underground Cable conductor drums
- Transformers

D.1.2 The sources and volumes required to be transported are presented in Annex A.

Port and River Route Capacity

Annex Image D.1 Identified ports in the vicinity of the Project alignment



D.1.3 The routes were determined by considering the infrastructure required for suitable material handling and the proximity of ports to the delivery site. All other ports not located within reasonable proximity to the site of delivery have been discounted at this stage.

Storage Assessment

D.1.4 An initial storage assessment has been carried out to identify potential storage capacities to store shipped materials at the ports before being transported to the allocated construction site. Initial assessment of port storage was based on areas from polygons on maps for comprehension of availability. Further discussions were made with the relevant port authority personnel regarding storage facilities available for each of the ports considered.

Data Used

D.1.5 This assessment is based on:

- Waterway maps, Navionics (datum and berths information)
- Port navigation, capacity, and material handling constraints on each port's website
- Information made available through initial discussions with relevant Port Authorities
- Port access from Admiralty Charts and Sailing Directions (Dover Strait Pilot, North Sea West Pilot)

D.1.6 The port capacities will inform road supply options from the ports.

D.1.7 The identified sources of materials and material quantities required were developed by the Project team and are presented in Annex A.

Assumptions

D.1.8 The following assumptions have been made for this assessment:

- Materials delivered by sea will originate from a quarry with existing access to a port with the capabilities and capacity to handle the materials
- No restrictions on the extent of temporary works, additional works, or barge supply were initially considered, however, this was a criterion for eliminating some potential routes
- Although the ports have bulk handling equipment, this is not always of sufficient capacity for the material volumes required and it is assumed that more suitable equipment would be employed at the ports. This could be provided by the port or the material transport contractor on a dedicated berth.

D.2 Port Location – Initial Screening

D.2.1 The remainder of the ports under consideration are set out in Annex Table D.1. Each of these locations is expanded on in the following sections.

Annex Table D.1 List of ports under consideration

List of Port Locations	Nature of Port	Suitability
King's Lynn	River Port	Aggregates, AILs
Great Yarmouth (Outer Harbour)	Sea Port	Aggregates, AILs
Lowestoft	Sea Port	Aggregates, AILs
Harwich	Sea Port	Aggregates, AILs
Ipswich	River Port	Aggregates, AILs
Felixstowe	Sea Port	AILs
Tilbury	River Port	Aggregates, AILs, Containerised Loads
London Gateway Port	River Port	AILs

D.3 Locations for Further Consideration

D.3.1 This section describes the ports identified in Annex Table D.1 as being suitable for importing aggregates. An overview of the capabilities of these ports is summarised in Annex Table D.2, with available details and berth information included in the subsequent sub-sections for each respective port facility.

Annex Table D.2 Overview of ports

Port Location	General Cargo Vessel			Port Handling	
	Dimensions (m) (Length, Beam, Draft)	dwt	Maximum Shipment/ Year	Kit Facilities	Storage
King's Lynn	140x20x6	5,500	10,000 FEU 125,000 t	1x Liebherr LHM 70, 1x Mantsinen, 1x Fuchs	1.5 ha (covers 3 packages)
Great Yarmouth	190x28.2x10.5	19,000	70,000 FEU 875,000 t	2x400 t/hr clam shell on crane	3.0 ha
Lowestoft	190x30x11.5 (max)	27,900 (max)	200,000t	3x400 t/hr, clam shell on crane;	5.0 ha
Harwich	139x16.9x7	5,000	17.3 Mt	Reachstackers, Telehandlers, tractor-trailer units and forklifts No operational cranage.	9.25 ha
Ipswich	152x23x8.2	7,500	30,000 FEU 375,000 t	West Bank: 1 x small Liebherr MH60 (Leased) Cliff Quay: 3 x Mantsinen 95R	1.5 ha

Port Location	General Cargo Vessel			Port Handling	
	Dimensions (m) (Length, Beam, Draft)	dwt	Maximum Shipment/ Year	Kit Facilities	Storage
				material handling tracked cranes 2x800 t/hr bucket unloader	
Tilbury	200x32.2x11.2	37,200	1 M TEU	2x800 t/hr bucket unloader; 1x4,000 t/hr unloading conveyor	3.8 ha

Note on nomenclature – ‘FEU’ (Forty-foot Equivalent Unit) and ‘TEU’ (Twenty-foot Equivalent Unit) refer to standard intermodal container sizes. Refer to glossary section for more information.

King’s Lynn, Norfolk

D.3.2 The Port of King’s Lynn is a small commercial port handling steel and other metals, timber, fuel, project and bulk cargo, construction, and agricultural products. It lies, two miles south-east of the entrance to Lynn Cut, the artificially straightened mouth of the River Great Ouse with embankments up to 3.5 m high The port is connected by road to Cambridge and the M11, Peterborough and the A1(M) and east to the Midlands and the motorway network serving all of the UK.

D.3.3 Approach from The Wash through the Bull Dog Channel leading to Lynn Cut (alternative channels are suitable for small crafts and require local knowledge). The channel is navigable by vessels from two hours before to two hours after High Water. Bed level 1.0 m above chart datum at some places of the channel. The tidal streams follow the channels lying in south-south-west/north-north-east direction in the approaches and set across other channels.

D.3.4 For vessels underway, allowance over vessel's maximum draught against predicted height of tide above local datum (0.7 m below chart datum) are required, which is subject to rapid change. Within the harbour, in some places, bed level is observed to be 2 m above chart datum to ensure it does not dry completely. Vessels on Riverside and South Quays take bottom at Low Water (LW).

D.3.5 Across the river, one mile north of the town, power cables with safe overhead clearance of 45 m have been noted. Mean Spring range – 5.8 m; Mean neap range – 3.2 m.

D.3.6 Entry Regulations: All vessels entering and departing the port are to have sufficient under-keel clearance. Vessels over Length Overall (LOA) of 100 m are notified to the harbour office for draught considerations.

D.3.7 The port is operational between 06:00 and 22:00 and open 24 hours a day, with security facilities on the gate.

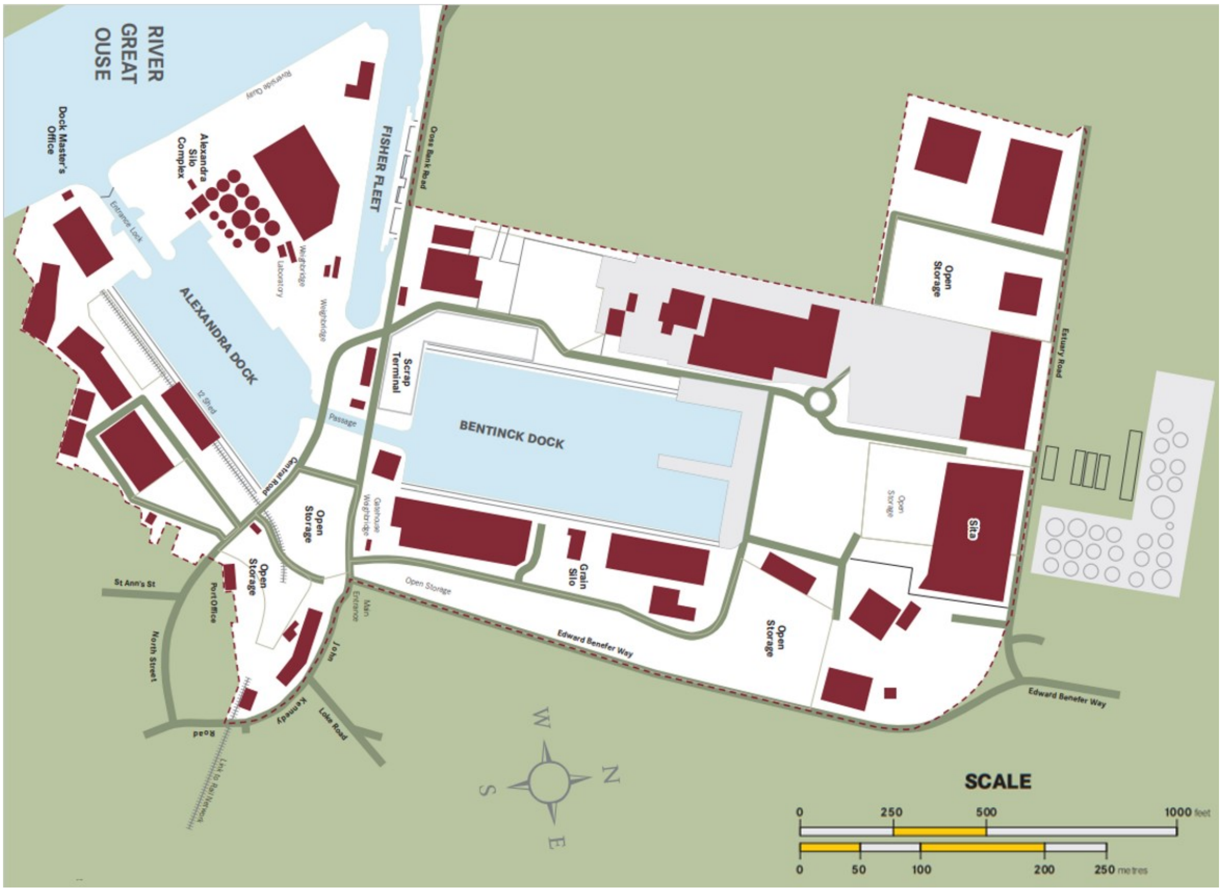
Berths

D.3.8 The berth layout at The Port of King's Lynn is shown in Annex Image D.2, with berthing details given in Annex Table D.3 where information has been provided.

D.3.9 The port consists of tidal berths on the river and a non-tidal dock comprising two docks (Alexandra Dock and Bentinck Dock) separated by two swing bridges:

- Riverside Quay
  - Includes two berths. 220 m long, 2.5 m in depth, vessels up to 140 m LOA
- South Quay
  - Contains six berths and is 396 m long
- Boal Quay (deepest berth)
  - Not commercially utilised, 122 m LOA; Dries at LW
- Alexandra Docks
  - 350 m long, largest Roll-on/Roll-off (Ro-Ro) berth, accommodates vessels up to 120 m LOA and 13.85 m beam.
- Bentinck Docks
  - 800 m Quayside

Annex Image D.2 General arrangement, The Port of King's Lynn



Annex Table D.3 Berthing information, The Port of King's Lynn

	Quay Length (m)	Depth of Water (m)	Length (m)	Beam (m)	Draught (m)	Approximate Dwt.
Alexandra Dock	350	4.8	119	13.85	5.5	4000
Bentinck Dock	800	4.8	119	13.85	5.5	4000
Riverside Quay	220	Tidal	140	20.0	6.0	5000

Port Capacity

D.3.10 The Port of King's Lynn has the following capacities:

- Maximum of 5000 dwt
- Maximum vessel size accommodated: 140x20x6 m
- Current annual aggregate throughput of 32,000 tonnes per year; parts of channel dry out at LW, although with no large impact on actual throughput.

D.3.11 These capacities all use the same berth. If multiple cargo types are expected then capacity would need to be proportioned. However, from discussion with the ports there have been sufficient capacities to handle Project requirements.

Great Yarmouth, Norfolk

D.3.12 The Port of Great Yarmouth is a commercial port with inland navigation access, majorly handling offshore oil and gas field industry south of North Sea and agribulk, large scale preassembly sites, aggregates, offshore support, steel, subsea structure decommissioning, automotive, timber products and complex project cargo.

D.3.13 The Outer Harbour of Great Yarmouth is considered for this study, owing to the dredge level of 10.5 m, history of capacity to handle complex project cargo over 200 tonnes, and storage infrastructure. The Outer Harbour is located on the seaward side of the South Denes peninsula adjacent to the mouth of the River Yare.

D.3.14 There are two approach channels into The Port of Great Yarmouth: the northern approach has a clear depth of up to approximately 9.0m mid-channel, and the southern approach has a clear depth of up to approximately 6.7m mid-channel. Access to the Inner Harbour is limited to a depth of approximately 4.1m.

D.3.15 Additionally, the vertical clearance is 1.8m when Haven Bridge is closed and 4.0m when Breydon Bridge is closed.

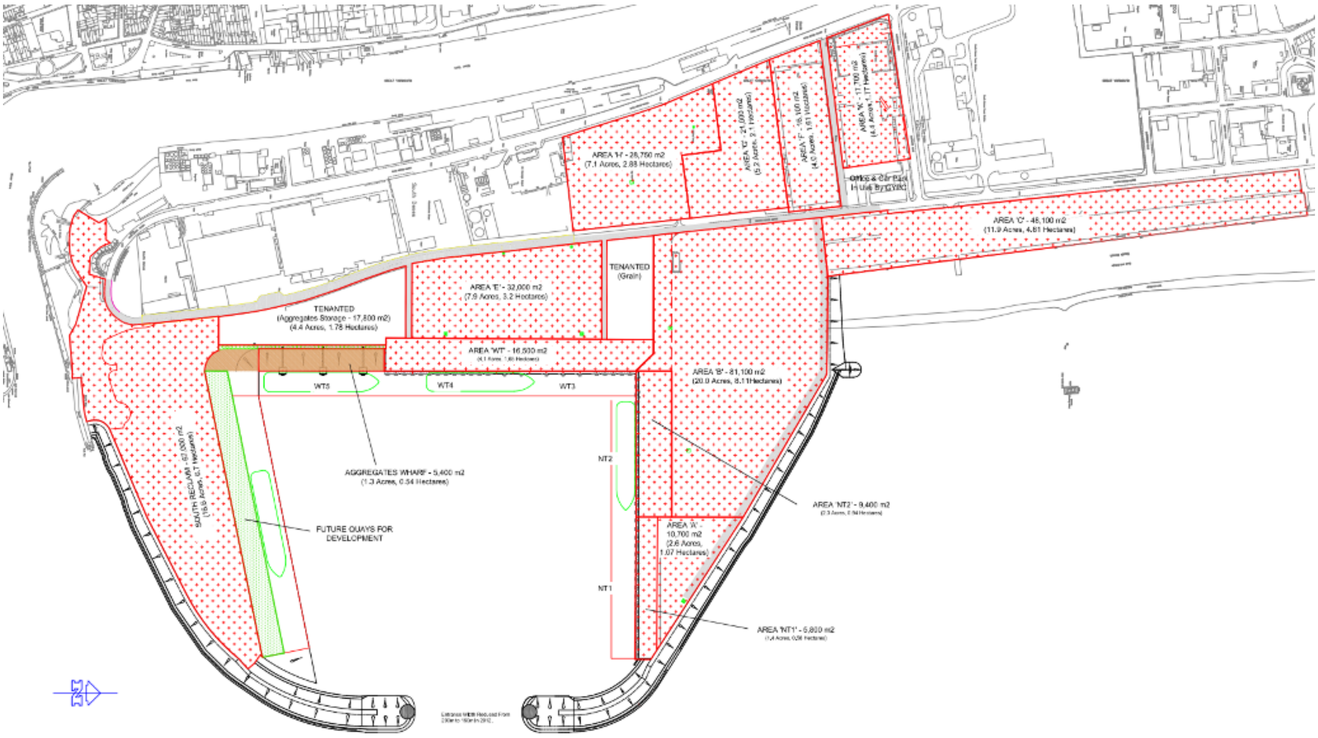
D.3.16 The port is International Ship and Port Facility Security Code (ISPS) secured with 24/7 security on site and closed-circuit television (CCTV) fully operational.

Berths

D.3.17 The berth layout at The Port of Great Yarmouth is shown in Annex Image D.3 and includes the following:

- Outer Harbour
  - N side – two berths for general cargo, wind farm, offshore and project cargo
  - W side – two berths for general cargo, bulk, offshore and project cargo
- Great Yarmouth Haven Main Berths:
  - East Bank
- 5A-5C (E Quay), 8B, 13A, 13B, 14A, 21A-21E (S quay)
  - West Bank
- 25 (South town wharf), 26, 31A to E (Bollard Quay)

Annex Image D.3 General arrangement, Outer Harbour at The Port of Great Yarmouth



Port Capacity

D.3.18 The Port of Great Yarmouth has the following capacities:

- Maximum 18,000 dwt,
- Maximum vessel size accommodated 166x25x10.5 m
- Maximum throughput 1,900,000 tonnes per year

D.3.19 From the initial discussion with ports, two existing tenants have been noted and these capacities all use the same berth. If multiple cargo types are expected then capacity would need to be proportioned.

Lowestoft, Suffolk

D.3.20 The Port of Lowestoft is an artificial port and is located six miles south of Great Yarmouth, on the banks of Lake Lothing. It is a commercial and fishing port and a base for supply ships servicing the offshore oil and gas industry or servicing offshore wind farms.

D.3.21 The channel is liable to silting but is cleared by dredgers. A depth of 4.7 m is maintained in the channel from the harbour entrance to Lowestoft Harbour Bridge, progressively reducing to 1.5 m towards the west end of Lake Lothing.

D.3.22 Vertical clearance of 1.7 m when Lowestoft Harbour Bridge is closed 4.1 m at Carlton Swing Bridge and 4.1 m at Mutford Road Bridge (all when closed).

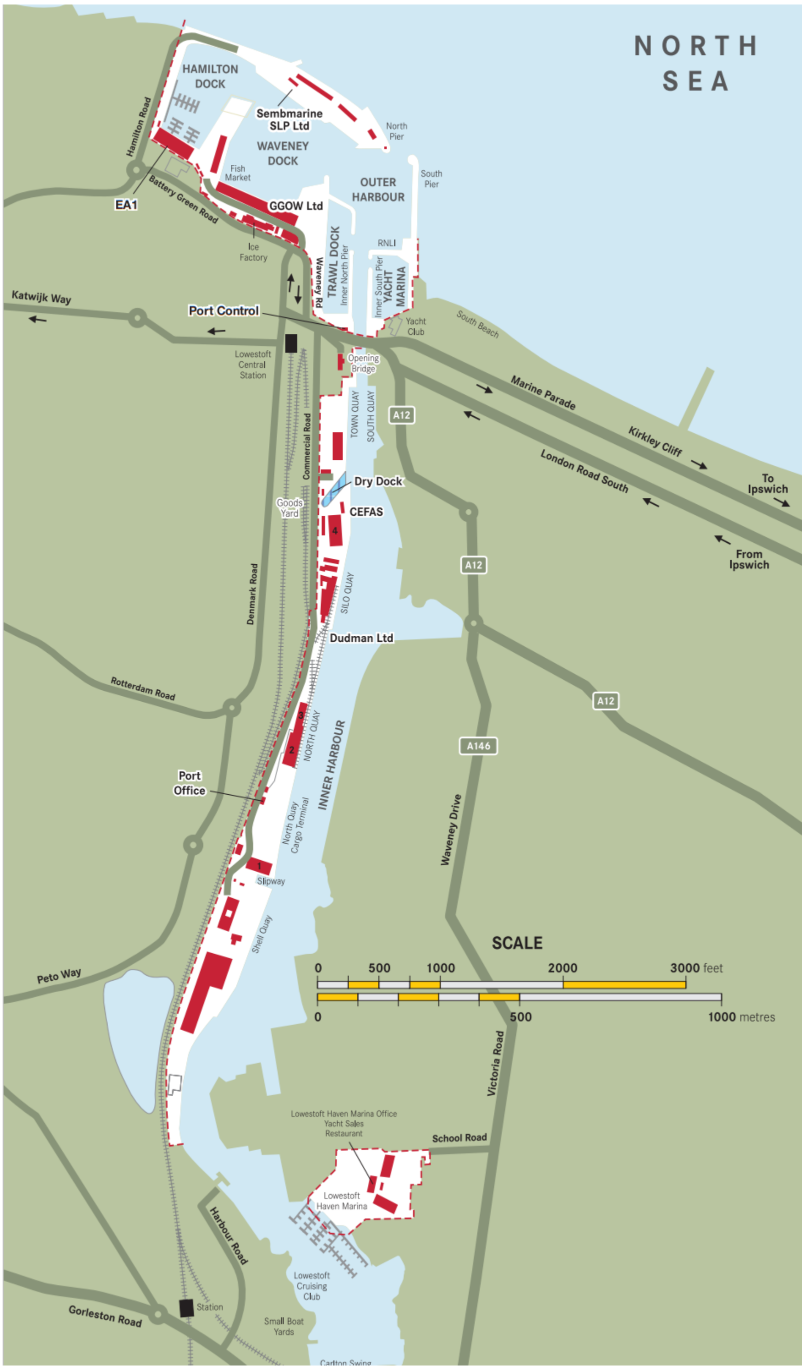
Berths

D.3.23 The berth layout at The Port of Lowestoft is shown in Annex Image D.4, with further details presented in Annex Table D.4 where information has been provided.

D.3.24 The port contains outer and inner harbours.

- The outer harbour consists of:
  - Hamilton Quay, Berth 1-60 m long, dredged to 5.0 m
- Inner harbour consists of 2,000 m of quays, mainly on north of the Lake Lothing:
  - Town Quay 1 – dredged to 3.7 m at 150 m
  - Town Quay 2/3 – dredged to 6.2 m
  - CEFAS – dredged to 6.0 m
  - Talisman’s – dredged to 3.7 m
  - Silo Quay – dredged to 4.0 m
  - North Quay 1–4 – dredged to 3.7 m at 600 m
  - North Quay 5 – dredged to 4.0 m
  - North Quay 6/7 – dredged to 4.7 m

Annex Image D.4 General arrangement, The Port of Lowestoft



Annex Table D.4 Berthing information, The Port of Lowestoft

	Quay Length (m)	Length (m)	Beam (m)	Draught (m)
Outer Harbour - Docks	1400	125	35	5.5
Entrance Channel and Inner Harbour	2100	125	22	6.0

Port Capacity

D.3.25 The Port of Great Yarmouth has the following capacities:

- Maximum vessel size accommodated: 120 m in length, 6.0 m draught.
- Maximum length of vessels for the inner harbour area of Lowestoft is advertised at 125 m LOA. Vessels nearing this length could only be accommodated at a reduced maximum draught (4.0 m maximum), to be able to swing in the turning area.
- Storage availability on site for several 100,000 tonnes on quayside.

D.3.26 From the discussion with ports, there is availability of aggregate and project cargo throughput capacities to accommodate Project demands.

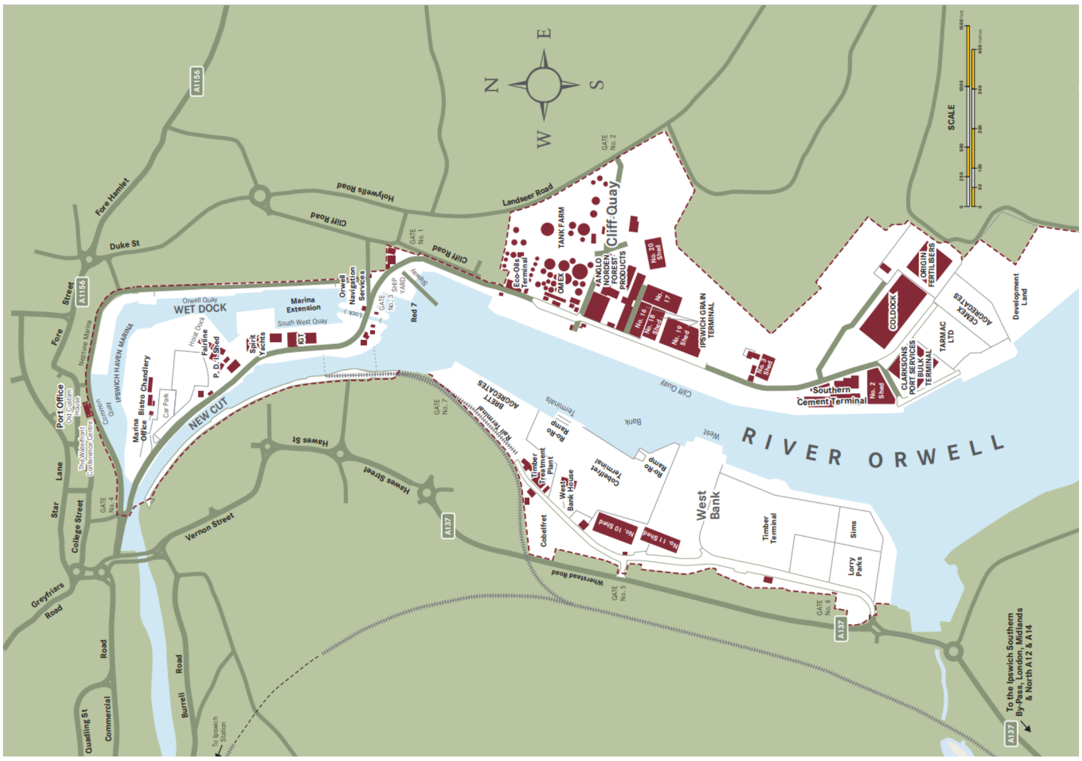
Ipswich, Suffolk

D.3.27 Commercial port handling agribulks, construction, forest products, project cargo, petroleum products, fertilizers, grains and pulses exports, bulk energy, and liquid bulk products. The terminal handles sawn timber products including battens, fencing, board, decking and window frames.

D.3.28 A river port comprising the tidal berths on the riverbanks and a non-tidal dock; contains two container terminals and two Ro-Ro terminals.

D.3.29 Approach from Harwich Harbour dredged to 5.6 m with vertical clearance of 42 m at Orwell Bridge and 45 m where the power cables pass through. Maximum draught vessels are to enter the river between 1hr to 1hr 30 min before High Water (HW) in Ipswich.

Annex Image D.5 General arrangement, The Port of Ipswich



Berths

D.3.30 The berth layout at The Port of Ipswich is shown in Annex Image D.5, with further details presented in Annex Table D.5 where information has been provided.

D.3.31 It consists of:

- Riverside berths:
  - West Bank Terminals, East Bank Terminals, Power Station Berth
- Ipswich Wet Dock
  - West Bank Terminals handle dry bulk, Ro-Ro, and breakbulk cargo. Handling equipment includes quay cranes, mobile cranes, conveyor systems, hoppers, excavators, bulldozers, forklifts, tractors, and trailers.
  - Berths can accommodate up to three small coastal tankers. Terminal handles petroleum products and chemicals
  - Maximum draught for any vessel inside Wet Dock is 5.5 m. Due to the shape of the lock bottom, maximum draught may also be affected by vessel's beam.

Annex Table D.5 Berthing information, The Port of Ipswich

	Length (m)	Beam (m)	Draught (m)	Height of Quay (m Above Chart Datum)
Wet Dock	90	13.8	5.5	1.89
Cliff Quay	155	No restrictions	8.4	6.27 – 6.34
West Bank	150	No restrictions	7.0	5.68 – 5.77

Port Capacity

D.3.32 The Port of Ipswich has the following capacities:

- Maximum of 18,000 dwt
- Maximum vessel size 134x22.6x8.2 m
- Maximum aggregate throughput exceeds 1,000,000 tonnes per year.

D.3.33 The outlined capacities all use the same berth. If multiple cargo types are expected then capacity would need to be proportioned. However, from the discussion with the ports there have been sufficient capacities to handle Project requirements.

D.3.34 Cargo handled include bulk grain, fertilisers, malt and animal feed, breakbulk cargo, and containers. Grain can be handled at up to 700 tonnes/hour. and malt at up to 550 tonnes/hour. Storage facilities include silos, warehousing and paved open areas. Other berths handle bulk cargo including coal, grain, animal feed, cement, aggregates, and asphalt.

Harwich, Suffolk

D.3.35 The Port of Harwich is located on the south bank of the River Stour, west of its confluence with River Orwell. The port is operated by two entities, both handling Ro-Ro vessels, and contain container terminals: the Navyard operated by the Harwich Dock Company and the Harwich International Port located at Parkeston Quay, which also houses a cruise liner terminal, a high-speed ferry terminal, a grain terminal and tanker berth.

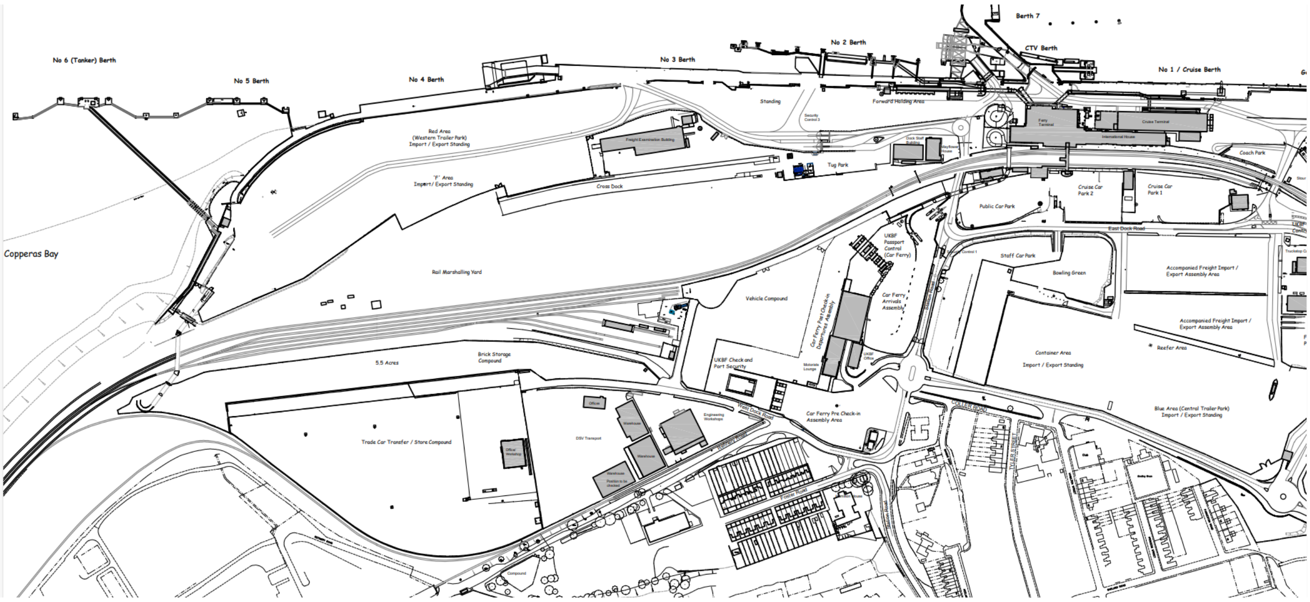
D.3.36 The deepest and longest berth, Harwich International Port, is dredged to 9.0 m at its east end and 8.0 m at the west end. The Navyard is dredged between 6.5 m and 8.5 m.

Berths

D.3.37 The berth layout at The Port of Harwich is shown in Annex Image D.6 and includes the following:

- The Navyard consists of three berths: two Ro-Ro berths and one berth which is 160 m long with an 8.5 m depth.
- The Harwich International Port at Parkeston Quay is 1,204 m long with depths between 7.0 m and 9.5 m consisting of eight berths including a ramp for high speed ferry, passenger ferry Ro-Ro berth, a cruise line terminal, facilities for containerships and bulk grain, two Ro-Ro berths for passenger ferries and two for freight ferries, one of which specialises in importing motor vehicles, and a tanker berth capable of accepting vessels up to 190 m long and a depth of 8.0 m.

Annex Image D.6 General arrangement, The Port of Harwich



Port Capacity

D.3.38 Aggregates and project cargo cannot be stored at quayside, with a limitation of 4 tonnes/sq m on the quay deck, and would need to be transported elsewhere on-site where storage is available.

D.3.39 From initial discussion with the port, there are capacities to handle complex project cargo as per Project requirements. Although the port has previously handled aggregate imports, consistent large volumes of throughput would be required for a viable operation.

Port of Tilbury, Essex

D.3.40 The Port of Tilbury forms the largest multi-modal port in the South East and London's major port located on the north bank of the River Thames. It has an annual throughput of 16 million tonnes, handling breakbulk and project cargo, automotives, forest products, containers, liquid bulk, grain and dry bulk, oil, gas and renewable resources.

D.3.41 From initial discussions with the port, capacities for frequent handling of project cargo such as cable drums, transformers etc., has been noted besides no constraints on AIL imports with reasonable notice.

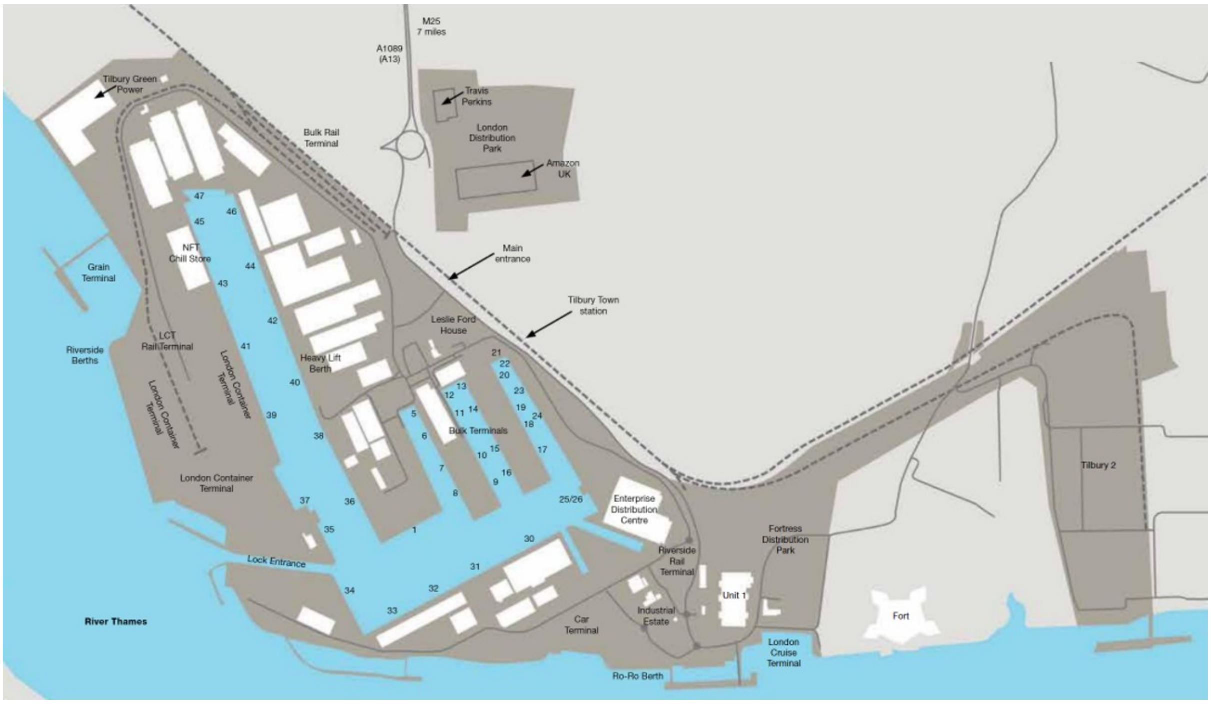
D.3.42 Tilbury is a major aggregate hub for London and South East industries, further strengthened by the recent addition of the Construction Material and Aggregate Terminal (CMAT) as a part of the port expansion.

Berths

D.3.43 The berth layout at the North Bank of The Port of Tilbury is shown in Annex Image D.7 and includes the following:

- **Grays Terminal** – two tanker berths: stores petroleum products
- **West Thurrock jetty** – chemical products for UK and export
- **Vopak Terminal** – three tanker berths: petrol, chemicals, edible oils
- **Jurgens jetty** – edible oils
- **CdMR Purfleet** – two Ro-Ro berths: trailers, containers, steel, motor vehicles
- **Esso Terminal** – two jetties
- **Fords Jetty** – Ro-Ro berth, two jetties: handles aggregates
- **Thunderer Jetty** – tanker jetty: chemical, bulk oils
- **Thames Refinery wharf** – with two inner berths: serves sugar refinery

Annex Image D.7 General arrangement, The Port of Tilbury



Port Capacity

D.3.44 The Port of Tilbury has the following capacities:

- From initial discussions with the port, Tilbury2, the port's latest expansion project, includes the CMAT facility that unloads onto a conveyor to stockpiling with capacity of 4,000 tonnes/hour for Project use was noted. Availability of three large cranes on quayside to support millions of tonnes throughput. Currently used by multiple aggregate suppliers.
- The port handles over 3,000 ships per year and over 13,000 traffic vehicles a day, handling 16 million tonnes per year currently with a projection to double that throughput to 32 million tonnes over 15 to 20 years.
- Capacity of 100,000 tonnes discharge in 24 hours with the largest self-discharging vessel in the regular port, accounting to about 4,100 tonnes per hour.
- The port delivers lower carbon footprint using its developed multi-modal transport platforms.

London Gateway Port, Essex

D.3.45 London Gateway Port with a maximum lifting capability of 90 tonnes is considered a suitable option for importing cable drums as per Project requirements. Maximum cargo dimensions accepted in the terminal are 20 m long and 6 m wide.

Summary

D.3.46 As set out in the sections above, all available feasible routes along the alignment of the Project have been explored to deliver Project materials by water-borne transport. The materials considered are aggregates and AILs. The following ports have been identified with existing aggregate supply operations which may be engaged by the

Project, and are subject to the availability of suitable onward road connections to the proposed destinations:

- The Port of King's Lynn
- The Port of Great Yarmouth
- The Port of Lowestoft
- The Port of Ipswich
- The Port of Tilbury

D.3.47 In addition to these, engagement with the port operator has indicated that Harwich International Port could plausibly be utilised to facilitate additional aggregate imports. Although there are currently no active aggregate import operations at Harwich International Port, the port has previously been utilised for this purpose.

Annex Table D.6 Recommended shipments for aggregates

Port Location	Recommended Vessel Dimensions (m)	Shipment Volume (tonnes)
King's Lynn	140 x 6	4450
Great Yarmouth	220 x 10.5	18000
Ipswich	155 x 8.4	8900
Harwich	245 x 13.2	18200
Lowestoft	144 x 23.7 x 9.2	4450
Tilbury	250 x 10.5 to 13.5	37200

D.3.48 All ports as outlined in Annex Table D.1 are viable options for AILs as per Project requirements.

Annex E
Highway Connection Assessment

E.1 Assessment Considerations

E.1.1 The Highway Connection Assessment presented in this section considers road links associated with the railhead and port facilities identified in Sections 3 and 4, respectively. This assessment includes the elements of the LRN which would be utilised in order to access the SRN from the port or railhead. The SRN does not form part of this assessment – it is assumed that construction traffic will be able to utilise the SRN to access any point on the proposed Project alignment via an appropriate PAR, as required.

E.1.2 This includes the identification of highway constraints and sensitive receptors along potential access routes, including:

- Level crossings
- Bridges and identified structures
- Road geometry and condition
- Height and width constraints
- Residential proximity.

E.1.3 The assessment has been undertaken on the basis of publicly available information – including mapping and imagery.

E.1.4 This assessment represents an initial study of the potential highway access routes. Should any of the identified facilities be identified for use at a later stage of project development, these should be progressed to the equivalent level of detail as the Primary Access Routes, including consideration of suggested mitigations.

E.1.5 The assessment detailed in Annex E has been undertaken for standard road vehicles, up to and including maximum legal HGV size and weight. For details regarding abnormal load routeing, please refer to the AIL Access Strategy (appended to the Outline CTMP (document reference 7.3)).

E.2 Road Connections to Identified Railheads

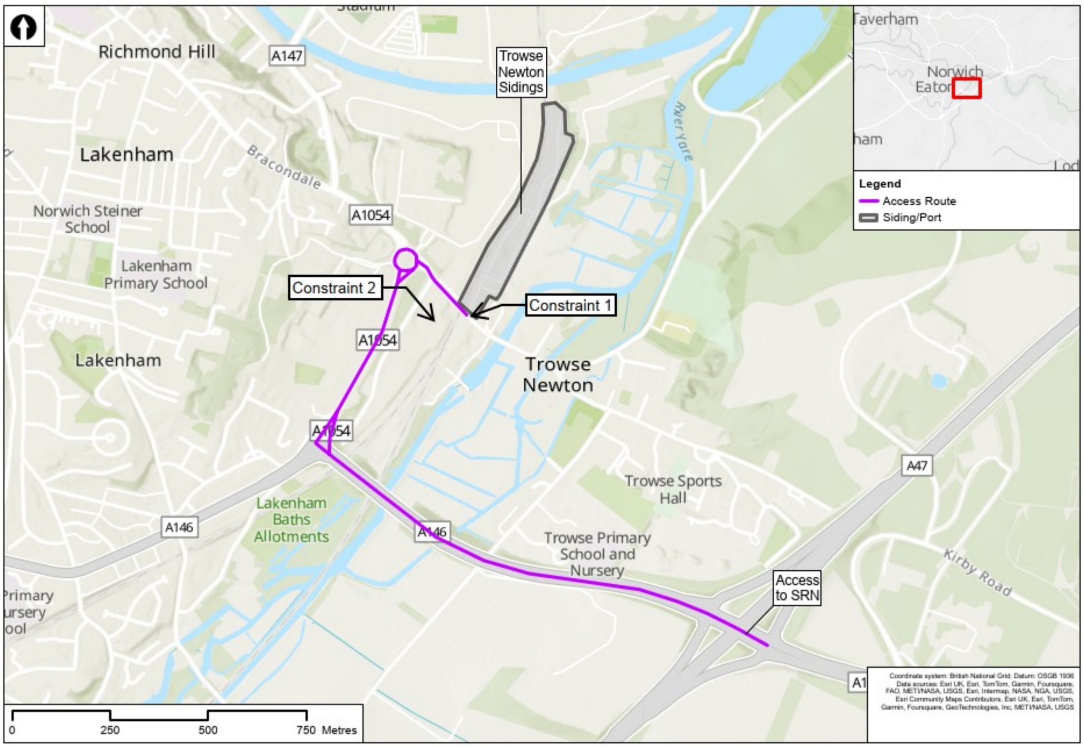
Trowse Newton

E.2.1 The existing sidings at Trowse Newton are located off Bracondale in Trowse Newton, approximately 2 km south-east of Norwich city centre. The most direct route from this site to the SRN is the following, as shown in Annex Image E.1:

- Turning right out of the existing site access onto Bracondale
- Proceeding north-west on Bracondale for approximately 0.2 km to the Bracondale/A1054 Roundabout
- Turning left at the roundabout, and proceeding south-west on the A1054 Martineau Lane for approximately 0.4 km

- Turning left onto the A146 at the signal controlled A146/A1054 junction, and proceeding south-east on the A146 for approximately 1.0 km
- Accessing the A47 Norwich Southern Bypass from the A47/A146 junction.

Annex Image E.1 Trowse Newton Sidings access plan



E.2.2 This route is approximately 1.6 km in total. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.1 have been identified.

Annex Table E.1 Trowse Newton Sidings access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Road Geometry	Existing sidings access potentially insufficient for two-way HGV traffic.	Temporary traffic management and/or carriageway widening to be implemented if required.
2	Residential Proximity	Residential properties are adjacent to the route on Bracondale.	Traffic impacts to be assessed.

E.2.3 Alternative routeing could be considered, though would not mitigate the constraints noted above as they relate to the siding access location onto Bracondale. Provision of a preferable alternative access point is also unlikely to be achievable, due to the boundaries imposed by:

- River Wensum to the north
- River Yare to the east
- Railway to the west.

E.2.4 Therefore, access onto Bracondale is required in order to make use of the siding. Use of alternative routes from the Bracondale/A1054 Roundabout to the SRN are also not anticipated to be preferable, on the basis that these would route traffic through additional urban and residential areas.

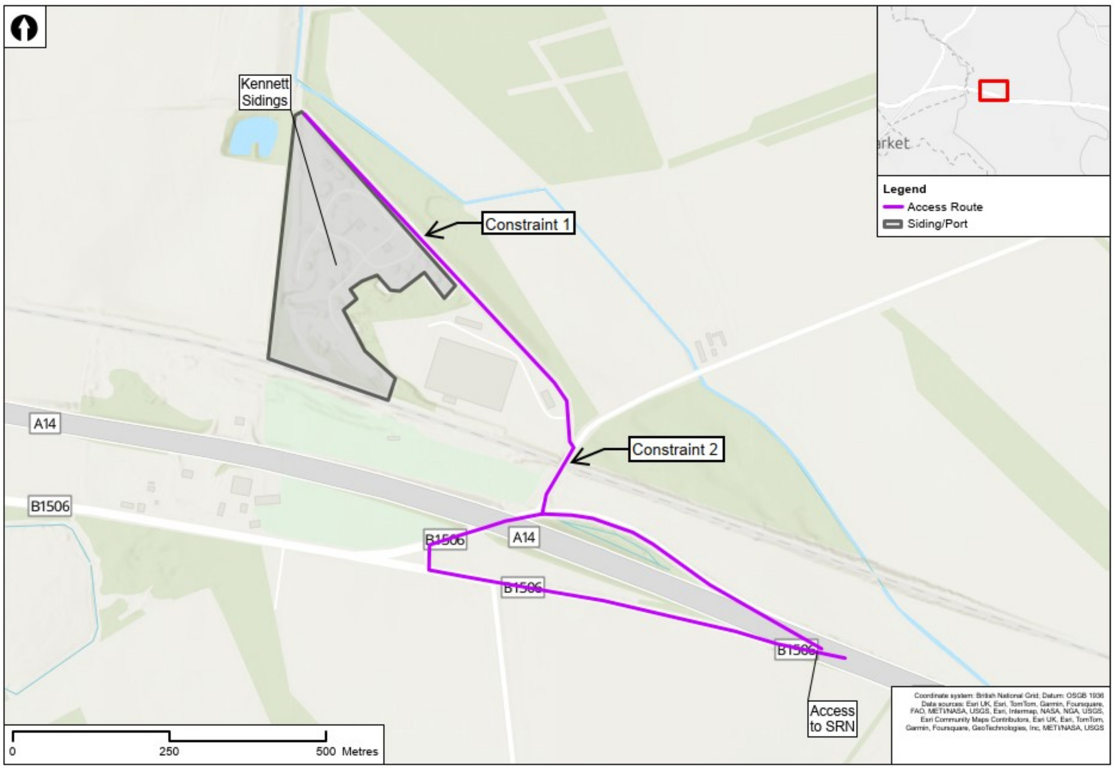
E.2.5 Hence, it is considered that the access route shown in Annex Image E.1 is the most appropriate for construction traffic access to the Trowse Newton Sidings.

Kennett Sidings

E.2.6 The existing sidings at Kennett are located off Icknield Way near Kentford, approximately 8 km north-east of Newmarket town centre. The most direct route from this site to the SRN is the following, as shown in Annex Image E.2:

- Turning right out of the existing site access onto the restricted local access road serving the railhead and neighbouring industrial facility
- Proceeding south-east for approximately 0.6 km to the junction with Icknield Way
- Turning right onto Icknield Way and proceeding south for approximately 0.1 km to the B1506/Icknield Way junction, passing underneath the Great Eastern Main Line
- Turning left onto the B1506 and proceeding eastbound for approximately 0.5 km, joining the A14 eastbound via the existing A14 Junction 39 access slip
- This provides access to the A14 in the eastbound direction only. For westbound movements, use of a junction further to the east on the A14 would be required, such as Junction 40 which is approximately 2.3 km further to the east
- Proceeding westbound on the B1506 Bury Road for approximately 0.6 km
- Turning right at the junction to follow the B1506 northbound for approximately 0.2 km to the junction with Icknield Way.

Annex Image E.2 Kennett Sidings access plan



E.2.7 This route is approximately 1.2 km for egress, and approximately 1.5 km for access to the facility. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.2 have been identified.

Annex Table E.2 Kennett Sidings access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Road Geometry	Existing local access road and carriageway on Icknield Way potentially insufficient for two-way HGV traffic.	Temporary traffic management and/or carriageway widening to be implemented if required.
2	Height Constraints	Icknield Way passes under railway overbridge with signed 13’6” (4.1 m) height constraint.	Delivery vehicle height to be limited.

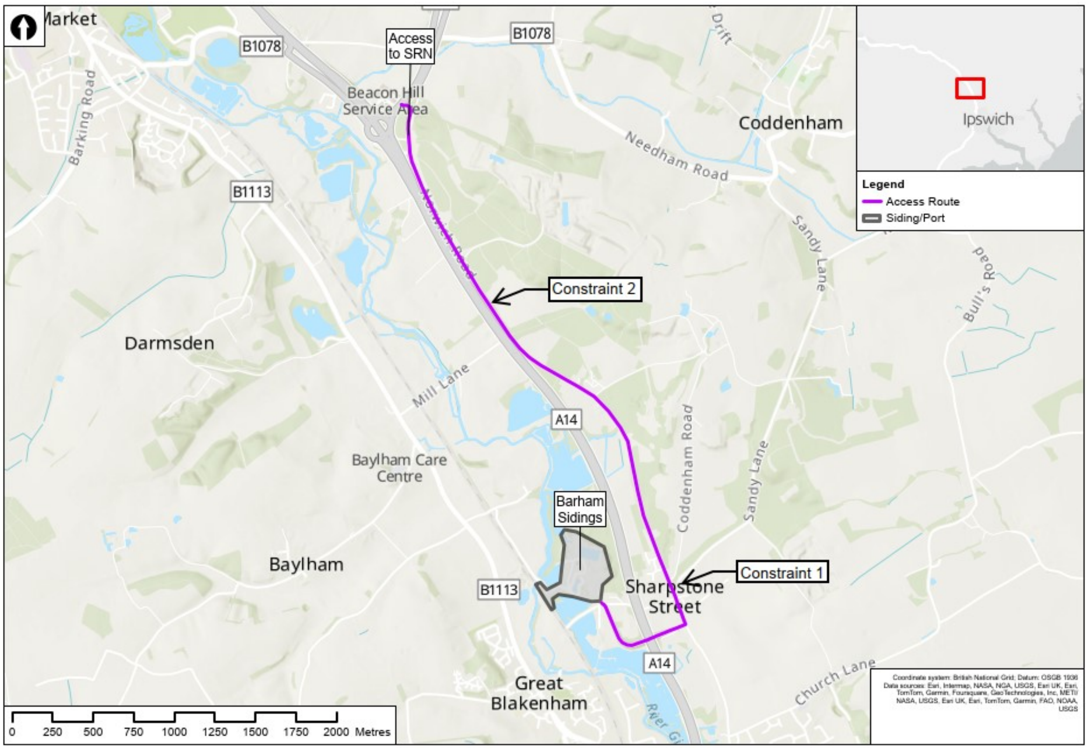
E.2.8 There is no reasonably practicable alternative access route to this site, hence it is considered that the access route shown in Annex Image E.2 is the most appropriate for construction traffic access to the Kennet Sidings.

Barham Sidings

E.2.9 The existing sidings at Barham are located off Pesthouse Lane near Great Blakenham, approximately 9 km north-west of Ipswich town centre. The most direct route from this site to the SRN is the following, as shown in Annex Image E.3:

- Turning out of the existing site access onto Pesthouse Lane, and proceeding on this road for approximately 0.7 km to the Pesthouse Lane/Norwich Road junction, passing over the A14 on the existing overbridge
- Turning left at the T-junction onto Norwich Road, and proceeding north-west for approximately 3.8 km to the Norwich Road/A140 junction
- Joining the A140, and hence accessing the A14 at the A14/A140 junction approximately 0.1 km to the south.

Annex Image E.3 Barham Sidings access plan



E.2.10 This route is approximately 4.6 km in total. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.3 have been identified.

Annex Table E.3 Barham Sidings access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Residential Proximity	Residential properties adjacent to the route on Norwich Road in Barham.	Traffic impacts to be assessed.
2	Road Geometry	Existing carriageway along sections of Norwich Road potentially	Temporary traffic management and/or carriageway widening to be implemented if required.

Constraint ID	Type	Description	Suggested Mitigation
		insufficient for two-way HGV traffic.	Overhanging vegetation to be cut back if required.

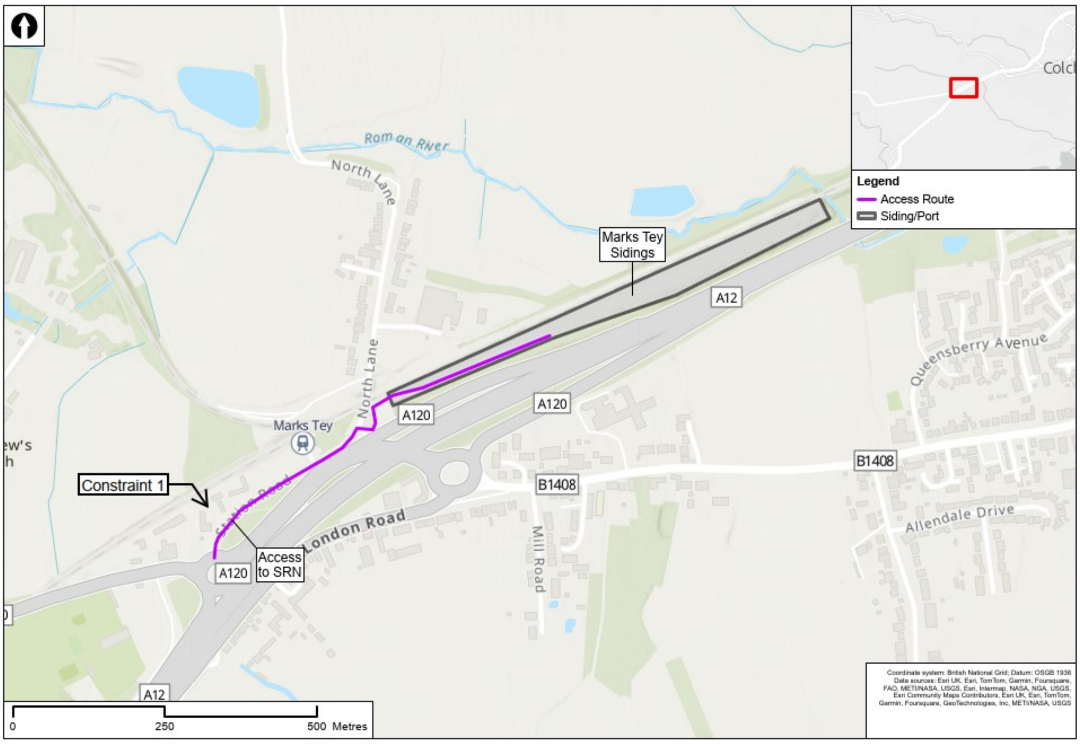
E.2.11 The alternative approach to accessing the SRN from the sidings would be to turn right at the Pesthouse Lane/Norwich Road junction and route southbound through Claydon towards the A14 Junction 52. This would be a shorter route (approximately 2.5 km in total); however, it would take construction traffic through greater extents of built-up residential areas in Claydon. This route is also subject to a 7.5 tonne ‘except for loading’ environmental weight limit, indicating a sensitivity to heavy traffic and suggesting that the existing access route to the sidings is likely to be that set out in Annex Image E.3.

Marks Tey Sidings

E.2.12 The existing sidings at Marks Tey are located off North Lane in Marks Tey, approximately 8 km west of Colchester city centre. The most direct route from this site to the SRN is the following, as shown in Annex Table E.4.

- Turning left out of the existing railhead access onto North Lane
- Proceeding south-west on North Lane/Station Road for approximately 0.3 km to the A120/Station Road junction
- Hence accessing the A120 or A12 from the A120/Station Road junction.

Annex Image E.4 Marks Tey Sidings access plan



E.2.13 This route is approximately 0.3 km in total. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.4 have been identified.

Annex Table E.4 Marks Tey Sidings access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Residential Proximity	Care home adjacent to the route on Station Road.	Traffic impacts to be assessed.

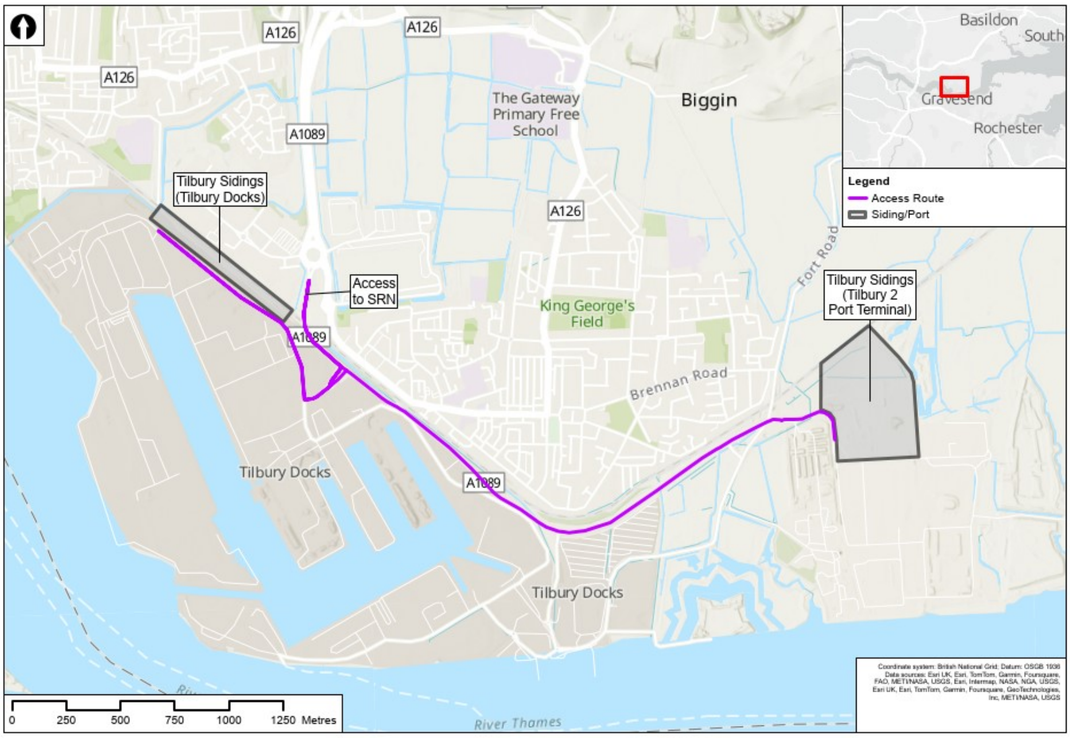
E.2.14 Given that the only alternative access route to the Marks Tey Sidings – turning north on North Lane – would be far longer and pass through the village of Aldham, the route outlined in Annex Image E.4 is the most appropriate for construction traffic access to the Marks Tey Sidings.

Tilbury Sidings

E.2.15 The existing sidings at Tilbury are located on land associated with the Port of Tilbury. There are two sets of sidings, one each located:

- In the northern part of the Tilbury Docks site
- In the northern part of the Tilbury 2 Port Terminal.

Annex Image E.5 Tilbury Sidings access plan



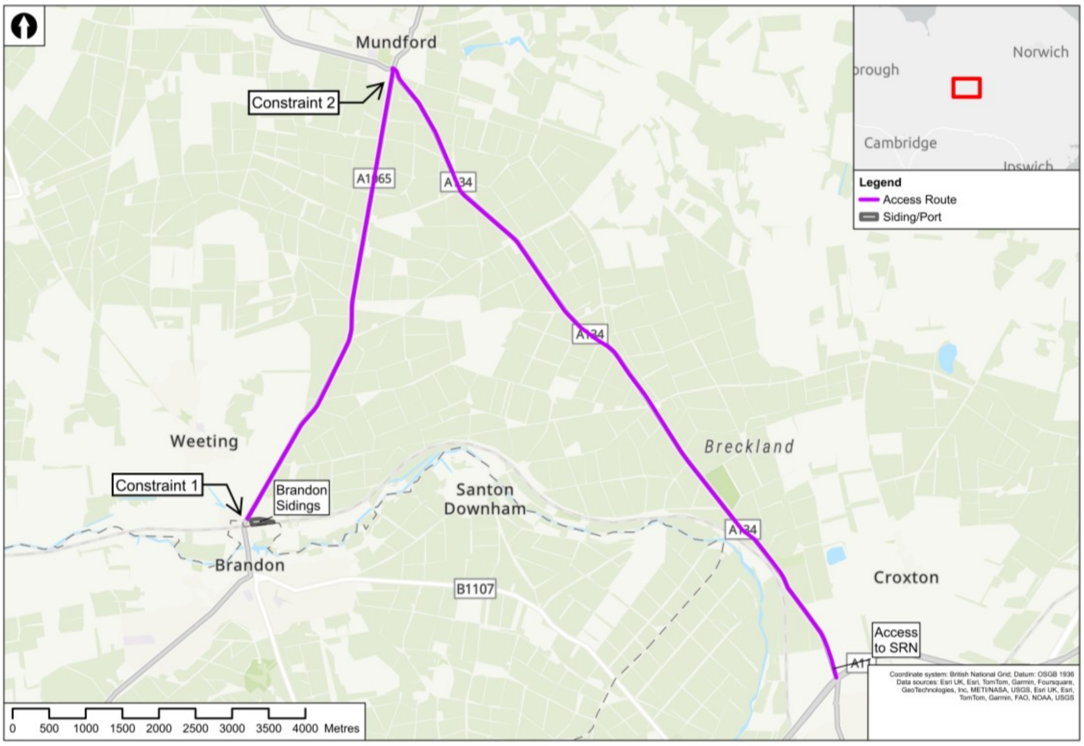
E.2.16 Access from the Port of Tilbury to the SRN is via the A1089, as shown in Annex Image E.5. Based on a desktop assessment of the available data for this route, no highway constraints have been identified for this access route.

Brandon Sidings

E.2.17 The existing sidings at Brandon are located off the A1065 Mundford Road, to the north of Brandon town centre, approximately 10 km north-west of Thetford. Routeing from this site to the south to the A11 Fiveways Roundabout at Barton Mills via the A1065 through Brandon town centre was not considered to be appropriate. This is due to the anticipated impact of this approach on Brandon and the existing sensitivities identified around this in relation to the sidings' operation. Therefore, the following route from this site to the SRN is proposed, as shown in Annex Image E.6:

- Turning right out of the existing railhead access onto the A1065 Mundford Road
- Proceeding north-east on the A1065 for approximately 6.6 km to the A1065/A134 junction in Mundford
- Turning onto the A134 southbound, and proceeding south for approximately 10.4 km to the A134/A11 junction
- Accessing the A11 from the A134/A11 junction.

Annex Image E.6 Brandon Sidings access plan



E.2.18 This route is approximately 17.0 km in total. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.5 have been identified.

Annex Table E.5 Brandon Sidings access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Residential Proximity	Residential properties adjacent to the existing site access point on the A1065 Mundford Road in Brandon.	Traffic impacts to be assessed.
2	Residential Proximity	Residential properties adjacent to the route on the A1065 in Mundford.	Traffic impacts to be assessed.

Chelmsford Sidings

E.2.19 The existing sidings at Chelmsford are located off Brook Street, approximately 0.7 km north-east of Chelmsford Station. Three routeing options using nearby A-road connections have been identified from this site to the SRN, as follows:

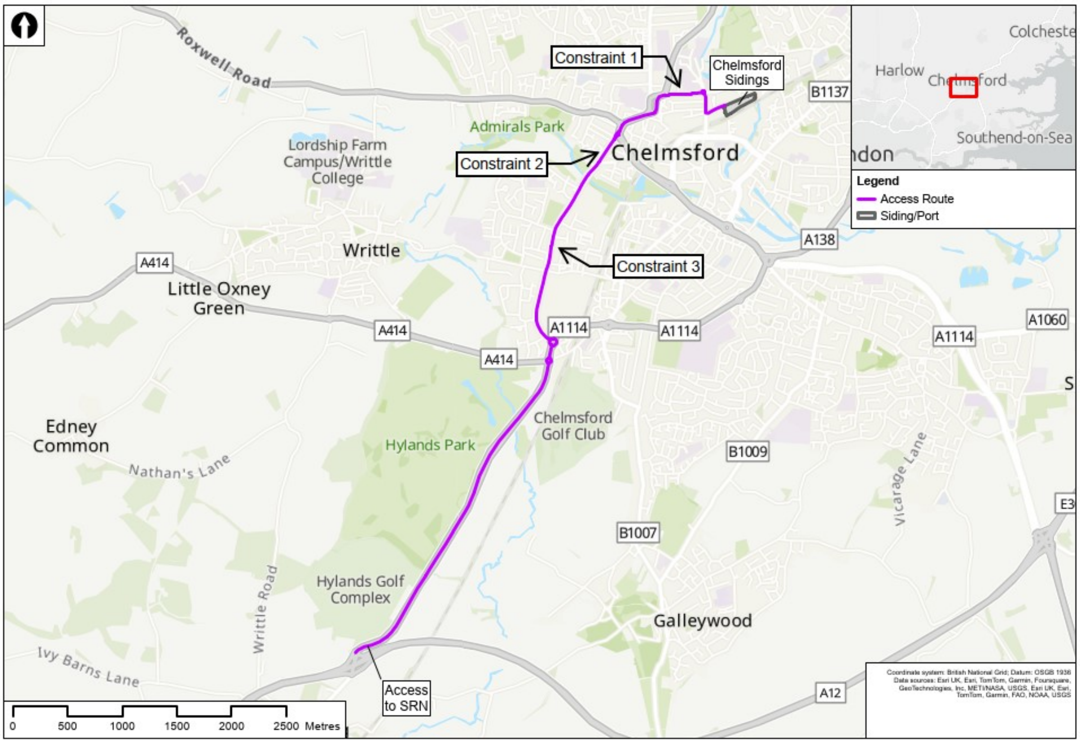
- Route Option A - via the A1016 and A414 London Road to Junction 15 of the A12, a distance of approximately 7.0 km
- Route Option B - via the A1016, A1060, and A1114 Essex Yeomanry Way to Junction 17 of the A12, a distance of approximately 7.2 km
- Route Option C - via the A1016, A1060, and A138 to Junction 19 of the A12, a distance of approximately 7.6 km.

E.2.20 Route option A would utilise the route of the previously identified PARs H28-A2 and H29-A1 – as set out in the Indicative Highway Mitigation Plans (appended to the Outline CTMP (document reference 7.3)) – from the A1016/A1060 junction to the A12. This would therefore be preferable to the alternatives on the basis that it would limit the spread of the Project impacts. Furthermore, route option A is also the shortest length of the routes identified and would also avoid impacting the section of the A1060 through Chelmsford city centre. On this basis, Route option A is likely to be preferable.

E.2.21 The description of this route is as follows, as set out in Annex Image E.7:

- Turning left out of the existing railhead access onto Brook Street
- Proceeding west along Brook Street for approximately 0.2 km, before turning right onto the B1008
- Following the B1008 northbound to the roundabout with Bishop Hall Lane, before turning left to continue on the B1008 Rectory Lane to the junction with the A1016
- Proceeding southbound on the A1016 to junction with the A414 at the Widford Roundabout, a distance of approximately 2.9 km
- Then joining the A414 and continuing southbound to join the SRN at the A12 Junction 15, a distance of approximately 3.3 km.

Annex Image E.7 Chelmsford Sidings access plan



E.2.22 This route is approximately 7.0 km in total. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.6 have been identified.

Annex Table E.6 Chelmsford Sidings access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Road Geometry	Existing carriageway along an approximate length of 150m of the B1008 Rectory Lane appears to be potentially insufficient for two-way HGV traffic due to presence of marked parking bays. Existing carriageway along an approximate length of 150m of the B1008 Rectory Lane potentially insufficient for two-way HGV traffic due to presence of marked parking bays.	Temporary traffic management and/or suspension of parking facilities to be implemented if required.
2	Residential Proximity	Residential properties adjacent to the route on the A1016 Rainsford Lane, in the vicinity of Norton Road and Andrews Place.	Traffic impacts to be assessed.
3	Residential Proximity	Residential properties adjacent to the route on the A1016 Waterhouse Lane, in the vicinity of Writtle Road.	Traffic impacts to be assessed.

E.3 Road Connections to Identified Ports

King's Lynn

E.3.1 The Port of King's Lynn is located within the town of King's Lynn, to the north-east of the town centre on the east bank of the River Great Ouse. Four routeing options have been identified from the port to the SRN, as follows:

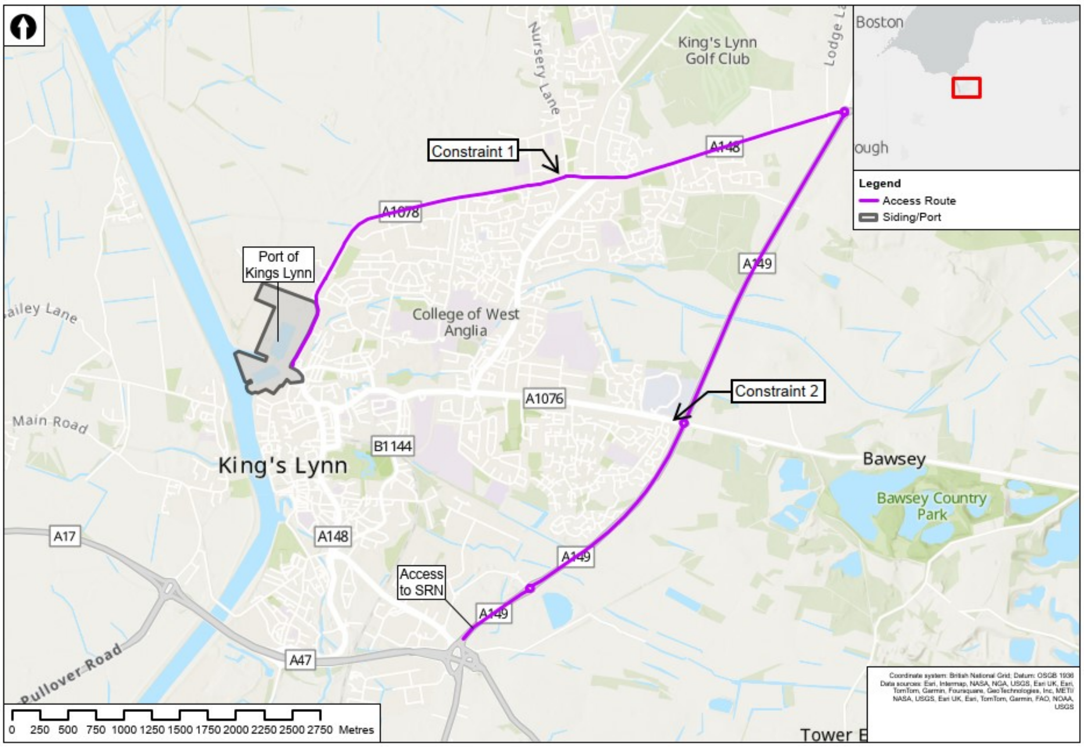
- Route Option A – via the North Lynn Industrial Estate and South Wootton, on the A1078, A148, and A149 to the A47 Hardwick Roundabout, a distance of approximately12 km
- Route Option B – via the centre of King's Lynn and Gaywood, on the A148, A1076, and A149 to the A47 Hardwick Roundabout, a distance of approximately 7 km
- Route Option C – via the centre of King's Lynn, on the A148 and A149 to the A47 Hardwick Roundabout, a distance of approximately 4 km
- Route Option D – via the centre of King's Lynn and South Lynn, on the A148 to the A47 Saddlebow Interchange, a distance of approximately 4 km

E.3.2 Given routes from the port through the centre of King's Lynn would pass through areas in the historic town centre with a significant proportion of residential properties close to the carriageway, use of these by significant volumes of HGV traffic is likely to be constrained. Route option A presented above would bypass this section and hence, although it is a longer route, is considered to be preferable.

E.3.3 The description of this route is as follows, as shown in Annex Image E.8:

- Turning left out of the existing port access on the A1078 Edward Benefer Way
- Proceeding north and east on the A1078 and A148 to the A148/A149 Knight's Hill Roundabout, a distance of approximately 6 km
- Turning right at the roundabout, and proceeding south on the A149 to the A47 Hardwick Roundabout, a distance of approximately 6 km
- Hence accessing the A47 from the A47 Hardwick Roundabout.

Annex Image E.8 King's Lynn Port access plan



E.3.4 This route is approximately 12 km length in total. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.7 have been identified.

Annex Table E.7 King's Lynn Port access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Residential Proximity	Residential properties adjacent to the route in South Wootton.	Traffic impacts to be assessed.
2	Residential Proximity	Proximity to Queen Elizabeth Hospital main access on A1076.	Traffic impacts to be assessed.

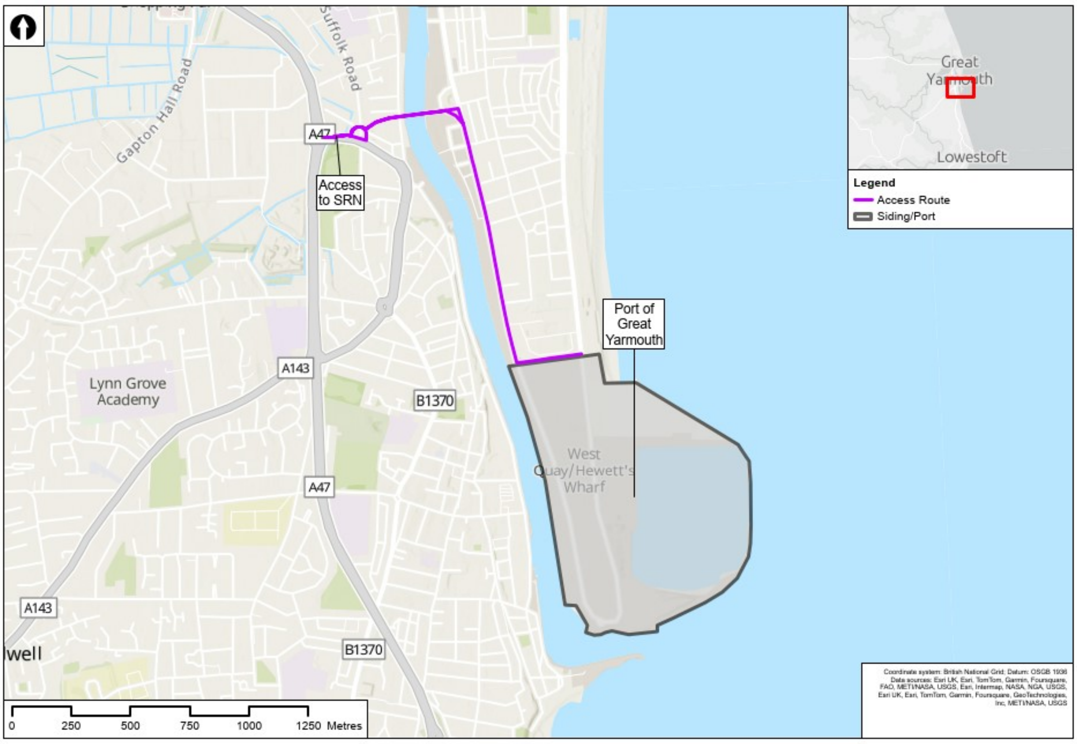
Great Yarmouth

E.3.5 The Port of Great Yarmouth is located within the town of Great Yarmouth, to the south of the town centre on the east bank of the River Yare. The most direct route to the SRN is the following, as shown in Annex Image E.9:

- Exiting the port via the Outer Harbour North Gate on South Beach Parade
- Proceeding north on South Beach Parade for approximately 0.1 km, before turning left onto Hartmann Road and travelling west for approximately 0.3 km to the Hartmann Road/South Denes Road junction
- Turning right onto the A1243 South Denes Road, and proceeding northbound for approximately 1.1 km to the Herring Bridge

- Crossing Herring Bridge and taking William Adams Way westbound at the roundabout to join the A47 at Harfrey's Roundabout, a total distance of 0.6 km.

Annex Image E.9 Port of Great Yarmouth access plan



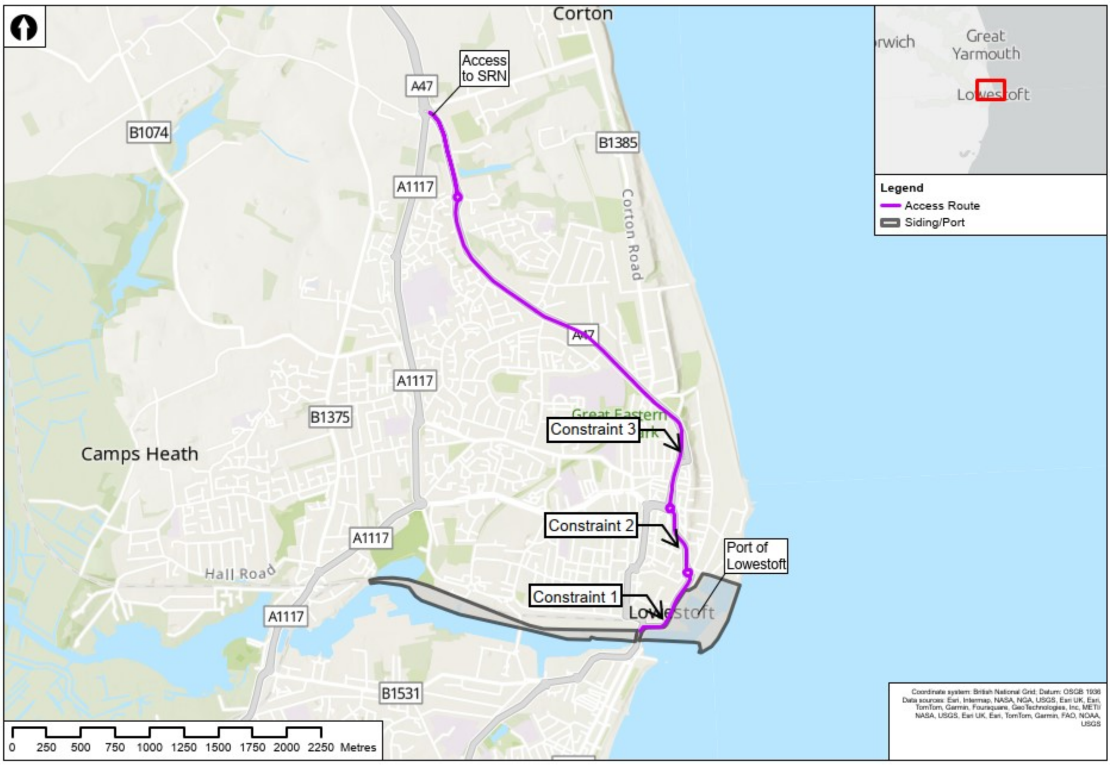
E.3.6 This route is approximately 2.1 km length in total. Based on a desktop assessment of the available data for this route, no highway constraints have been identified for this access route.

Lowestoft

E.3.7 The Port of Lowestoft is located within the town of Lowestoft, to the south of the town centre on the River Waveney. The most direct route to the SRN is the following, as shown in Annex Image E.10:

- Exiting the port via the existing access on Commercial Road, and proceeding to the junction with the A47
- Turning left onto the A47, and proceeding northbound for approximately 0.6 km to the Gordon Road Roundabout
- Crossing the roundabout and continuing northbound on the A47 for approximately 0.5 km to the Jubilee Way Roundabout
- Crossing the roundabout and continuing northbound on the A47 for approximately 3.0 km to the A47/Bentley Drive Roundabout
- Crossing the roundabout and continuing northbound on the A47 for approximately 0.6 km to the A47/Millenium Way Roundabout
- Hence joining the A47 Yarmouth Road northbound.

Annex Image E.10 Port of Lowestoft access plan



E.3.8 This route is approximately 4.7 km in total. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.8 have been identified.

Annex Table E.8 Port of Lowestoft access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Residential Proximity	Residential properties adjacent to the route on A47 Battery Green Road.	Traffic impacts to be assessed.
2	Residential Proximity	Residential properties adjacent to the route on A47 Old Nelson Street.	Traffic impacts to be assessed.
3	Residential Proximity	Residential properties adjacent to the route on A47 Jubilee Way.	Traffic impacts to be assessed.

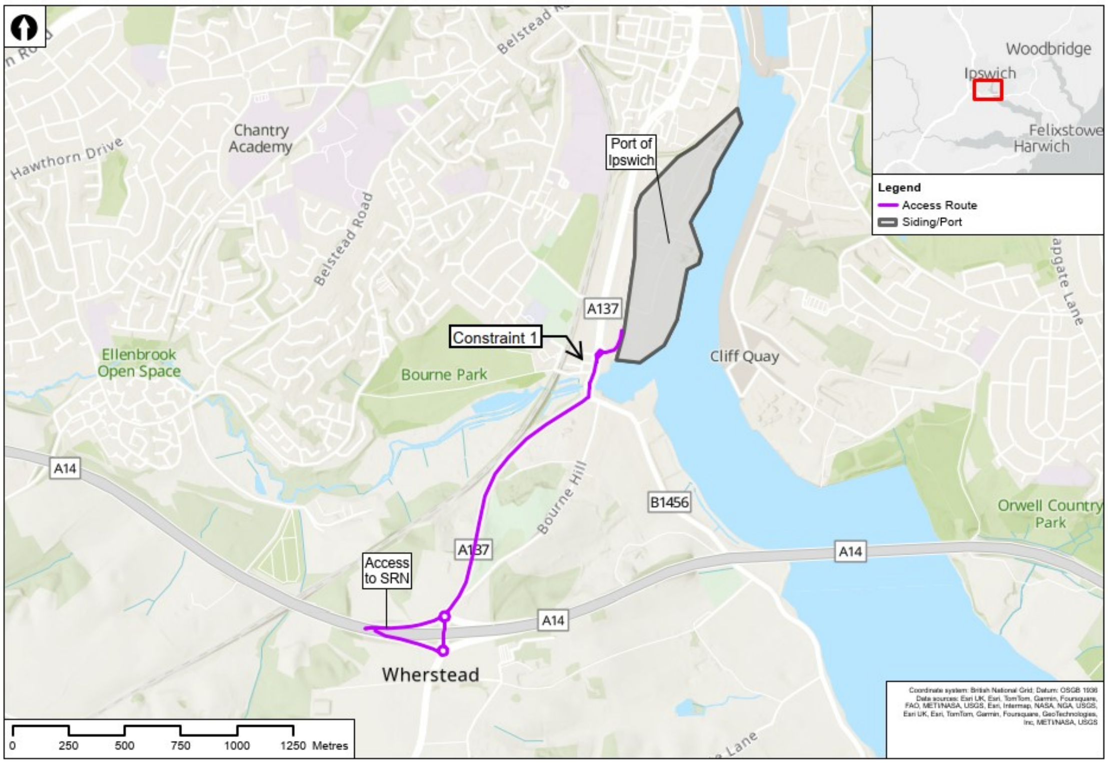
E.3.9 As an alternative approach, it may be preferable to utilise the Gull Wing Bridge, re-routeing construction traffic via the A12, Gull Wing Bridge, Peto Way, and the A1117 Millenium Way. This would reduce incidences of construction traffic passing through residential areas compared to the route outlined above, although would utilise more minor local roads compared to the access route shown.

Ipswich

E.3.10 The Port of Ipswich is located within the town of Ipswich, to the south of the town centre on the River Orwell. Assuming the use of the quay on the west bank of the River Orwell only, the most direct route to the SRN is the following, as shown in Annex Image E.11:

- Exiting the port via the existing Port of Ipswich West Bank Terminal gate, and joining the A137 Wherstead Road
- Proceeding southbound on the A137 Wherstead Road for approximately 1.6 km
- Joining the A14 at Junction 56.

Annex Image E.11 Ipswich Port access plan



E.3.11 This route is approximately 1.6 km in total. Based on a desktop assessment of the available data for this route, the constraints listed in Annex Table E.9 have been identified.

Annex Table E.9 Ipswich Port access constraints

Constraint ID	Type	Description	Suggested Mitigation
1	Residential Proximity	Residential properties adjacent to the route on A137 Wherstead Road.	Traffic impacts to be assessed.

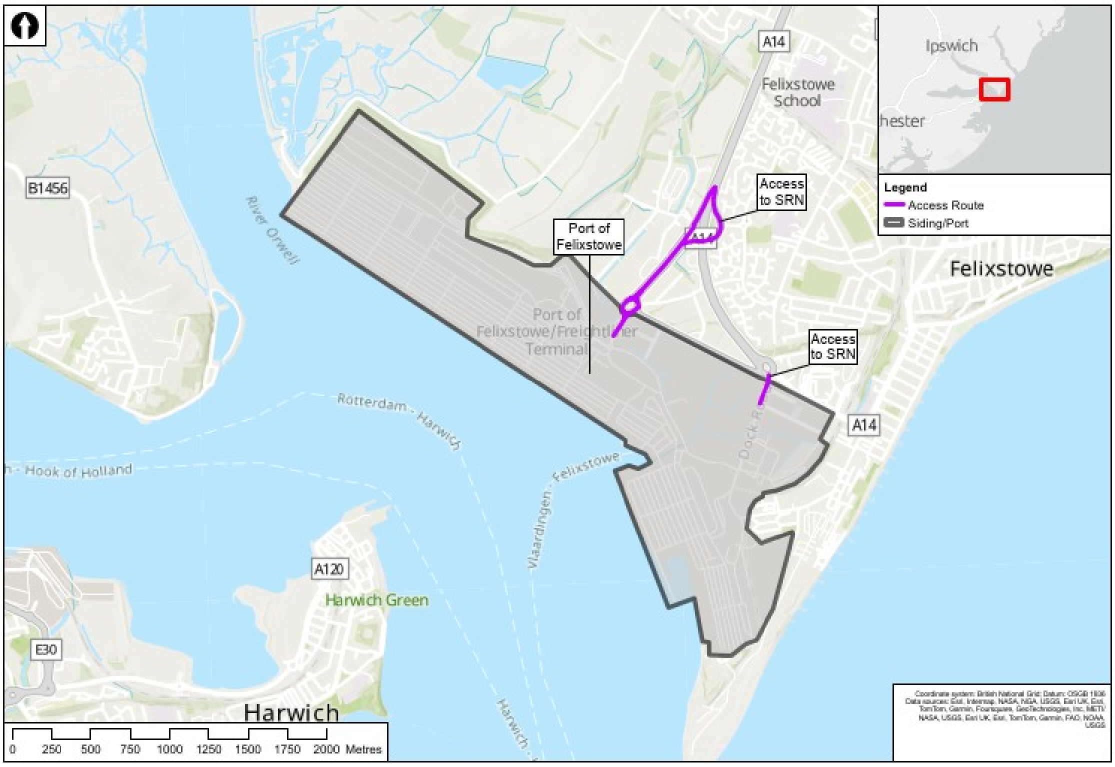
Felixstowe

E.3.12 The Port of Felixstowe is located within the town of Felixstowe, to the south-west of the town centre. There are two options for accessing the SRN from this facility, depending upon which part of the port shipments are delivered to, as shown in Annex Image E.12:

- Route Option A: From the western part of the port:
  - Exiting the port via the existing gate onto the Trinity Avenue Roundabout
  - Crossing the roundabout and proceeding northbound on Trinity Avenue for approximately 0.6 km
  - Hence joining the A14 at Junction 61.
- Route Option B: From the eastern part of the port:
  - Existing the port via the existing gate onto Dock Road
  - Hence joining the A14 at the roundabout immediately ahead.

E.3.13 Based on a desktop assessment of the available data for this route, no highway constraints have been identified for either of these access route options.

Annex Image E.12 Felixstowe Port access plan

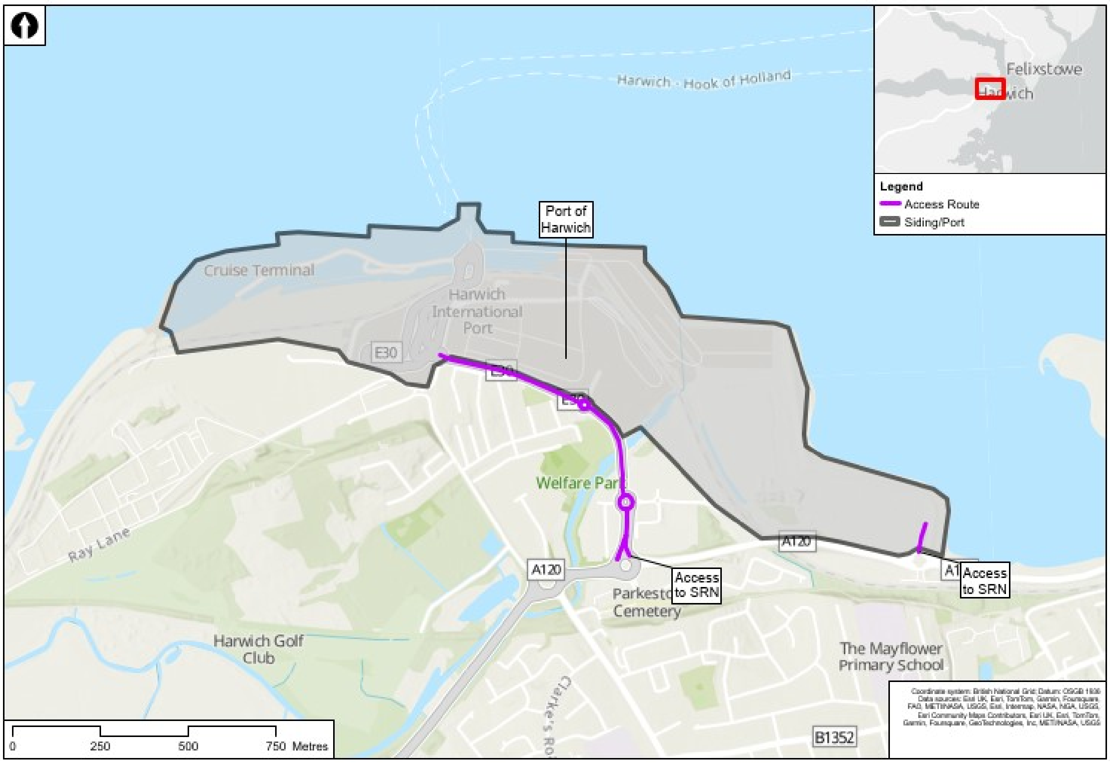


Harwich

E.3.14 The Port of Harwich is located to the north of the town of Harwich, on the south bank of the River Stour. There are two options for accessing the SRN from this facility, depending upon which part of the port shipments are delivered to, as shown in Annex Image E.13:

- Route Option A: From the western part of the port: Exiting the port via the existing mini roundabout onto the A136 Parkston Bypass
  - Proceeding southbound on the A136 Parkston Bypass for approximately 0.9 km to the St Nicholas Roundabout
  - Hence joining the A120 at the roundabout.
- Route Option B: From the eastern part of the port:
  - Exiting the port via the existing access gate onto Phoenix Road, and proceeding southbound for approximately 0.2 km to the roundabout with the A120
  - Hence joining the A120 at the roundabout.

Annex Image E.13 Harwich Port access plan



E.3.15 Based on a desktop assessment of the available data for this route, no highway constraints have been identified for either of these access route options.

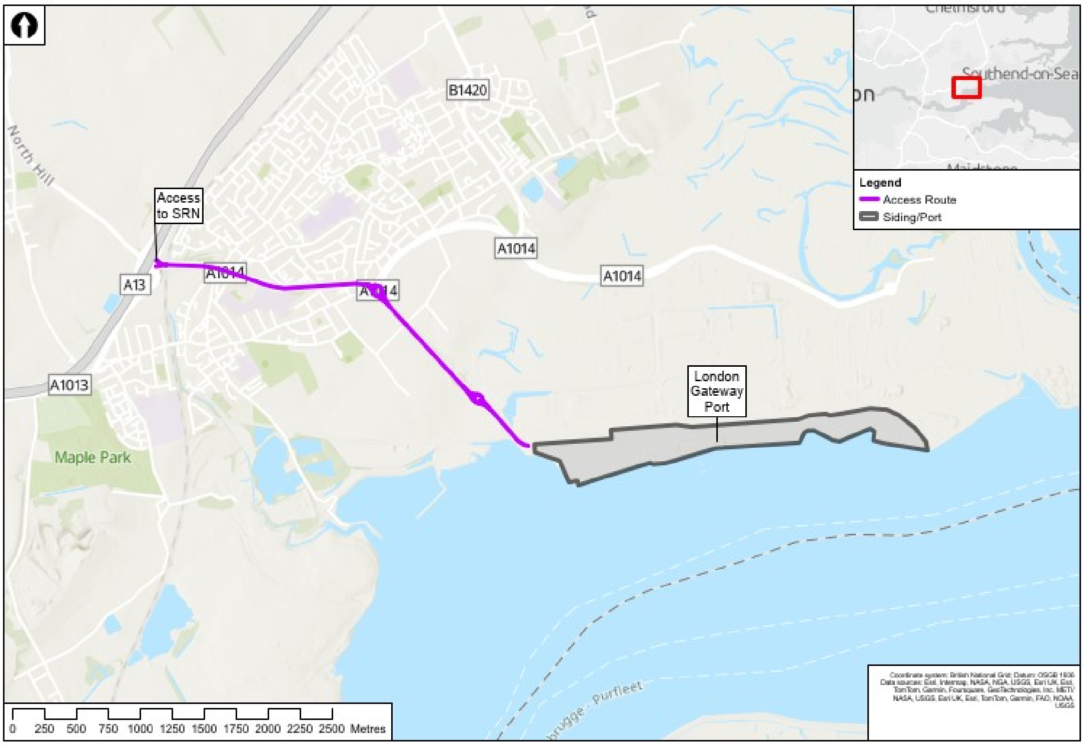
London Gateway

E.3.16 London Gateway Port is located to the south-east of the town of Stanford-le-Hope, on the north bank of the River Thames. The most direct route to the SRN is the following, as shown in Annex Image E.14:

- Exiting the port via the existing gate and proceeding northbound for approximately 0.8 km
- Crossing the Ocean Boulevard Roundabout and continuing northbound on London Gateway Drive for approximately 1.2 km to the A1014 Roundabout

- Crossing the A1014 Roundabout and proceeding westbound on the A1014 The Manorway for approximately 1.8 km to the A13/A1014 Junction
- Hence joining the A13.

Annex Image E.14 London Gateway Port access plan



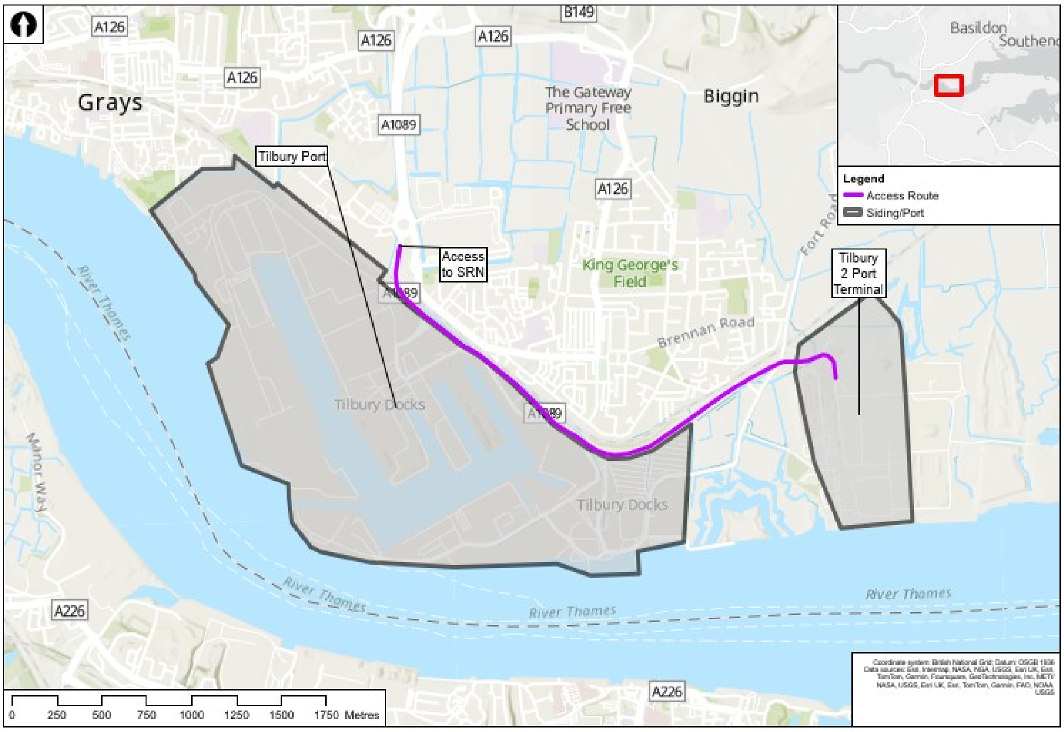
E.3.17 This route is approximately 3.8 km in total. Based on a desktop assessment of the available data for this route, no highway constraints have been identified for this access route.

Tilbury

E.3.18 The Port of Tilbury is split between two adjacent sites:

- The Tilbury Docks site to the west
- The Tilbury 2 Port Terminal to the east.

Annex Image E.15 Tilbury Port access plan



E.3.19 Access from the Port of Tilbury to the SRN is via the A1089, as shown in Annex Image E.15. Based on a desktop assessment of the available data for this route, no highway constraints have been identified for this access route.

E.4 Summary

E.4.1 Suitable routes have been identified for HGVs accessing the SRN by road from each of the sidings and port locations assessed to be suitable for further consideration in Sections 3 and 4. These connections are:

- Trowse Newton Sidings to the A47
- Kennett Sidings to the A14
- Barham Sidings to the A14
- Marks Tey Sidings to the A12/A120
- Tilbury Sidings to the A1089
- King's Lynn Port to the A47
- Port of Great Yarmouth to the A47
- Port of Lowestoft to the A47
- Ipswich Port to the A14
- Felixstowe Port to the A14
- Harwich Port to the A120
- London Gateway Port to the A13
- Tilbury Port to the A1089.

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