

**HyNet North West  
Hydrogen Pipeline**

Delivering clean growth

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# HyNet North West Hydrogen Pipeline Project

**Cadent Ltd**

**EIA Scoping Report**

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# Contents

<b>1.</b>	<b>Introduction</b>	<b>17</b>
1.1	Overview	17
1.2	Intention to apply for Development Consent	18
1.3	The need for Environmental Impact Assessment	19
1.4	Purpose of the Scoping Report	20
1.5	Competence	21
1.6	Other assessments	21
	Habitats Regulations Assessment	21
	Flood Risk Assessment	22
1.7	Structure of the Scoping Report	22
<b>2.</b>	<b>The Project</b>	<b>23</b>
2.1	Background to and need for the Project	23
2.2	Consideration of alternatives	24
	Introduction	24
	Strategic alternatives	25
2.3	Routeing and Siting	26
	West Corridor Options	26
	South Corridor Options	27
	Hydrogen Above Ground Installations	27
2.4	Design envelope approach for EIA Scoping	27
2.5	Development proposals	28
	Introduction	28
	Spurs	33
	HAGIs	34
	<i>Pressure reduction units</i>	37
	<i>Metering facilities</i>	38
	<i>Pigging facilities</i>	38
	<i>Instrumentation and Control Kiosks</i>	38
	Block Valves	38
2.6	Construction	39
	Construction phasing and timescales	39
	Pipeline Construction	40
	Crossing techniques	42
	Compounds	44
	Above ground infrastructure	44
2.7	Operation and maintenance	45
2.8	Decommissioning	46

<b>3.</b>	<b>Legislation and Policy Overview</b>	<b>47</b>
3.1	Introduction	47
3.2	Withdrawal of the UK from the EU	47
3.3	Planning Act 2008	48
3.4	The EIA Regulations	48
3.5	National Policy Statements	50
	Overarching National Policy Statement for Energy (EN-1)	51
	National Policy Statement for Oil and Gas Supply and Storage (EN-4)	51
	Draft Overarching NPS-EN1	51
	Draft NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)	52
3.6	National Guidance	52
	National Planning Policy Framework	52
3.7	Local Planning Policy	53
<b>4.</b>	<b>The EIA process</b>	<b>58</b>
4.1	Approach to EIA Scoping	58
	Overarching Approach	58
4.2	Determining the scope of the assessment	59
	Technical scope	59
	Spatial scope	60
	Temporal scope	60
4.3	Assessment of effects and determining significance	61
	Overview	61
	Resource and receptor sensitivity	62
	Magnitude of change	62
	Determination of significance	63
4.4	Environmental measures	64
4.5	Cumulative effects assessment	66
	Inter-project effects	66
	Intra-project effects	67
4.6	Transboundary effects	68
4.7	Consultation and engagement	69
	Pre-application consultation	69
	Technical engagement	70
4.8	COVID-19 implications	70
4.9	Assumptions and limitations	71
4.10	Structure of the ES	71
<b>5.</b>	<b>Ecology</b>	<b>73</b>
5.1	Introduction	73
	Assumptions and limitations	73
5.2	Relevant Legislation and Technical Guidance	74
	Legislation	74

	Technical guidance	79
5.3	Consultation	80
5.4	Baseline Conditions	81
	Study Area	81
	Data gathering methodology	82
	Sources of data	83
	Current baseline	85
	Future baseline	97
5.5	Embedded Environmental Measures	97
5.6	Scope of the Assessment	101
	Potential features	101
	Spatial scope	103
	Potentially significant effects	105
	Ecological features scoped out from further assessment	107
5.7	Assessment Methodology	108
	Significant evaluation methodology	109
	Negative effects	110
	Positive effects	111
	Habitat Regulations	111
	Biodiversity Net Gain	112
5.8	Proposed Survey and Assessment Approach	112
	Baseline	112
<b>6.</b>	<b>Historic Environment</b>	<b>119</b>
6.1	Introduction	119
	Assumptions and limitations	119
6.2	Relevant Legislation and Technical Guidance	119
	Legislation	119
	Technical guidance	123
6.3	Consultation	125
6.4	Baseline Conditions	126
	Data gathering methodology	126
	Study Area	127
	Current baseline	128
	Future baseline	133
6.5	Embedded environmental measures	133
6.6	Scope of the assessment	134
	Temporal scope	134
	Spatial scope	134
	Potential receptors	134
	Likely significant effects	135
6.7	Assessment Methodology	136
	Assessment of heritage significance	136
	Assessment of magnitude of change	138
	Assessment of significance of effect	139
	Assessment of harm and substantial harm	140

<b>7.</b>	<b>Water Environment</b>	<b>141</b>
7.1	Introduction	141
	Assumptions and limitations	141
7.2	Relevant legislation and technical guidance	141
	Legislation	142
	Technical Guidance	150
7.3	Consultation	157
7.4	Baseline conditions	157
	Data gathering methodology	158
	Current baseline	161
	Future baseline	178
7.5	Embedded environmental measures	181
7.6	Scope of the Assessment	186
	Study Area	186
	Potential receptors	186
	Likely significant effects	188
	Impacts scoped out of assessment	191
7.7	Assessment Methodology	192
	Introduction	192
	Significance evaluation methodology	192
<b>8.</b>	<b>Landscape and Visual</b>	<b>199</b>
8.1	Introduction	199
	Assumptions and limitations	199
8.2	Relevant legislation and technical guidance	199
	Legislation	199
	Technical Guidance	200
8.3	Consultation	201
8.4	Baseline conditions	202
	Data gathering methodology	202
	Current baseline	203
	Future baseline	206
8.5	Embedded environmental measures	206
8.6	Scope of the assessment	207
	Study Area	207
	Potential receptors	208
	Likely significant effects	208
8.7	Assessment methodology	210
	Landscape Assessment	211
	Visual Assessment	213
	Evaluation of significance of landscape and visual effects	215
<b>9.</b>	<b>Air Quality</b>	<b>217</b>
9.1	Introduction	217

	Assumptions and limitations	217
9.2	Relevant legislation and technical guidance	217
	Legislation	217
	Technical Guidance	222
9.3	Consultation	223
9.4	Into data Baseline conditions	223
	Data gathering methodology	223
	Current baseline	225
	Future baseline	228
9.5	Embedded environmental measures	228
9.6	Scope of the assessment	229
	Study Area	229
	Potential receptors	231
	Likely significant effects	234
9.7	Assessment methodology	235
<b>10.</b>	<b>Noise and Vibration</b>	<b>242</b>
10.1	Introduction	242
	Assumptions and limitations	242
	Noise sources	243
10.2	Relevant legislation and technical guidance	243
	Legislation	243
	Technical Guidance	245
10.3	Consultation	249
10.4	Baseline conditions	249
	Data gathering methodology	249
	Current baseline	251
	Future baseline	251
10.5	Embedded environmental measures	252
10.6	Scope of the assessment	252
	Study area	252
	Potential receptors	255
	Likely significant effects	256
	Processes and impacts scoped out	258
10.7	Assessment methodology	260
	Establishing receptor sensitivity	260
	Establishing magnitude of impact and significance	261
<b>11.</b>	<b>Traffic and Transport</b>	<b>268</b>
11.1	Introduction	268
11.2	Assumptions and limitations	268
11.3	Relevant technical guidance	268
	Technical guidance	268
11.4	Consultation	269

11.5	Baseline conditions	270
	Study Area	271
	Data gathering methodology	271
	Current baseline	273
	Future baseline	282
11.6	Embedded environmental measures	282
11.7	Scope of the assessment	284
	Potential receptors	284
	Likely significant effects	284
	Effects scoped out of assessment	286
11.8	Assessment methodology	287
	Introduction	287
	General approach	287
	Determination of significance	288
	Receptor sensitivity	289
	Magnitude of change	290
	Desk-based assessment	291
	Site based assessment	291
	Undertaking further assessments	292
<b>12.</b>	<b>Ground Conditions</b>	<b>293</b>
12.1	Introduction	293
	Assumptions and limitations	293
12.2	Relevant legislation, planning policy and technical guidance	293
	Legislation	293
	Technical Guidance	297
12.3	Consultation	298
12.4	Baseline conditions	298
	Data gathering methodology	298
	Current baseline	299
	Future baseline	300
12.5	Embedded environmental measures	301
12.6	Scope of the assessment	304
	Spatial Scope and Study Area	304
	Potential receptors	305
	Potential effects	305
	Activities or impacts scoped out of the assessment	309
12.7	Assessment methodology	310
	Risk Assessment	310
	Significance evaluation methodology	317
<b>13.</b>	<b>Agriculture and Soil Resources</b>	<b>319</b>
13.1	Introduction	319
	Assumptions and limitations	319
13.2	Relevant legislation, planning policy and technical guidance	319



	Legislation	319
	Technical Guidance	321
13.3	Consultation	322
13.4	Baseline conditions	323
	Data gathering methodology	323
	Current baseline	324
	Future baseline	326
13.5	Embedded environmental measures	327
13.6	Scope of the assessment	330
	Study area	330
	Potential receptors	330
	Likely significant effects	332
13.7	Assessment methodology	333
	Magnitude of change	335
	Evaluation of significance	337
<b>14.</b>	<b>Land Use</b>	<b>338</b>
14.1	Introduction	338
14.2	Assumptions and limitations	338
14.3	Relevant legislation and technical guidance	338
	Legislation and Guidance	339
14.4	Consultation	339
14.5	Baseline conditions	339
	Data gathering methodology	339
	Current baseline	340
14.6	Future baseline	342
14.7	Embedded environmental measures	342
14.8	Scope of the assessment	343
	Study Area	343
	Potential receptors	343
	Likely significant effects	344
14.9	Assessment methodology	345
	Significance assessment methodology: direct and isolation effects	345
<b>15.</b>	<b>People and Communities</b>	<b>348</b>
15.1	Introduction	348
	Assumptions and limitations	348
15.2	Relevant legislation and technical guidance	349
	Legislation	349
	Technical Guidance	349
15.3	Consultation	353
15.4	Baseline Conditions	353
	Data gathering methodology	353

	Further information sources	354
	Current baseline	354
	Future baseline	372
15.5	Embedded Environmental Measures	372
15.6	Scope of the assessment	372
	Study area	372
	Temporal scope	373
	Potential receptors	374
	Likely significant effects	374
15.7	Assessment methodology	377
	Identification of effects	378
	Assessment of Significance	378
	Methodologies for sub-topics	381
<b>16.</b>	<b>Major Accidents and Disasters</b>	<b>384</b>
16.1	Introduction	384
	Assumptions and Limitations	384
16.2	Relevant legislation and technical guidance	384
	Legislation	385
	Technical Guidance	386
16.3	Consultation	388
16.4	Baseline Conditions	388
	Data gathering methodology	388
	Current baseline	390
	Future baseline	395
16.5	Embedded environmental measures	396
16.6	Scope of the Assessment	399
	Study Area	399
	Potential receptors	400
	Likely significant effects	403
16.7	Assessment methodology	407
	General methodology approach	408
	Assessment of effects	409
	Determination of significance	411
<b>17.</b>	<b>Climate Change</b>	<b>413</b>
17.1	Introduction	413
17.2	Assumptions and limitations	413
17.3	Relevant legislation and technical guidance	414
	Legislation	414
	Technical Guidance	417
17.4	Consultation	420
17.5	Baseline conditions	420
	Greenhouse Gases	420

	Climate Change Resilience	421
17.6	Embedded environmental measures	426
17.7	Scope of the assessment	427
	Study area	427
	Potential receptors	427
	Likely significant effects	428
17.8	Assessment methodology	433
	Greenhouse Gases	433
	Climate Change Resilience	436

## 18. Summary 443

Table 2.1	Route corridor description	29
Table 3.1	Cheshire West and Chester Adopted Development Plan	53
Table 3.2	Cheshire East Local Plan Strategy	54
Table 3.3	Trafford Local Plan Core Strategy	55
Table 3.4	Warrington Local Plan Core Strategy	55
Table 3.5	St Helens Core Strategy	56
Table 3.6	Halton Core Strategy	56
Table 4.1	Generic guidelines for the assessment of sensitivity	62
Table 4.2	Generic guidelines for the assessment of magnitude	63
Table 4.3	Significance evaluation matrix	64
Table 4.4	Generic classification of effect definitions	64
Table 4.5	Outline structure of the ES	71
Table 5.1	Legislation relevant to ecology	74
Table 5.2	Technical guidance relevant to ecology	80
Table 5.3	Current baseline – statutory sites within the Study Area	85
Table 5.4	Current baseline – HPI within the Study Area	94
Table 5.5	Relevant ecology embedded environmental measures	98
Table 5.6	Defining importance of ecological features	102
Table 5.7	Environmental changes and potentially significant ecology effects	105
Table 5.8	Guidelines for the assessment of the scale of magnitude	110
Table 5.9	Field survey programme	112
Table 6.1	Legislation relevant to historic environment	120
Table 6.2	Technical guidance relevant to historic environment	123
Table 6.3	Likely significant historic environment effects	136
Table 6.4	Classification of sensitivity of receptors	137
Table 6.5	Classification of magnitude of change	138
Table 6.6	Classification of effect	140
Table 7.1	Legislation relevant to the Water Environment	142
Table 7.2	Technical guidance relevant to the Water Environment	151
Table 7.3	Key Sources of water environment data	159
Table 7.4	Flows for Gauges within the Study Area taken from the National River Flow Archive	163
Table 7.5	WFD Cycle 2 (2019) River Waterbody details	168
Table 7.6	WFD Cycle 2 (2019) Groundwater body details	173

Table 7.7	Environment Agency peak river flow climate change allowances	179
Table 7.8	Environment Agency peak rainfall intensity allowances for England	180
Table 7.9	Environment Agency sea level allowances for the North West river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline)	180
Table 7.10	Relevant water environment embedded environmental measures	181
Table 7.11	Likely significant Water Environment effects	189
Table 7.12	Definitions of receptor sensitivity	192
Table 7.13	Definitions of magnitude of change	196
Table 7.14	Significance evaluation matrix	198
Table 8.1	Legislation relevant to Landscape and Visual	200
Table 8.2	Technical guidance relevant to Landscape and Visual	200
Table 8.3	Visual angle calculation in relation to distance from a HAGI	207
Table 8.4	Potentially significant landscape and visual effects	208
Table 8.5	Evaluation of Landscape Sensitivity	212
Table 8.6	Establishing the magnitude of landscape change	212
Table 8.7	Evaluation of Visual Sensitivity	213
Table 8.8	Evaluation of Visual Sensitivity	215
Table 8.9	Establishing the magnitude of visual change	215
Table 8.10	Evaluation of Landscape and Visual Effects	216
Table 9.1	Legislation relevant to the Air Quality assessment	217
Table 9.2	Relevant Air Quality Standards and Objectives	221
Table 9.3	Technical guidance relevant to Air Quality	222
Table 9.4	Data sources used to inform the Air Quality assessment	223
Table 9.5	AQMAs declared within 10km of the red line boundary	225
Table 9.6	Embedded environmental measures relating to Air Quality	229
Table 9.7	Screening criteria for detailed air quality assessment of road traffic emissions	230
Table 9.8	Examples of locations where Air Quality Objectives apply	231
Table 9.9	Ecological receptors within 350m of the Scoping red line boundary	233
Table 9.10	Likely significant Air Quality effects	234
Table 9.11	Summary of relevant assessment criteria for ecological receptors	238
Table 9.12	Matrices for determining risk of impacts from construction dust	240
Table 9.13	Impact descriptors for individual receptors	241
Table 10.1	Legislation relevant to noise and vibration	244
Table 10.2	Technical guidance relevant to noise and vibration	246
Table 10.3	Summary of noise sensitive receptor types	255
Table 10.4	Likely significant noise and vibration effects	257
Table 10.5	Elements proposed to be scoped out	258
Table 10.6	Establishing the sensitivity of receptors	260
Table 10.7	Example threshold of potential significant effect at dwellings	262
Table 10.8	Magnitude of impact of construction traffic at receptors	263
Table 10.9	Criteria for construction vibration – human response	264
Table 10.10	Criteria for construction vibration – cosmetic damage	265
Table 10.11	Proposed LOAELs and SOAELs for assessing operational site noise	267
Table 11.1	Technical guidance relevant to Traffic and Transport	269
Table 11.2	Key sources of transport data	271

Table 11.3	Motorways, 'A' and 'B' Roads within the transport study area (West Corridor)	274
Table 11.4	Annual Average Daily Flow (West Corridor)	275
Table 11.5	Motorways, 'A' and 'B' Roads within the transport study area (North Corridor)	276
Table 11.6	Annual Average Daily Flow (North Corridor)	276
Table 11.7	Motorways, 'A' and 'B' Roads within the transport study area (East Corridor)	278
Table 11.8	Annual Average Daily Flow (East Corridor)	278
Table 11.9	'A' and 'B' Roads within the transport study area (South Corridor)	279
Table 11.10	Annual Average Daily Flow (South Corridor)	280
Table 11.11	Relevant transport embedded environmental measures	283
Table 11.12	Likely significant Traffic and Transport effects	285
Table 11.13	Significance evaluation matrix	289
Table 11.14	Receptor sensitivity	289
Table 11.15	Magnitude of change	290
Table 12.1	Legislation relevant to ground conditions	294
Table 12.2	Data sources to be used to inform the ground conditions baseline	299
Table 12.3	Relevant ground conditions embedded environmental measures	301
Table 12.4	Receptors requiring assessment for ground conditions	305
Table 12.5	Potential effects on ground conditions receptors scoped in for further assessment	306
Table 12.6	Activities or impacts scoped out of the ground conditions assessment	309
Table 12.7	Likelihood classification of contaminant linkage being realised	311
Table 12.8	Classification of consequence	313
Table 12.9	Risk matrix	316
Table 12.10	Risk definitions	316
Table 12.11	Ground conditions significance evaluation matrix	318
Table 13.1	Legislation relevant to agriculture and soil resources	320
Table 13.2	Key sources of soils and agricultural data	323
Table 13.3	Agriculture and soil embedded environmental measures	327
Table 13.4	Receptors requiring assessment for soils and agriculture	331
Table 13.5	Likely significant agriculture effects	332
Table 13.6	Sensitivity of receptor/resource	334
Table 13.7	Magnitude of change for agricultural land and soils	336
Table 13.8	Significance evaluation matrix	337
Table 14.1	Land Use embedded environmental measures	342
Table 14.2	Likely significant Land Use effects	344
Table 14.3	Magnitude of effects	346
Table 14.4	Receptor sensitivity	346
Table 14.5	Determining significance	347
Table 15.1	Technical guidance relevant to people and communities	350
Table 15.2	Population of six local councils in 2020 (total)	354
Table 15.3	Population of working age (16-64) in 2020 - % of total population	357
Table 15.4	Employment status for working age population (16-64) (2020-2021) (%)	359
Table 15.5	Employment by occupation (2020-2021) (%)	361
Table 15.6	Educational qualifications (2020) (% of resident population aged 16-64)	363

Table 15.7	Employee Earnings in the UK 2019	365
Table 15.8	Life Expectancy for six local councils by age group	370
Table 15.9	Likely significant people and communities effects	374
Table 15.10	Template for table of summary presentation of effects and their significance	380
Table 16.1	Legislation relevant to Major Accidents and Disasters	385
Table 16.2	Technical guidance relevant to Major Accidents and Disasters	386
Table 16.3	Data sources to be used to inform the major accidents and disasters assessment	388
Table 16.4	COMAH Establishments within 5km of Study Area	390
Table 16.5	Closest Sites Regulated by ONR	393
Table 16.6	Embedded environmental measures relevant to Major Accidents and Disasters	396
Table 16.7	Preliminary list of receptors within the Major Accidents and Disasters Study Area	401
Table 16.8	Likely significant Major Accidents and Disasters effects	404
Table 16.9	Magnitude of change matrix – non-human receptors	410
Table 16.10	Magnitude of change matrix – Human receptors	411
Table 16.11	Significance matrix – Major Accidents and Disasters	412
Table 17.1	Legislation relevant to the GHG assessment	414
Table 17.2	UK Carbon Budgets	416
Table 17.3	Legislation relevant to the CCR assessment	416
Table 17.4	Technical guidance relevant to the GHG assessment	417
Table 17.5	Technical guidance relevant to the CCR assessment	418
Table 17.6	Baseline climate data 1981 - 2010	423
Table 17.7	Future climate projections for the north-west of England from UKCP18	424
Table 17.8	Stages of the Project considered as sources of GHG emissions and likely significant effects	428
Table 17.9	Assessment of the likely significant effects to be scoped into the EIA	431
Table 17.10	Significance criteria	435
Table 17.11	Definitions of levels of sensitivity of the receptor to the climate impact	438
Table 17.12	Definitions of levels of exposure of the receptor to the climate impact	438
Table 17.13	Matrix showing vulnerability of receptors to climate impacts	439
Table 17.14	Potential climate impacts on receptors during construction and assessment of vulnerability of the receptor	439
Table 17.15	Potential climate impacts on receptors during operation and assessment of vulnerability of the receptor	440
Table 18.1	Summary scope of the assessment	443

Figure 1.1	Scoping red line boundary. Sheet A: Overview	After Page 22
Figure 1.1	Scoping red line boundary. Sheet B: West	After Page 22
Figure 1.1	Scoping red line boundary. Sheet C: North	After Page 22
Figure 1.1	Scoping red line boundary. Sheet D: East	After Page 22
Figure 1.1	Scoping red line boundary. Sheet E: South	After Page 22
Figure 1.2	Key components of the Project	After Page 22
Figure 2.1	Illustration of the wider HyNet North West project	24
Figure 2.2a	Strategic Alternatives (A)	After Page 46
Figure 2.2b	Strategic Alternatives (B)	After Page 46
Figure 2.2c	Strategic Alternatives (C)	After Page 46
Figure 2.2d	Strategic Alternatives (D)	After Page 46
Figure 2.3	Initial corridor options	After Page 46
Figure 2.4	Illustrative HAGI layout	35
Figure 2.5	Above ground installation example (1)	36
Figure 2.6	Above ground installation example (2)	37
Figure 2.7	Typical components at an above ground installation	38
Figure 2.8	Typical layout of a working width for pipe laying	39
Figure 4.1	Intra-project effects assessment process	68
Figure 5.1	Designated sites within 20km	After Page 118
Figure 6.1	Historic Environment Study Area and Designated Assets	After Page 140
Figure 7.1	Water environment Scoping red line boundary and Study Area	After Page 198
Figure 7.2	Solid Geology	After Page 198
Figure 7.3	Superficial Geology	After Page 198
Figure 7.4	WFD surface water bodies (river, transitional and coastal) and river flow gauging stations	After Page 198
Figure 7.5	WFD groundwater bodies and SPZs	After Page 198
Figure 7.6	Flood zones	After Page 198
Figure 7.7	Hydrological and Hydrogeological Potential Receptors	After Page 198
Figure 7.8	Water Environment Constraints Map	After Page 198
Figure 8.1	Landscape receptors	After Page 216
Figure 8.2	Visual Receptors and Zone of Theoretical Visibility (ZTV) of Hydrogen Above Ground Installations (HAGIs)	After Page 216
Figure 9.1	Air Quality Management Areas (AQMAs) in the vicinity of the Scoping boundary	After Page 241
Figure 9.2	Background NO <sub>2</sub> concentrations	After Page 241
Figure 9.3	Background NO <sub>x</sub> concentrations	After Page 241
Figure 9.4	Background PM <sub>10</sub> concentrations	After Page 241
Figure 9.5	Background PM <sub>2.5</sub> concentrations	After Page 241
Figure 9.6	Air quality monitoring locations	After Page 241
Figure 11.1	Transport study areas Sheet 1: West	After Page 292
Figure 11.1	Transport study areas Sheet 2: North	After Page 292
Figure 11.1	Transport study areas Sheet 3: East	After Page 292
Figure 11.1	Transport study areas Sheet 4: South	After Page 292
Figure 11.2	Public Rights of Way Sheet 1: West	After Page 292
Figure 11.2	Public Rights of Way Sheet 2: North	After Page 292
Figure 11.2	Public Rights of Way Sheet 3: East	After Page 292

Figure 11.2	Public Rights of Way Sheet 4: South	After Page 292
Figure 11.3	National Cycle Network Sheet 1: West	After Page 292
Figure 11.3	National Cycle Network Sheet 2: North	After Page 292
Figure 11.3	National Cycle Network Sheet 3: East	After Page 292
Figure 11.3	National Cycle Network Sheet 4: South	After Page 292
Figure 12.1	Ground Conditions Study Area	After Page 318
Figure 12.2	Superficial geology	After Page 318
Figure 12.3	Bedrock geology	After Page 318
Figure 12.4	Groundwater Source Protection Zones (SPZ)	After Page 318
Figure 12.5	Historic and Authorised landfills	After Page 318
Figure 13.1	Agricultural Land Classification	After Page 337
Figure 14.1	Land Use Study Area	After Page 347
Figure 14.2	Land Use baseline receptors Sheet 1: West	After Page 347
Figure 14.2	Land Use baseline receptors Sheet 2: North	After Page 347
Figure 14.2	Land Use baseline receptors Sheet 3: East	After Page 347
Figure 14.2	Land Use baseline receptors Sheet 4: South	After Page 347
Figure 15.1	Population distribution in six local councils (total) and England in 2020 - % of total population	355
Figure 15.2	Population distribution in individual six local councils - % of total population	356
Figure 15.3	GDP in England and the North West indexed to 2013	366
Figure 15.4	Average annual growth by economic sector in the North West and England (2013-2019)	367
Figure 15.5	Gross Value Added by economic sector in the North West and England as a proportion of totals (2019)	368
Figure 15.6	Private housing rental prices in England and the North West indexed to 2005	369

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Appendix 1A	Abbreviations
Appendix 3A	Planning Policy Summary
Appendix 6A	Historic Environment
Appendix 9A	Air Quality Automatic and Passive monitoring data
Appendix 16A	Scoping Assessment of Major Accidents and Disasters
Appendix 16B	Major Accidents and Disasters Harm Criteria

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# 1. Introduction

## 1.1 Overview

- 1.1.1 The HyNet North West Hydrogen Pipeline Project (hereafter ‘the Project’) is a proposal by Cadent Gas Ltd (hereafter ‘the Applicant’) to construct and operate the UK’s first 100 per cent hydrogen pipeline. It will deliver hydrogen – a clean energy source – to multiple industrial users and power generators, taking hydrogen to gas blending points for introduction into the existing gas network.
- 1.1.2 The Project is part of the wider ‘HyNet North West’ project that will produce, store and distribute hydrogen as well as capture and store carbon from industry in the North West of England and North Wales. This project has the potential to reduce carbon dioxide emissions by 10 million tonnes every year by 2030 – the equivalent of taking four million cars off the road. By achieving this, HyNet North West will create and maintain thousands of local jobs, enabling long-term sustainability for businesses and supporting financial security for communities across the region.
- 1.1.3 The Project includes the construction, operation and maintenance of up to 125km of new pipeline to distribute hydrogen to industry and for blending with the gas network in the North West, and a number of Hydrogen Above Ground Installations (HAGIs) (plus Block Valves described in **Chapter 2: The Project**) required to control the flow and pressure of hydrogen at key points along the proposed pipeline.
- 1.1.4 The Project would connect to the Hydrogen Production Plant at the Essar Stanlow site as the source of hydrogen for onward distribution to the Network. The pipeline would continue to the Central Hub at the centre of the Network which serves as the connection and onward distribution point to the South, East and North corridors, which would extend to locations near Middlewich, Irlam, and St. Helens respectively. The location of the Project is illustrated by the Scoping red line boundary in **Figure 1.1**.
- 1.1.5 The proposed key components of the Project are shown in **Figure 1.2** and can be summarised as follows:
- Hydrogen Pipeline Network (HPN) across the North West region:
    - ▶ West corridor: Stanlow Hydrogen Production Plant (HPP) to Central Hub, incorporating Rocksavage Hydrogen Above Ground Installation (HAGI) and Runcorn HAGI; spurs to customers at Intergen, Rocksavage; Inovyn, Runcorn; and The Heath Business and Technical Park.
    - ▶ North corridor: Central Hub to St. Helens HAGI, incorporating HAGIs at Clock Face, Burtonwood, Cuerdley and Higher Walton; spurs to customers at NSG Pilkington’s Greengate Works; Glass Futures; NGF Europe Ltd; Novelis, Latchford; PQ Silicas, Warrington; and Ingevity / Solvay, Warrington (shared connection).

- ▶ East corridor: Central Hub to Partington HAGI, incorporating a HAGI at Warburton<sup>1</sup> and potential Block Valve at Sworton Heath; spur to customer at SAICA, Partington.
- ▶ South corridor: Central Hub to Hydrogen Storage Facility located south of Northwich (including potential Block Valve); spur from Central Hub to Tata Chemicals, Winnington. Two options are under consideration at this stage for the South Corridor:
  - Option A: west of Northwich;
  - Option B: east of Northwich.

1.1.6 A full description of the Project is provided in **Chapter 2: The Project**.

1.1.7 This Scoping Report supports a request by the Applicant, under Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017<sup>2</sup> (hereafter referred to as 'the EIA Regulations'), for a written Scoping Opinion from the Secretary of State (SoS) for Business, Energy and Industrial Strategy (BEIS), administered by the Planning Inspectorate on behalf of the SoS, to inform the Environmental Impact Assessment (EIA) for the Project.

1.1.8 A review of the Scoping Opinion<sup>3</sup> from the SoS regarding stage one of the wider HyNet North West project, the North West Carbon Dioxide Pipeline, has been undertaken and has informed the preparation of this Scoping Report.

## 1.2 Intention to apply for Development Consent

1.2.1 The Project is a Nationally Significant Infrastructure Project (NSIP) under Part 14(1)(f) ('the construction of a pipe-line by a gas transporter') of the Planning Act 2008 (as amended)<sup>4</sup>. The Applicant intends to submit an application for an order granting development consent (Development Consent Order (DCO)) under Section 37 of the Planning Act 2008 to the Planning Inspectorate. The application will comprise details of all development proposals and will be accompanied by an Environmental Statement (ES) conforming to the EIA Regulations and other relevant policies and legislation. The red line boundary for the DCO (known as the 'Order Limits') will include all works proposed as part of the DCO, including those comprising the principal NSIP development itself and any associated development (as defined by Section 115 of the Planning Act 2008 and the accompanying

<sup>1</sup> Partington and Warburton HAGIs will be blending points to allow hydrogen to be blended with natural gas and supplied into the wider gas pipeline network to maximise the extent of supply

<sup>2</sup> UK Government (2017). Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended). (Online) Available at: <https://www.legislation.gov.uk/ukxi/2017/572/contents> (Accessed January 2022).

<sup>3</sup> The Planning Inspectorate (2021), North West Carbon Dioxide Pipeline. (Online). Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN070007/EN070007-000024-HYNE - Scoping Opinion.pdf> (Accessed 19 November 2021).

<sup>4</sup> UK Government (2008). Planning Act 2008. (Chapter 29). (Online) Available at: <https://www.legislation.gov.uk/ukpga/2008/29/contents> (Accessed January 2022).

Guidance on associated development applications for major infrastructure projects document)<sup>5</sup>.

### 1.3 The need for Environmental Impact Assessment

- 1.3.1 EIA is a process required by UK law which brings together information about the likely significant effects of a development. The legal basis for EIA lies in *European Community Directive 85/337/EEC*<sup>6</sup> (the 'EIA Directive') (as amended by Directive 2014/52/EU<sup>7</sup>). The EIA Directive is transposed into UK law through several pieces of legislation.
- 1.3.2 In relation to NSIPs, EIA is required for certain developments under the EIA Regulations. EIA is mandatory for development projects defined under Schedule 1. Those development projects defined in Schedule 2 only require EIA if they are likely to have significant effects on the environment by virtue of their nature, size or location.
- 1.3.3 The four stages of the DCO EIA process include:
- i. Screening (discretionary).
  - ii. Scoping (discretionary) (this stage).
  - iii. Preparation of Preliminary Environmental Information.
  - iv. Preparation of an ES.
- 1.3.4 The Project falls within the provisions of Schedule 1 (16)(a) as the pipeline for transporting hydrogen gas has a diameter of more than 800 millimetres and a length of more than 40km. An EIA will therefore be prepared, and in line with Regulation 8(1)(b) of the EIA Regulations<sup>2</sup>, the Applicant hereby provides notice that the application for a DCO will be accompanied by an ES.

<sup>5</sup> Department for Communities and Local Government (2013). Planning Act 2008: Guidance on associated development applications for major infrastructure projects. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/192681/Planning\\_Act\\_2008\\_-\\_Guidance\\_on\\_associated\\_development\\_applications\\_for\\_major\\_infrastructure\\_projects.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/192681/Planning_Act_2008_-_Guidance_on_associated_development_applications_for_major_infrastructure_projects.pdf) (Accessed January 2022).

<sup>6</sup> European Commission (1985). Council Directive of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment. (85/337/EC). (Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31985L0337&from=EN> (Accessed January 2022).

<sup>7</sup> European Commission (2014). DIRECTIVE 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. (Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0052&from=EN> (Accessed January 2022).

## 1.4 Purpose of the Scoping Report

1.4.1 This Scoping Report sets out the proposed content, methodologies to be adopted and the anticipated likely significant environmental effects that are proposed to be considered in the EIA. It supports a request from the applicant for a written Scoping Opinion from the Planning Inspectorate, on behalf of the SoS, to inform the ES which will be submitted as part of the application for development consent.

1.4.2 The opinion of the SoS is being sought specifically on:

- The environmental topics that should be included in the EIA;
- The relevant components of the Project and the resultant likely significant effects;
- Those effects not likely to be significant that do not need to be considered further;
- The approach to setting the study areas for each topic;
- The data that has been gathered (and will be gathered);
- The assessment methods that will be used to determine likely significant effects; and
- The approach to determining the environmental measures that could be incorporated into the Project to avoid, prevent, reduce or, if necessary, offset significant effects.

1.4.3 The Scoping Report has been produced in accordance with the EIA Regulations<sup>2</sup>, as well as having due regard to Planning Inspectorate ‘Advice Note Seven’<sup>8</sup>. A list of other Advice Notes considered is provided in **Chapter 3: Legislation and Policy Overview**. Specifically, Regulation 10(3) of the EIA Regulations<sup>2</sup> defines the information that must be provided when requesting a Scoping Opinion, namely:

*“(a) a plan to sufficiently identify the land;*

*(b) a description of the proposed development including its location and technical capacity;*

*(c) an explanation of the likely significant effects of the development on the environment; and*

*(d) such other information or representations as the person making the request may wish to provide or make.”*

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<sup>8</sup> The Planning Inspectorate (2020). Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Version 7). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/> (Accessed January 2022).

## 1.5 Competence

- 1.5.1 Regulation 14(4) of the EIA Regulations requires that an ES is prepared by 'competent experts' and that the ES is accompanied by a statement outlining the relevant expertise or qualifications of such experts.
- 1.5.2 This Scoping Report has been prepared and coordinated by environmental consultants who are members of the Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark Scheme. The Scheme allows organisations that lead the co-ordination of EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.
- 1.5.3 Details of the expertise and qualifications of the competent experts who have been responsible for preparing the topic specific chapters of this Scoping Report will be provided in the ES.

## 1.6 Other assessments

### Habitats Regulations Assessment

- 1.6.1 In accordance with *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora*<sup>9</sup> (the 'Habitats Directive') and *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds*<sup>10</sup> (the 'Birds Directive'), a network of protected areas has been designated by EU member states for the protection of Europe's most valuable and threatened habitats and species. These areas are known as European sites. *The Conservation of Habitats and Species Regulations 2017 (SI 2017 No. 1012)*<sup>11</sup> (the 'Habitats Regulations') transpose the EU Directives into UK law.
- 1.6.2 When considering the merits of the application, the SoS must consider potential effects on European sites. European sites are defined as Special Areas of Conservation (SACs), candidate SACs, Sites of Community Importance (SCI) and Special Protection Areas (SPAs). UK policy extends the requirements pertaining to European sites to include Ramsar sites and potential SPAs, which would include proposed extensions or alterations to existing SPAs.
- 1.6.3 In addition to the assessment of potential effects on European sites that will need to be addressed in the ES, the Habitats Regulations require a further screening

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<sup>9</sup> European Commission (1992). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. (Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN> (Accessed January 2022).

<sup>10</sup> European Commission (2009). Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. (Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0147&from=EN> (Accessed January 2022).

<sup>11</sup> UK Government (2017). The Conservation of Habitats and Species Regulations 2017. (Online) Available at: <https://www.legislation.gov.uk/uksi/2017/1012/contents> (Accessed January 2022).

exercise to be undertaken to determine whether any European sites are likely to be significantly affected by the Project, either alone or in combination with other plans and projects. If significant effects are likely, there will be a need for an Appropriate Assessment to be carried out. The screening, any Appropriate Assessment and any subsequent assessment form part of what is known as the Habitats Regulations Assessment (HRA) process.

- 1.6.4 Screening and any subsequent Appropriate Assessment will be undertaken by PINS (the 'competent authority'), drawing upon information about the effects of the Project on European sites that will be provided by the Applicant. In undertaking its assessment, PINS is required to consult with Natural England (NE). To facilitate the HRA process, the Applicant will also liaise with NE, and other interested parties as appropriate.

## Flood Risk Assessment

- 1.6.5 A Flood Risk Assessment (FRA) will be submitted, forming part of the Application. The FRA will assess the flood risk both to and from the Project and demonstrate how that flood risk will be managed over the Project's lifetime. The FRA will give due regard to climate change

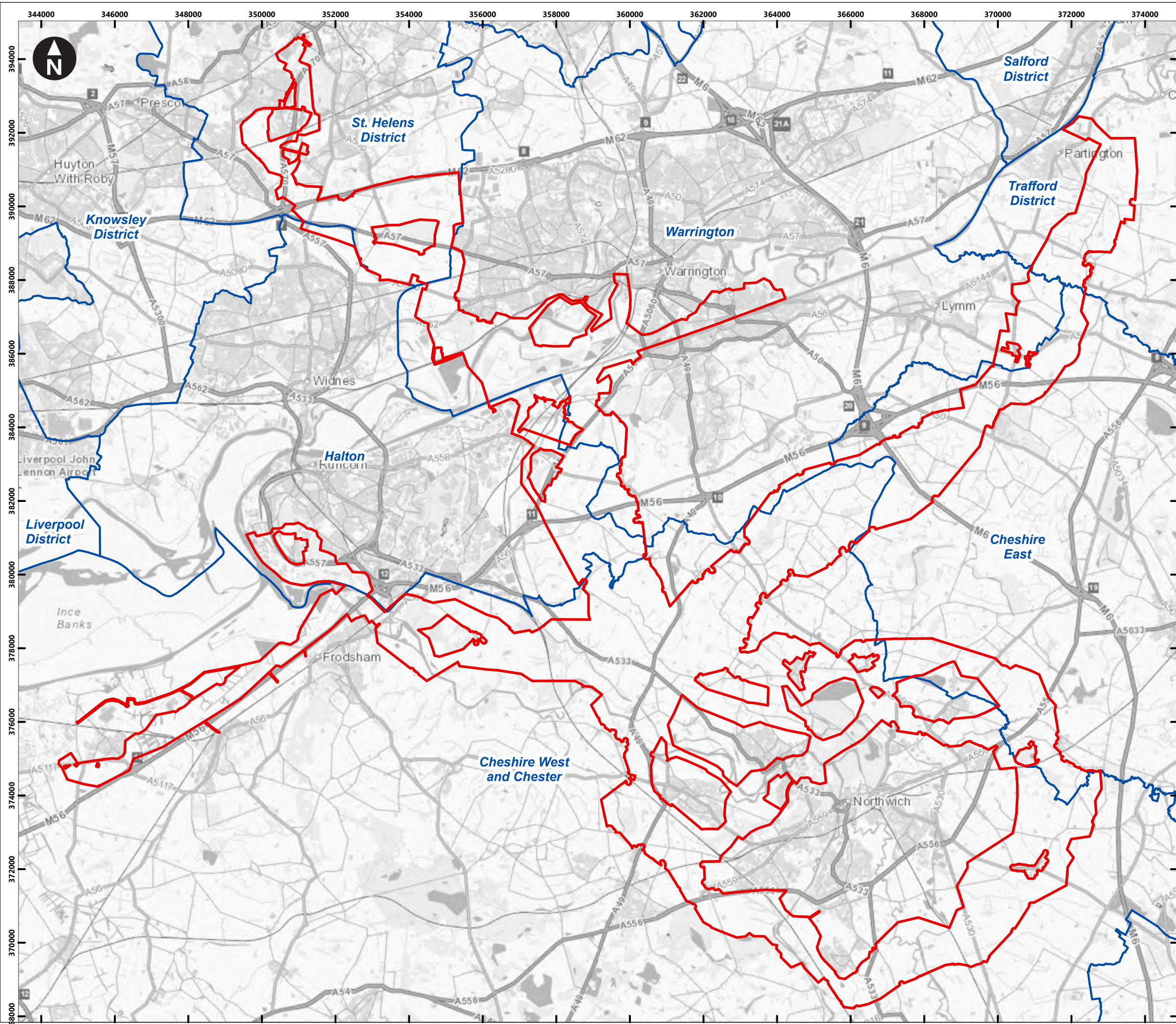
## 1.7 Structure of the Scoping Report

- 1.7.1 The Scoping Report is structured as follows:

- **Chapter 1** sets out an overview of the Project, the background to the need for an EIA in relation to the Project, the structure of this Scoping Report, and other assessments to be undertaken.
- **Chapter 2** provides a background to and the need for the Project, a description of the surrounding land and its land uses alongside a description of the components of the Project and the main alternatives considered.
- **Chapter 3** provides an overview of the legislation and policies that are relevant to the Project.
- **Chapter 4** summarises the approach that has been taken to identify the scope of the EIA, including an introduction to the methods used.
- **Chapters 5 to 17** outline the proposed scope of the assessment for each technical topic, the baseline data collected, the approach to setting the study area and the proposed methodology for assessment.
- **Chapter 18** provides a summary of the scope of the assessment.

- 1.7.2 A table of abbreviation used in this Scoping Report is provided in **Appendix 1A**.

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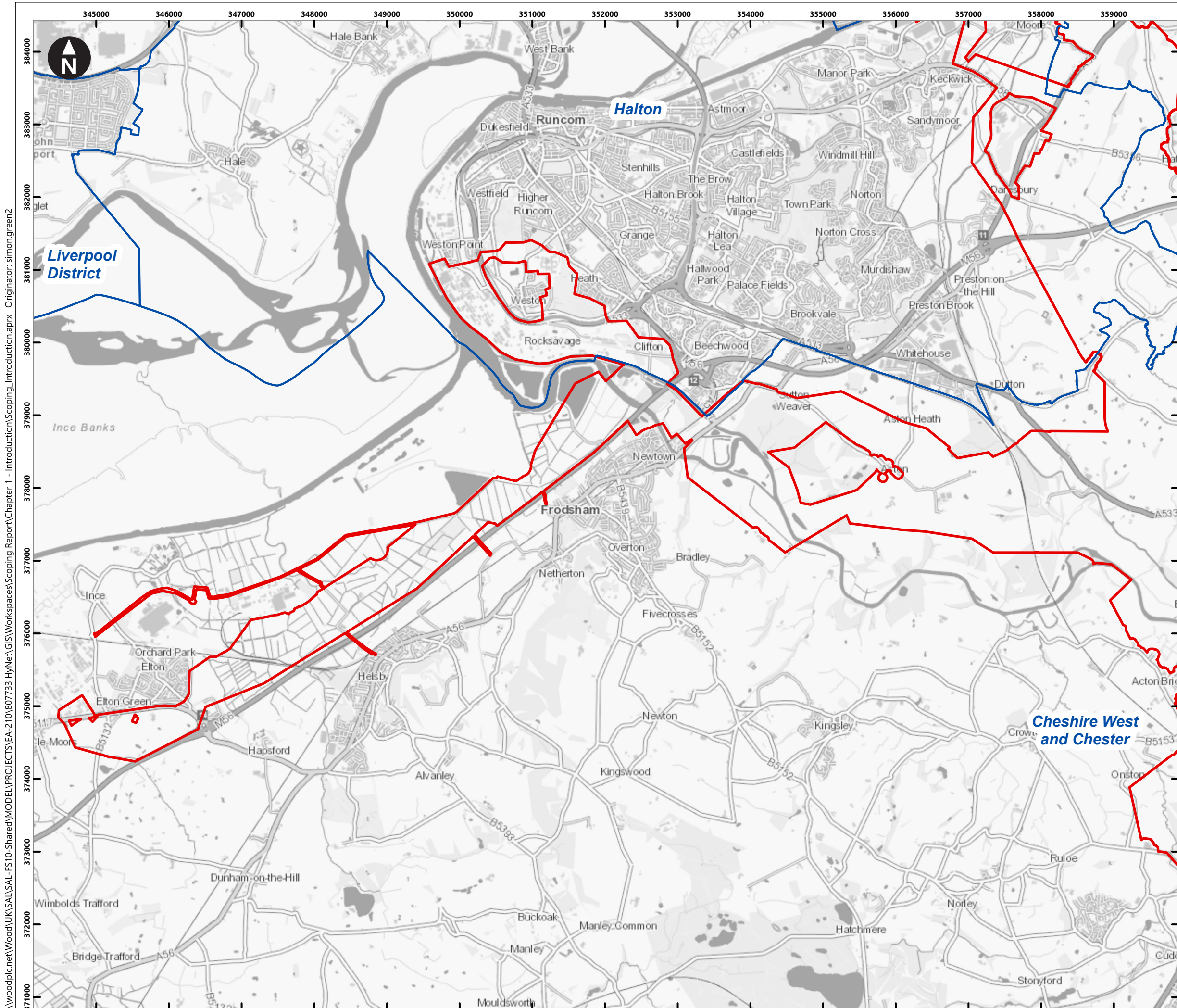
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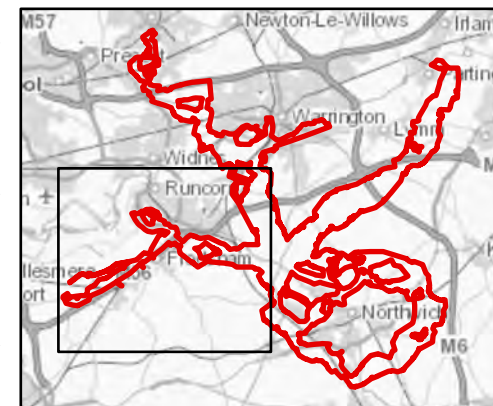


HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 1 - Introduction

**Figure 1.1**  
**Scoping red line boundary**  
**Sheet A: Overview**



- Key
- Scoping boundary
  - Local Authority boundaries



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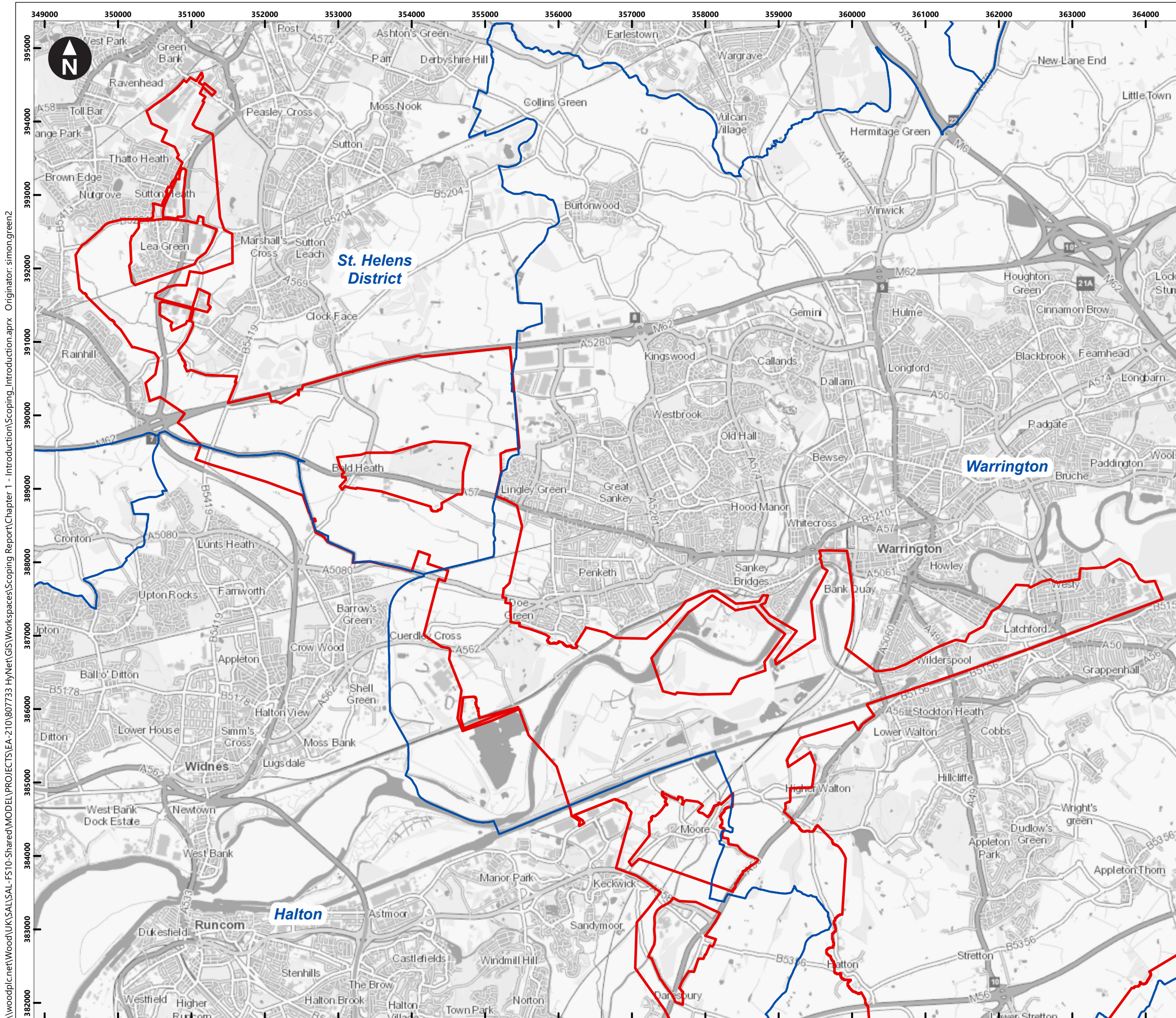
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HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 1 - Introduction

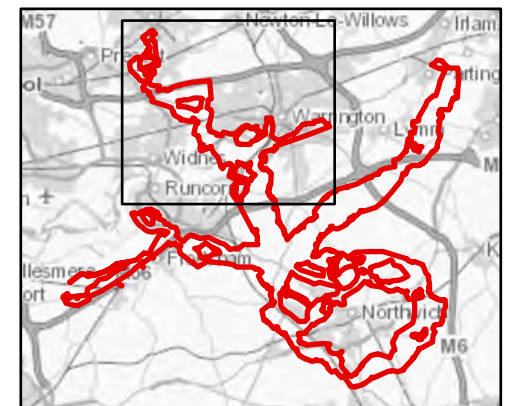
**Figure 1.1**  
**Scoping red line boundary**  
**Sheet B: West**

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- Key
- Scoping boundary
  - Local Authority boundaries



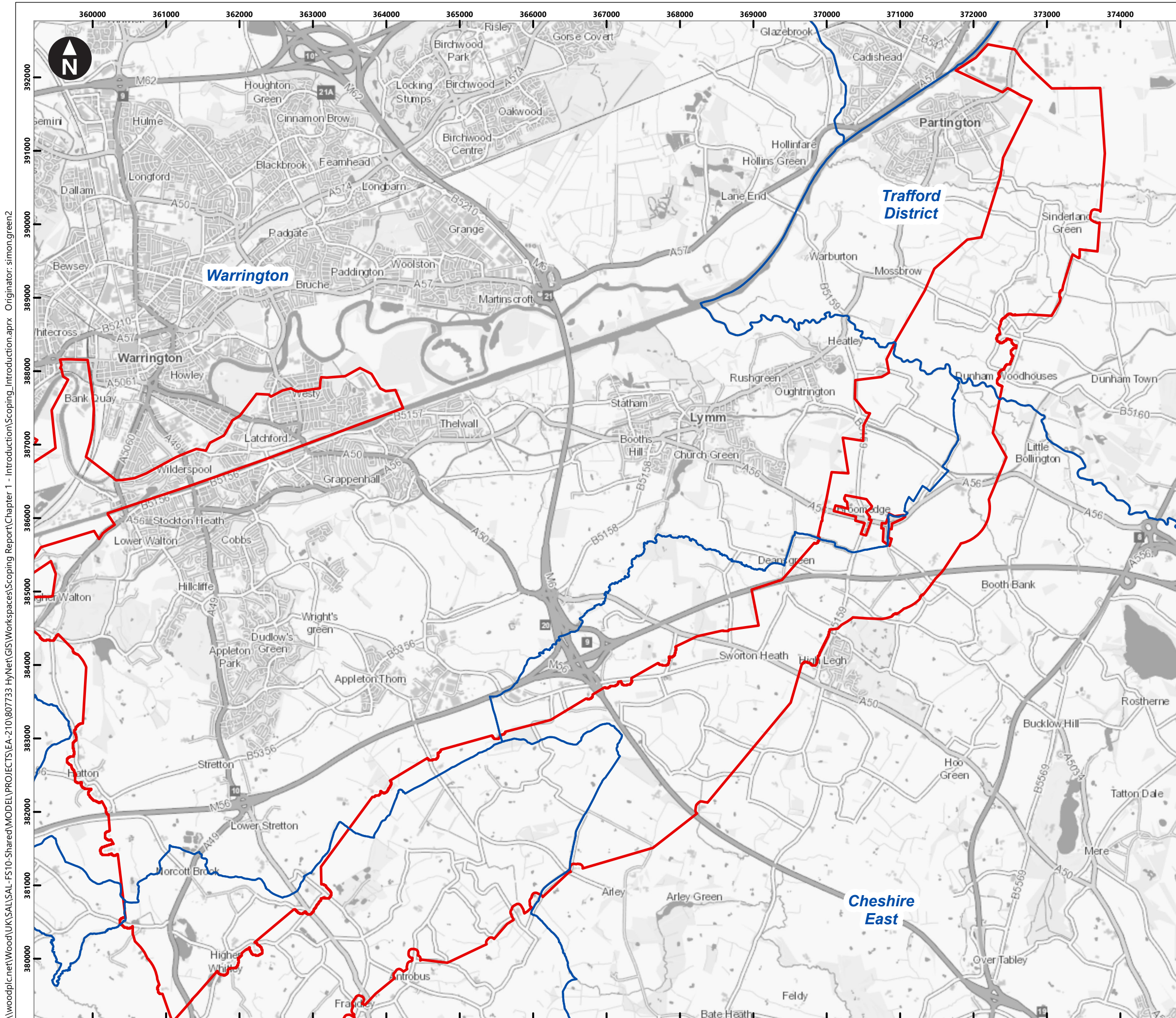
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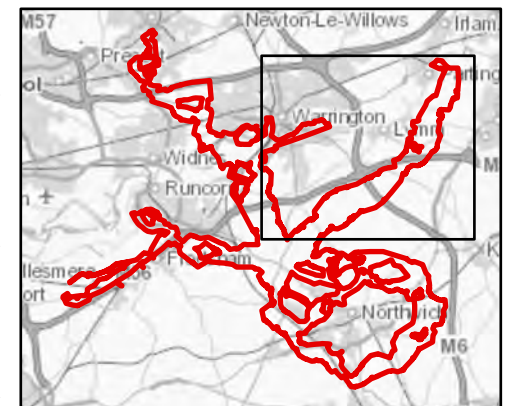
HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 1 - Introduction

**Figure 1.1**  
**Scoping red line boundary**  
**Sheet C: North**

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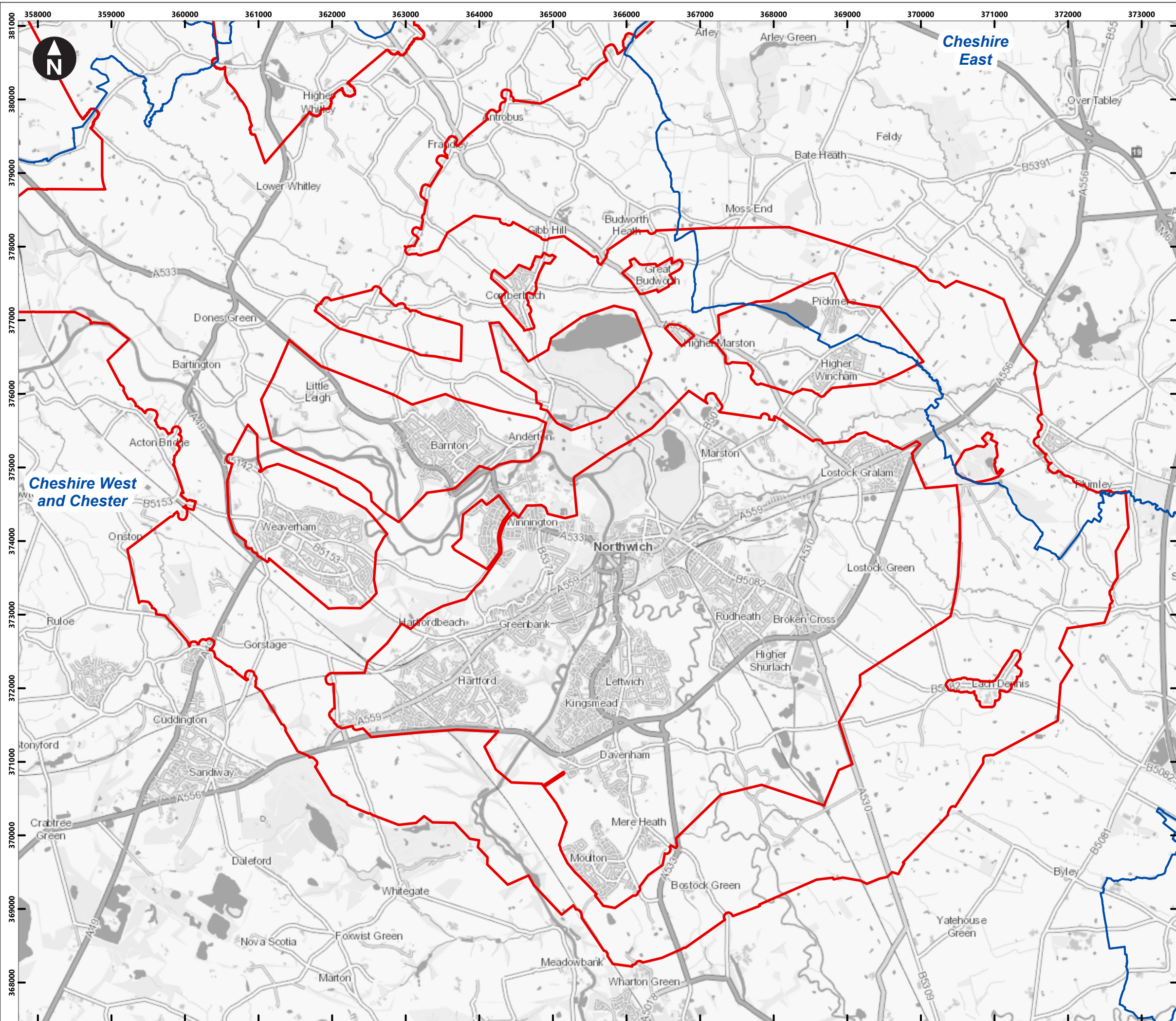
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HyNet North West Hydrogen Pipeline Project  
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Chapter 1 - Introduction

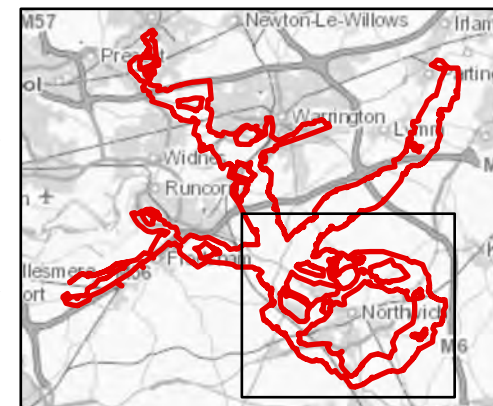
**Figure 1.1**  
Scoping red line boundary  
Sheet D: East

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- Key
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  - Local Authority boundaries



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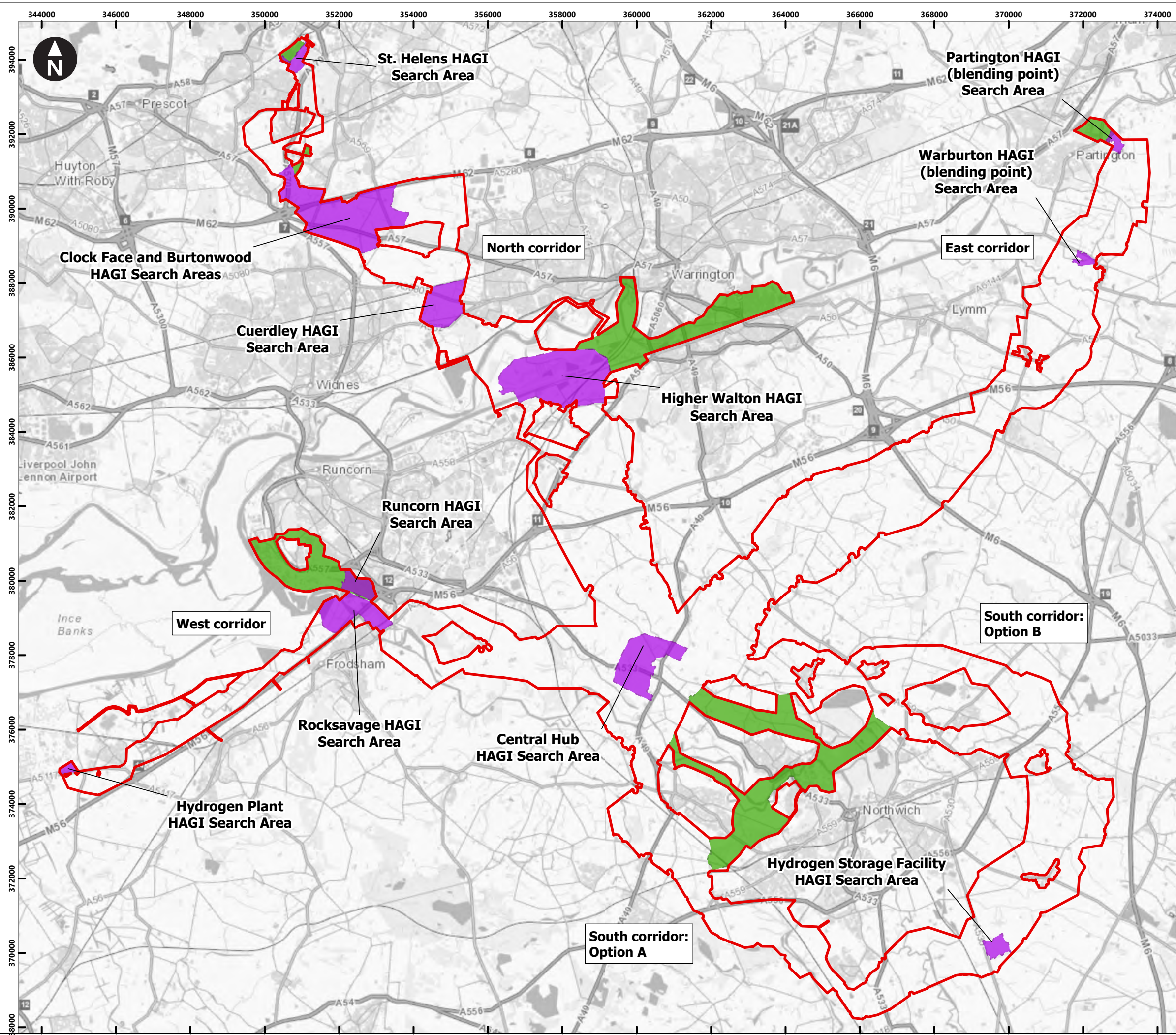
HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 1 - Introduction

**Figure 1.1**  
 Scoping red line boundary  
 Sheet E: South

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**Key**

- Scoping boundary
- HAGI search areas
- Spurs to industrial users

**Note:**  
The requirement for block valves is subject to further design and risk assessment therefore no search area has been identified at this stage.

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HyNet North West Hydrogen Pipeline Project  
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Chapter 1 - Introduction

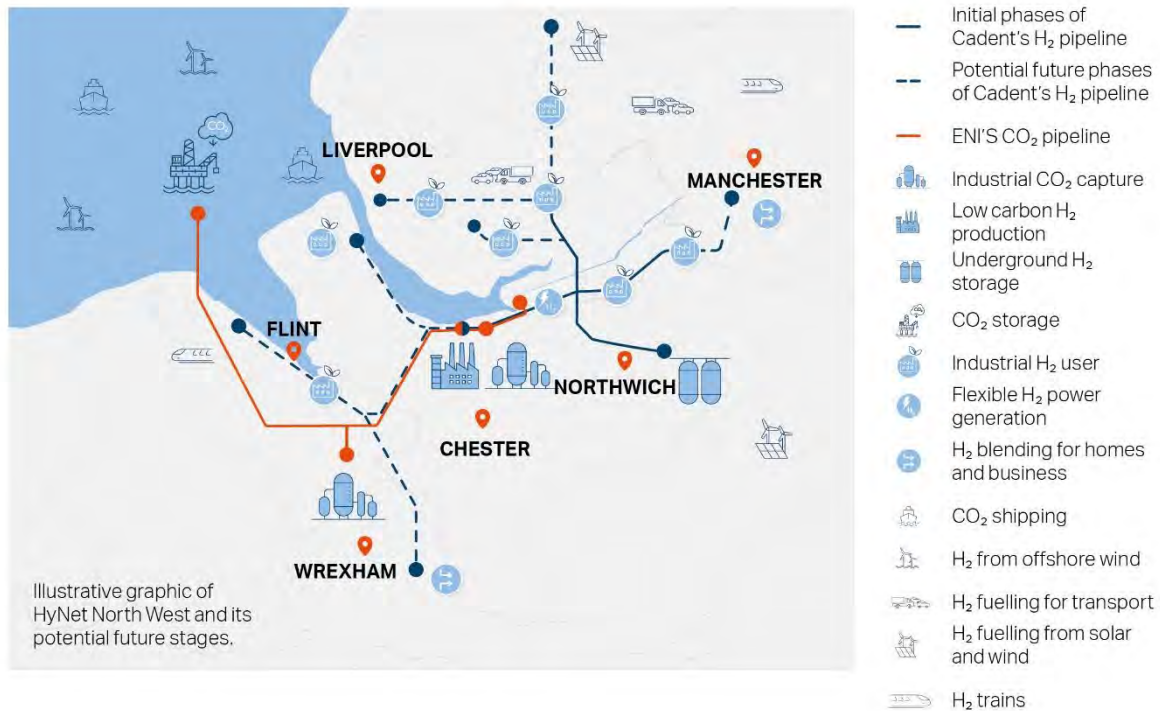
**Figure 1.2**  
**Key components of the Project**

## 2. The Project

### 2.1 Background to and need for the Project

- 2.1.1 The UK Government has set legally binding net-zero carbon dioxide (CO<sub>2</sub>) emissions targets in response to the global climate emergency. This means that by 2050, any CO<sub>2</sub> emissions to the atmosphere must be offset by equivalent emissions removal.
- 2.1.2 This Scoping Report is for the HyNet North West Hydrogen Pipeline Project ('the Project'). This is an integral part of the wider HyNet North West project and the associated removal of emissions described in **Chapter 1: Introduction, Section 1.1**.
- 2.1.3 The HyNet North West project is being developed in stages, as is necessary and appropriate for the commercial deployment of hydrogen technology. The Project is of a scale and located in proportion and proximity to other key elements of the wider HyNet North West project (production, storage and demand) with the aim of commissioning in 2027. As such, the key objective of the Project is as follow:
- "The HyNet North West Hydrogen Pipeline project will transport low carbon hydrogen from the Stanlow production site or the Inovyn storage site to identified industrial users and to blending points at Partington and Warburton (the "Users"). The aim is for the Project to be commissioned in 2027, but it will also be designed with foreseeable future demand and need in mind. In this way it will support some of the North West's biggest businesses and employers for years to come, helping the region lead the way in the transition to Net Zero Carbon by 2050."*
- 2.1.4 **Figure 2.1** illustrates the pipeline (labelled 'Initial Phases of Cadent's H<sub>2</sub> Pipeline') element of the Project in the context of the wider HyNet North West project. Further detailed description of the Project is provided in **Section 2.5**.

Figure 2.1 Illustration of the wider HyNet North West project



Note: the figure above is an illustrative representation of the wider HyNet North West project only. For the HyNet North West Hydrogen Pipeline Project, please refer to **Section 2.5** and the accompanying figures with this Scoping Report.

## 2.2 Consideration of alternatives

### Introduction

2.2.1 Schedule 4 of the *Infrastructure Planning (Environmental Impact Assessment) Regulations 2017*<sup>12</sup> (the EIA Regulations) states that an ES should include:

*"A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."*

2.2.2 Whilst there is no statutory requirement to include an assessment of alternatives in support of a request for a Scoping Opinion, the Planning Inspectorate's Advice Note Seven<sup>13</sup> recommends that a Scoping Report includes "an outline of the

<sup>12</sup> UK Government (2017). Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended). (Online) Available at:

<https://www.legislation.gov.uk/ukxi/2017/572/contents> (Accessed December 2021).

<sup>13</sup> The Planning Inspectorate (2020). Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Version 7).

*reasonable alternatives considered and the reasons for selecting the preferred option”.*

## Strategic alternatives

- 2.2.3 Strategic alternatives were developed to allow the identification of connection routes between the following defined end points which the Project needs to connect to:
- Hydrogen Production Facility (at Essar Stanlow Refinery):
    - ▶ The initial source of hydrogen supply to the Hydrogen Pipeline Network (HPN).
  - Hydrogen Storage Facility (Inovyn, Northwich):
    - ▶ To allow hydrogen to be stored at times of peak supply and released into the HPN to meet demand.
  - Two blending points to the existing Cadent gas network (Partington and Warburton):
    - ▶ To allow hydrogen to be blended with natural gas and supplied into the wider gas pipeline network to maximise the extent of supply.
  - A cluster of industrial operations in St Helens:
    - ▶ To allow hydrogen to be supplied to these users as a fuel for their operational requirements.
- 2.2.4 In addition, a number of other industrial operations that wish to be supplied with hydrogen as a fuel for their operational requirements have been identified. The Project is required to facilitate connections to those users via spurs from the main pipeline route.
- 2.2.5 Illustrative representations of Alternatives A-D are provided on **Figures 2.2 A-D**.

### Alternative A

- 2.2.6 Alternative A forms an ‘X’ shape configuration, with a central hub (where a junction of the different legs of the pipeline is located) near to the A553/A49 junction and four legs run out from here: west to Stanlow, north to St Helens, east to Partington and Warburton and south to the Hydrogen Storage Facility. Two options were considered for the southern leg due to the location of Northwich between the central hub and the Hydrogen Storage Facility.

### Alternative B

- 2.2.7 Alternative B forms a ‘H’ shape configuration. The western leg would run from Stanlow to Frodsham, and the north across the Mersey Estuary to St Helens. The

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(Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/> (Accessed December 2021).

eastern leg would run from Partington, south past Warburton to a location near to Junction 20 of the M6 and then south to the Hydrogen Storage Facility. A central connection leg would join the western and eastern legs from near Junction 20 of the M6 to a location near junction 7 of the M62.

### Alternative C

- 2.2.8 Alternative C is formed from a combination of Alternatives A and B, with the western, northern and eastern legs being the same as for Alternative A. The connection to the hydrogen storage facility utilises the option provided in Alternative B, with a leg running from near junction 20 of the M6 to the storage facility.

### Alternative D

- 2.2.9 Alternative D forms a roughly 'U' shaped configuration, with a western leg running from Stanlow to St Helens across the Mersey Estuary (with a spur off towards Warrington), a southern leg running from Stanlow to the Hydrogen Storage Facility and an Eastern leg from Winsford to Carrington.

### Preferred Strategic Alternatives

- 2.2.10 Each of the alternatives has been reviewed against the criteria considering the following specific issues: the likely length of the pipeline; major road/rail/river crossings (and associated cost, constructability and environmental issues); proximity to population (and associated routeing or connection considerations); conflict with key policy constraints and the ability for the network to accommodate future expansion in later stages of the wider HyNet North West project. Each alternative had both positive and negative considerations, however Alternative A was chosen as the most appropriate option on the basis that:

- Alternatives B and D both involved crossings of the Mersey Estuary with the environmental implications of work within or closer to the Special Protection Area and Ramsar designations (shown on **Figure 5.1**) and the additional cost and difficulty of long-distance drilling required to create the pipeline route.
- Alternative C would require an additional hub site which adds complexities and cost to the construction of the development and requires additional land take.

## 2.3 Routeing and Siting

- 2.3.1 Within Strategic Alternative A, a single corridor for the North and East legs and two options for both the West and South legs were identified. These options are shown in **Figure 2.3** and described below.

### West Corridor Options

- 2.3.2 The West Corridor options consisted of:
- An option running from Stanlow, crossing the M56 to the north of Frodsham, then running to the central hub.



- An option running from Stanlow and crossing the M56 before heading towards Dunham on the Hill, and then running to the central hub. This option would require a spur running from the corridor to the east of Frodsham, to provide a connection into users based to the south of Runcorn.

2.3.3 Due to the greater pipeline length and the presence of a number of locally important landscape designations along the second option, the first option was selected as the most appropriate to take forward in this Scoping Report.

## South Corridor Options

2.3.4 The South Corridor options consisted of:

- An option running from Winsford around the southern and western extents of Northwich to connect with the central hub.
- An option running from Winsford around the eastern and northern extents of Northwich to connect with the central hub.

2.3.5 Both of these options have been taken forward for consideration in this Scoping Report, however further design work will identify a preferred option to be considered in the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES).

## Hydrogen Above Ground Installations

2.3.6 Search areas for Hydrogen Above Ground Installations (HAGIs) have been identified within the pipeline route corridors to be considered in the Scoping Report. The locations of these search areas have been informed by the points on the pipeline network where connections are required, with the search areas also being sited to avoid key designations or constraints where possible. Note that the requirement for block valves is subject to further design and risk assessment therefore no search area has been identified at this stage. The search areas allow for alternative locations for the HAGIs within this Scoping exercise. For further information on the HAGIs and block valves please refer to **Section 2.5**.

## 2.4 Design envelope approach for EIA Scoping

2.4.1 At this stage of the Project, the exact components and location of the infrastructure required for the Project are to be confirmed. The likely construction techniques are described but the location and extent of construction elements, for example the working area and construction compounds, are to be defined. Therefore a 'design envelope' approach has been adopted for EIA Scoping, having regard to the Planning Inspectorate's Advice Note Nine (The Planning Inspectorate, 2018<sup>14</sup>). This approach, known as the 'Rochdale Envelope' Approach, is employed "*where the nature of the Proposed Development means that some details of the whole project have not been confirmed*" and "*flexibility is sought to address uncertainty*."

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<sup>14</sup> The Planning Inspectorate (2018). Advice Note Nine: Rochdale Envelope (Version 3). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/> (Accessed December 2021).

- 2.4.2 To retain flexibility, a Scoping red line boundary has been defined to represent the maximum extent of development (**Figure 1.1**) to incorporate all known elements of the NSIP and the associated development that the Applicant will be seeking consent for as part of the DCO. At this stage of the project design the Scoping red line boundary covers a wider area than is expected to be required for the DCO. This is to allow design flexibility for the following reasons:
- to take account of ongoing engineering development;
  - to allow for design changes in light of on-going environmental surveys and assessment; and
  - to take account of feedback received through engagement, including through consultation events with the public, key stakeholder meetings and discussions with landowners.
- 2.4.3 The Scoping red line boundary was determined by taking into account factors including key connection points to the Hydrogen Production Plant at Essar Stanlow, the Inovyn Hydrogen Storage Facility, required HAGIs, gas network blending points and the spurs to connect to identified industrial users. The spurs represent connections from the pipeline network to an identified point at the boundary of the user's premises usually located partially outside of and partially within the street.
- 2.4.4 Where these spurs consist of any lengths of pipeline of less than 7 bar (unit of pressure) and, should they be located wholly within an adopted highway, these works may be able to be undertaken as permitted development under the Applicant's existing statutory undertaker powers, subject to EIA screening under the appropriate regulations. They therefore may not be required to be included as part of the DCO Order Limits. However, further assessment and consultation is required to determine to what extent this may apply, so at the current time the Scoping red line boundary includes these areas for consideration as part of this Scoping Report. In any event, any such areas which may be excluded from the DCO Order Limits in future will, where required, be assessed as part of the cumulative assessment forming part of the full EIA.
- 2.4.5 The project design and red line boundary will also be further refined and evolve through the EIA process.

## 2.5 Development proposals

### Introduction

- 2.5.1 The Project includes the construction, operation and maintenance of up to 125km of new pipeline to distribute hydrogen to industry and blending with the gas network in the North West. The pipeline would connect to a newly constructed Hydrogen Plant at the Essar Stanlow site as the source of hydrogen for onward distribution to the network. It would continue to the Central Hub at the centre of the network, which serves as the connection and onward distribution point to users along the South, East and North Corridors.

- 2.5.2 The pipeline would vary in diameter along the route between approximately 6” and 48”. Two main types of pipe expected to be used are Carbon Steel (CS) and Polyethylene (PE) pipes. The pipeline would be buried along the entire route apart from at locations where HAGIs are required. It is currently envisaged that 12 HAGIs and two block valves would be required at points along the network.
- 2.5.3 The pipeline would be constructed predominantly using open cut techniques and trenchless crossing techniques at key locations including motorways and major highways, rail, rivers (typically those classed as main rivers, but some may be ordinary watercourses) and canals. Major crossings would be engineered to minimise the environmental and community impact. The potential impact of all techniques such as open cut and trenchless methods will be considered, and a reasonable worst case assessed.
- 2.5.4 **Table 2.1** presents a description of these corridors and sections between the HAGIs for which a description follows in **paragraph 2.5.10**. **Figure 1.2** illustrates these route corridors and sections.

**Table 2.1 Route corridor description**

Corridor	Section	Description and characteristics	Indicative construction requirements
West	Stanlow Hydrogen Production Facility to Rocksavage HAGI	The corridor would run east from the production site, to the south of the village of Elton with crossings required at A5117 north of Hapsford Interchange and the rail line between Helsby and Ince and Elton stations. The West Corridor continues east on the north side of the M56 to the Rocksavage HAGI. This is approximately 1km from the Mersey Estuary RAMSAR/SPA/SSSI.	Approximately 10km of pipeline. Two major crossings.
	Rocksavage HAGI to Central Hub	The corridor continues east from Rocksavage HAGI towards River Weaver before turning south. It is expected that an open cut solution will be possible below the M56 Weaver viaduct. Crossings of the River Weaver and Weaver Navigation will be required. The corridor continues broadly south-east with options for the route avoiding the Chapel and Dell Woods Ancient Woodland and Listed Buildings in the area (e.g., Aston Park). The corridor continues to the Central Hub crossing regional rail line (on the	Approximately 11km of pipeline.  Six major crossings.

Corridor	Section	Description and characteristics	Indicative construction requirements
		stretch between Frodsham and Runcorn East) and West Coast Mainline, the A56 (Chester Road) and A553 (Northwich Road), the River Weaver/Frodsham Cut and Trent and Mersey Canal.	
North	Central Hub to Higher Walton HAGI	The corridor extends north through areas of fields and local road crossings before crossing the M56 (between J10-11). Three potential corridors are being considered around the crossing of the A56 Chester Road, Bridgewater Canal, West Coast Mainline and the regional rail line (northeast of Runcorn East station). Crossing of the Manchester Ship Canal is made before connection to the Higher Walton HAGI.	Approximately 12km of pipeline  Five major crossings.
	Higher Walton HAGI to Cuerdley HAGI	The corridor continues north and includes two options of crossing points of the River Mersey and the disused St Helens/Sankey Canal and regional rail line running parallel to the course of the disused canal. The River Mersey crossing site is approximately 5km from the Mersey Estuary RAMSAR/SPA/SSSI. A further crossing of the A562 (Widnes Road) is required before connection to the Cuerdley HAGI.	Approximately 4km of pipeline  Three major crossings.
	Cuerdley HAGI to Clock Face HAGI	The corridor continues north-east crossing the A5080 and Manchester and Allerton Junction Line and A57 (Warrington Road) to connect to the Clock Face HAGI.	Approximately 5km of pipeline.  Three major crossings.
	Cuerdley HAGI to Burtonwood HAGI and onward to	This is an alternative option to connection from Cuerdley to Clock Face HAGI. To connect to Burtonwood HAGI the corridor continues northwest through fields and crossing the A57 before	Approximately 5km to Burtonwood and 3km onwards to Clock Face HAGI

Corridor	Section	Description and characteristics	Indicative construction requirements
East	Clock Face HAGI	returning west towards the HAGI. To connect to Clock Face HAGI, the route would proceed east and include a crossing of the A569.	Two major crossings.
	Clock Face HAGI to St Helen's HAGI	From the Clock Face HAGI the corridor continues north crossing the M62. Route crosses A570 and Manchester – Liverpool rail lines with two options to go around the areas of Sutton Green/Lea Heath and crossing local roads, fields and recreational sites (Sherdley Park golf course).	Approximately 8km of pipeline.  Three major crossings.
	Central Hub to Warburton HAGI	From the Central Hub, the corridor continues east across an area dominated by rural fields with crossings of the A49 and A559 to reach Sworton Heath, a block valve may be required in this approximate location. The corridor continues approximately north-east in an area that continues to be dominated by rural fields with crossings including M6 south of Lymm interchange, A50, M56, A56, Bridgewater Canal and River Bollin.	Approximately 20km of pipeline.  Eight major crossings.
	Warburton HAGI to Partington HAGI	The corridor continues from Warburton HAGI approximately north across fields towards the existing industrial areas of Partington. This includes crossings of the B5160, Caldwell Brook and Sinderland Brook before reaching Partington HAGI.	Approximately 5km of pipeline Three major crossings.

Corridor	Section	Description and characteristics	Indicative construction requirements
<b>South Option A (west and south of Northwich)</b>	Central Hub Hydrogen Storage Facility	<p>This corridor option continues south across areas of rural fields that are intersected by a number crossing points at the A553, Trent and Mersey Canal, River Weaver Navigation, West Coast Mainline, A49, the regional rail line (between Greenbank and Cuddington stations) and A556 Chester Road before heading approximately south-east towards Hartford; a block valve may be required in this approximate location</p> <p>The corridor continues south-east crossing the River Weaver and Weaver Navigation, the West Coast Mainline before turning due east and crossing the A553, River Dane, Trent and Mersey Canal, regional rail line (running north – south between Northwich and Middlewich) and the A530 to the HAGI and connection for the Hydrogen Storage Facility.</p>	Approximately 21km of pipeline Fifteen major crossings.
<b>South Option B (north and east of Northwich)</b>	Central Hub to Hydrogen Storage Facility	<p>This corridor option extends approximately east from the Central Hub, crossing the A49 before going through fields around Comberbach with a crossing of the A559 and proceeding through fields around Great Budworth, Upper Marston and Wincham. The corridor crosses the A556 and heads approximately south to the HAGI and connection for the Hydrogen Storage Facility crossing fields and regional rail line (between Plumley and Lostock Graham stations) and around Lach Dennis.</p>	Approximately 16km of pipeline Four crossings

2.5.5 A Cathodic Protection (CP) system will be required as part of the pipeline system. This protects the pipeline from corrosion by imposing a small electrical current which inhibits the electrochemical process of corrosion. This requires the placement of Transformer Rectifier (TR) units including cabinets and groundbeds

at 20 – 30 km intervals. These would typically be included at the HAGIs with required electrical supplies or if required, they can be installed on the street within a typical telecommunications cabinet. HAGIs are described further below.

- 2.5.6 CP monitoring points would be installed at regular intervals along the pipeline (approximately every 1 - 2km). These are housed within marker posts typically at selected road or footpath crossings and do not require any other above ground infrastructure such as a compound or kiosk. Markers would also be required at crossings and field boundaries.

## Spurs

- 2.5.7 The spurs are the connections from the pipeline to users identified as part of the Project. These include spurs from the following locations on the corridors, which are shown in **Figure 1.2**.

- **West Corridor:** Connection from the Rocksavage HAGI extending approximately north-east with crossing of the River Weaver and Weaver Navigation. The spur then runs approximately north-west with two options around Weston to connect to the following users:
  - i. xIntergen (Rocksavage).
  - ii. The Heath Business and Technical Park.
  - iii. Inovyn, Runcorn.

These spur options are bounded by Manchester Ship Canal to the west and Runcorn Heath to the East. Crossing of the A557 Expressway would be required. This would be approximately 5km of pipeline.

- **North Corridor:** at the northern end of this corridor, a short spur is required to connect to:
  - iv. NSG Pilkington's Greengate Works.
  - v. Glass Futures.

A further short connection is required east at Micklehead Green to:

- vi. NGF Europe Ltd.

Two spurs totalling approximately 9km in to north-east and east of Warrington. This includes a spur from Higher Walton HAGI running north-east towards Warrington Bank Quay with a crossing of the River Mersey. Connection to:

- vii. PQ Silicas, Warrington.

A spur from Higher Walton HAGI east along on the northern side of the Manchester Ship Canal towards Edgewater Park crossing the River Mersey, West Coast Mainline, A5060, A49, A5061 and A50.

- viii. Solvay, Warrington (shared connection with Ingevity).
- ix. Ingevity, Warrington (shared connection with Solvay).
- x. Novelis, Warrington.

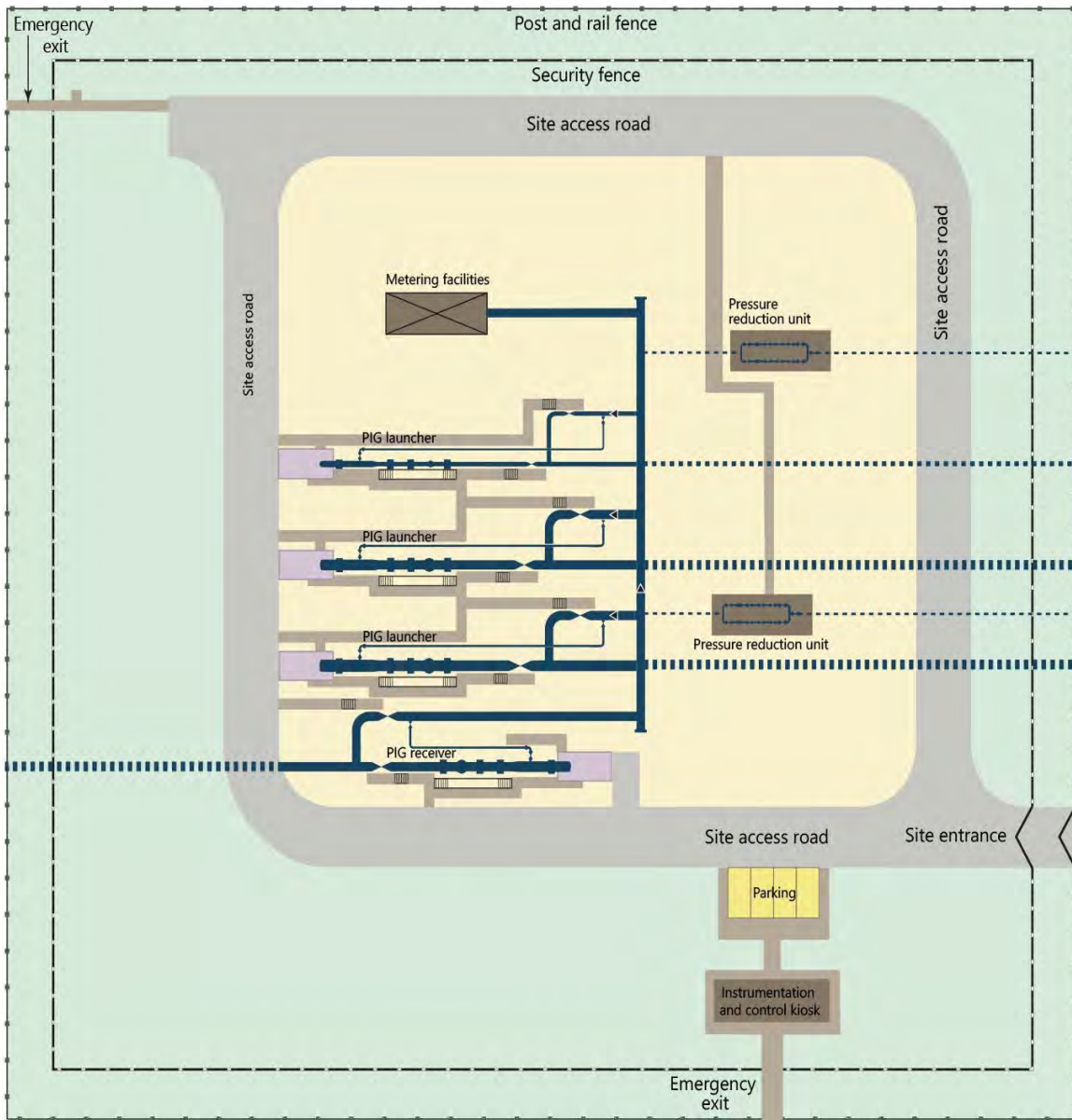
- **East Corridor:** a short connection (approximately 1km) north-west from the Partington HAGI including crossing of the A6144.
  - xi. SAICA, Partington.
- **South Corridor:** two longer connection options (approximately 8km) that would extend south-east from the Central Hub including potential crossings of the Trent and Mersey Canal, River Weaver/Weaver Navigation, West Coast Mainline and A533. Two additional connection options that extend from South Corridor Option A and Option B over approximately 5km including potential crossings of West Coast Mainline, River Weaver/Weaver Navigation and A533. These options are to provide connection to:
  - xii. TATA Chemicals, Winnington.

## HAGIs

- 2.5.8 The Hydrogen Above Ground Installations (HAGIs) are required to control the flow and pressure of hydrogen at key points along the proposed pipeline. These sites will also include the connection points to the new Hydrogen Plant, the Storage Facility, for connections to industrial users and blend points with the existing gas network. The Central Hub is a HAGI at the centre of the network.
- 2.5.9 Search areas in which the HAGIs will be located are shown in **Figure 1.2**. The exact location of the HAGIs will be subject to further design, consultation and environmental assessment.
- 2.5.10 HAGI sites will typically include a range of permanent above ground components for which further description is provided under the headings below. The above ground components described will be kept at low level for safety and to reduce visual impact. This would typically be approximately 1.5m to 2m in height subject to further design. The HAGIs will require connection to the local electrical distribution and telecommunication systems. An illustrative layout for a HAGI is provided in **Figure 2.4**. Photos of above ground installations as part of the existing gas network are shown in **Figure 2.5** and **Figure 2.6** with typical above ground components shown in **Figure 2.7**.



Figure 2.4 Illustrative HAGI layout



Note: this illustrative layout is based on the Central Hub with four onward pipeline corridors.

**Figure 2.5 Above ground installation example (1)****Figure 2.6 Above ground installation example (2)**

**Figure 2.7 Typical components at an above ground installation**

- 2.5.11 The sites will require security fencing, typically 2.4m high with double-leaf access gates for vehicles. It is noted that if HAGIs are designated as Critical National Infrastructure (CNI) sites the fence heights may be higher and additional security infrastructure incorporated. Access will be required from the adjacent road network, access tracks or similar. There will also need to be space for operatives to safely park their vehicle(s) and open the gates.
- 2.5.12 The HAGI sites will vary in area but will typically range between 0.5ha to 2ha. The area required will be subject to further design development including requirements for security, safety and associated landscaping such as planting or bunds to provide screening. HAGIs will generally be unlit except during maintenance or potential breakdown/ emergency requirements when task lighting columns (approximately 2-3m high) will be used.

### *Pressure reduction units*

- 2.5.13 The Pressure Reduction Unit (PRU) is provided to control the flow or pressure into the network and consists of above ground components including pipework. Above ground pipework (for PRUs as well as metering and pigging facilities) will vary in diameter with the maximum piping sizes approximately the same diameter as the adjacent buried pipeline but many of the associated pipes would be much smaller.
- 2.5.14 The pressure reduction process can result in noise emissions. This will be considered further during the design development and EIA process and consideration given to the requirement for attenuation measures.

- 2.5.15 A typical PRU will be skid mounted i.e., mounted to a frame at the point of manufacture and delivered to site for connection.

### *Metering facilities*

- 2.5.16 Metering facilities are required for volume measurements of the hydrogen gas flow for control and fiscal purposes. As with a PRU, these consist of above ground pipework and components and can be skid-mounted.

### *Pigging facilities*

- 2.5.17 Pigging facilities support future in-line inspection (ILI) and the cleaning of the pipeline network. The ILI and cleaning is undertaken by passing a device known as a 'pig' through the pipeline which is propelled by the flowing gas without interruption to the gas supply. The facilities include above ground pipework from which to launch and receive the pig as well as operating equipment including valves.

### *Instrumentation and Control Kiosks*

- 2.5.18 Instrumentation and Control (I&C) kiosks will house the equipment that monitors key parameters (including the flow, pressure and temperature). Field instruments located on pipework will connect the equipment in the kiosk. Signals are sent to an Energy Control Centre via satellite link or similar. The kiosks are typically pre-fabricated Glass Reinforced Plastic (GRP) units of approximately 2.4m height placed on a concrete base that is cast in situ. An example is shown in **Figure 2.5**.

### *Block Valves*

- 2.5.19 Where the distance between two HAGIs is greater than 16km, a Block Valve (BV) is typically required. These are smaller sites than the HAGIs described above. The requirement for BVs will be subject to further design and risk assessment therefore no search area has been identified at this stage. BVs may also be required at either side of some major crossings. There are currently two points identified along the proposed pipeline network where BVs may be required. Further description of a typical site is provided below.
- 2.5.20 These sites will be housed in a compound (up to approximately 0.5ha) with fencing approximately 2.4m high with an access gate. Access will be required for service vehicles, typically a Light Goods Vehicle (LGV) and is likely to include access track and facilities for turning vehicles.
- 2.5.21 The valve connection to the pipeline will be below ground. The valve actuator will extend a short height (approximately 1.5m) above ground. The valves may be operated remotely for which the necessary equipment on site will be housed in an I&C kiosk (similar to those described above).

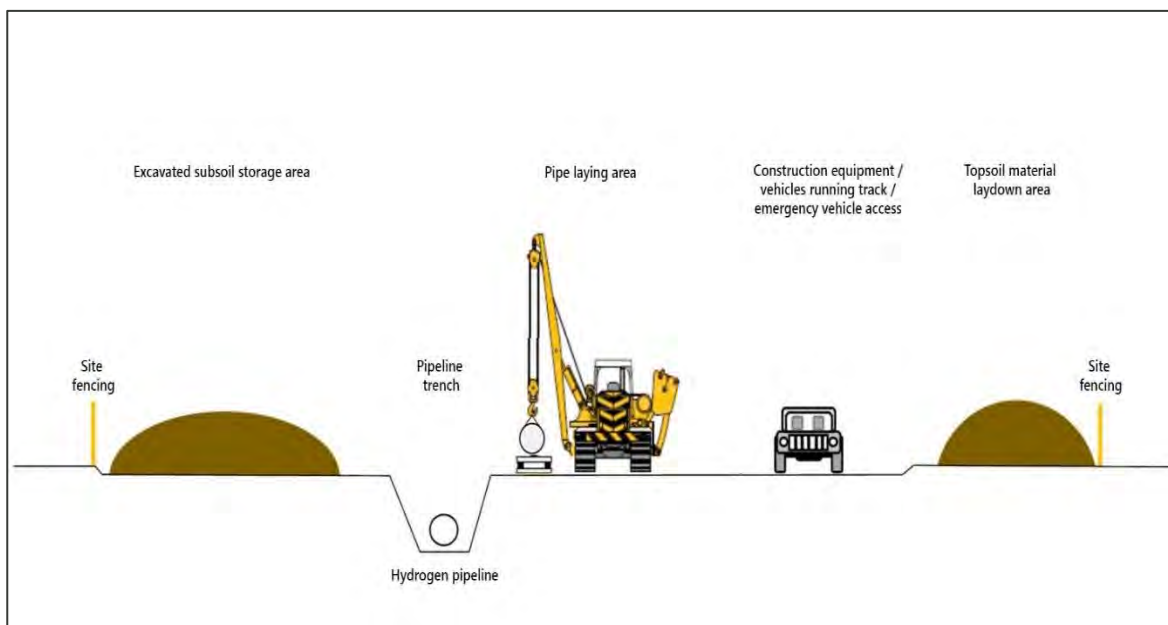
## 2.6 Construction

2.6.1

The following section provides an overview of the typical form and sequencing of construction for both the pipeline and HAGIs. The pipeline would predominantly be constructed by the open lay installation technique. This is most applicable to rural settings i.e., open fields. A range of options for trenchless solutions are identified and will be employed at crossing points where required. These crossing points will be refined during the design process.

The proposed HyNet North West Hydrogen Pipeline would be a multi-diameter pipeline transportation network and as such each section would have a working width specific to the given leg diameter to ensure environmental impact is minimised. These working widths will be developed further during the EIA process. The working width is divided into work, transport and laydown areas that generally increase as pipe diameter increases. It comprises topsoil and subsoil laydown areas, the trench area, pipe string and construction equipment area and a running track for through access of construction related personnel. A typical cross-section is shown in **Figure 2.8**.

**Figure 2.8 Typical layout of a working width for pipe laying**



2.6.2

The extents of the temporary land take required during pipeline construction for access, temporary working areas including pipe lay down areas, offices and compounds would be within the Scoping red line boundary. This will be developed further to include the necessary working widths and will be included as part of the Order Limits.

### Construction phasing and timescales

2.6.3

Construction is expected to commence in 2025 with commissioning in 2027. The Project would be fully operational from late 2027 to early 2028.

- 2.6.4 Pipelines are constructed within the pipeline “spread” or temporary working width which is a corridor of land extending along the route. Pipe laying can be likened to a production line with successive activities moving along the spread. Activities include site preparation, pipeline stringing, welding, inspection, laying and testing. Once all complete, the final reinstatement of the temporary working width would be undertaken.
- 2.6.5 Pipeline construction typically starts in the spring and each of the construction activities can advance at approximately 500m to 1km per day, with successive activities following behind. Through more congested areas and where the pipe diameter and weights are larger on the Project, then daily production may be much less and could be in the region of tens of metres per day.
- 2.6.6 Pipe laying is normally planned to be complete by the autumn. Separate crews would be used to construct road, rail and watercourse crossings.
- 2.6.7 Work crews would be located at several locations at any one time and move forward as the work progresses. Equally at times during the construction period there would be no active work at particular locations.
- 2.6.8 Typically crews may involve up to 30 persons with total workforce of 200 to 500 personnel. Plant and vehicles will include 4x4, lorries, cranes, hydraulic excavators, earth movers (bull dozers), welding sets, etc. Further information on the numbers of personnel and plant will be determined as the design and construction programme is developed.
- 2.6.9 Construction of a HAGI would typically take between 3-6 months and may be in progress at any point during the year, subject to any local constraints.
- 2.6.10 Typical construction hours can be 10 hours per day (08:00 to 18:00) from Monday to Saturday. Limited 24-hour working would be required for some activities such as trenchless crossings where they need to be completed as a continuous operation as well as pipeline testing.
- 2.6.11 A number of works would be expected to occur in parallel, however, the exact phasing of the works has yet to be determined. Further details of the likely construction programme and phasing will be included within the PEIR and ES.

## Pipeline Construction

### *Construction site preparation*

- 2.6.12 Following survey of the construction site, including utilities and Unexploded Ordnance (UXO) checks, work would commence to prepare the pipeline corridor. This would include any installation of site fencing, the type of which would be determined based on key factors including security and land use. Safe crossing points would be implemented depending on the site specific constraints.
- 2.6.13 Temporary accesses would be determined in consultation with the local Highway Authority. Site access tracks would be based on the particular conditions at the access point. This can vary from stripping the topsoil to allow vehicles to run on the subsoil, to use of bog mats or laying a thickness of crushed stone on a geotextile membrane.

- 2.6.14 Site clearance and localised re-grading would take place. The requirements for clearance would be location specific but during the development of the Project a key consideration would be to retain and protect sensitive areas, including habitats and vegetation, where practicable.
- 2.6.15 Topsoil would be stripped and stored adjacent to the works and in accordance with industry best practice to protect topsoil integrity for future reuse during reinstatement.
- 2.6.16 Other activities likely to be required during site preparation include:
- Site signage, service protection and other site safety requirements;
  - Establishment of temporary facilities for site personnel;
  - Establishing site environmental management requirements e.g., tree protection fencing and other site specific pre-commencement activities;
  - Development of temporary site drainage, sediment management and any necessary temporary watercourse crossings; and
  - Creation of temporary accesses including opening field boundaries along the route.

### *Trenching*

- 2.6.17 The pipe trench would generally be dug using mechanical excavators or trenching machines which would normally straddle the trench. The depth and width would vary with pipeline diameter but would allow a minimum reinstated cover of 1.2m over the top of the pipeline. The material excavated would be stored separately from the topsoil to avoid mixing.
- 2.6.18 Dewatering of trenches may be required e.g., in the event that groundwater is present. The further design and assessment process will consider the risks, potential dewatering methods and associated good practice measures.

### *Fabrication*

- 2.6.19 Line pipes would be brought to site and stored in stacks prior to deployment along the pipeline route, before being transported to their final location along the route where they would be placed on wooden supports or skids adjacent to the trench. This process is known as pipe stringing.
- 2.6.20 Where necessary changes in horizontal direction and vertical profiling would be undertaken by employing cold bending i.e., undertaken at ambient temperature. This would require mobilisation of associated plant on site.
- 2.6.21 Line pipes would be lifted onto skids and the pipes welded to form a continuous string. A range of techniques for CS pipes including semi-automatic and manual welding techniques would be employed along the route. All joints would be tested by Non-Destructive Test procedures. Jointing of PE pipes would be undertaken using Butt Fusion or Electrofusion fittings. Once tested an anti-corrosion coating would be applied to the welded joints

### Pipe laying

- 2.6.22 Welded pipe sections would be carefully lifted and lowered into the trench in a continuous operation using side booms. PE pipes may be lifted into position using lighter lifting equipment or may be pulled into the trench using a winch and rollers or pulled into the ground using trenchless methods. PE pipe may come to site in coils allowing much longer lengths of pipe without joints being necessary
- 2.6.23 The pipe would generally be laid on bedding material and covered in padding material. This would typically be soft fill from excavated materials and would serve to protect and minimise movement of the pipe. Backfilling would be undertaken using subsoil from the temporary storage areas.

### Testing

- 2.6.24 The pipeline would be cleaned using pigging equipment and hydrostatically pressure tested, using a local water source, agreed and permitted by the Environment Agency and appropriate local authority as required. Disposal of test water would also be undertaken in accordance with the permit.
- 2.6.25 The pipeline would be further inspected by pigging equipment to ensure it is free of defects e.g., unacceptable dents, flat spots or areas of ovality. Final end to end drying and dew point testing would be undertaken.

### Reinstatement

- 2.6.26 Reinstatement of the working area would be undertaken typically including regrading, subsoil ripping to relieve compaction and removal of debris. Topsoil would be reinstated to the former depth.
- 2.6.27 Where possible, previous land uses would be re-established e.g., agricultural areas and fencing established in accordance with agreements with landowners and in consideration of the necessary easements. Areas of landscaping and required habitat reinstatement, including tree and hedgerow planting, would be implemented through a landscaping scheme that would be prepared and delivered in accordance with a requirement of the DCO.
- 2.6.28 Drainage altered during construction would be reinstated and where necessary, new drainage would be laid. All temporary materials such as bog mats, road fill, temporary culverts and geotextile membrane will be removed during the reinstatement works.

### Crossing techniques

- 2.6.29 The number of crossings and the appropriate techniques will be determined during further design development and determined by factors including ground conditions and technical feasibility. Below are a number of techniques that will be considered, alternative techniques may also be used. A crossing schedule will be developed and included within the draft DCO.



### Open cut

- 2.6.30 Open cut installation involves the excavation of a trench across the feature to be crossed and the installation of the pipeline in the trench. This method is typically used for third party utilities (subject to agreement), minor roads, tracks, small rivers and streams.

### Horizontal Directional Drilling (HDD)

- 2.6.31 The HDD technique involves guiding a pilot hole along a pre-determined profile beneath the obstacle. The depth of the drilled profile can be set to minimise risk to the obstacle being crossed and maximise protection of the pipeline.
- 2.6.32 Once the pilot hole is complete the bore is enlarged in stages using reamers (drill heads) in soft ground or hole openers in hard ground to a diameter approximately 1.5 times greater than the diameter of the pipeline to be installed.
- 2.6.33 When the bore has been enlarged to the required diameter the pipeline is pulled through using the drilling rig. A stringing site that is equivalent to the length of the HDD crossing is required to fabricate the product pipeline in a single length allowing the installation operation to be completed without interruption.
- 2.6.34 During drilling, the bore is supported by drilling fluid which also performs functions such as drill bit cooling, lubrication and removal of drill cuttings.

### Auger Boring

- 2.6.35 Auger bores may be cased or uncased. For cased auger boring, steel or concrete pipe sections are pushed along the crossing section and material is removed by the auger drill inserted into the pipe.
- 2.6.36 Two pits are excavated at either side of the crossing, one to accommodate the auger rig and the start of the auger drive (thrust pit) and one to receive the auger head (reception pit). A cutting head is fixed to the auger screw at the front of the driven pipes and rails installed in the floor of the pit for the auger unit to run on. Additional pipes and auger screw extensions are systematically connected at the thrust pit drill face allowing drilling to progress along the crossing profile.
- 2.6.37 The excavated material is drawn from the cutting head, down the auger screw flutes exiting from the rear of the pipe string. Following installation of the casing pipe the product pipe is inserted with insulators to insulate and centralise the pipe in the casing. In the event that casing pipe is not used the initially drilled pipe is considered as 'sacrificial pipe'. Following reception of the auger head the screw is removed and product pipe is welded and pushed through to the reception pit.

### Grundoram

- 2.6.38 This pipe ramming method involves a pneumatic piston driving a casing pipe from the thrust pit to a receiving pit at the other side of the crossing. Following ramming of the casing pipe the material is typically removed by inserting a plug into the thrust end of the casing and injecting compressed air to push the material out into the reception area. Alternatively, an auger screw can be used in the same way as in the auger boring method.

2.6.39 Once material is removed, the pipe is inserted using the same method as the cased auger method described above.

### Micro-tunnelling

2.6.40 Microtunnels are created with concrete casing pipe driven from a thrust pit to a reception pit using a hydraulic ram or jack placed within a shaft. A typical profile arrangement has a shaft at one end and a tunnel profile long radius at the other where the pipe exits and transitions to normal cover.

2.6.41 A cutting tool/machine provides the mechanical excavation, generally controlled remotely from an above ground compound. There are a range of open and closed face tools/machines including: boring, earth pressure balance and pressurised slurry for use in the appropriate ground conditions.

2.6.42 The line pipes are then welded into a string pipe and gradually pulled into the casing or, where space is limited, the pipe may be welded at the base of a shaft.

### Compounds

2.6.43 Temporary construction compounds would be established to support the construction of the pipeline and HAGIs. The location and area required for temporary compounds will be subject to further design and route refinement. Key locations are likely to include the HAGI construction sites.

2.6.44 The temporary compounds would typically include:

- Secure fencing and access for plant, vehicles and personnel;
- Hard surfacing and drainage;
- Temporary connections to utilities;
- Welfare facilities;
- Vehicle and plant storage and associated fuels;
- Storage for pipes in stacks, equipment and materials; and
- Lighting for security and task lighting for the winter months.

2.6.45 Once the pipeline has been constructed and reinstated, the temporary compounds themselves will be decommissioned and land reinstated to its former condition. Landscaping would be implemented through a landscaping scheme that would be prepared and delivered in accordance with the DCO.

### Above ground infrastructure

2.6.46 The construction site for a HAGI would typically include the necessary temporary works area to be co-located for maximum convenience. The temporary works area would be adequate to accommodate all requirements described in the compounds section above. The temporary working area is expected to be up to approximately 3ha.

2.6.47 The typical site construction sequence would include:

- Site preparation including typical activities for pipeline construction described above;
- Earthworks and civils including establishment of bases;
- Installation of mechanical equipment and laying and connection of pipes;
- Installation of electrics, I&C and associated kiosk; and
- Testing and commissioning.

2.6.48 Reinstatement of temporary accesses, working areas and landscaping would be undertaken in accordance with a landscape scheme, prepared in accordance with the DCO.

## 2.7 Operation and maintenance

2.7.1 The HAGIs would generally be operated remotely from an Energy Control Centre located off-site. The frequency of periodic maintenance undertaken on-site has yet to be determined but would typically include the following:

- Routine checks on a weekly basis requiring 1-2 personnel for a short period (approximately 1 hour).
- Annual maintenance requiring two personnel for approximately one day.
- Major maintenance requiring five personnel for approximately one week (every 2 to 5 years).
- Pipeline pigging operations requiring ten personnel for approximately one week and undertaken every 5 to 15 years, subject to further development for hydrogen pipelines. Pigging operations involve an internal inspection of the pipe undertaken by a “pig”, an automatic inspection tool, which travels inside the pipeline from one HAGI to the next. Access to the pipeline between HAGIs is not required.
- Infrequent breakdown or emergency visits with access on a 24/7 basis if required.

2.7.2 Pipeline visual inspection is undertaken by helicopter or drone and vantage surveys so access onto private land is not normally required. Aerial surveys are typically undertaken every two weeks, but frequency will be determined during further design development. There are some infrequent maintenance surveys which may be required and which would require access on foot (line walking) over the route of the pipeline but do not require excavation or other intrusive activities

2.7.3 As described above, the inspection of the pipelines is undertaken internally from the pigging facilities at HAGI without access to the buried pipeline route. It is anticipated that no pipeline maintenance would be required where excavation of the pipeline is required unless a defect is identified.

## 2.8 Decommissioning

- 2.8.1 The design life of the pipeline and HAGIs is 40 years but it is anticipated that the actual life of the pipeline would extend well over 40 years. It is reasonably expected that the statutory framework will develop prior to any decommissioning. Similarly, technology and good practice would develop and provide for new ways to undertake the process.
- 2.8.2 Decommissioning of the Project would likely involve leaving the pipeline in situ and making it safe. This would typically involve rail, road and watercourse crossings being filled with grout and the removal of all HAGIs. All materials removed would be reused or recycled where possible or disposed of in accordance with relevant waste disposal requirements. Land would then be restored to its former use. It is therefore considered that effects from decommissioning of the Project would be less than those during the construction phase, with significant effects unlikely.
- 2.8.3 An Outline Decommissioning Strategy would be produced, which would detail measures envisaged to be implemented to avoid or reduce impacts during the decommissioning phase. This would be submitted with the application and secured in the DCO. At the appropriate point in time a Decommissioning Plan will be developed by the Undertaker in accordance with this strategy. The Plan would address the relevant statutory requirements at the time, any extant commitments with landowners/statutory authorities and take account of any developed technology and good practice.
- 2.8.4 On the basis of the above, the decommissioning of the Project has therefore been scoped out from further assessment.



Key

0 1 2 3 4 5 Kilometers

Scale at A3: 1:110,000

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**Figure 2.2a**  
**Strategic alternatives (A) - illustrative representation**

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Key

0 1 2 3 4 5 Kilometers

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**Figure 2.2b**  
**Strategic alternatives (B) - illustrative representation**

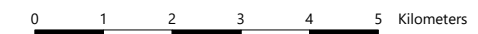
January 2022

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Key



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**Figure 2.2c**  
**Strategic alternatives (C) - illustrative representation**

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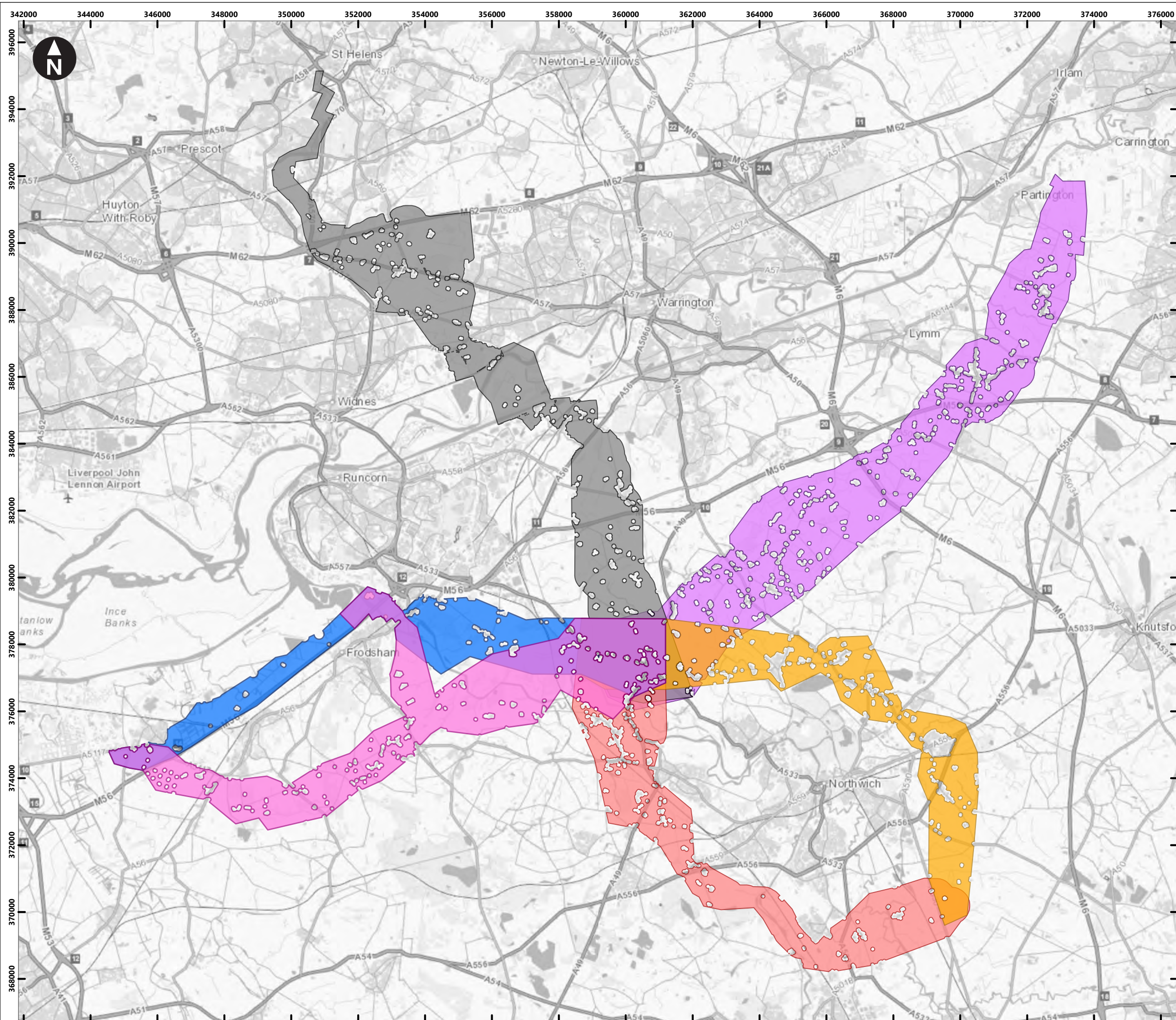
**Figure 2.2d**  
**Strategic alternatives (D) - illustrative representation**

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Key

- North
- East
- South 1
- South 2
- West 1
- West 2

0 1 2 3 4 5 Kilometers  
 Scale at A3: 1:110,000  
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**Figure 2.3**  
**Initial corridor options**

## 3. Legislation and Policy Overview

### 3.1 Introduction

3.1.1 This chapter contains a summary of the key legislation and policy against which the HyNet North West Hydrogen Pipeline Project Development Consent Order (DCO) application ('the Project') will be assessed. Full explanations of the relevant policy and legislation will be provided in the Preliminary Environmental Information Report (PEIR) and the Environmental Statement (ES).

3.1.2 **Appendix 3A** provides a further summary of the key legislation which is specifically relevant to the specific environmental topics discussed in **Chapter 5 to 17**.

### 3.2 Withdrawal of the UK from the EU

3.2.1 UK Legislation is influenced by a variety of international agreements (including European Union (EU) directives, regulations and agreements), which are outlined in this chapter. Following the UK leaving the EU under the terms of the European Union (Withdrawal Agreement) Act 2020<sup>15</sup> (SI 2020 c.1) (the 'Withdrawal Act'), EU legislation and EU-derived domestic legislation continue to have effect in domestic law provided that they have not been modified by UK law since 31 December 2020.

3.2.2 In exercise of the powers in the Withdrawal Act, the Government made The Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018<sup>16</sup> (SI 2018 No. 1232). These regulations provide for the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017<sup>17</sup> (as amended) ('the EIA Regulations') to be amended to ensure they function correctly after the UK exited the EU. In particular, the amendments update references in the EIA Regulations to EU law, Member States and related terms to reflect the UK leaving the EU. The regulations do not make substantive changes to the way the EIA regime operates following the UK leaving the EU.

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<sup>15</sup> UK Government (2020). European Union (Withdrawal Agreement) Act 2020. (Online) Available at: <https://www.legislation.gov.uk/ukpga/2020/1/contents> (Accessed January 2022).

<sup>16</sup> UK Government (2018). The Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018. (Online) Available at: <https://www.legislation.gov.uk/uksi/2018/1232/contents/made> (Accessed January 2022).

<sup>17</sup> UK Government (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. (Online) Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents> (Accessed January 2022).

### 3.3 Planning Act 2008

3.3.1 The Planning Act 2008<sup>18</sup> (SI 2008 c. 29) (as amended) is the primary legislation that establishes the legal framework for applying for, examination and determination of applications for DCOs for Nationally Significant Infrastructure Projects (NSIPs). As the Project involves the construction of a pipeline by a gas transporter, it is classified as an NSIP under Part 14(1)(f) of the Planning Act 2008.

### 3.4 The EIA Regulations

3.4.1 The requirement for an EIA originates from the EU Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment<sup>19</sup> (the 'EIA Directive') (as amended by Directive 2011/92/EU<sup>20</sup> and 2014/52/EU<sup>21</sup>). The EIA Directive is directly transposed into English law for NSIPs (required as part of the Planning Act 2008<sup>18</sup>) by the EIA Regulations.

3.4.2 The EIA Regulations<sup>16</sup> identify which projects are likely to have significant environmental effects and will therefore require an EIA, and as described in **Section 1.3** the Project has been identified as an EIA Project. The EIA Regulations<sup>16</sup> also set out a procedure for assessing, consulting and informing the decision-making process for such projects and require the provision of an ES, which will be submitted alongside the DCO application for the Project.

3.4.3 Paragraph 5 of Schedule 4 of the EIA Regulations<sup>16</sup> specifically outlines that the EIA must identify, describe and assess, the direct and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, positive and negative significant effects of the Project upon specific environmental factors. The requirement of Schedule 4 of the EIA Regulations<sup>16</sup> will be met through the assessment of effects for each environmental topic assessed as part of the EIA. Further details on the approach to the EIA are outlined in **Chapter 4: The EIA Process** and in the scope of environmental topics outlined in the environmental topic chapters (**Chapters 5 to 17**).

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<sup>18</sup> UK Government (2008). Planning Act 2008. (Online) Available at:

<https://www.legislation.gov.uk/ukpga/2008/29/contents> (Accessed January 2022).

<sup>19</sup> European Commission (1985). Council Directive of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment (85/337/EEC).

(Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31985L0337&from=EN> (Accessed January 2022).

<sup>20</sup> European Commission (2011). Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment. (Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0092&from=EN> (Accessed January 2022).

<sup>21</sup> European Commission (2014). Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. (Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0052&from=EN> (Accessed January 2022).

3.4.4 The EIA will be undertaken in line with legislation and policy, specifically in accordance with the requirements of the EIA Regulations<sup>16</sup>. In addition, the EIA will take into consideration a range of key guidance documents from the Planning Inspectorate which include:

- **Advice Note Three:** EIA consultation and notification (Version 7)<sup>22</sup>.
- **Advice Note Six:** Preparation and submission of application documents (Version 10)<sup>23</sup>.
- **Advice Note Seven:** Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Version 7)<sup>24</sup>.
- **Advice Note Nine:** Rochdale Envelope (Version 3)<sup>25</sup>.
- **Advice Note Ten:** Habitats Regulations Assessment relevant to Nationally Significant Infrastructure Projects (Version 8)<sup>26</sup>.
- **Advice Note Eleven:** Working with public bodies in the infrastructure planning process (Version 4)<sup>27</sup>.
- **Advice Note Twelve:** Transboundary Impacts and Process (Version 6)<sup>28</sup>.

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<sup>22</sup> Planning Inspectorate (2017). Advice Note Three: EIA consultation and notification (Version 7). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-three-eia-notification-and-consultation-2/> (Accessed January 2022).

<sup>23</sup> Planning Inspectorate (2020). Advice Note Six: Preparation and submission of application documents (Version 10). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-six-preparation-and-submission-of-application-documents/> (Accessed January 2022).

<sup>24</sup> Planning Inspectorate (2020). Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Version 7). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/> (Accessed January 2022).

<sup>25</sup> Planning Inspectorate (2018). Advice Note Nine: Rochdale Envelope (Version 3). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/> (Accessed January 2022).

<sup>26</sup> Planning Inspectorate (2017). Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects (Version 8). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-ten/> (Accessed January 2022).

<sup>27</sup> Planning Inspectorate (2017). Advice Note Eleven: Working with public bodies in the infrastructure planning process (Version 4). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-eleven-working-with-public-bodies-in-the-infrastructure-planning-process/> (Accessed January 2022).

<sup>28</sup> Planning Inspectorate (2020). Advice Note Twelve: Transboundary Impacts and Process (Version 6). (Online) Available at:

- **Advice Note Seventeen:** Cumulative effects assessment (Version 2)<sup>29</sup>.
- **Advice Note Eighteen:** The Water Framework Directive (Version 1)<sup>30</sup>.

3.4.5 The Institute of Environmental Management and Assessment (IEMA) also provides guidance on EIA, and the EIA for the Project will take into consideration the following Environmental Impact Assessment guidance documents from IEMA:

- Delivering Quality Development<sup>31</sup>.
- Delivering Proportionate EIA. A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice<sup>32</sup>.

3.4.6 These lists of guidance documents are not exhaustive but they provide a general overview of the principal guidance that will help to inform the EIA process for the Project. The lists will be continually reviewed and updated throughout the EIA process up to submission of the DCO application. Each individual environmental topic will also refer to relevant topic-specific guidance in the environmental topic chapters (**Chapters 5 to 17**) of the Scoping Report, where appropriate. A full list of the relevant legislation and guidance considered as part of the EIA process will be provided within the PEIR and ES.

## 3.5 National Policy Statements

3.5.1 National Policy Statement (NPSs) are produced by the Government, and they comprise the Government's objectives for the development of NSIPs. Part 2 of the Planning Act 2008<sup>18</sup> outlines the provisions in relation to NSIPs. There are currently 12 designated NPSs of which six relate to energy generation and. The two current NPSs of relevance to the Project are:

<https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-twelve-transboundary-impacts-and-process/> (Accessed January 2022).

<sup>29</sup> Planning Inspectorate (2019). Advice Note Seventeen: Cumulative effects assessment (Version 2). (Online) Available at:

<https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/> (Accessed January 2022).

<sup>30</sup> Planning Inspectorate (2017). Advice Note Eighteen: The Water Framework Directive (Version 1). <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/> (Accessed January 2022).

<sup>31</sup> Institute of Environmental Management and Assessment (2016). Environmental Impact Assessment Guide to: Delivering Quality Development. (Online) Available at: <https://www.iema.net/document-download/7014> (Accessed January 2022).

<sup>32</sup> Institute of Environmental Management and Assessment (2017). Delivering Proportionate EIA. A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice. (Online) Available at: <https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia> (Accessed January 2022).

## Overarching National Policy Statement for Energy (EN-1)<sup>33</sup>

- 3.5.2 This document establishes the need for nationally significant energy projects, although Part 3.8, relating to the need for significant gas infrastructure, focuses upon natural gas supply and does not specifically mention hydrogen. However, it is considered that those parts of the document which relate to natural gas infrastructure are also relevant to hydrogen infrastructure due to the similarity of the infrastructures involved.
- 3.5.3 Assessment Principles and Generic Impacts for EIA purposes are identified in EN-1 and these by definition apply to all types of energy infrastructure considered in the subsequent NPSs (NPS EN-2 to EN-6). Generic impacts cover a range of environmental topics, from air quality to water quality and resources. Policy guidance provided in the document has been used to inform the scope of the environmental topics which are addressed later in this document.

## National Policy Statement for Oil and Gas Supply and Storage (EN-4)<sup>34</sup>

- 3.5.4 This NPS only covers those nationally significant infrastructure pipelines, which transport natural gas or oil and as such would not be the determinant policy document for the Project. However, as noted at 1.8.2 of EN-4, policy advice in this NPS may be a material consideration when identifying impacts arising from applications for pipelines intended to transport other substances.
- 3.5.5 Of relevance to the EIA process are sections on climate change adaption, the control of major accident hazards, noise and vibration, biodiversity, water quality and soils and geology, and where relevant these criteria will be referenced directly in the environmental topic chapters (**Chapters 5 to 17**) of the Scoping Report.
- The UK government has now published a series of draft National Policy Statements for energy infrastructure which, when finalised, will guide decision makers on the application of government policy when determining applications for development consent for NSIP under the Planning Act 2008.

## Draft Overarching NPS-EN1<sup>35</sup>

- 3.5.6 Paragraph 1.3.3 of the draft Overarching EN-1 notes that where the need for a particular type of energy infrastructure is established by the NPS, but that type of infrastructure is outside the scope of one of the technology specific NPSs, then

<sup>33</sup> Department of Energy & Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf) (Accessed January 2022).

<sup>34</sup> Department of Energy & Climate Change (2011). National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/37049/1941-nps-gas-supply-oil-en4.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37049/1941-nps-gas-supply-oil-en4.pdf) (Accessed January 2022).

<sup>35</sup> Department for Business, Energy & Industrial Strategy (2021). Draft Overarching National Policy Statement for Energy (EN-1). (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1015233/en-1-draft-for-consultation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf) (Accessed January 2022).

this NPS will have effect alone and will be the primary basis for SoS's decision making. Hydrogen pipelines are noted as being such a type of energy infrastructure.

- 3.5.7 Paragraph 3.4.11 – 3.4.15 state that '*There is an urgent need for all types of low carbon hydrogen infrastructure to allow hydrogen to play its role in the transition to net zero. New hydrogen pipelines and underground storage for hydrogen (in both cases whether or not blended with natural gas) will require consent from the Secretary of State where they meet the definitions in sections 15-21 of the Planning Act 2008*'.
- 3.5.8 Draft Overarching EN-1 contains content on assessment principles and generic impacts and where relevant, this content will be referenced directly in the environmental topic chapters (**Chapter 5 to 17**) of the Scoping Report.

### Draft NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)<sup>36</sup>

- 3.5.9 Issued in conjunction with Draft Overarching EN-1 this statement provides the primary policy for decisions on projects, which include gas supply infrastructure but excludes hydrogen pipelines. However, some of the assessment and technology-specific information contained within the document may be of relevance when determining the scope of an environmental assessment for hydrogen infrastructure. Environmental topics of potential relevance include noise and vibration, Biodiversity, Landscape and Visual, Water Quality/Resources and Soils and Geology, and this will therefore again be referenced where relevant in the environmental topic chapters of the Scoping Report.

## 3.6 National Guidance

### National Planning Policy Framework<sup>37</sup>

- 3.6.1 Paragraph 5 of the National Planning Policy Framework (NPPF) states that whilst it does not contain specific policies for NSIPs, it may be considered as 'important and relevant' in the decision-making process in accordance with section 104 of the Planning Act 2008<sup>18</sup>. It sets out the Government's planning policies for England and how they should be applied. At the heart of the framework is a presumption in favour of sustainable development and to deliver this, the NPPF sets out the Government's economic, environmental and social planning policies for England and how these should be applied.

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<sup>36</sup> Department for Business, Energy & Industrial Strategy (2021). Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1015237/en-4-draft-for-consultation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf) (Accessed January 2022).

<sup>37</sup> Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1005759/NPPF\\_July\\_2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf) (Accessed January 2022).

- 3.6.2 The NPPF is supported by The National Planning Practice Guidance (NPPG), which is a web-based resource.
- 3.6.3 Relevant content from the NPPF and NPPG will be referenced directly in the environmental topic chapters (**Chapters 5 to 17**) of the Scoping Report as required.

### 3.7 Local Planning Policy

- 3.7.1 Whilst NSIP applications are required to be assessed against national policy, local policy contained within the Development Plans for the areas can be material considerations and provide an indication of local environmental sensitivities. The proposed corridors fall within six local authority areas, as listed, and relevant adopted policies are listed in **Table 3.1** to **Table 3.6**. **Appendix 3A** provides a further summary of the key policies which are specifically relevant to environmental topics discussed in **Chapters 5 to 17**.
- Cheshire West and Chester Council.
  - Cheshire East Council.
  - Halton Borough Council.
  - Warrington Borough Council.
  - Trafford Council.
  - St. Helens Council.

**Table 3.1 Cheshire West and Chester Adopted Development Plan<sup>38</sup>**

Plan	Summary
Strat 1	Sustainable Development
Strat 9	Green Belt and Countryside
Strat 11	Infrastructure
ENV1	Flood Risk and Water Management
ENV2	Landscape
ENV3	Green Infrastructure
ENV4	Biodiversity and Geodiversity
ENV5	Historic Environment

<sup>38</sup> Cheshire West and Cheshire Council (2019). Adopted Development Plan Documents (Online) Available at: [https://consult.cheshirewestandchester.gov.uk/portal/cwc/ldf/adopted\\_cwac\\_lp/](https://consult.cheshirewestandchester.gov.uk/portal/cwc/ldf/adopted_cwac_lp/) (Accessed January 2022).



Plan	Summary
ENV6	High Quality Design and Sustainable Construction
ENV7	Alternative Energy Supplies
ENV9	Minerals Supply and Safeguarding

**Table 3.2 Cheshire East Local Plan Strategy<sup>39</sup>**

Plan	Summary
<b>Strategic Priority 3</b>	Protecting and enhancing environmental quality of the built and natural environment.
MP1	Presumption in Favour of Sustainable Development
PG3	Green Belt
SD1	Sustainable Development in Cheshire East
SD2	Sustainable Development Principles
SE1	Design
SE3	Biodiversity and Geodiversity
SE4	The Landscape
SE5	Trees Hedgerows and Woodland
SE8	Renewable and Low Carbon Energy
SE12	Pollution, Land Contamination and Land Instability
SE13	Flood Risk and Water Management

<sup>39</sup> Cheshire East Council (2017). Cheshire East Local Plan. Local Plan Strategy 2010-2030. (Online) Available at: <https://www.cheshireeast.gov.uk/pdf/planning/local-plan/local-plan-strategy-web-version-1.pdf> (Accessed January 2022).

**Table 3.3 Trafford Local Plan Core Strategy<sup>40</sup>**

Plan	Summary
SO7	Secure Sustainable Development
L5, L5.12	Climate Change
L7	Design
R2	Natural Environment
R3	Green Infrastructure
R4	Green Belt

**Table 3.4 Warrington Local Plan Core Strategy<sup>41</sup>**

Plan	Summary
CS1	Delivering Sustainable Development
CS5	Green Belt
QE1	Decentralised Energy Networks and Low Carbon Development
QE2	Grid Connected Renewable Energy
QE5	Biodiversity and Geodiversity
QE6	Environment and Amenity Protection
MP10	Infrastructure

<sup>40</sup> Trafford Council (2012). Trafford Local Plan: Core Strategy. (Online) Available at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/core-strategy-adopted-final.pdf> (Accessed January 2022).

<sup>41</sup> Warrington Borough Council (2014). Local Plan Core Strategy. (Online) Available at: [https://www.warrington.gov.uk/sites/default/files/2019-08/local\\_plan\\_core\\_strategy\\_adopted\\_2014.pdf](https://www.warrington.gov.uk/sites/default/files/2019-08/local_plan_core_strategy_adopted_2014.pdf) (Accessed January 2022).

**Table 3.5 St Helens Core Strategy<sup>42</sup>**

Plan	Summary
CS1	Delivering Sustainable Development
CS5	Green Belt
QE1	Decentralised Energy Networks and Low Carbon Development
QE2	Grid Connected Renewable Energy
QE5	Biodiversity and Geodiversity
QE6	Environment and Amenity Protection
MP10	Infrastructure

**Table 3.6 Halton Core Strategy<sup>43</sup>**

Plan	Summary
CS2	Presumption in favour of Sustainable Development
CS6	Green Belt
CS19	Sustainable Development and Climate Change
CS20	Natural and Historic Environment
CS21	Green Infrastructure
CS25	Minerals

3.7.2 Engagement with the relevant Host Authorities, regarding the extent to which the key policies identified above are relevant to the Project will be undertaken; the Applicant would welcome preliminary views as part of this Scoping Report.

3.7.3 In addition, the following Development Plan documents are also in production, and are expected to either replace the above documents, prior to the determination of the DCO application, or they will be sufficiently well advanced that they could be considered as a material consideration.

<sup>42</sup> St Helens Council (2012). St Helens Local Plan Core Strategy. (Online) Available at: <https://www.sthelens.gov.uk/media/3385/sthelens-local-plan-core-strategy-october-2012.pdf> (Accessed January 2022).

<sup>43</sup> Halton Borough Council (2013). Halton's Local Plan Core Strategy. (Online) Available at: <https://www3.halton.gov.uk/Documents/planning/planning%20policy/CoreStrategy.pdf> (Accessed January 2022).

- St Helens Local Plan 2020-2035.
  - ▶ The Submission Draft is currently under examination. If the examination approves the Local Plan, it would be expected to be adopted and replace the adopted Core Strategy for the purpose of the Project.
- Places For Everyone Joint Development Plan Document.
  - ▶ Places for Everyone is a joint, strategic level plan, which is being developed for the nine Manchester authorities (which includes the host authority of Trafford). It is expected to be submitted for Examination early in 2022, with a planned adoption date in 2023.
- Trafford Local Plan.
  - ▶ A new Trafford Local Plan is at an early stage of production, with consultation on an initial draft occurring in early 2021. It is scheduled to be completed and adopted in 2023, however progress will be dependent on progress of the Places for Everyone strategic plan. With that plan not due for adoption until 2023, the Trafford Local Plan may therefore be delayed.
- Halton Delivery and Allocations Local Plan.
  - ▶ The Submission Draft is currently under examination. If the Examination approves the Local Plan, it would be expected to be adopted and will be a relevant policy document for the purpose of the Project.
- Warrington Local Plan 2021-2038.
  - ▶ This draft Local Plan was published for consultation in October/November 2021. Following this consultation, it is likely that the Local Plan would be submitted for examination in 2022. The Plan will therefore be a material consideration for the purpose of the Project and may even be adopted in time to become formal policy.

## 4. The EIA process

### 4.1 Approach to EIA Scoping

#### Overarching Approach

- 4.1.1 Environmental Impact Assessment (EIA) is a process for identifying the likely significant environmental effects (positive and negative) of a Project to inform the decision-making process for development consent to be granted. The EIA process will culminate in the provision of an Environmental Statement (ES) written in accordance with the EIA Regulations<sup>44</sup> and will provide an overview of the likely significant effects, including cumulative effects, associated with the Project during the construction, operation and maintenance phases which will help to inform decision-making.
- 4.1.2 Schedule 4(4) of the EIA Regulations<sup>44</sup> specifies that the ES should describe those:
- “...factors...likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.”*
- 4.1.3 Regulation 5(2) of the EIA Regulations<sup>44</sup> requires the interaction between these factors to be considered. In addition, Regulation 5(4) requires ESs to consider:
- “...the expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development.”*
- 4.1.4 The EIA process aims to be systematic, analytical, impartial, consultative and iterative allowing opportunities for environmental concerns to be addressed in the design and evolution of the Project. Typically, throughout the evolution of the design, a number of design iterations take place in response to environmental constraints identified during the EIA process, stakeholder engagement and consultation prior to the final design being submitted for approval. This iterative design process is a fundamental element of the EIA for the Project and this will be described further at later stages in the Preliminary Environmental Information Report (PEIR) and ES as the design continues to develop.
- 4.1.5 The scoping process identifies the different methodologies used for the assessment and these will be based on recognised good practice and guidelines specific to each environmental aspect as set out in **Chapters 5 to 17**.

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<sup>44</sup> UK Government (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. (Online) Available at: <https://www.legislation.gov.uk/ukxi/2017/572/contents> (Accessed January 2022).

## 4.2 Determining the scope of the assessment

- 4.2.1 The EIA scoping process establishes which aspects of the environment are likely to be significantly affected by a project and involves identifying:
- the people and environmental resources (collectively known as 'receptors') that could be significantly affected by the Project, and
  - the work required to take forward the assessment of these potentially significant effects.
- 4.2.2 Scoping is an important procedure, which sets the context for the EIA process. It is intended to inform a proportional and robust approach to assessment through initial evaluation and reporting of identified likely significant effects in a Scoping Report.
- 4.2.3 Effective scoping enables agreement to be reached on the aspects and methodologies to be taken forward, assessed and reported in much greater detail in the ES. It also provides an opportunity for early interaction with stakeholders, strengthening the assessment evidence base and allowing active participation of interested parties in project development and decision making. This can in turn improve project design, environmental soundness and social acceptability.
- 4.2.4 The approach taken in preparation of this Scoping Report has also been informed by the Planning Inspectorate's 'Advice Note Seven'<sup>45</sup> and reflects that the EIA Regulations require an ES to focus on aspects of the environment likely to be subject to significant effects. In line with guidance and legislation this Scoping Report seeks to, where appropriate, scope out aspects/matters from further assessment with suitable justification provided. This will streamline the assessment to focus on key likely significant effects and ensure the EIA for the Project is proportionate in accordance with the IEMA 'Delivering Proportionate EIA'<sup>46</sup> guidance document.

### Technical scope

- 4.2.5 The technical scope of assessment for each environmental aspect is detailed in **Chapters 5 to 17** and this covers the scoping in and out of impacts and effects to be assessed as part of the EIA. Justification is provided for the individual approach and scoping of matters to be considered in the assessment for each environmental

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<sup>45</sup> Planning Inspectorate (2020). Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Version 7). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/> (Accessed January 2022).

<sup>46</sup> Institute of Environmental Management and Assessment (2017). Delivering Proportionate EIA. A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice. (Online) Available at: <https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia> (Accessed January 2022).

aspect. The technical scope also details the approach to baseline data collection and assessment methodologies.

## Spatial scope

- 4.2.6 The spatial scope for each environmental aspect, the area over which changes to the environment are predicted to occur as a consequence of the Project, will depend on the nature of the potential effects and the location of receptors that could be affected. It takes account of:
- the physical area of the Project;
  - the nature of the baseline environment; and
  - the manner and extent to which environmental effects may occur.
- 4.2.7 Each of the environmental aspect chapters (**Chapters 5 to 17**) describes the study area to be considered, providing a clear explanation as to why the study area has been adopted. The spatial scope of each assessment may be refined for both the PEIR and the ES in response to comments from consultees or further assessment work.

## Temporal scope

- 4.2.8 The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur, and are typically defined as either being temporary or permanent:
- Permanent - these are effects that will remain even when the Project is complete, although these effects may be caused by environmental changes that are permanent or temporary.
  - Temporary – these are effects that are related to environmental changes associated with a particular activity and that will cease when that activity finishes.
- 4.2.9 The assessment will have regard to the project programme and will evaluate the environmental effects of the Project during construction, operation and maintenance. These effects will be compared to the situation prevailing before the Project is commenced (the current baseline), and to the situation that would prevail in the future without the Project (the projected future baseline).
- 4.2.10 As stated in Section 2.8 of **Chapter 2: The Project**, consideration of effects arising from decommissioning of the Project has been scoped out from further assessment due to the nature of the works and the proposed implementation of a Decommissioning Plan. This Plan would address the relevant statutory requirements at the time, any extant commitments with landowners and statutory authorities and take account of any developed technology and good practice.
- 4.2.11 An Outline Decommissioning Strategy, to be submitted with the DCO application, will detail measures envisaged to be implemented to avoid or reduce impacts during the decommissioning phase.

- 4.2.12 The future baseline is the theoretical situation that would exist in the absence of the Project. This is based upon extrapolating the current baseline using technical knowledge of likely changes to predict this (e.g., predictable changes such as climate change, changes that can be predicted based on reasonable assumptions and modelling calculations, information about other relevant developments etc.).
- 4.2.13 Each environmental aspect chapter of the ES will define the baseline (current or future or both) against which the environmental effects of the Project will be assessed. The baseline conditions to be assessed for each environmental aspect are outlined in **Chapters 5 to 17** of this Scoping Report. Where relevant, aspect chapters provide further information on the time elements within the project programme that will be considered for their assessment.

## 4.3 Assessment of effects and determining significance

### Overview

- 4.3.1 For consistency, and to allow comparison between aspects, the methodology described in this section will be applied when preparing the ES. This methodology is designed to consider whether impacts of the Project would have an effect on any environmental receptors. Assessments broadly consider the magnitude of impacts and the sensitivity of resources or receptors that could be affected to classify the significance of effects.
- 4.3.2 The conclusion that is made on whether an effect should be considered significant is based upon professional judgement, with reference to the description of the Project in **Chapter 2: The Project**, and available information about:
- The magnitude and other characteristics of the potential changes (impacts) that are expected to be caused by the Project.
  - The sensitivity of receptors to these changes.
  - The effects of these changes on relevant receptors.
  - The value of receptors (where relevant).
- 4.3.3 For each environmental aspect, the categories of resource or receptor sensitivity and magnitude of impact will be described or defined. The following sections therefore provide the generic criteria for the definition of resource or receptor sensitivity, magnitude of change and classification of effect.
- 4.3.4 The environmental aspect chapters (**Chapters 5 to 17**) provide greater detail on the approach to the assessment and specific guidelines for the definition of impact magnitude and resource or receptor sensitivity. The approach to the assessment undertaken by each environmental aspect will broadly follow the approach set out in the following sections. Variations from this approach may be applicable to specific environmental aspects whereby professional judgment in the application of standards mandated by professional bodies (for example the Institute of Ecology and Environmental Management (IEEM) or the Landscape Institute) is applied. Where this is the case, further detail and justification will be provided.



## Resource and receptor sensitivity

- 4.3.5 The sensitivity or value of a receptor is largely a product of the importance of an asset, as informed by legislation and policy, and as qualified by professional judgement. For example, higher value receptors for landscape, biodiversity or the historic environment may be defined as being of international or national importance; lower value resources may be designated as being sensitive or important at a county or district level.
- 4.3.6 The use of a receptor also plays a part in its classification. For example, when considering visual amenity, a receptor which is residential in nature may be valued more than a place of work as the environmental quality of the residential receptor is more likely to be an important part of that receptor's use.
- 4.3.7 **Table 4.1** sets out the generic guidelines for the assessment of sensitivity of a resource or receptor.

**Table 4.1 Generic guidelines for the assessment of sensitivity**

Value or Sensitivity	Guidelines
<b>High</b>	Value: Feature or receptor possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site or receptor (for example designated features of international or national importance).
<b>Medium</b>	Sensitivity: Feature or receptor has a very low capacity to accommodate the proposed form of change.
<b>Low</b>	Value: Feature or receptor possesses key characteristics which contribute significantly to the distinctiveness and character of the site or feature (for example designated features of regional or county importance).
<b>Very low</b>	Sensitivity: Feature or receptor has a low capacity to accommodate the proposed form of change.

## Magnitude of change

- 4.3.8 The magnitude of change affecting a receptor that would result from the Project will be identified on a scale from minor alterations or change, up to major changes or the total or substantial loss of the receptor. For certain aspects, the magnitude of change would be related to guidance on levels of acceptability (for example, for air quality or noise), and is therefore based on numerical parameters. For others it will be a matter of professional judgement to determine the magnitude of change, using descriptive terminology.
- 4.3.9 **Table 4.2** sets out the generic guidelines of the assessment of the magnitude of change.

**Table 4.2 Generic guidelines for the assessment of magnitude**

Magnitude	Guidelines
<b>High</b>	Large scale changes over the whole development area and potentially beyond to key characteristics or features of the particular environmental aspect's character or distinctiveness.
<b>Medium</b>	Medium scale changes over the majority of the development area and potentially beyond to key characteristics or features of the particular environmental aspect's character or distinctiveness.
<b>Low</b>	Noticeable but small-scale changes over part of the development area and potentially beyond to key characteristics or features of the particular environmental aspect's character or distinctiveness.
<b>Very low</b>	Noticeable but very small-scale change or barely discernible changes over a small part of the development area and potentially beyond, to key characteristics or features of the particular environmental aspect's character or distinctiveness.

## Determination of significance

- 4.3.10 The significance of effects relates to information about the nature of the Project, the sensitivity or value of receptors that could be affected, together with the magnitudes of change that are likely to occur.
- 4.3.11 For many environmental aspects, significance can be determined by using a matrix. Variations to this matrix approach are detailed within the respective chapters (**Chapters 5 to 17**), along with descriptions of receptor sensitivity, magnitude of change and levels of effect that are considered significant. Definitions of how the categories used in the matrix are derived for each environmental aspect are also set out.
- 4.3.12 In addition, professional judgement is applied in the assessment, as the boundaries between the sensitivities or magnitudes of change may not be clearly defined and the resulting assessment conclusions may need clarifying.
- 4.3.13 The overarching significance matrix that will be used for the EIA is shown in **Table 4.3**. The generic definitions that will be used to determine the level of significance are shown in **Table 4.4**. Reference is made to:
- 'Major' effects, which will always be determined as being significant.
  - 'Moderate' effects can be significant, or not significant, based on specific scenarios and professional judgement.
  - 'Minor' or 'negligible' effects, which will always be deemed as 'not significant'.
- 4.3.14 Effects can be either beneficial or adverse.

Table 4.3 Significance evaluation matrix

		Magnitude of change			
		High	Medium	Low	Very low
Sensitivity or value	High	Major (significant)	Major (significant)	Moderate (potentially significant)	Minor (not significant)
	Medium	Major (significant)	Moderate (potentially significant)	Minor (not significant)	Minor (not significant)
	Low	Moderate (potentially significant)	Minor (not significant)	Minor (not significant)	Negligible (not significant)
	Very low	Minor (not significant)	Minor (not significant)	Negligible (not significant)	Negligible (not significant)

Table 4.4 Generic classification of effect definitions

Magnitude	Guidelines
<b>Major</b>	Very large or large change in environmental or socio-economic conditions. Effects, both negative and positive, which are likely to be important considerations at a national to regional level because they contribute to achieving national or regional objectives, or which are likely to result in exceedance of statutory objectives or breaches of legislation.
<b>Moderate</b>	Intermediate change in environmental or socio-economic conditions. Effects that are likely to be important considerations at a regional or local level.
<b>Minor</b>	Small change in environmental or socio-economic conditions.
<b>Negligible</b>	No discernible change in environmental or socio-economic conditions. An effect that is likely to have a neutral or negligible influence.

## 4.4 Environmental measures

- 4.4.1 In accordance with Regulation 14(2)(c) of the EIA Regulations<sup>44</sup>, the ES will include a description of the “*measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects of the project on the environment*”. For each environmental aspect, the EIA process will systematically identify impacts and effects and take into consideration environmental measures

that the Project will adopt. These environmental measures include avoidance, best practice and design commitments, which are classified into primary or tertiary measures in accordance with the IEMA 'Guide to Shaping Quality Development'<sup>47</sup> definitions as follows:

- Primary (inherent): Referred to as 'embedded measures', are modifications to the location, design or operation of the development made during the pre-application phase that are an inherent part of the Project, and do not require additional action to be taken.
- Secondary (foreseeable): Actions that will require further activity to achieve the anticipated outcome and are referred to as 'additional measures'.
- Tertiary (inexorable): Actions that would occur with or without input from the EIA feeding into the development process. These include actions that will be undertaken to meet other existing legislative requirements or actions that are considered to be standard practice used to manage commonly occurring environmental effects. These are referred to as 'good practice measures' and are also embedded within the design of the Project. Examples of tertiary measures identified in this Scoping report include undertaking works to vegetation outside the bird breeding season; the reduction of noise from operational plant using conventional and readily available noise control measures such as enclosures and pipe lagging; and the preparation of pollution prevention plans to detail how ground and surface waters would be protected during construction and operation. Such measures are typically secured via the implementation of a Code of Construction Practice and/or Construction Environmental Management Plan.

4.4.2 Opportunities for embedded design measures will be identified throughout the evolution of the design of the Project and the EIA process, whereby potential significant adverse environmental effects will be fed back into the design process to verify whether they can be avoided or otherwise mitigated in accordance with the hierarchy. Alongside this, good practice measures will be identified with reference to legislative requirements and measures of standard practice to manage commonly occurring effects. These design measures and good practice measures will be included within the project plans and drawings and thus are integrated into the overall design strategy as embedded measures.

4.4.3 Following the application of embedded measures, where the potential for a significant environmental effect remains, 'additional measures' will be considered to avoid, reduce or compensate this effect. The ES will report on the anticipated effects of the Project following the implementation of all mitigation to determine the 'residual effects'. A clear statement will be made as to whether the residual effects are significant or not significant. Residual effects may be beneficial as well as adverse.

4.4.4 As required by the EIA Regulations<sup>44</sup>, there will be a need to monitor the effectiveness and implementation of any proposed measures, where appropriate.

<sup>47</sup> Institute of Environmental Management and Assessment (2016). Environmental Impact Assessment Guide to: Delivering Quality Development. (Online) Available at: <https://www.iema.net/document-download/7014> (Accessed January 2022).

The means for securing how measures will be implemented and monitored will be set out in the ES.

- 4.4.5 A separate Register of Environmental Actions and Commitments document will also be provided as part of the DCO application which will summarise the environmental measures committed to within the ES and associated appendices.

## 4.5 Cumulative effects assessment

- 4.5.1 A Cumulative Effects Assessment (CEA) will be carried out for the Project, which will examine the result from the combined impacts of the Project with other developments on the same single receptor or resource as required under Paragraph 5(e) of Schedule 4 of the EIA Regulations<sup>44</sup> and the interaction of environmental aspect effects occurring as a result of the Project in accordance with Regulation 5(2). Two types of effects will be considered:

- Inter-project effects: effects that arise as a result of the Project in combination with other large-scale developments or projects.
- Intra-project effects: effects that occur as a result of two or more environmental aspect effects acting together (i.e. combined), to result in a new or changed effects on a single receptor.

- 4.5.2 In addition, where any other developments are anticipated to be completed before construction of the Project begins, and the effects of those developments are fully determined, effects arising from those developments will be taken into consideration within the construction and operational assessments reported in the environmental aspect chapters and considered as part of the potential 'future baseline'. The ES will clearly distinguish between developments forming part of this future baseline and those in the CEA.

### Inter-project effects

- 4.5.3 The EIA will follow the methodology for CEA defined in the Planning Inspectorate's 'Advice Note Seventeen'<sup>48</sup>. This is a four-stage approach, as follows:

- Stage 1 – establish the Zone of Influence (Zoi) for the Project and identify a 'long list' of 'other development'.
- Stage 2 – identify a 'shortlist' of 'other development' for the CEA.
- Stage 3 – information gathering.
- Stage 4 – assessment.

- 4.5.4 The Zoi of the Project, within which any potential effects of the Project may combine with the effects arising from other developments, will be defined by the

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<sup>48</sup> Planning Inspectorate (2019). Advice Note Seventeen: Cumulative effects assessment (Version 2). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/> (Accessed January 2022).

environmental aspect specialists and combined into a single area within which other development will be identified.

4.5.5 The Stage 1 'long list' of other developments will be grouped into three tiers, reflecting the likely degree of certainty attached to each development, with Tier 1 being the most certain. It is proposed that this 'long list' is refined and finalised in discussion with the relevant local planning authorities and key prescribed consultees.

4.5.6 In order to ensure that the CEA is proportionate, a shortlist of 'other development' will be prepared. Each of the developments and allocations will be considered in terms of whether they would be likely to generate impacts which could combine to result in cumulative effects in combination with the Project. Criteria used for this process will be specific to each discipline and will take account of scale, nature and timescales. As with the long list, this shortlist will be discussed with the relevant local planning authorities and key prescribed consultees.

4.5.7 It will be necessary to freeze the cumulative development list and relevant information on these developments, prior to the DCO application submission, to allow impact assessments to be completed and reported in the ES.

### *Wider HyNet North West Project*

4.5.8 The following components of the wider HyNet North West project will be considered as part of the cumulative effects assessment as appropriate:

- Stanlow hydrogen production facility;
- Carbon capture, utilization and storage infrastructure; and
- hydrogen storage facility.

4.5.9 These are projects comprised in the wider HyNet North West project, which the Project forms part of, and are subject to separate consent applications which are being promoted by separate project promoters. Further local HyNet projects may be considered if they reach a stage of adequate maturity for assessment prior to DCO submission.

4.5.10 The ES will include an assessment of any cumulative effects of the Project along with these other projects. This will draw upon environmental information and EIA documentation submitted in support of the consent applications for each of these elements of the wider HyNet North West project to the extent available.

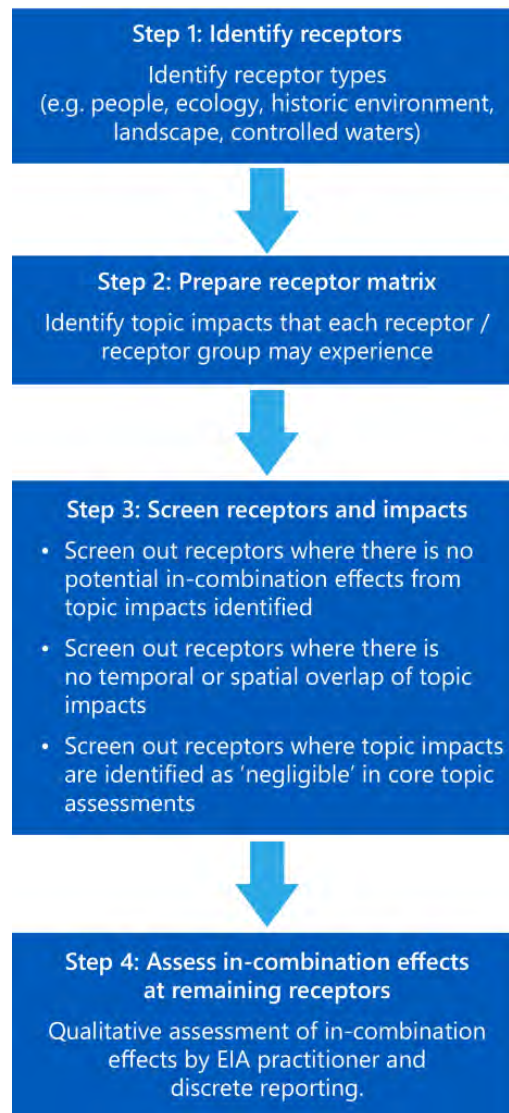
4.5.11 The overall effects of these components of the wider HyNet North West project will be also be summarised, or links provided, insofar as sufficient information on the other projects is available. The aim of this is to provide a summary of the wider elements of the HyNet North West project and to give an overview of the overall environmental effects of the wider HyNet North West project.

### *Intra-project effects*

4.5.12 The assessment of intra-project effects involves identifying whether any of the individual environmental aspect effects resulting from the Project, which are not significant in their own right, could combine to create effects that are significant.

- 4.5.13 There is no standard approach to the assessment of intra-project effects although it should be carried out with reference to guidance and to professional judgement. The proposed approach for the assessment of intra-project effects for the Project is shown in **Figure 4.1**. This follows a receptor-based approach for the consideration of intra-project effects.

**Figure 4.1 Intra-project effects assessment process**



## 4.6 Transboundary effects

- 4.6.1 The EIA Regulations require an ES to consider the transboundary effects of a development (paragraph 5 of Schedule 4). Given the nature of the Project and its proposed location, significant transboundary effects are unlikely. However, the

transboundary screening matrix will be completed as detailed in the Planning Inspectorate's 'Advice Note Twelve'<sup>49</sup> and included within the ES.

## 4.7 Consultation and engagement

4.7.1 This section sets out the proposed approach to consultation and engagement for the EIA. All pre-application consultation will be undertaken in accordance with the Planning Act 2008<sup>50</sup> (SI 2008 c. 29) (as amended) and relevant guidance, including the Planning Inspectorate's 'Advice Note Seven'<sup>45</sup>.

### Pre-application consultation

4.7.2 Section 42 of the Planning Act 2008<sup>50</sup> requires the Applicant to carry out pre-application consultation with a range of prescribed consultees. The key stakeholders to be consulted as part of the pre-application process are outlined in Section 42 to 47 of the Planning Act 2008<sup>50</sup> and include (but are not limited to):

- Prescribed statutory bodies.
- Local authorities.
- Landowners/land interests.
- Local communities.
- Other key interest groups.

4.7.3 In addition to statutory consultation with prescribed consultees, as best practice, applicants are also encouraged to engage in non-statutory consultation with all potentially affected parties:

*“a sufficiently early stage to allow consultees a real opportunity to influence the proposals. At the same time, consultees will need sufficient information on a project to be able to recognise and understand the impacts”.*<sup>51</sup>

4.7.4 This allows stakeholders and local communities to gain a better understanding of the Project and any potential effects identified whilst also giving the opportunity to influence the design and help identify appropriate mitigation. Local knowledge and understanding is important, and the Applicant will seek to engage with consultees through both formal and informal consultation prior to submission of the DCO application.

<sup>49</sup> Planning Inspectorate (2020). Advice Note Twelve: Transboundary Impacts and Process (Version 6). (Online) Available at:

<https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-twelve-transboundary-impacts-and-process/> (Accessed January 2022).

<sup>50</sup> UK Government (2008). Planning Act 2008. (Online) Available at:

<https://www.legislation.gov.uk/ukpga/2008/29/contents> (Accessed January 2022).

<sup>51</sup> Department for Communities and Local Government (2015). Planning Act 2008: Guidance on the pre-application process. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/418009/150326\\_Pre-Application\\_Guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/418009/150326_Pre-Application_Guidance.pdf) (Accessed January 2022).



- 4.7.5 Statutory and non-statutory consultation will help to inform the preparation of key materials as part of the EIA in support of the pre-application DCO process. This includes this Scoping Report, the PEIR supporting statutory consultation and the ES submitted alongside the DCO application.
- 4.7.6 A Consultation Report will form part of the DCO application and will summarise how pre-application consultation was undertaken and set out how feedback received was considered by the Applicant.

## Technical engagement

- 4.7.7 In addition to the stages of pre-application consultation, the applicant has held and will continue to hold informal engagement with the key prescribed consultees, as appropriate, in order to refine the Project and the EIA and to assist in the development of any required mitigation or other environmental measures. Specific information on any feedback received is presented in the individual environmental aspect chapters (**Chapter 5 to 17**).

## 4.8 COVID-19 implications

- 4.8.1 The current restrictions imposed during the COVID-19 pandemic have potential implications for the Project, in particular with regard to normal consultation activities and conducting site surveys. The following measures are being taken by the project team to achieve as much as possible during the EIA programme whilst working fully within the restrictions, and being mindful of and managing any potential implications:
- EIA surveys that do require land access are planned to proceed within appropriate seasons this calendar year (2022), whilst applying social distancing measures to keep surveyors and members of the public safe. A watching brief will be maintained on the progress of data collection throughout the EIA, and progress will be shared with appropriate stakeholders.
  - EIA surveys that may not require land access but rely on the baseline environment to reflect the normal situation such as noise and traffic surveys or that are significantly hindered this calendar year because of the restrictions imposed by the pandemic will be planned for a time when survey results will reflect a more normal pattern. Flexibility will be sought from where needed stakeholders to enable the timely completion of surveys and the provision of this information.
  - In accordance with the Planning Inspectorate's 'Advice Note Seven'<sup>45</sup>, the applicant is conducting early targeted consultation with some stakeholders, including the local planning authorities, Natural England and the Environment Agency. The purpose of this engagement is to share and seek agreement on assessment approaches and to obtain as much relevant environmental information as possible in advance of key project milestones such as scoping, the production of the PEIR and ES. As recognised in 'Advice Note Seven'<sup>45</sup>, the Planning Inspectorate expects consultation bodies to work with applicants in finding suitable approaches to aid the robust preparation of applications, and the applicant will continue to engage with stakeholders on this basis.

- The project team is keeping abreast of the advice issued with regard to site surveys and consultation activities such as that issued by the National Infrastructure Planning Association, Natural England, Chartered Institute of Ecology and Environmental Management (CIEEM) and the Planning Inspectorate. In addition, all activity will follow Government guidance on COVID-19.
- The requirements of the *Infrastructure Planning (Publication and Notification of Applications etc.) (Amendment) Regulations 2020*<sup>52</sup> will be adhered to where relevant.

## 4.9 Assumptions and limitations

4.9.1 Assumptions and limitations are addressed under each environmental aspect as identified in the appropriate chapters (**Chapters 5 to 17**).

## 4.10 Structure of the ES

4.10.1 The Planning Inspectorate's 'Advice Note Seven'<sup>45</sup> requires that applicants provide an outline structure of what the ES will contain. The structure of the ES for the Project will broadly follow the same order of chapters that are presented in this Scoping Report, acknowledging that changes may need to be made to address the requirements of the Scoping Opinion, both in terms of presentation of the Project to aid understanding, or as the design requirements evolve.

4.10.2 An indicative outline structure for the ES is set out in **Table 4.5**.

**Table 4.5 Outline structure of the ES**

ES content	Likely contact
<b>Non-Technical Summary (NTS)</b>	A concise and standalone document that provides a description of the EIA process and its findings in a manner that is both appealing to read and easily understood by the general public.
<b>Introduction</b>	Overview of the Project. The applicant and EIA project team and competency details. Purpose of the ES. Structure of the ES. A brief summary of other relevant assessments and documents (for example, Habitats Regulations Assessment).
<b>The Project</b>	Description of the Project and its surroundings. Development proposals (location and development description, development timescales and programme etc.). Embedded mitigation and management measures.

<sup>52</sup> UK Government (2020). The Infrastructure Planning (Publication and Notification of Applications etc.) (Amendment) Regulations 2020. (Online) Available at: <https://www.legislation.gov.uk/ukxi/2020/1534/contents/made> (Accessed January 2022).

<b>ES content</b>	<b>Likely contact</b>
<b>Need and alternatives</b>	The need for the Project. Alternatives considered and environmental reasons for the choice of preferred options.
<b>Legislation and policy</b>	Legislative context. National and local policy context. Other relevant guidance and policies. Applicable consents and permits.
<b>Approach to preparing the ES</b>	The EIA process. EIA terminology. EIA scoping. Stakeholder engagement. Identification of baseline conditions. Overview of assessment methodology. Approach to significance evaluation. Development of environmental measures Approach to CEA.
<b>Environmental topic chapters</b>	Introduction. Relevant topic specific legislation, policy and guidance. Consultation and engagement. Data gathering methodology. Baseline description. Scope of the assessment. Embedded environmental measures. Assessment methodology. Assessment of effects. Cumulative effects (inter-project effects) assessment. Limitations and assumptions.
<b>Cumulative effects (intra-project effects) assessment</b>	Intra-project effects that occur as a result of two or more environmental aspect effects acting together (i.e. combined), to result in a new or changed effects on a single receptor.
<b>Assessment summary</b>	Summary of the outcome of the environmental aspect assessments and how mitigation, monitoring and other environmental measures will be implemented.

## 5. Ecology

### 5.1 Introduction

5.1.1 The ecology assessment will consider the potentially significant effects<sup>53</sup> on terrestrial and freshwater ecological receptors, as well as ornithological receptors, hereafter together referred to as ecological features<sup>54</sup> that may arise from the construction and operation of the Project. This chapter of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the potentially significant effects to be considered within the EIA, and how these potentially significant effects will be assessed for the purpose of an EIA.

5.1.2 Ecology interfaces with many other topics and as such, should be considered alongside these:

- **Chapter 7: Water Environment;**
- **Chapter 9: Air Quality;**
- **Chapter 10: Noise and Vibration;**
- **Chapter 11: Traffic and Transport;**
- **Chapter 12: Ground Conditions;**
- **Chapter 13: Agriculture and Soil Resources;**
- **Chapter 14: Land Use;** and
- **Chapter 17: Climate Change.**

### Assumptions and limitations

5.1.3 Please refer to **Chapter 2: The Project** for the parameters on which this Scoping Report is based.

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<sup>53</sup> Other technical chapters use “likely significant effects” and “potential likely significant effects” to accord with the EIA Regulations 2017. Within the Ecology chapter the term “potentially significant effects” is used as it accords with Chartered Institute of Ecology and Environmental Management guidance (CIEEM 2018, updated 2019) and avoids confusion with the term “Likely Significant Effects” that is used in the context of a Habitats Regulations Assessment (see sub-section ‘Habitat Regulations’ within **Section 5.7: Assessment methodology**). “Potentially significant effects” is therefore used to describe effects that have the potential to be significant prior to their assessment (i.e. until the end of the “scope of the assessment”). The term “likely significant effects”, would only arise once assessment has determined that they would indeed be significant.

<sup>54</sup> ‘Ecological feature’ is used within CIEEM guidance (2018, updated 2019) in place of the term ‘terrestrial ecology receptor’. The term ecological feature is used throughout this chapter.

5.1.4 The proposed assessment approach in this chapter is based on readily available desk study data and habitats identified using Ordnance Survey (OS) maps and aerial imagery. ‘Reasonable worst-case’ assumptions regarding ecological features potentially present within the Scoping red line boundary will be made when assessing potentially significant effects. A comprehensive and proportionate baseline data gathering exercise and an ecological walkover will then be undertaken as part of the EIA. Whilst these tasks are essential to inform the assessment of effects, it is considered unlikely that the findings will substantively alter the scope of, or approach to, the assessment described in this chapter, which has been determined with regard to this data limitation.

## 5.2 Relevant Legislation and Technical Guidance

5.2.1 This section sets out the legislation and guidance in the context of the ecological environment. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

### Legislation

5.2.2 A summary of the relevant legislation is given in **Table 5.1**.

**Table 5.1 Legislation relevant to ecology**

Legislation	Legislative context	Section considered
<b>The Environment Act 2021<sup>55</sup></b>	The Environment Act (passed in November 2021) translates aspects of the government’s “A Green Future: Our 25 Year Plan to Improve the Environment” - year plan into legislation. The Environment Act will make it mandatory, once the relevant secondary legislation is passed pursuant to the Act, for the vast majority of development projects to deliver a 10% Biodiversity Net Gain (BNG) as a requirement of their consent.	<b>Section 5.5: Embedded environmental measures</b> and <b>Section 5.6: Scope of assessment</b>

<sup>55</sup> UK Government (2021). Environment Act 2021, c. 30. (Online) Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>. (Accessed 23 November 2021).

Legislation	Legislative context	Section considered
	<p>Nationally Significant Infrastructure Projects (NSIPs) consented under the Planning Act 2008 (as amended) will also, once this becomes law, need to deliver a biodiversity gain commitment, although the percentage increase set will be controlled by the relevant Secretary of State either through individual National Policy Statements or by separately published statements.</p>	
<p><b>Natural Environment and Rural Communities (NERC) Act 2006 (as amended)<sup>56</sup></b></p>	<p>Section 40 states “<i>every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.</i>”</p> <p>The NERC Act also places a duty on the Secretary of State to maintain lists of species and habitats which are regarded as being of principal importance for the conservation of biodiversity in England. These Habitats of Principal Importance (HPI) and Species of Principal Importance (SPI) are used to guide decision makers in implementing their duties to have regard to the conservation of biodiversity in England when carrying out their normal functions.</p>	<p><b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b></p>

<sup>56</sup> UK Government (2006). Natural Environment and Rural Communities Act 2006, c.16. (online) Available from <https://www.legislation.gov.uk/ukpga/2006/16/contents>. (Accessed 23 November 2021).

Legislation	Legislative context	Section considered
<b>The Conservation of Habitats and Species Regulations 2017 (as amended)</b> <sup>57</sup>	<p>The Conservation of Habitats and Species Regulations 2017 (as amended) transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (“the Habitats Directive”) and elements of Directive 2009/147/EC on the conservation of wild birds (“the Birds Directive”) in England.</p> <p>These aim to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites. Under the Regulations, competent authorities have a general duty to have regard to the EC Habitats Directive. Provides legal protection of animals listed on schedule two and plants on schedule five of the legislation.</p> <p>The Regulations are amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations</p>	<b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b>

<sup>57</sup> UK Government (2017). The Conservation of Habitats and Species Regulations 2017 (No. 1012). (online) Available from <https://www.legislation.gov.uk/uksi/2017/1012/contents>. (Accessed 23 November 2021).

Legislation	Legislative context	Section considered
<p><b>Wildlife and Countryside Act (WCA) 1981 (as amended)<sup>59</sup></b></p>	<p>2019<sup>58</sup> following the United Kingdom's withdrawal from the EU. These changes, allow for new administrative and regulatory arrangements and the creation of a national site network comprising the protected sites already designated under the Nature Directives, and any further sites designated under these Regulations.</p> <p>The WCA Act 1981 (as amended) is the principal mechanism for the legislative protection of wildlife in England. This legislation is how the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (which transposed the EU European Union Directives on the Conservation of Wild Birds (79/409/EEC) and Natural Habitats and Wild Fauna and Flora (92/43/EEC) to ensure the legislation still operates effectively following the United Kingdom's withdrawal from the EU) are implemented in England.</p>	<p><b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b></p>

<sup>58</sup> UK Government (2019). The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. (Online) Available at:

<https://www.legislation.gov.uk/ukdsi/2019/9780111176573> (Accessed December 2021).

<sup>59</sup> UK Government (1981). Wildlife and Countryside Act 1981, c.69. (online) Available from <https://www.legislation.gov.uk/ukpga/1981/69/contents> (Accessed 23 November 2021).



Legislation	Legislative context	Section considered
	The Act affords various levels of protection to species of plants and animals listed on Schedules one, five, six and eight of the Act, with Schedule nine listing species which it is an offence to allow to spread in the wild.	
<b>Badger Act 1992<sup>60</sup></b>	Provides legal protection for badgers by making it illegal to kill or injure a badger, disturb a badger while occupying a sett, or to damage or obstruct a badger sett.	<b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b>
<b>Countryside and Rights of Way Act 2000 ('the CROW Act')<sup>61</sup></b>	This CROW Act, amongst other elements, details further measures for the management and protection of Sites of Special Scientific Interest (SSSI) and strengthens wildlife enforcement legislation.	<b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b>
<b>The Hedgerow Regulations 1997<sup>62</sup></b>	Legislation that protects 'important' hedgerows from damage or destruction.	<b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b>
<b>The European Union (EU) Water Framework Directive (2000/60/EC) (WFD) as enacted into domestic law by the Water Environment WFD (England and Wales)</b>	The WFD originates from the EU but has been retained in UK law in domestic legislation following the United Kingdom's withdrawal from the EU as set out in the	<b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b>

<sup>60</sup> UK Government (1992). Badger Act 1992, c.51. (online) Available from <https://www.legislation.gov.uk/ukpga/1992/51/contents> (Accessed 23 November 2021).

<sup>61</sup> UK Government (2000). Countryside and Rights of Way Act 2000, c.37. (online) Available from <https://www.legislation.gov.uk/ukpga/2000/37/contents> (Accessed 23 November 2021).

<sup>62</sup> UK Government (1997). The Hedgerows Regulations 1997 (No.1160). (online) Available from <https://www.legislation.gov.uk/uksi/1997/1160/contents/made> (Accessed 23 November 2021).

Legislation	Legislative context	Section considered
<b>(Amendment) Regulations 2017<sup>63</sup></b>	European Union (Withdrawal) Act 2018.  A fundamental requirement of the WFD is to attain ‘ <i>Good Ecological Status</i> ’, or ‘ <i>Good Ecological Potential</i> ’ within each defined water body, by December 2027 at the latest and to ensure that any deterioration in status is prevented.	
<b>Salmon and Freshwater Fisheries Act 1975<sup>64</sup></b>	Includes provisions that legally protect spawning fish, fish spawn, spawning areas and juvenile fish from harm/disturbance. Also includes provisions that make it an offence to impede/obstruct fish migration. The Act mainly relates to salmon and trout, also affording more limited protections to lamprey, shad and smelt.	<b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b>
<b>The Eel (England and Wales) Regulations 2009<sup>65</sup></b>	Includes legal provisions to avoid actions that impede/obstruct eel migration/passage.	<b>Section 5.5: Embedded environmental measures and Section 5.6: Scope of assessment</b>

## Technical guidance

5.2.3 A summary of the relevant technical guidance is given in **Table 5.2**.

<sup>63</sup> UK Government (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. (online) Available from [https://www.legislation.gov.uk/ukxi/2017/407/pdfs/ukxi\\_20170407\\_en.pdf](https://www.legislation.gov.uk/ukxi/2017/407/pdfs/ukxi_20170407_en.pdf) (Accessed 22 November 2021).

<sup>64</sup> UK Government (1975). Salmon and Freshwater Fisheries Act 1975, c.51. (online) Available at: <https://www.legislation.gov.uk/ukpga/1975/51/contents> (Accessed 22 November 2021).

<sup>65</sup> UK Government (2009). The Eels (England and Wales) Regulations 2009 (No. 3344). (online) Available from <https://www.legislation.gov.uk/ukxi/2009/3344/made> (Accessed 22 November 2021).

**Table 5.2 Technical guidance relevant to ecology**

Technical guidance document	Context	Section considered
<b>Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Second Edition v1.1 (2018 updated 2019)<sup>66</sup></b>	Provides guidance that is relevant to the assessment of potentially significant effects on ecology.	<b>Section 5.7: Assessment methodology</b>
<b>Guidelines for Baseline Ecological Assessment (1995)<sup>67</sup></b>	Provides guidance that is relevant to the assessment of potentially significant effects on ecology.	<b>Section 5.7: Assessment methodology</b>
<b>Guidelines for Preliminary Ecological Appraisal: Second Edition (2017)<sup>68</sup></b>	Provides guidance that is relevant to the assessment of potentially significant effects on ecology.	<b>Section 5.7: Assessment methodology</b>
<b>BS 42020 Biodiversity: Code of Practice for Planning and Development<sup>69</sup></b>	Provides guidance that is relevant to the assessment of potentially significant effects on ecology.	<b>Section 5.7: Assessment methodology</b>

5.2.4 Technical guidance for features or groups of features that will be used during the survey work to inform the assessment is noted in **Table 5.9**.

## 5.3 Consultation

5.3.1 In respect of ecology, key consultees have been identified and focussed engagement (through both informal and statutory consultation) will be undertaken and recorded throughout the pre-application stages of the Project. Key consultees identified to date include:

<sup>66</sup> Chartered Institute of Ecology and Environmental Management (CIEEM) (2018, updated 2019). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Second Edition v1.1. CIEEM, Winchester.

<sup>67</sup> Institute of Environmental Assessment (IEA) (1995). Guidelines for Baseline Ecological Assessment. E & FN Spon, London.

<sup>68</sup> CIEEM (2017). Guidelines for Preliminary Ecological Appraisal: Second Edition. CIEEM, Winchester.

<sup>69</sup> BSI Group (2013). BS 42020 – a code of practice for biodiversity in planning and development - Smart guide to biodiversity in planning and development. (online) Available from <https://www.bsigroup.com/LocalFiles/en-GB/biodiversity/BS-42020-Smart-Guide.pdf> (Accessed 22 November 2021).

- Natural England;
- County Ecologists for Cheshire West, Cheshire East, Merseyside and Greater Manchester;
- Environment Agency;
- Cheshire Wildlife Trust (CWT);
- Wildlife Trust for Lancashire, Manchester and North Merseyside (LWT); and
- Royal Society for the Protection of Birds (RSPB).

5.3.2 Engagement with key consultees will follow the Stakeholder Engagement Programme. The aim of consultation will be to seek agreement on the proposed Study Area (further details covering the rationale of the Study Area definition are provided at **Section 5.4**), ecological features to be included in the assessment, proposed survey extent and methodology and the requirement for Habitat Regulations Assessment (HRA), in addition to seeking local knowledge to complement information and species/habitat records obtained during the desk study. Any variations to the agreed survey scope will be discussed with the key consultees (for example, if and when important ecological features are identified during the extended Phase 1 habitat survey).

5.3.3 Local or specialist groups will be contacted should the assessment process identify a need to engage further detailed local knowledge, or if requested during the consultation process.

## 5.4 Baseline Conditions

### Study Area

5.4.1 The Study Area encompasses the area over which all desk-based data was gathered to inform the ecology scoping assessment presented in this chapter. Due to the presence of multiple ecological features and many potential effects, the level and type of data collection varies across the Study Area. The Study Area comprises:

- land within the Scoping red line boundary, (as shown on **Figure 5.1**);
- land within the Scoping red line boundary and surrounding buffer (known as “area of search”, see paragraph 5.4.4) for sites designated for their nature conservation interest at the international, European, national and local levels (as described in **Table 5.6**) dependent on the ecological feature for which the sites are designated;
- the area of search for legally protected and notable ecological features; and
- the area of search for any legally controlled species.

5.4.2 The extent of the desk study areas of search used in this chapter (see paragraph 5.4.4) were determined based on best practice guidance (see **Table 5.9**) and a high-level overview of the types of ecological features potentially present (see **Figure 5.1**), as well as the type and nature of likely works and the potential effects

that could occur. The Study Area was defined on a precautionary basis to ensure that the Zones of Influence (Zol) relevant to all ecological features were covered during baseline data collection activities. Zols are the areas within which a potentially significant effect associated with the Project may be identified for a particular ecological feature and vary from feature to feature.

- 5.4.3 The Study Area should be regarded as preliminary at this stage and will be reviewed and amended in response to the refinement of the Project design, the identification of additional impact pathways and where appropriate in response to feedback from consultation, to ensure that there is sufficient data on which to conduct the assessment. These refinements are expected to reduce the extent of the Study Area as the Project progresses, whilst still reflecting recognised good practice.

## Data gathering methodology

### Desk study data

- 5.4.4 To inform this scoping process, a preliminary desk study has been undertaken. The desk study information to date was obtained from publicly available resources as listed in 'Sources of data' (see paragraph 5.4.9). Data was gathered for:
- Statutory designated sites within and up to 2km from the Scoping red line boundary in respect of terrestrial ecology. This buffer was extended to 10km for all internationally and nationally important sites with bat interest (see **Figure 5.1**);
  - nationally important sites within and up to 10km from the Scoping red line boundary and internationally important sites within and up to 20km in respect of ornithology interest (see **Figure 5.1**);
  - non-statutory designated sites within and up to 2km of the Scoping red line boundary; and
  - HPI and ancient woodland within and up to 2km of the Scoping red line boundary.
- 5.4.5 The Environment Agency's catchment data explorer database includes details of the ecological status of the 25 waterbodies that have drainage basins that are intercepted by the Scoping red line boundary. This information is detailed in Table 7.6 of **Chapter 7: Water Environment** and includes details of the status of the biological quality elements (fish, macroinvertebrates, macrophytes and phytobenthos). This information was used to identify potential aquatic ecological features within the Scoping red line boundary.
- 5.4.6 A full desk study will be completed and will detail non-statutory site information (e.g. Local Wildlife Sites) and records of legally protected species and SPI, requested from RECORD – Biodiversity Information Centre for Cheshire, Halton, Warrington and Wirral; Greater Manchester Record Centre; and Merseyside Biobank. Specialist interest groups will also be contacted (e.g. the British Trust for Ornithology (BTO) and Cheshire and Wirral Raptor Study Group (C&WRSG)) for their data. Data on granted European Protected Species (EPS) Mitigation

Licences will be sought from the Government's Multi Agency Geographic Information for the Countryside (MAGIC) website. Finally, the most recent information and monitoring data on the baseline status of freshwater ecology (fish, macroinvertebrates and macrophytes) held by the Environment Agency will be reviewed.

### Survey data

- 5.4.7 Data gathered during wintering bird surveys undertaken in 2020 and 2021 by the Applicant<sup>70</sup> and Wood on behalf of the Applicant has also been used to inform the chapter in relation to bird species present within the Study Area.
- 5.4.8 No data is yet available from breeding bird surveys or terrestrial ecology field surveys to inform the Scoping Report due to the early stage of the Project; however, these surveys will be undertaken in 2022 (see **Table 5.9**).

### Sources of data

#### Desk study data

- 5.4.9 Desk study data gathered to date was obtained from the following sources:
- The Government's Multi Agency Geographic Information for the Countryside (MAGIC) website<sup>71</sup>;
  - a review of aerial imagery using Google Earth<sup>72</sup>;
  - a review of Ordnance Survey mapping<sup>73</sup>;
  - St Helens Council's LWS dataset<sup>74</sup>;
  - Greater Manchester Council's Sites of Biological Importance (SBIs) dataset<sup>75</sup>;

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<sup>70</sup> Cadent - Hydrogen Pipeline - Wintering Bird Surveys. 14 May 2021.

<sup>71</sup> Defra. Multi Agency Geographic Information for the Countryside. Data retrieved from MAGIC Interactive Map. (online) Available from <https://magic.defra.gov.uk/home.htm> (Accessed 25 November 2021).

<sup>72</sup> Google (2021). Google Earth Pro 7.3.3.7721 (64-bit). (Computer program). Google; California, USA. (Accessed 25 November 2021).

<sup>73</sup> Ordnance Survey (2021). Ordnance Survey Maps 3.3.0.900 (Computer program). Ordnance Survey; Southampton, UK (Accessed 25 November 2021).

<sup>74</sup> St Helens Council (2014). St Helens Local Wildlife Sites.(online) Available at: <https://data.gov.uk/dataset/1fc17614-7148-4bfb-8fea-b874a664951e/st-helens-local-wildlife-sites> (Accessed 25 November 2021).

<sup>75</sup> Greater Manchester Ecology Unit (2020). Sites of Biological Importance (SBI/LWS) in Greater Manchester. (online) Available at: <https://data.gov.uk/dataset/81cbf1a0-6304-470c-ade8-60272be0d219/sites-of-biological-importance-sbi-lws-in-greater-manchester> (Accessed 25 November 2021).

- Cheshire East Council's Local Wildlife Site (LWS) dataset<sup>76</sup>;
- Cheshire West and Chester Council Interactive Map<sup>77</sup>;
- The Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland (Balmer *et al.*, 2013)<sup>78</sup>;
- Birds in Cheshire and Wirral: A breeding and wintering atlas (Cheshire and Wirral Ornithological Society, 2008)<sup>79</sup>; and
- Northern England Raptor Forum Annual Review 2020 (Smith *et al.*, 2021)<sup>80</sup>.

### Survey data

- 5.4.10 Field surveys within the Scoping red line boundary<sup>81</sup> to date have been limited to wintering bird surveys undertaken by WSP UK Ltd (WSP), during October 2020 to March 2021 inclusive. These included farmland bird surveys (comprising five monthly visits, November 2020 to February 2021 inclusive) as well as wintering waterbird surveys (comprising ten fortnightly visits, October 2020 to March 2021 inclusive).
- 5.4.11 Wood has been undertaking wintering bird surveys since October 2021. These have focussed on qualifying species of the Mersey Estuary SPA and potentially functionally linked habitat (covering the same wetland/intertidal bird surveys transects as those identified by WSP). Currently five visits have been undertaken with a further five fortnightly visits to each survey area scheduled until the end of February 2021<sup>82</sup>.

<sup>76</sup> Cheshire East Council (2019). Local Wildlife Sites. (online) Available at: <https://data.gov.uk/dataset/24e0c59d-f136-405e-ac4d-32b3867a4f15/local-wildlife-sites> (Accessed 25 November 2021).

<sup>77</sup> Chester West and Cheshire Council. Public map viewer. (online) Available at: <https://maps.cheshirewestandchester.gov.uk/cwac/webmapping> (Accessed 25 November 2021).

<sup>78</sup> Balmer, D.E, Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller, R.J. 2013. The Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland. BTO Books, Thetford, UK.

<sup>79</sup> Cheshire and Wirral Ornithological Society (2008). Birds in Cheshire and Wirral: A breeding and wintering atlas. (online) Available at: <http://www.cheshireandwirralbirdatlas.org/species/> (Accessed 26 November 2021).

<sup>80</sup> Smith, A.J., Norman, W. & NERF et al. 2021. Northern England Raptor Forum Annual Review 2020.

<sup>81</sup> HyNet. CO2 and H2 Pipeline Enabling Works. Wintering Bird Survey Methodology. August 2020.

<sup>82</sup> In the absence of best practice guidance, the survey method comprised transects walked twice a month (October to February inclusive to cover the entire winter period) with varied start times between morning and afternoon to avoid any time related bias. Transect timings also considered the Mersey Estuary tidal cycle so survey results would be representative of habitat use by birds at varying stages of tidal movement and habitat exposure. During each survey visit the transect was walked slowly, approaching all suitable habitat and scanning and listening for target waterbird species, as well as notable

- 5.4.12 No breeding bird surveys have been undertaken to date, but further ornithological surveys are programmed for the 2022 breeding season (April to July) focussing solely on breeding Schedule 1 species (see **Table 5.9**).

## Current baseline

### Designated sites

- 5.4.13 The desk study completed to date has identified internationally and nationally designated sites within the Study Area, outlined in **Table 5.3** and illustrated on **Figure 5.1**. None of the sites identified fall within the Scoping red line boundary.

**Table 5.3** Current baseline – statutory sites within the Study Area

Site name	Designated feature summary	Position relating to the Scoping red line boundary
<b>Mersey Estuary SPA</b>	Non-breeding water bird assemblage for which the site is designated: shelduck ( <i>Tadorna tadorna</i> ), teal ( <i>Anas crecca</i> ), pintail ( <i>Anas acuta</i> ), golden plover ( <i>Pluvialis apricaria</i> ), dunlin ( <i>Calidris alpina</i> ), black-tailed godwit ( <i>Limosa limosa</i> ), redshank ( <i>Tringa totanus</i> ).	~205m west
<b>Mersey Estuary Ramsar</b>	<p><b>International</b></p> <p>Shelduck: 12,676 individuals in spring/autumn.            Black-tailed godwit: 2,011 individuals in spring/autumn.            Redshank: 6,651 individuals in spring/autumn.            Teal: 10,613 individuals in winter.            Pintail: 565 individuals in winter.            Dunlin: 48,364 individuals in winter.</p> <p><b>National</b></p> <p>Ringed plover (<i>Charadrius hiaticula</i>): 429 individuals in spring/autumn.            Curlew (<i>Numenius arquata</i>): 2,010 individuals (breeding).            Spotted redshank (<i>Tringa erythropus</i>): three individuals in spring/autumn.            Greenshank (<i>Tringa nebularia</i>): six individuals in spring/autumn.            Wigeon (<i>Anas penelope</i>): 8,268 individuals in winter.</p>	~205m west

aggregations of other species and potential resident Schedule 1 breeding species (e.g. Cetti's warbler, barn owl, peregrine falcon etc).



Site name	Designated feature summary	Position relating to the Scoping red line boundary
<b>Mersey Estuary SSSI</b>	The Mersey Estuary is an internationally important site for wildfowl and consists of large areas of intertidal sand and mudflats. The site also includes an area of reclaimed marshland, saltmarshes, brackish marshes and boulder clay cliffs with freshwater seepages. Notable species include pintail, teal, shelduck, wigeon, dunlin, redshank, curlew and golden plover.	~205m west
<b>Rostherne Mere Ramsar</b>	Over winter, the site supports nationally important numbers of shoveler (86 individuals) and pochard ( <i>Aythya ferina</i> ) (757 individuals).	~2.2km south-east
<b>Rostherne Mere SSSI</b>	<i>“The Mere is nationally important for its birds. It acts as a winter roost for large numbers of ducks and holds nationally significant numbers of pochard and pintail as well as good numbers of all other common species associated with freshwater. Over 10,000 gulls regularly roost on the water and up to 90 cormorants roost in the trees along the edge. Because of its size and depth it is the last freshwater body in the area to freeze in winter and is consequently an important refuge in severe weather”.</i>	~2.2km south-east
<b>Midlands Meres and Mosses Phase 2 Ramsar</b>	Nationally important site for passage shoveler ( <i>Anas clypeata</i> ) (171 individuals) and wintering cormorant ( <i>Phalacrocorax carbo</i> ) (323 individuals), bittern ( <i>Botaurus stellaris</i> ) (one individual) & water rail ( <i>Rallus aquaticus</i> ) (seven individuals) (2008).	~3km south-west
<b>Midlands Meres and Mosses Phase 1 Ramsar</b>	No birds listed on the designation.	~4km east
<b>The Dee Estuary SPA</b>	Non-breeding: shelduck, teal, pintail, oystercatcher ( <i>Haematopus ostralegus</i> ), grey plover ( <i>Pluvialis squatarola</i> ), knot, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank, Sandwich tern ( <i>Sterna sandvicensis</i> ). Breeding: common tern, little tern ( <i>Sterna albifrons</i> ). Waterbird assemblage.	~13.5km west

Site name	Designated feature summary	Position relating to the Scoping red line boundary
<b>The Dee Estuary Ramsar</b>	<p>Non-breeding season regularly supports 120,726 individual waterbirds (5-year peak mean 1994/5–1998/9).</p> <p>Species with peak counts in spring/autumn: Redshank, 8,795 individuals, representing an average of 3.5% of the Eastern Atlantic population (5 year peak mean 1994/95 - 1998/99).</p> <p>Species with peak counts in winter: Teal, NW Europe 5,251 individuals, representing an average of 1.05% of the population (5 year peak mean 1994/95 - 1998/99); Shelduck, NW Europe 7,725 individuals, representing an average of 2.6% of the population (5 year peak mean 1994/95 - 1998/99); Oystercatcher, Europe &amp; W Africa 22,677 individuals, representing an average of 2.2% of the population (5 year peak mean 1994/95 - 1998/99); Curlew, Europe/NW Africa 3,899 individuals, representing an average of 1.1% of the Europe population (5 year peak mean 1994/95 - 1998/99); Pintail, NW Europe 5,407 individuals, representing an average of 9.0% of the population (5 year peak mean 1994/95 - 1998/99); Grey plover, E Atlantic 1,643 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1994/95 - 1998/99); Knot (<i>Calidris canutus</i>), W Europe/Canada 12,394 individuals, representing an average of 2.75% of the W Europe population (5 year peak mean 1994/95 - 1998/99); Dunlin, Europe (breeding) 27,769 individuals, representing an average of 2.0% of the population (5 year peak mean 1994/95 - 1998/99); Black-tailed godwit, Iceland (breeding) 1,747 individuals, representing an average of 3.7% of the population (5 year peak mean 1994/95 - 1998/99); Bar-tailed godwit (<i>Limosa lapponica</i>), W European (wintering) 1,150 individuals, representing an average of 1.2% of the Europe population (5 year peak mean 1994/95 - 1998/99); and Redshank, Eastern Atlantic 5,293 individuals representing an average of 2.1% Eastern Atlantic population (5 year peak mean 1994/95 - 1998/99).</p>	~13.5km west

Site name	Designated feature summary	Position relating to the Scoping red line boundary
<b>Mersey Narrows and North Wirral Foreshore SPA</b>	Non-breeding: bar-tailed godwit, little gull ( <i>Hydrocoloeus minutus</i> ), knot, common tern. Breeding: common tern. Waterbird assemblage.	~18.2km west
<b>Mersey Narrows and North Wirral Foreshore Ramsar</b>	The site qualifies under Criterion 4 because it regularly supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions: During 2004/05 - 2008/09 the Mersey Narrows and North Wirral Foreshore Ramsar site supported important numbers of non-breeding little gulls and common terns. The site qualifies under Criterion 5 because it regularly supports 20,000 or more waterbirds: During the winters 2004/05 - 2008/09, the Mersey Narrows and North Wirral Foreshore Ramsar site supported an average peak of 32,402 individual waterbirds. The site qualifies under Criterion 6 because it regularly supports 1% of the individuals in the populations of the following species or subspecies of waterbird in any season: During the winters 2004/05 - 2008/09, the Mersey Narrows and North Wirral Foreshore Ramsar site supported 2.4% of the <i>islandica</i> subspecies, W Europe/Waddensea/Britain/Ireland (non-breeding) population of knot and 2.8% of the <i>lapponica</i> subspecies W Europe/NW Africa (non-breeding) population of bar-tailed godwits.	~18.2km west
<b>Ribble and Alt Estuaries SPA</b>	Non-breeding: Bewick's swan ( <i>Cygnus columbianus</i> ), whooper swan ( <i>Cygnus cygnus</i> ), pink-footed goose ( <i>Anser brachyrhynchus</i> ), shelduck, wigeon, teal, pintail, oystercatcher, ringed plover, golden plover, grey plover, knot, sanderling ( <i>Calidris alba</i> ), dunlin, black-tailed godwit, bar-tailed godwit, redshank Breeding: ruff ( <i>Philomachus pugnax</i> ), lesser black-backed gull, common tern. Waterbird assemblage. Seabird assemblage.	~18.5km north-west

Site name	Designated feature summary	Position relating to the Scoping red line boundary
<b>Ribble and Alt Estuaries Ramsar</b>	<p>Species with peak counts in winter: 222,038 waterfowl (5 year peak mean 1998/99-2002/2003).</p> <p>Species with peak counts in spring/autumn: Black-tailed godwit, Iceland/W Europe 3,323 individuals, representing an average of 7% of the population (5 year peak mean 1998/9-2002/3); Redshank, 4465 individuals, representing an average of 1.7% of the population (5 year peak mean 1998/9-2002/3); Dunlin, W Siberia/W Europe 38,196 individuals, representing an average of 2.8% of the population (5 year peak mean 1998/9-2002/3 - spring peak); Grey plover, E Atlantic/W Africa -wintering 11,021 individuals, representing an average of 4.4% of the population (5 year peak mean 1998/9-2002/3 - spring peak); Knot, W &amp; Southern Africa (wintering) 42,692 individuals, representing an average of 9.4% of the population (5 year peak mean 1998/9-2002/3); Ringed plover, Europe/Northwest Africa 3761 individuals, representing an average of 5.1% of the population (5 year peak mean 1998/9-2002/3 - spring peak); and Sanderling, Eastern Atlantic 7,401 individuals, representing an average of 6% of the population (5 year peak mean 1998/9-2002/3 - spring peak).</p> <p>Species with peak counts in winter: Bar-tailed godwit, W Palearctic 13,935 individuals, representing an average of 11.6% of the population (5 year peak mean 1998/9-2002/3); Oystercatcher, Europe &amp; NW Africa-wintering 18,926 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/9-2002/3); Teal, NW Europe 5107 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3); Wigeon, NW Europe 69,841 individuals, representing an average of 4.6% of the population (5 year peak mean 1998/9-2002/3); Pintail, NW Europe 1,497 individuals, representing an average of 2.5% of the population (5 year peak mean 1998/9-2002/3);</p>	~18.5km north-west

Site name	Designated feature summary	Position relating to the Scoping red line boundary
	Pink-footed goose, Greenland, Iceland/UK 6,552 individuals, representing an average of 2.42% of the population (5 year peak mean 1998/9-2002/3); Bewick's swan, NW Europe 230 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3); and Whooper swan, Iceland/UK/Ireland 211 individuals, representing an average of 1% of the population (5 year peak mean 1998/9-2002/3).	
<b>Hatton's Hey Wood, Whittles Corner and Bank Rough SSSI</b>	Areas of woodland situated on the south facing slopes of the River Weaver valley. Together they form one of the largest blocks of semi-natural clough woodland in the county. Of particular importance are the nationally rare stands of ash and small-leaved lime ( <i>Tilia cordata</i> ) which occur on the poorly drained and mildly acidic slopes.	Adjacent to a section of the southern boundary of the Scoping red line boundary
<b>Plumley Lime Beds SSSI</b>	A calcareous habitat colonised by a wide range of plant species. Other habitats on site include woodland, a pool and marshland and an area of soil deposited on part of the lime beds. Little ringed plover ( <i>Charadrius dubius</i> ) is known to have bred.	Surrounded on all sides by the Scoping red line boundary
<b>Woolston Eyes SSSI</b>	A nationally important site for its breeding bird assemblage of lowland open waters and their margins (including nationally important numbers of black-necked grebe ( <i>Podiceps nigricollis</i> ), gadwall ( <i>Anas strepera</i> ) and pochard, shoveler and teal. Wintering tufted duck ( <i>Aythya fuligula</i> ) use Woolston Eyes in numbers of regional importance.	Adjacent to a section of the eastern boundary
<b>Witton Lime Beds SSSI</b>	A calcareous habitat colonised by a wide range of plant species.	~240m east
<b>Brookheys Covert SSSI</b>	The majority of the site comprises well-established pedunculate oak-hazel-ash woodland with a large number of small pools. Woodland of this type is uncommon in Greater Manchester and the site contains a wide range of woodland and wetland habitats which make it the most diverse example in the county.	~250m east
<b>Flood Brook Clough SSSI</b>	A deep wooded valley with an ash ( <i>Fraxinus excelsior</i> ) and wych elm ( <i>Ulmus glabra</i> ) woodland. Many of the plants present are characteristic of	~255m north-east

Site name	Designated feature summary	Position relating to the Scoping red line boundary
	ancient woodland on base-rich soils and are comparatively rare in Cheshire.	
<b>Pettypool Brook Valley SSSI</b>	The wetland communities at the head of Pettypool, and those downstream along the course of Pettypool Brook, comprise Cheshire's most extensive and diverse valley mire system. The mature woodland with its abundant dead wood, and the extensive peatland habitats, offer a diversity of refugia to a wide range of insects. The site supports populations of a number of national and county rarities.	~340m south-west
<b>Frodsham Railway and Road Cuttings SSSI</b>	Designated for geological features.	~365m south
<b>Beechmill Wood and Pasture SSSI</b>	A small clough woodland on the south side of the River Weaver. The woodland is dominated by ash ( <i>Fraxinus excelsior</i> ) and wych elm ( <i>Ulmus glabra</i> ), some of which occurs on freely draining light-medium textured soils and forms a nationally rare woodland type. The side valley running north-south is dominated by pedunculate oak ( <i>Quercus robur</i> ) and because ash is not present it is an uncommon woodland type in Cheshire cloughs. Also included in the site is an unimproved field containing an extensive flushed area.	~375m south
<b>Tabley Mere SSSI</b>	A waterbody consisting of very nutrient rich water with a well-developed aquatic flora. The site also includes an area of acidic, marshy grassland and woodland. A large heronry is present in the woodland and the undisturbed meres attract numerous wildfowl.	~490m north-east
<b>Red Brow Cutting SSSI</b>	Designated for geological features.	~680m south-west
<b>Warburton's Wood and Well Wood SSSI</b>	An ancient semi-natural clough woodland occupying two deep cloughs and a steep bank of the River Weaver. A number of woodland types occur reflecting the differences in the soils. These range from the acid free-draining upper slopes and	~915m south

Site name	Designated feature summary	Position relating to the Scoping red line boundary
	flushes to the waterlogged areas often found at the bottom of the valley.	
<b>Dunham Park SSSI</b>	Pasture-woodland is the dominant habitat type within this site. A large number of the oak and beech ( <i>Fagus sylvatica</i> ) trees are ancient, with some dating back to the 17 <sup>th</sup> Century. Dunham Park is the only site in the northwest and one of the few remaining sites in Britain with such a considerable number of old trees. Their associated dead wood beetle fauna is exceptionally rich with 181 species recorded. The fly fauna is very also rich with over 350 species known for this site.	~1.2km east
<b>Dunsdale Hollow SSSI</b>	An acidic lowland birch <i>Betula spp.</i> and sessile oak ( <i>Quercus petraea</i> ) woodland. This type of woodland is often found in the uplands but its occurrence in a lowland landscape is very unusual and it is found on only one other site in Cheshire.	~1.4km south-east
<b>Tatton Meres SSSI</b>	This area is also important ornithologically as a breeding site for sedge ( <i>Acrocephalus schoenobaenus</i> ) and reed warblers ( <i>A. scirpaceus</i> ), sand martins ( <i>Riparia riparia</i> ) and for wintering and breeding wildfowl.	~4.5km north-east
<b>Risley Moss SSSI</b>	A wide range of breeding birds are present including species associated with unmodified mires, for example meadow pipit ( <i>Anthus pratensis</i> ), skylark ( <i>Alauda arvensis</i> ), reed bunting ( <i>Emberiza schoeniclus</i> ), mallard ( <i>Anas platyrhynchos</i> ) and snipe ( <i>Gallinago gallinago</i> ). The area is also of value for wintering wildfowl and raptors.	~5km west
<b>Astley &amp; Bedford Mosses SSSI</b>	Important for birds, in particular wintering raptors such as hen harrier ( <i>Circus cyaneus</i> ), short-eared owl ( <i>Asio flammeus</i> ) and merlin ( <i>Falco columbarius</i> ), and it supports breeding species such as curlew and long-eared owl ( <i>Asio otus</i> ). Nightjar ( <i>Caprimulgus europaeus</i> ), precariously confined to the remnant lowland mosslands in the county, may also breed.	~6.4km south
<b>Sandbach Flashes SSSI</b>	Several of the flashes are important for breeding birds and also support large numbers of wildfowl and waders as migrants and winter residents.	~6.8km southeast

Site name	Designated feature summary	Position relating to the Scoping red line boundary
	Wigeon (200), teal (500), lapwing ( <i>Vanellus vanellus</i> ) (500), snipe (200) and curlew (50) are regularly recorded.	
<b>Stanley Bank Meadow SSSI</b>	"The diversity of habitats present supports a wide range of insect and bird life. Breeding birds include willow warbler ( <i>Phylloscopus trochilus</i> ), reed bunting, yellowhammer ( <i>Emberiza citrinella</i> ) and redpoll ( <i>Carduelis spp.</i> )."	~7.5km north-east
<b>Cotteril Clough SSSI</b>	The site has an interesting bird fauna with spotted flycatcher ( <i>Muscicapa striata</i> ), lesser spotted ( <i>Dendrocops minor</i> ), greater spotted ( <i>Dendrocops major</i> ) and green woodpecker ( <i>Picus viridis</i> ), blackcap ( <i>Sylvia atricapilla</i> ) and whitethroat ( <i>Sylvia communis</i> ) all known to breed in the woodlands.	~8km south-east
<b>River Dee (England) SSSI</b>	The entire River Dee system and associated tributaries support a wide range of breeding birds, which utilise a variety of bankside habitats. Nesting habitat for the kingfisher ( <i>Alcedo atthis</i> ) and sand martin is provided by active erosion of riverbanks. Areas of fast flowing water and bankside cover are favoured by the dipper ( <i>Cinclus cinclus</i> ) and grey wagtail ( <i>Motacilla cinerea</i> ), whereas the yellow wagtail ( <i>Motacilla flava</i> ) and mute swan ( <i>Cygnus olor</i> ) are found along the slower flowing reaches. Populations of grey heron ( <i>Ardea cinerea</i> ), common sandpiper ( <i>Actitis hypoleucos</i> ) and goosander ( <i>Mergus merganser</i> ) also occur on the River Dee. Areas of the Lower Dee floodplains provide breeding grounds for waders such as the lapwing ( <i>Vanellus vanellus</i> ), and, when flooded, provide important over-wintering sites for the pintail.	~9.2km south

5.4.14 Eight locally important statutory sites have been identified within the Study Area comprising: Thatto Heath LNR; Oxmoor Wood LNR; Dorchester Park LNR; Daresbury Firs LNR; Helsby Quarry LNR Murdishaw Wood and Valley LNR; Marshall's Arm LNR; and Paddington Meadows LNR.

5.4.15 In addition, there are at least 30 non-statutory sites comprising LWSs and SBIs within the Study Area. This number has been estimated given that site names and boundaries are not always obtainable on the freely available non-statutory site mapping used to date. The search will be refined following the completion of a full



desk study where a comprehensive list of up-to-date non-statutory site information will be obtained from local record centres (see paragraph 5.4.6).

### *Habitats of Principal Importance/ancient woodland*

5.4.16 The desk study completed to date has identified several HPIs within 2km of the Scoping red line boundary as shown in **Table 5.4**.

**Table 5.4 Current baseline – HPI within the Study Area**

HPI	Within Scoping red line boundary? (Y/N)	Position of closest area if outside Scoping red line boundary
Coastal and floodplain grazing marsh	Y	
Coastal saltmarsh	Y	
Deciduous woodland	Y	
Lowland calcareous grassland	N	~140m south
Lowland dry acid grassland	N	~25m south
Lowland fens	Y	
Lowland meadows	Y	
Lowland raised bog	Y	
Mudflats	Y	
Reedbeds	N	~10m south
Traditional orchard	Y	
Woodland pasture and parkland	Y	
Open mosaic habitats on previously developed land	Y	

5.4.17 Several parcels of ancient woodland have also been identified within the Scoping red line boundary and the wider Study Area.

## Habitats

- 5.4.18 Aerial imagery shows the dominant habitat throughout the Scoping red line boundary to be arable and grazed agricultural land bounded by hedgerows. Areas of denser vegetation, likely woodland or scrub, are present, some of which border linear features such as watercourses and railway lines. Industrial, commercial and residential areas are also present within and adjacent to the Scoping red line boundary. Several waterbodies and watercourses are present throughout the Study Area including the River Mersey, the Manchester Ship Canal, the Trent and Mersey Canal and the River Weaver, as well as scattered smaller tributaries and ditches.
- 5.4.19 Further to the linear features referenced in paragraph 5.4.18, connectivity from the land within the Scoping red line boundary is provided to the wider landscape through a network of hedgerows, agricultural ditches and open green spaces.
- 5.4.20 Major roads are also present, with both the M62 and M56 within the Scoping red line boundary.

## Waterbodies

- 5.4.21 The Study Area includes biodiversity conservation sites that are designated for aquatic ecological features and that are likely to have hydraulic linkages to the Scoping red line boundary via surface water and/or groundwater. These sites are summarised in **Table 5.3**.
- 5.4.22 The Study Area includes those WFD surface waterbodies that are intersected by, and downstream of, the Scoping red line boundary. **Chapter 7: Water Environment** sets out the ecological status of the 25 waterbodies that have drainage basins that are intercepted by the Scoping red line boundary, including the relevant Reasons for Not Achieving Good status, as detailed in the Environment Agency's catchment data explorer database<sup>83</sup>.

## Protected/notable species

- 5.4.23 A high-level assessment of the habitats from aerial imagery within the Scoping red line boundary suggests there is potential for a variety of protected and notable species. This includes, but is not limited to:
- habitats with potential to support foraging, commuting and roosting bats;
  - waterbodies and terrestrial habitat with the potential to support great crested newt (*Triturus cristatus*);
  - habitats with potential to support badgers (*Meles meles*) and their setts;
  - watercourses and terrestrial habitat with the potential to support otter (*Lutra lutra*) and their rest sites;
  - watercourse suitable for water vole (*Arvicola amphibius*) and freshwater fish;

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<sup>83</sup> Environment Agency (2021). Catchment Data Explorer. (online) Available at: <https://environment.data.gov.uk/catchment-planning/>. (Accessed 15 November 2021).

- habitats which may support wintering and breeding birds;
- habitats with the potential to support reptiles;
- habitats with the potential to support protected or notable invertebrate species/assemblages;
- habitats with the potential to support SPI such as brown hare (*Lepus europaeus*), European hedgehog (*Erinaceus europaeus*) and common toad (*Bufo bufo*);
- veteran trees and notable plant species; and
- important hedgerows.

5.4.24 Wintering bird surveys conducted by WSP during October 2020 to March 2021 inclusive<sup>70</sup>, recorded a total of 115 bird species, of which six are qualifying species of the Mersey Estuary SPA, 18 were listed on Schedule 1 of the WCA, 19 were SPI in accordance with Section 41 of the NERC Act (2006)<sup>84</sup>, a further 26 species are Birds of Conservation Concern (BoCC) red listed, and 37 species BoCC amber listed. The six qualifying species of the Mersey Estuary SPA comprise shelduck, teal, pintail, golden plover, black-tailed godwit and redshank. Schedule 1 species recorded during the wintering bird surveys considered as having the potential to breed within the Study Area comprise garganey (*Anas querquedula*), bittern, kingfisher, peregrine (*Falco peregrinus*), Cetti's warbler (*Cettia cetti*) and bearded tit (*Panurus biarmicus*).

5.4.25 Wintering bird surveys undertaken by Wood since October 2021 have recorded the following four Mersey Estuary SPA qualifying species within the Study Area; shelduck, teal, pintail, and black-tailed godwit. Several assemblage species have also been recorded within the Study Area including shoveler, lapwing and curlew. Only teal, pintail, black-tailed godwit and shoveler have been recorded in notable numbers, with distribution largely restricted to the Ince Marshes and a high tide roost site at Lordship Marsh (the latter is potentially functionally linked to the SPA)<sup>85</sup>. Additionally with reference to Schedule 1 listed species, several barn owl (*Tyto alba*) nest boxes have been identified across the Study Area as well as Cetti's warblers and kingfisher present in most of the areas surveyed with suitable habitat. A marsh harrier (*Circus aeruginosus*) winter roost has also been recorded within the Study Area, with four to six individuals using the site.

5.4.26 The following Schedule 1 listed species have the potential to breed within the Study Area (Balmer *et al.*, 2013<sup>78</sup>; Cheshire and Wirral Ornithological Society, 2008<sup>79</sup>; and Smith *et al.*, 2021<sup>80</sup>): quail (*Coturnix coturnix*), bittern, avocet (*Recurvirostra avosetta*), little ringed plover, marsh harrier, barn owl, hobby (*Falco subbuteo*), peregrine and kingfisher.

<sup>84</sup> Some species can be listed on Schedule 1, be SPI and on either the BoCC red or amber list.

<sup>85</sup> Natural England (2015). Review and analysis of changes in waterbird use of the Mersey Estuary SPA, Mersey Narrows & North Wirral Foreshore pSPA and Ribble & Alt Estuaries SPA (NECR173). 27 May 2015. Annex II: Roost locations by species at a regional level. (online) Available at: <http://publications.naturalengland.org.uk/file/5495789449117696>. (Accessed 28 October 2021).

- 5.4.27 Watercourses within the Study Area support both cyprinid and salmonid fish species (Apem 2007<sup>86</sup>). Cyprinid fishes are generally more common within the Study Area and include roach (*Rutilus rutilus*), rudd (*Scardinius erythrophthalmus*), dace (*Leuciscus leuciscus*), chub (*Leuciscus cephalus*), bream (*Abramis brama*), tench (*Tinca tinca*), common carp (*Cyprinus carpio*), crucian carp (*Carassius carassius*), minnow (*Phoxinus phoxinus*), barbel (*Barbus barbus*), gudgeon (*Gobio gobio*), perch (*Perca fluviatilis*), pike (*Esox lucius*) and ruffe (*Gymnocephalus cernua*). Other common species include three-spined stickleback (*Gasterosteus aculeatus*), stone loach (*Barbatula barbatula*) and flounder (*Platichthys flesus*).
- 5.4.28 Species that are of notable biodiversity conservation importance that occur within a number of watercourses that cross the Scoping red line boundary include Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta morpha fario*), sea trout (*Salmo trutta morpha trutta*), river lamprey (*Lampetra fluviatilis*), brook lamprey (*Lampetra planeri*), bullhead (*Cottus gobio*) and European eel (*Anguilla anguilla*), all of which are SPI and most of which have suffered population declines.
- 5.4.29 Watercourses that cross the Study Area also support aquatic macrophyte and invertebrate assemblages, including populations of white-clawed crayfish (*Austropotamobius pallipes*). This legally protected species and SPI is known to occur on the Weaver/Dane and Bollin catchments (CWT<sup>87</sup>).

## Future baseline

- 5.4.30 It is not known at this stage whether a different future baseline (in the absence of the Project) is more likely to occur than that currently present. Due to climate change it is possible that in the medium to long term the range of some species may be altered. Any potentially relevant changes to the baseline would be reviewed during the EIA process and, should any likely instances be identified, the implications will be considered on a case-by-case basis within the EIA. A description of the potential future baseline will also be provided in any future environmental reporting.

## 5.5 Embedded Environmental Measures

- 5.5.1 As part of the project design process, a number of embedded environmental measures are proposed to reduce the potential for impacts on ecology (see **Table 5.5**). These will evolve over the development process as the EIA progresses and in response to consultation, they will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

<sup>86</sup> Apem (2007). Manchester Ship Canal: Strategic Review of Fisheries. Report for United Utilities.

<sup>87</sup> Cheshire Wildlife Trust (2018). White-clawed crayfish – Local Biodiversity Action Plan. (online) Available from <https://www.cheshirewildlifetrust.org.uk/sites/default/files/2018-06/White%20clawed%20crayfish.pdf>. (Accessed 23 November 2021).

- 5.5.2 As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment (and are noted in **Table 5.6**).

**Table 5.5 Relevant ecology embedded environmental measures**

Embedded environmental measure proposed	How the environmental measures will be secured
<p>Where practical, sensitive sites including SPAs, SACs, Ramsar, NNRs, SSSIs, LNRs, SINCs, Ancient Woodland, LWT/CWT and RSPB reserves would be avoided when micro-siting the likely working areas.</p>	<p>DCO works plans and order limits.</p>
<p>Vegetation would be retained where possible. To avoid destruction of active bird nests, and disturbance to Schedule 1 species only, in any areas where vegetation clearance is required, such works would be undertaken outside the breeding bird season (outside mid-March-July) where practicable. Where works are unavoidable during the breeding bird season, appropriate control measures would be followed including pre-works surveys for nests. If a nest is found, measures would be implemented appropriate to the species and associated level of protection, and may include a protective buffer, a behavioural method statement with ecological monitoring, and if necessary, suitable screening around working areas to avoid significant human disturbance. Suitable methods would also be used to ensure vegetation with potential to support other legally protected species (e.g. reptiles) is removed sensitively and in compliance with legal requirements.</p>	<p>DCO works plans and Code of Construction Practice (CoCP) and DCO requirement.</p>
<p>In line with good practice, pollution prevention plans will detail how ground and surface waters would be protected during construction and operation. These will include information on the control of run off, storage of any fuels, oils and other chemicals and pollution incidence response planning.</p>	<p>CoCP and DCO requirement.</p>
<p>The number of watercourse crossings will be kept to the minimum that is technically and financially practicable. This includes crossings on access routes, with existing crossings used where practicable.</p>	<p>CoCP and DCO requirement.</p>
<p>A watercourse crossing schedule will be prepared, including access routes. Each crossing would be micro-</p>	<p>CoCP and DCO requirement.</p>

Embedded environmental measure proposed	How the environmental measures will be secured
<p>sited in construction to avoid sensitive ecological features. In addition to terrestrial features this may include for example riffles, pools, gravels and aquatic macrophyte beds, as well as mature, diverse or semi-natural bankside and riparian habitats. Each crossing would be checked in advance for ecological constraints by the Project Ecologist, who would identify any additional environmental measures.</p>	
<p>Watercourses would be crossed by Horizontal Directional Drilling (HDD) or other trenchless techniques where this represents the best environmental solution and is financially and technically feasible. Trenchless crossings will be undertaken by non-impact methods and without blasting.</p>	CoCP and DCO requirement.
<p>Bridged crossings will be used where practicable. Where this is impracticable, bottomless culverts will be used, maintaining the existing channel bed, substrate and hydromorphology. These will be single pipe structures (not multiple pipes), with no gaps around culvert edges, which could provide alternative flow pathways.</p>	CoCP and DCO requirement.
<p>Culverts/bridges would be installed (and decommissioned) from the bank, in low flows, under the Project Ecologist supervision, with culverts transferred to watercourse crossings intact, avoiding mixing concrete near watercourses.</p>	CoCP and DCO requirement.
<p>Any damming/over-pumping during work on watercourse crossings would be accompanied by a fish rescue under Project Ecologist supervision.</p>	CoCP and DCO requirement.
<p>Culverts would be subject to a programme of inspection and monitoring throughout the construction of the Project.</p>	CoCP and DCO requirement.
<p>At watercourse crossing locations the working width/area will be confined within the minimum reasonably practicable width/area. This applies to HDD sites and any crossings of smaller/minor watercourses. A riparian buffer/exclusion zone between HDD sites and watercourse banks would be maintained. This zone would only be crossed by the minimum width required for the pipe that connects to the water pump, minimising</p>	CoCP and DCO requirement.

Embedded environmental measure proposed	How the environmental measures will be secured
<p><b>unnecessary disturbance to riparian vegetation/habitats and associated species.</b></p>	
<p><b>HDD sites, storage areas, laydown areas and compounds will remain within the minimum practicable area and within the working corridor. With the exception of work at watercourse crossings, a buffer/exclusion zone (e.g. 50m radius) around watercourses would be implemented, minimising unnecessary disturbance to riparian habitats and associated species.</b></p>	<p>CoCP and DCO requirement</p>
<p><b>It may be necessary to deploy aggregates, bog-matting, trackway or geotextiles in places to create a stable surface for construction traffic and minimise habitat damage, erosion and sediment mobilisation. The route and approach to deployment (and decommissioning) will be agreed with the Project Ecologist to limit effects on sensitive ecological features.</b></p>	<p>CoCP and DCO requirement</p>
<p><b>In line with good practice, a Construction Environmental Management Plan (CEMP) will be developed to ensure that any risk of effects on ecological features from dust emission is minimised through the use of standard dust suppression methods.</b></p>	<p>CEMP and DCO requirement.</p>
<p><b>Areas of temporary habitat loss would be reinstated, wherever practicable, following the completion of construction in each area. Wherever possible, reinstatement would be back to the type of habitat affected. Areas of permanent habitat loss would be considered during the environmental gain described above.</b></p>	<p>DCO works plans and CoCP and DCO requirement.</p>
<p><b>A lighting design of all temporary and permanent lighting would be developed once contractors are appointed; however, the principles of lighting design will be detailed at the time of application and informed by the joint guidance provided by the Bat Conservation Trust and Institution of Lighting Professionals. The lighting design will account for the potential effects on terrestrial ecology by taking measures to minimise lighting usage, minimise light spill, use most appropriate wave lengths of light and locate lighting in the most appropriate locations – this is to decrease the potential displacement effects on light sensitive fauna such as bats.</b></p>	<p>CoCP and DCO requirement</p>

Embedded environmental measure proposed	How the environmental measures will be secured
Speed limits would be imposed on all construction haul roads and access tracks to minimise the risk of road traffic collisions with fauna such as badgers, otters, bats and barn owls.	CoCP and DCO requirement
The use of tried and tested invasive species control and biosecurity measures to avoid the spread of non-native invasive species and infested materials would be applied.	CoCP and DCO requirement

## 5.6 Scope of the Assessment

5.6.1 The project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this ecology chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the ecology assessment.

### Potential features

5.6.2 The starting point for defining the scope of the ecology assessment was to use the baseline data collated through the desk study and by undertaking a high-level assessment of the habitats from aerial imagery to determine the potential presence of protected/notable species within the Study Area (see **Section 5.4**), it is considered that number of designated sites, HPI and protected and notable species have the potential to be affected by the Project.

5.6.3 The baseline data was also used to determine which of the identified ecological features are 'important'. Following CIEEM (2018, updated 2019) guidance<sup>66</sup>, the importance of each ecological features was determined using a geographic scale (see **Table 5.6**). The importance of the ecological features has been described in relation to UK legislation and policy and with regard to the extent of habitat or size of population that may be significantly affected by the Project.

5.6.4 The importance of ecological features can therefore differ from that which would be conferred solely by legislative protection or identification as a conservation notable species. For example, house sparrow (*Passer domesticus*) is important at a national level (in policy terms) because it is a SPI and features on the BoCC red list. However, a small population that could be affected by a development might be assessed as being of local importance only due to the large, albeit declining, UK population (in excess of five million pairs). Similarly, a small length of hedgerow (an HPI), even if deemed to be 'important' with regard to the Hedgerow Regulations, is unlikely to be considered to have greater than 'local' importance due to the extent of this habitat type across a given county.



5.6.5 Wherever possible, information regarding the extent and population size, population trends and distribution of the ecological features was used to inform the categorisation and determine their importance at the project level. Where detailed criteria or contextual data were not available at this stage of the Project, professional judgement was used to determine importance (see **Table 5.6**).

**Table 5.6 Defining importance of ecological features**

<b>Geographic context of importance</b>	<b>Description</b>
<b>International or European</b>	European sites <sup>88</sup> including SPAs, SACs, candidate SACs and Sites of Community Importance (SCI). Potential SPAs (pSPA), possible SACs (pSACs), Ramsar sites (designated under international convention) and proposed Ramsar sites are also considered in the same manner in accordance with national planning policy.
<b>National (UK context)</b>	A nationally designated site including SSSI and NNRs. SPI and HPI, Red listed and legally protected species that are not addressed directly in Part 2 of the “Guidelines for Selection of Biological SSSIs” <sup>89</sup> but can be determined to be of national importance using the principles described in Part 1 of the guidance. Areas of Ancient Woodland, for example woodland listed within the Ancient Woodland Inventory and ancient and veteran trees.
<b>Regional (North West England)</b>	Regularly occurring HPI or populations of SPI, Red listed and legally protected species may be of regional importance in the context of published information on population size and distribution.
<b>County (Cheshire, Merseyside, Greater Manchester)</b>	LNR and non-statutory designated sites including: LWSs, SBIs and notable roadside verges.
<b>Local</b>	HPI and SPI, Red listed and legally protected species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above.

<sup>88</sup> These statutory sites are defined collectively as “European sites” within Advice Note 10 Habitats Regulations Assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate 2017 (version 8)).

<sup>89</sup> JNCC (2019). Guidelines for selection of biological SSSIs. (online) Available at: <https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/> (Accessed 23 November 2021).

Geographic context of importance	Description
<b>Negligible</b>	<p>Common and widespread semi-natural habitats occurring within the Study Area in proportions greater than may be expected in the local context.</p> <p>Common and widespread native species occurring within the Study Area in numbers greater than may be expected in the local context.</p> <p>Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area.</p> <p>Areas of heavily modified or managed land uses (for example, hard standing used for car parking, as roads etc.)</p>

- 5.6.6 Where protected species are present and there is the potential for a breach of the legislation, those species are considered to be ‘important’ features. Except for such species receiving specific legal protection, or those subject to legal control (for example, certain invasive non-native species), all ecological features determined to be important at negligible level are scoped out of the assessment. This approach is consistent with that described by CIEEM<sup>66</sup>.
- 5.6.7 Legally protected species and ecological features that are of sufficient importance that effects upon them as a result of the Project could be significant, were then taken through to the next stage of the scoping assessment. Through an understanding of the activities associated with the Project and the resulting environmental change, it is possible to identify ecological features that may be subject to potentially significant effects. In order to identify such ecological features, all the activities and consequent environmental changes associated with the construction and operation of the Project have been considered. Given the ongoing design process, at this stage of the Project the environmental changes have been considered in broad categories only. Wherever there is uncertainty as to the potential level of effect or the occurrence of a particular ecological feature, a precautionary approach has been taken.

**Spatial scope**

- 5.6.8 Key to establishing a potentially significant effect is the determination of a Zol (see paragraph 5.4.2) for each ecological feature. Zols differ depending on the type of environmental change (in other words an impact that is the change from the existing baseline) as a result of the Project, and the ecological feature being considered.
- 5.6.9 The construction and operational phases of the Project may result in the following broad environmental changes:

- permanent (e.g. the installation of the pipeline) or temporary (e.g. temporary trackway access route installed for the duration of construction) land take/land cover change (resulting in habitat loss or degradation and/or loss of fauna);
- fragmentation of habitats (resulting in a reduction in connectivity);
- increased noise and vibration (resulting in disturbance/displacement);
- increased light levels (resulting in disturbance/displacement);
- changes in ground water levels resulting in habitat change); and
- introduction of invasive non-native species (resulting in habitat degradation).

5.6.10 The most straightforward Zol to define is the area affected by land-take and direct land-cover changes associated with the Project. This Zol is the same for all affected ecological features. By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (for example noise created by construction), the Zol may vary between ecological features, dependent upon their sensitivity to the change and the precise nature of the change. For example, a dormouse might only be disturbed by noise generated very close to its nest, whilst nesting lapwing might be disturbed by noise generated at a much greater distance; other species (for example many invertebrates) may be unaffected by changes in noise. In view of these complexities, the definition of the Zol that extends beyond the land-take area was based upon professional judgement informed, as far as possible, by a review of published evidence (for example disturbance criteria for various species). Similarly, internationally designated sites for birds were considered up to 20km from the Scoping Red line boundary due to the distance that certain species can commute from their overnight roost sites (e.g. pink-footed goose can travel 15-20km from their roost sites to feed each day) (Pendlebury *et al.*, 2011)<sup>90</sup>. Although there is no peer-reviewed science documenting distances that other species may travel from designated sites to functionally linked land during the winter period<sup>91</sup>, it is considered that they are likely to commute much shorter distances.

5.6.11 In view of these complexities, the definition of the Zol that extends beyond the land-take area was based upon professional judgement informed by a review of published evidence (for example disturbance criteria for various species).

5.6.12 It should be noted that the avoidance of potential effects through design are implicitly taken into account through the consideration of each Zol. Furthermore, when scoping in or out ecological features from further assessment, embedded environmental measures associated with good practice have been taken into account (for example dust suppression, appropriately scheduled vegetation removal etc.).

<sup>90</sup> Pendlebury, C., Zisman, S., Walls, R., Sweeney, J., McLoughlin, E., Robinson, C., Turner, L. & Loughrey, J. 2011. Literature review to assess bird species connectivity to Special Protection Areas. Scottish Natural Heritage Commissioned Report No. 390.

<sup>91</sup> Pendlebury *et al.*, (2011) presents potential connectivity distances for a range of species during the breeding season.

### Potentially significant effects

- 5.6.13 The potentially significant ecology effects that will be taken forward for assessment are summarised in **Table 5.7**.
- 5.6.14 The assessment of potentially significant effects will assume the effective implementation of best practice and ‘tried and tested’ embedded environmental measures built into the design of the Project, as described in **Table 5.6**.
- 5.6.15 Additional potential effects may be identified as the Project design and scope of works is refined.

**Table 5.7 Environmental changes and potentially significant ecology effects**

Activity	Environmental change (impact) and resulting potential effects	Ecological feature
<b>Construction Phase</b>		
<b>Development construction: general activities</b>	Noise and physical activities leading to disturbance.	Schedule 1 breeding birds.
<b>Development construction: general activities</b>	Noise and physical activities leading to disturbance	SPA qualifying features and SSSI designated species using functionally linked land.
<b>Development construction: culverts</b>	Disturbance, direct killing or reduced chance of survival of individual animals through aquatic habitat loss/damage.	Protected and/or notable aquatic species and habitats.
<b>Development construction: HDD sites</b>	Water pumping leading to scour of a riverbed (habitats loss or damage).	Freshwater fish, aquatic invertebrates and macrophytes.
<b>Development construction: vehicles/machinery</b>	Noise/vibration as a result of construction activities leading to disturbance.	Protected and/or notable species.
<b>Development construction: habitat removal e.g. earthworks</b>	Habitat fragmentation through working areas creating barriers to species dispersal.	Protected and/or notable species, species listed on designated site citations.
<b>Development construction: habitat removal e.g. earthworks</b>	Direct killing or reduced chance of survival of individual animals and local	Protected and notable plant and animal species and/or species listed on designated site citations.

<b>Activity</b>	<b>Environmental change (impact) and resulting potential effects</b>	<b>Ecological feature</b>
	species populations through habitat loss/damage.	
<b>Development construction: habitat removal e.g. earthworks</b>	Land take - Removal/degradation of irreplaceable habitats e.g. ancient woodland.	Protected or notable habitats, designated sites.
<b>Development construction: habitat removal e.g. earthworks</b>	Generation of sediment laden surface water run-off leading to deterioration in the water quality of aquatic environment features e.g. rivers.	Freshwater fish, aquatic invertebrates and macrophytes.
<b>Development construction: habitat removal e.g. vegetation clearance</b>	Damage or destruction of nests.	Breeding birds.
<b>Development construction: habitat removal e.g. vegetation clearance</b>	Loss of roosting, breeding, foraging, hibernating or resting habitat.	Protected and/or notable species.
<b>Development construction: lighting</b>	Light pollution through security lighting used at working areas spilling onto surrounding habitats.	Protected and/or notable species.
<b>Operational Phase</b>		
<b>Operation: vehicles/machinery</b>	Noise/vibration as a result of operation activities affecting surrounding features.	Protected and/or notable species.
<b>Operation: lighting</b>	Light pollution through security lighting used at the development spilling onto surrounding habitats.	Protected and/or notable species.
<b>Pre-commissioning</b>	Hydrostatic testing leading to disturbance or scour of river beds/substrates/habitats	River and riparian habitats and native species/communities of freshwater fish, aquatic

Activity	Environmental change (impact) and resulting potential effects	Ecological feature
	and/or transfer of non-native species.	invertebrates and macrophytes.
<b>Operation: habitat effects</b>	Habitat fragmentation through the development creating a barrier to species dispersal.	Protected and/or notable species.

## Ecological features scoped out from further assessment

5.6.16 The following ecological features have been scoped out of further assessment:

- Midlands Meres and Mosses Phase 1 Ramsar site** is located ~4km east of the Scoping red line boundary at its closest point. There are no ornithological features designated as part of this Ramsar site, and there is no hydrological connectivity between the Scoping red line boundary, e.g. a river. Therefore, there are no pathways for affecting the interest features and this site is therefore scoped out from further ecology assessment.
- Dee Estuary SPA and Ramsar site** is located ~13.5km west of the Scoping red line boundary at its closest point. These sites' qualifying features are unlikely to forage within the Scoping Red line boundary or 500m buffer, given the distance from these internationally designated sites. There is no hydrological connectivity between the Scoping red line boundary and the Ramsar site, e.g. a river. Therefore, there are no pathways for affecting the interest features, and these sites are therefore scoped out from further ecology assessment.
- Mersey Narrows and North Wirral Foreshore SPA and Ramsar site** is located ~18.2km north-west of the Scoping red line boundary at its closest point. These sites' qualifying features are unlikely to forage within the Scoping red line boundary or 500m buffer, given the distance from these internationally designated sites. There is no hydrological connectivity between the Scoping red line boundary and the Ramsar site, e.g. a river. Therefore, there are no pathways for affecting the interest features, and these sites are therefore scoped out from further ecology assessment.
- Ribble and Alt Estuaries SPA and Ramsar site** is located ~18.5km north-west of the Scoping red line boundary at its closest point. Apart from pink-footed goose, these sites' qualifying features are not considered to have potential connectivity with the habitats within the Scoping red line boundary or 500m buffer. The upper limit of pink-footed goose foraging activity from winter roost sites is 15-20km with farmland (particularly grassland) the principal foraging habitat in winter (Pendlebury *et al.*, 2011). Given the amount of grassland habitat within the wider area, impacts on this species are considered negligible. There is no hydrological connectivity between the Scoping red line boundary and the Ramsar site, e.g. a river. Therefore, there are no pathways

for affecting the interest features, and these sites are therefore scoped out from further ecology assessment.

- **Non-Schedule 1 nesting birds** – breeding bird surveys targeted at non-Schedule 1 species have been scoped out of the assessment as it is considered that any effects upon active nests of breeding birds can be mitigated by best practice embedded environmental measures (see **Table 5.5**) such as timing of vegetation clearance works outside the breeding bird season, and where this is not possible carrying out pre-construction nest checks.
- **Dormouse** - the potential for significant effects on dormouse has been scoped out of the assessment in view of the geographical location of the Project. Although there is an introduced population of dormouse known to be present in the Wych Valley, this is the only known population present within Cheshire and there is no suitable connective habitat between the land within the Scoping red line boundary and this population.
- **Reptiles** - the potential for significant effects on reptiles has been scoped out of the assessment in view of the geographical location of the Project; the limited project footprint located within predominantly sub-optimal agricultural landscape; and the employment of embedded environmental measures which would avoid significant effects on reptiles (see **Table 5.5**).

## 5.7 Assessment Methodology

- 5.7.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this ecology chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the ecology assessment in the ES. Cumulative effects resulting from the Project and other developments will also be assessed.
- 5.7.2 The ecology assessment methodology will be aligned with the standard industry guidance provided by CIEEM<sup>66</sup>. The assessment will be based upon not only the results of the desk study and field surveys, but also relevant published information (for example on potential ecological features' status, distribution, sensitivity to environmental changes and ecology, where this information is available), technical engagement with Natural England and other key consultees, and professional knowledge of ecological processes and functions.
- 5.7.3 For each scoped-in ecological feature, effects will be assessed against the predicted future baseline conditions (equivalent to the current baseline which will be confirmed following completion of extended Phase 1 habitat survey and protected species surveys) for that ecological feature during construction and operation. Throughout the assessment process, findings about potentially significant effects will be used to inform the definition of requirements for additional baseline data collection and the identification of embedded environmental measures to avoid or reduce adverse effects or to deliver enhancements. Measures to comply with relevant policies and legislation will also be included. The results of the assessment will reflect the final Project design (i.e. incorporating the embedded environmental measures).

- 5.7.4 The spatial extent of the assessment of each potentially significant effect will reflect the area occupied by the ecological feature that is being assessed and the Zol associated with the environmental changes that are likely to affect it. Thus, if part of a designated biodiversity site is located within the ecological Zol relating to a particular environmental change, an assessment will be made of the effects on the site as a whole. A similar approach will be taken for areas of important habitat. For species that occur within an ecological Zol that relates to a change that could significantly affect the species, an assessment will be carried out on the total area that is used by the affected individuals or population of the species (for example for foraging or as breeding territories).
- 5.7.5 For each ecological feature, the assessment will deal, in an integrated way, with the effects of construction and operation. As progressively more information is available about the Project and about the populations of important and legally protected species, and throughout the consultation process, an ongoing detailed scoping exercise will be undertaken to identify which ecological features have the potential to be significantly affected by the Project. Each scoped-in ecological feature will then be subject to further assessment work that addresses how it is likely to be affected by the Project, allowing for environmental changes that could affect it during construction and operation.

### Significant evaluation methodology

- 5.7.6 CIEEM<sup>66</sup> defines a significant effect as one *“that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general”*.
- 5.7.7 When considering potentially significant effects on ecological features, whether these are negative or positive, the following characteristics of environmental change are taken into account:
- extent – the spatial or geographical area over which the environmental change may occur;
  - magnitude – the size, amount, intensity or volume of the environmental change;
  - duration – the length of time over which the environmental change may occur;
  - frequency – the number of times an environmental change may occur;
  - timing – the periods of the day/year/season during which an environmental change may occur; and
  - reversibility – whether the environmental change can be reversed through restoration actions or regeneration.
- 5.7.8 Although the characteristics described above are all important in assessing effects, the magnitude of the environmental change as a result of the Project will also be used, as described in **Table 5.8**, to provide a contextual understanding of the relative scale of change from the baseline position.



**Table 5.8 Guidelines for the assessment of the scale of magnitude**

<b>Magnitude</b>	<b>Criteria and resultant effect</b>
<b>High</b>	The change permanently (or over the long-term) affects the conservation status of a habitat/species, reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised. There may be a change in the level of importance of the ecological feature in the context of the Project.
<b>Medium</b>	The change permanently (or over the long term) affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected. There may be a change in the level of importance of this ecological feature in the context of the Project.
<b>Low</b>	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction or increase. These changes are likely to be within the range of natural variability and they are not expected to result in any permanent change in the conservation status of the species/habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the ecological feature in terms of its importance.
<b>Very Low</b>	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations, means that they would experience little or no change. Any changes are also likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species ecological features or the integrity of designated sites.
<b>Negligible</b>	A change, the level of which is so low, that it is not discernible on designated sites or habitats or the size of species' populations, or changes that balance each other out over the lifespan of a project and result in a neutral position.

## Negative effects

5.7.9 A negative effect is assessed as being significant if the favourable conservation status of an ecological feature would be compromised or lost as a result of the Project. Conservation status is defined by CIEEM<sup>66</sup> as being:

- for habitats - the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as

well as the long-term survival of its typical species within a given geographical area; and

- for species - the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.

5.7.10 The decision as to whether the conservation status of an ecological feature has been compromised will be made using professional judgement, drawing upon the results of the assessment of how each feature is likely to be affected by the Project.

5.7.11 A similar procedure will be used for designated sites that may be affected by the Project, except that the focus will be on the effects on the integrity of each site, defined by CIEEM<sup>66</sup> as “*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.*” The assessment of effects on integrity will draw upon the assessment of effects on the conservation status of the features for which the site has been designated.

## Positive effects

5.7.12 The Project may result in positive effects where there is a resulting change from baseline that improves the quality of the environment (for example increases species diversity, increases the extent of a particular habitat etc.), or halts or slows down an existing decline. For a positive effect to be considered significant, the level of importance of an ecological feature determined at the baseline state would need to increase by one or more geographical levels (for example where an ecological feature of borough importance becomes of county importance following delivery of the Project).

## Habitat Regulations

5.7.13 In line with the Planning Inspectorate’s Advice Note 10<sup>92</sup>, the relevant Secretary of State is the competent authority for the purposes of the Habitats Directive and the Habitats Regulations in relation to applications NSIPs. The Habitats Regulations require competent authorities, before granting consent for a plan or project, to carry out an appropriate assessment (AA) in circumstances where the plan or project is likely to have a significant effect on a European site (either alone or in combination with other plans or projects).

5.7.14 A HRA Screening Report will be prepared in accordance with the Planning Inspectorate’s Advice Note 10<sup>92</sup> to determine whether the Project will have LSEs on any European sites. The HRA will include the Mersey Estuary SPA and Ramsar Site (designated for waterfowl and wader species) which lies ~205m to the west at its closest point to the Scoping red line boundary. Whilst the majority of

<sup>92</sup> The Planning Inspectorate (2017). Advice Note Ten: Habitats Regulations Assessment relevant to Nationally Significant Infrastructure Projects (Version 8). (Online) Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-ten/> (Accessed December 2021).

LSEs are expected to be screened out within the HRA Screening Report, some may remain. In this instance, sufficient information will be provided to allow the relevant competent authority to determine whether there will be a resulting adverse effect on the integrity of European sites. Natural England will be consulted on the draft HRA prior to the submission of the DCO application.

### Biodiversity Net Gain

5.7.15 Biodiversity Net Gain proposals are currently being considered by the Applicant and the Project team.

## 5.8 Proposed Survey and Assessment Approach

### Baseline

5.8.1 Future baseline data collection will consist of a programme of field surveys as outlined in **Table 5.9** (following discussion and agreement from Natural England and other statutory consultees). This programme will be regularly reviewed in light of the results of the surveys, ongoing consultation and the evolution of the design of the Project.

5.8.2 The following surveys will commence in 2022 to inform the assessment of potentially significant effects on ecological features. The proposed field survey programme is based on the results of the desk study and industry guidance. In order to ensure a focussed and proportionate approach (as advocated by CIEEM<sup>66</sup>), the areas that will be the focus of the field surveys will not encompass the whole Scoping red line boundary and respective parts of the Study Area. This is because as the design evolves, the potential environmental changes (such as land take) will become refined allowing for a more targeted survey programme to take place to inform the assessment. As such, baseline surveys will be carried out within an appropriate buffer of likely working areas along the pipeline network.

**Table 5.9 Field survey programme**

Survey	Summary	Coverage of Study Area
<b>Extended Phase 1 habitat survey</b>	An extended Phase 1 habitat survey following JNCC (2010) <sup>93</sup> is to be undertaken across proposed areas of land take to provide general information on each habitat and where appropriate within an additional suitable feature specific buffer (e.g. to map habitat connectivity to potential great crested newt ponds) during 2022 to	Surveys will focus on a 50m working corridor centred along the pipeline route, and a 50m buffer either side.

<sup>93</sup> Joint Nature Conservation Committee (JNCC) (2010). Handbook for Phase 1 Habitat Survey: a Technique for Environmental Audit. JNCC; Peterborough, UK

Survey	Summary	Coverage of Study Area
	<p>establish baseline conditions. Distinct habitats will be identified and mapped and as the standard Phase 1 Habitat survey methodology is, in the main, concerned only with vegetation communities, the survey will be extended to allow for the provision of information on other ecological features, particularly to identify the presence/potential presence of legally protected species. Habitats will also be mapped in accordance with UK Habitats Classification methodology and the condition criteria provided in the technical guidance that accompanies the Biodiversity Metric v 3.0.</p>	
<p><b>Great crested newt surveys</b></p>	<p>Following completion of the desk-based screening exercise, those waterbodies (including ponds and ditches) classed as potentially suitable to support great crested newts and located within a suitable buffer of potential area of land take will be assessed (in line with the Habitat Suitability Index methodology<sup>94</sup>) in conjunction with the extended Phase 1 habitat survey to determine the requirement for targeted great crested newt surveys. Where required, great crested newt</p>	<p>Suitable water bodies (ponds and ditches) within a 50m working corridor centred along the pipeline route and up to 250m either side (reflecting the distance within which the majority of adult great crested newts ordinarily remain around breeding ponds<sup>99</sup>), and where water bodies are not separated from work areas by barriers to great crested newt dispersal.</p>

<sup>94</sup> Oldham R.S., Keeble J., Swan M.J.S. and Jeffcote M. (2000). Evaluating the sustainability of habitat for the great crested newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155.

<sup>99</sup> Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001). Great Crested Newt Conservation Handbook. Froglife, Halesworth, UK.

Survey	Summary	Coverage of Study Area
	surveys will follow best practice <sup>95 96 9798</sup> .	
<b>Bat surveys</b>	In accordance with best practice <sup>100 101 102 103</sup> , any trees likely to be affected will be assessed from ground level to determine whether they have features which are suitable for roosting bats – Potential Roost features (PRFs). The results of these surveys will enable the scoping of any subsequent bat emergence and/or re-entry surveys/tree climbing surveys that may be required with a view to identifying potential or confirmed bat roosts. If required (i.e. where there is potential for the Project to affect significant areas of favourable bat habitat, such as foraging areas or habitat connectivity), bat activity transect surveys and remote static detector deployment will also be undertaken to inform the baseline and the assessment of potential effects on bats.	Surveys will be targeted within a 50m working corridor centred along the pipeline route and a 10m buffer either side (reflecting potential for indirect effects).
<b>Otter and water vole surveys</b>	Aerial imagery shows the presence of watercourses within the Scoping	Surveys will focus on watercourse crossings of

<sup>95</sup> English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature; Peterborough, UK.

<sup>96</sup> Natural England (2015). Great crested newts: surveys and mitigation for development projects. (Online) Available at: <https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects> (Accessed December 2021)..

<sup>97</sup> Froglife (2001). Great Crested Newt Conservation Handbook. Froglife, Suffolk, UK.

<sup>98</sup> Biggs J., Ewald N., Valentini A., Gaboriaud C., Griffiths R.A., Foster J., et al. (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford, UK.

<sup>100</sup> Mitchell-Jones, A. and McLeish, A. (2004). Bat Workers Manual. Joint Nature Conservation Committee, Peterborough, UK.

<sup>101</sup> Mitchell-Jones, A. (2004). Bat mitigation Guidelines (IN136). English Nature, Peterborough, UK.

<sup>102</sup> Collins, J. (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3<sup>rd</sup> Edition. The Bat Conservation Trust, London, UK.

<sup>103</sup> Institution of Lighting Professionals and Bat Conservation Trust (2018). Bats and artificial lighting in the UK. Bats and the Built Environment series. The Bat Conservation Trust, London, UK.

Survey	Summary	Coverage of Study Area
	red line boundary. Otter and water vole surveys will be undertaken in line with best practice guidance <sup>104</sup> <sup>105</sup> at those ditches and watercourses within the Scoping red line boundary identified as providing potentially suitable habitat for these species during the extended Phase 1 habitat survey, where there is potential for significant effects (for example river crossings). For water voles this will involve two survey visits (one during spring and one during summer) unless a single visit survey can be justified in line with best practice guidance.	suitable watercourses, within a 50m working corridor centred along the pipeline route and extending up to 250m upstream and downstream.
<b>Badger surveys</b>	A badger survey will be undertaken to record evidence of badger including setts, foraging pits, footprints, dung pits/latrines and mammal paths. Where setts are encountered, the sett type (main, annexe, outlier, subsidiary) and status will be determined if possible. These surveys will be completed in line with best practice guidance <sup>106</sup> .	Surveys will focus on suitable habitat and boundary features within a 50m working corridor centred along the pipeline route in conjunction with the extended Phase 1 habitat survey (up to 50m from likely working areas).
<b>Invertebrate surveys</b>	Should the extended Phase 1 habitat survey identify habitats with the potential to support important species or assemblages of SPI invertebrate species in areas likely to be subject to significant effects, these areas would be surveyed further. Invertebrate survey scope and methods vary between species. In determining site-specific survey details, account will be taken of	Areas identified during the extended Phase 1 habitat survey with sufficient potential to support notable or diverse invertebrate species/assemblages within a 50m working corridor centred along the pipeline route.

<sup>104</sup> Chanin P (2003). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10. English Nature, Peterborough, UK.

<sup>105</sup> Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. Mammal Society, London, UK.

<sup>106</sup> Scottish Natural Heritage (2003). Best Practice Badger Survey Guidance Note. (online) Available at: <https://www.nature.scot/guidance-licensing-badgers-badger-survey-best-practice> (Accessed 10 November 2021).

Survey	Summary	Coverage of Study Area
<b>Schedule 1 breeding bird surveys</b>	known records, habitat mix, landscape features and potentially significant effects. Survey methods will reflect standard guidance and could include, for example, direct observation, sweep netting, hand searching, aquatic netting, beating and pitfall traps.	Surveys would focus on suitable habitat for target Schedule 1 species within the Scoping red line boundary and up to a maximum 500m buffer around this to account for those species at risk of disturbance at this range (for example surveys for Cetti's warbler would comprise suitable habitat within the Scoping red line boundary and a 50m buffer around this, whereas for hobby this would extend to 500m).
<b>Winter bird walkover surveys</b>	Winter bird survey methods involve walking a number of transects using roads and public rights of way (PRoWs). Although a full suite of surveys are being undertaken between October 2021 to March 2022, additional visits were also undertaken from mid-February to March 2021.	Surveys will be undertaken in two key areas within the Scoping red line boundary to identify the distribution of bird species within the Study Area. Surveys will focus on detecting qualifying features of the Mersey Estuary SPA using functionally linked land within the Zol of the designated site.

<sup>107</sup> Gilbert, G., Gibbons, D.W., and Evans, J. (2001). Bird Monitoring Methods: a manual of techniques for key UK species. RSPB; London, UK.

<sup>108</sup> Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). Raptors: a field guide to survey and monitoring. Stationary Office; London, UK.

<sup>109</sup> Shawyer, C. (2012). Barn owl *Tyto alba* Survey Methodology and techniques for use in Ecological Assessment. Wildlife Conservation Partnership; London, UK.

Survey	Summary	Coverage of Study Area
<b>Hedgerows Regulations Assessment survey</b>	An initial assessment of hedgerows will be made during the extended Phase 1 habitat survey to assess whether any of the hedgerows have the potential to be classified as 'important' under the Hedgerows Regulations 1997. Those hedgerows identified as having sufficient potential and likely to be impacted by the Project will undergo a more detailed assessment <sup>110</sup> , including, size, number of woody species, associated features, connections and flora. The ecological importance of the hedge will subsequently be assessed against the set criteria within the Regulations.	Surveys will focus on working areas/direct land take, within a 50m working corridor centred along the pipeline route.
<b>Ancient and Veteran Tree assessments</b>	During the extended Phase 1 habitat survey, any trees which have the potential to be classified as ancient and/or veteran will be noted. Should any such trees be recorded in areas where significant effects are likely, an ancient/veteran tree survey assessment will be undertaken in line with best practice guidance <sup>111</sup> as part of an arboriculture survey.	Surveys will focus on working areas/direct land take within a 50m working corridor centred along the pipeline route.
<b>National Vegetation Classification (NVC) surveys</b>	The results of the desk study and aerial imagery suggest that the majority of habitats within the Scoping red line boundary are likely to be common and widespread. This will be confirmed during the extended Phase 1 habitat survey in 2021. Should any habitats be identified, that may qualify as HPIs and could be subject to loss or degradation due to the Project, detailed botanical surveys will be	Surveys will focus on working areas/direct land take within a 50m working corridor centred along the pipeline route. Surveys will focus on areas where direct land take and indirect effects may occur (this will be dependent on the habitat type potentially affected).

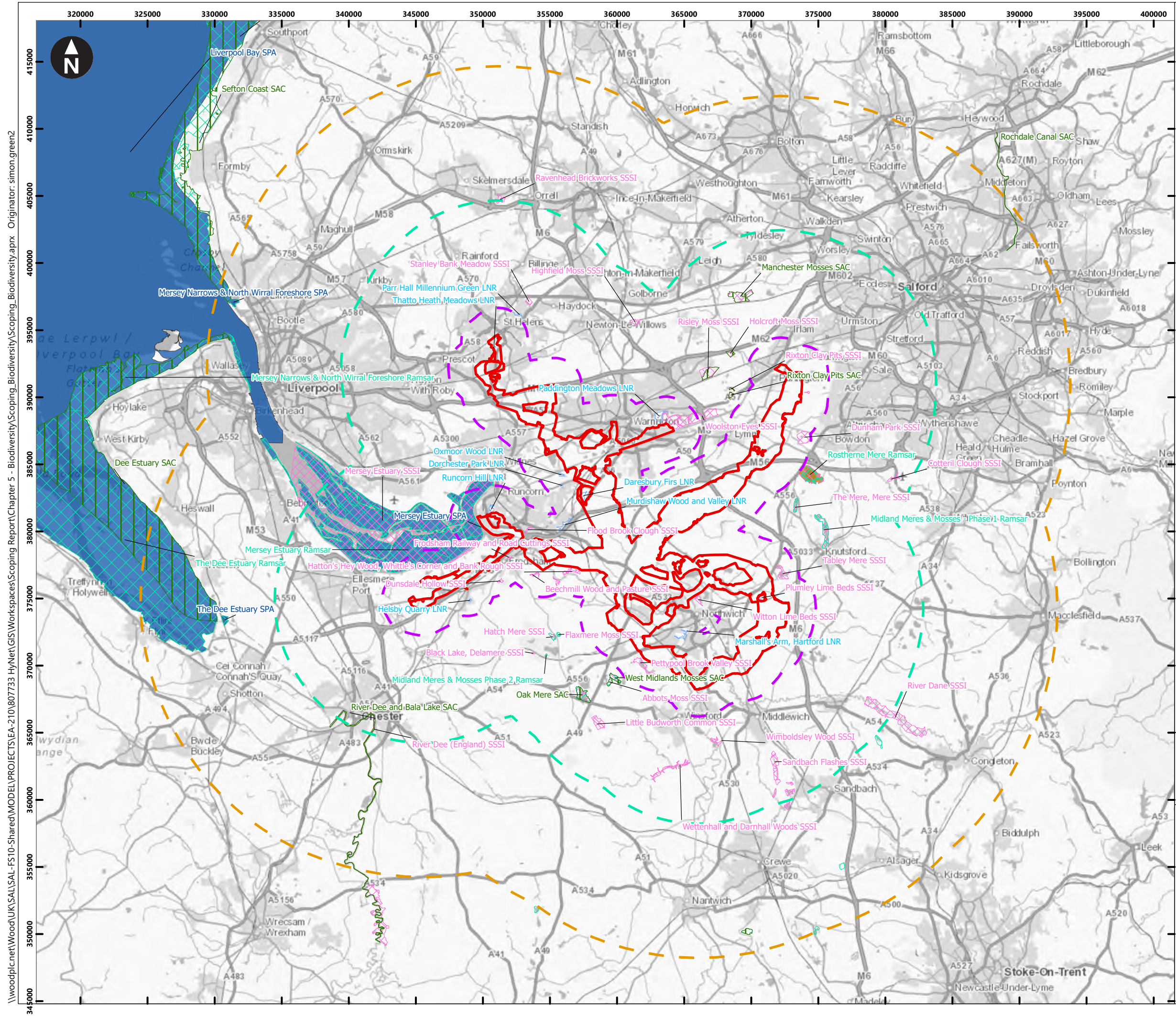
<sup>110</sup> Defra (2007) Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. Defra, London, UK.

<sup>111</sup> Fey, N (2007) Defining and Surveying Veteran and Ancient Trees. (Online) Available at: [https://www.treeworks.co.uk/downloads/publications/DEFINING\\_AGE\\_AND\\_SURVEYING\\_VETERAN\\_AND\\_ANCIENT%20TREESa.pdf](https://www.treeworks.co.uk/downloads/publications/DEFINING_AGE_AND_SURVEYING_VETERAN_AND_ANCIENT%20TREESa.pdf) (Accessed December 2021).



Survey	Summary	Coverage of Study Area
	undertaken in line with the NVC Users' Handbook <sup>112</sup> .	
<b>Watercourse surveys</b>	<p>Walkover survey of each watercourse crossing location to map/record potential ecological constraints.</p> <p>Where deemed necessary, subject to the emerging details of watercourse crossing designs and locations, follow-up surveys: fish; macroinvertebrates; macrophytes; and river habitats. Survey methods in accordance with standard WFD protocols.</p> <p>It is anticipated that ponds and larger waterbodies will be avoided and surveys of these waterbodies (e.g. PSYM (Predictive System for Multimetrics) method) are not currently planned.</p>	<p>50m working corridor at each watercourse crossing and a minimum of 50m upstream and downstream.</p> <p>Extended for follow-up surveys (e.g. fish, macroinvertebrates, macrophytes, river habitats) where specifically necessary, for example in the unlikely event of potentially significant effects on geomorphology or water quality.</p>

<sup>112</sup> Rodwell, J.S. (2006) NVC Users' Handbook. JNCC, Peterborough, UK.



- Key
- Scoping boundary
  - 2km study area
  - 10km study area
  - 20km study area
  - Local Nature Reserve
  - National Nature Reserve
  - Site of Special Scientific Interest
  - Ramsar site
  - Special Area of Conservation
  - Special Protection Area

0 2 4 6 8 10 12 14 km  
 Scale at A3: 1:269,380  
 OS Open Greyscale. Contains OS data © Crown Copyright and database right 2020



HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 5 - Biodiversity

**Figure 5.1**  
**Designated sites within 20km**

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## 6. Historic Environment

### 6.1 Introduction

- 6.1.1 The Historic Environment assessment will consider the likely significant effects on heritage assets that may arise from the construction and operation of the Project, including cumulative impacts from other relevant developments in the area. This section of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.
- 6.1.2 Historic Environment interfaces with many other topics and as such, should be considered alongside these:
- **Chapter 5: Ecology;**
  - **Chapter 8: Landscape and Visual;** and
  - **Chapter 10: Noise and Vibration.**

### Assumptions and limitations

- 6.1.3 Please refer to **Chapter 2: The Project** for the parameters on which this Scoping Report is based.
- 6.1.4 The baseline prepared for the Scoping Report is designed to enable the identification of the most sensitive heritage receptors and an appropriate spatial and temporal scope. It is not a comprehensive baseline for the historic environment and further detailed baseline information will be obtained, as described in this Chapter, and will be described in the Environmental Statement (ES) and any future environmental reporting.

### 6.2 Relevant Legislation and Technical Guidance

- 6.2.1 This section sets out the legislation and guidance in the context of the Historic environment. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

### Legislation

- 6.2.2 A summary of the relevant legislation and planning policies is given in **Table 6.1**.

**Table 6.1 Legislation relevant to historic environment**

Legislation	Legislative context	Section considered
<b>Ancient Monuments and Archaeological Areas Act 1979<sup>113</sup></b>	The Ancient Monuments and Archaeological Areas Act sets out that sites considered to be of national importance are required to be compiled in a Schedule of Monuments. These sites are accorded statutory protection. The Act sets out conditions whereby Scheduled Monument Consent is required. This Act also provides for the designation of Areas of Archaeological Interest in which statutory provisions for access to construction sites for carrying out archaeological works apply.	<b>Section 6.4: Baseline conditions, Section 6.6: Scope of assessment and Section 6.7: Assessment methodology</b>
<b>Planning (Listed Buildings and Conservation Areas) Act 1990<sup>114</sup></b>	The Act covers the registration of listed buildings (buildings that are seen to be of special architectural or historic interest) and the designation of Conservation Areas (areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance). It sets out the conditions under which a listed building consent would be required. The Act sets out at Sections 66 and Section 72 the duties of Local Planning	<b>Section 6.4: Baseline conditions, Section 6.6: Scope of assessment and Section 6.7: Assessment methodology</b>

<sup>113</sup> UK Government (1979). Ancient Monuments and Archaeological Areas Act, 1979. (Online). Available at <https://www.legislation.gov.uk/ukpga/1979/46> (Accessed 12 November 2021).

<sup>114</sup> UK Government (1990). Planning (Listed Buildings and Conservation Areas) Act, 1990. (Online). Available at <https://www.legislation.gov.uk/ukpga/1990/9/contents> (Accessed 12 November 2021).

Legislation	Legislative context	Section considered
	<p>Authorities (LPAs) to give great weight to the desirability of preserving listed buildings and their settings and the character of conservation areas in planning decisions.</p> <p>The Section 66 and Section 72 duties are superseded in applications under the Planning Act 2008 by equivalent provisions in the Infrastructure Planning (Decisions) Regulations 2010 (see below).</p>	
<p><b>Infrastructure Planning (Decisions) Regulations 2010<sup>115</sup></b></p>	<p>These regulations require decision-makers to have regard to the desirability of preserving a scheduled monument or its setting; listed buildings, any features which contribute to their special interest and their settings and to have regard for the desirability of preserving the character and appearance of conservation areas. These duties supersede sections 66 and 72 of the Planning Act (Listed Buildings and Conservation Areas) 1990 in determining DCO applications.</p>	<p><b>Section 6.4: Baseline conditions,</b> <b>Section 6.6: Scope of assessment</b> and <b>Section 6.7: Assessment methodology</b></p>
<p><b>Treasure Act 1996<sup>116</sup></b></p>	<p>This Act defines what constitutes “treasure”. Any find of “treasure” must be reported to the local Coroner.</p>	<p><b>Section 6.4: Baseline conditions,</b> <b>Section 6.6: Scope of assessment</b> and <b>Section 6.7: Assessment methodology</b></p>

<sup>115</sup> UK Government (2010). Infrastructure Planning (Decisions) Regs, 2010. (Online). Available at <https://www.legislation.gov.uk/ukdsi/2010/9780111490266/contents> (Accessed 12 November 2021).

<sup>116</sup> UK Government (1996). Treasure Act, 1996. (Online). Available at <https://www.legislation.gov.uk/ukpga/1996/24/contents> (Accessed 12 November 2021).

Legislation	Legislative context	Section considered
<b>Treasure (Designation) Order 2002<sup>117</sup></b>	This Order amends the statutory definition of “treasure”.	<b>Section 6.4: Baseline conditions, Section 6.6: Scope of assessment and Section 6.7: Assessment methodology</b>
<b>The Hedgerow Regulations 1997<sup>118</sup></b>	These regulations set out criteria to be used to determine the importance of hedgerows and protect important hedgerows from removal. Selection criteria include heritage-based considerations.	<b>Section 6.4: Baseline conditions, Section 6.6: Scope of assessment and Section 6.7: Assessment methodology</b>
<b>Burial Act 1857<sup>119</sup></b>	It is generally an offence to remove human remains from a place of burial without a licence from the Secretary of State.	<b>Section 6.4: Baseline conditions, Section 6.6: Scope of assessment and Section 6.7: Assessment methodology</b>
<b>Protection of Military Remains Act 1986<sup>120</sup></b>	This Act sets out specific protections for aircraft which have crashed or vessels which have sunk or been stranded whilst in military service. It sets out a general prohibition on any disturbance or removal of such remains without a licence granted by the Secretary of State.	<b>Section 6.4: Baseline conditions, Section 6.6: Scope of assessment and Section 6.7: Assessment methodology</b>

<sup>117</sup> UK Government (2002). Treasure (Designation) Order, 2002. (Online) Available at <https://www.legislation.gov.uk/ukdsi/2002/0110424700/contents> (Accessed 12 November 2021).

<sup>118</sup> UK Government (1997). The Hedgerow Regulations, 1997. (Online) Available at <https://www.legislation.gov.uk/uksi/1997/1160/contents/made> (Accessed 12 November 2021).

<sup>119</sup> UK Government (1857). Burial Act, 1857. (Online). Available at <https://www.legislation.gov.uk/ukpga/Vict/20-21/81/contents> (Accessed 12 November 2021).

<sup>120</sup> UK Government (1986). Protection of Military Remains, 1986. (Online). Available at <https://www.legislation.gov.uk/ukpga/1986/35/contents> (Accessed 12 November 2021).

## Technical guidance

6.2.3 A summary of the relevant planning policies is given in **Table 6.2**.

**Table 6.2** Technical guidance relevant to historic environment

Technical Guidance Document	Context	Section considered
<b>Planning Practice Guidance: Historic Environment 2019</b> <sup>121</sup>	This guidance provides advice on the conservation and enhancement of the historic environment.	<b>Section 6.6: Scope of assessment</b> and <b>Section 6.7: Assessment methodology</b>
<b>Historic England Good Practice Advice in Planning Note 2 (GPA 2): Managing Significance in decision-taking in the Historic Environment 2015</b> <sup>122</sup>	This document provides guidance and information to assist in implementing historic environment policy and ensuring compliance with National Planning Policy Framework (NPPF) <sup>123</sup> fundamentals.	<b>Section 6.6: Scope of assessment</b> and <b>Section 6.7: Assessment methodology</b>
<b>Historic England Good Practice Advice in Planning Note 3 (GPA 3): The Setting of Heritage Assets 2017</b> <sup>124</sup>	Sets out guidance on managing change within the settings of heritage assets. The document sets out five steps to follow to ensure an appropriate level of assessment is achieved.	<b>Section 6.6: Scope of assessment</b> and <b>Section 6.7: Assessment methodology</b>

<sup>121</sup> UK Government (2019). Planning Practice Guidance: Historic Environment, 2019. (Online) Available at <https://www.gov.uk/guidance/conserving-and-enhancing-the-historicenvironment> (Accessed 12 November 2021)

<sup>122</sup> Historic England (2015). Good Practice Advice in Planning Note 2 (GPA 2): Managing Significance in decision-taking in the Historic Environment. (Online). Available at <https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/> (Accessed 12 November 2021)

<sup>123</sup> Ministry of Housing, Communities and Local Government (2021), National Planning Policy Framework. (Online). Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> (Accessed 13 December 2021).

<sup>124</sup> Historic England (2017). Good Practice Advice in Planning Note 3 (GPA 3): The Setting of Heritage Assets. (Online). Available at <https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/heag180-gpa3-setting-heritage-assets/> (Accessed 12 November 2021).

Technical Guidance Document	Context	Section considered
<b>Conservation Principles, Policies and Guidance 2008</b> <sup>125</sup>	Sets out principles for the assessment of heritage significance and its management.	<b>Section 6.7: Assessment methodology</b>
<b>Conservation Principles for the Sustainable Management of the Historic Environment - consultation draft 2017</b> <sup>126</sup>	A draft version of the revised conservation principles for the sustainable management of the historic environment. This provides updated principles for assessing and managing heritage significance. Whilst not yet adopted it represents best practice and is, therefore, considered.	<b>Section 6.7: Assessment methodology</b>
<b>Statements of Heritage Significance: Analysing Significance in Heritage Assets 2019.</b> <sup>127</sup>	This Historic England advice note covers the NPPF <sup>123</sup> requirement for applicants for heritage and other consents to describe heritage significance to help local planning authorities to make decisions on the impact of proposals for change to heritage assets.	<b>Section 6.7: Assessment methodology</b>
<b>Chartered Institute for Archaeologists (CIfA) Standard and guidance for archaeological</b>	Sets out standards to produce archaeological desk-based assessments.	<b>Section 6.7: Assessment methodology</b>

<sup>125</sup> Historic England (2008). Conservation Principles, Policies and Guidance. (Online) Available at <https://historicengland.org.uk/images-books/publications/conservationprinciples-sustainable-management-historic-environment/> (Accessed 12 November 2021).

<sup>126</sup> Historic England (2017). Conservation Principles for the Sustainable Management of the Historic Environment - consultation draft. (Online). Available at <https://historicengland.org.uk/content/docs/guidance/conservation-principles-consultation-draft-pdf/> (Accessed 12 November 2021).

<sup>127</sup> Historic England (2019). Statements of Heritage Significance: Analysing Significance in Heritage Assets. (Online) Available at <https://historicengland.org.uk/imagesbooks/publications/statements-heritage-significance-advice-note-12/heag279-statements-heritage-significance/> (Accessed 12 November 2021).



Technical Guidance Document	Context	Section considered
<b>desk-based assessment 2017<sup>128</sup></b>		
<b>CIfA Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment 2014<sup>129</sup></b>	Sets out standards for the provision of consultancy advice in the historic environment.	<b>Section 6.7: Assessment methodology</b>
<b>CIfA Standard and guidance for archaeological field evaluation 2014<sup>130</sup></b>	Sets out standards for archaeological evaluation.	<b>Section 6.7: Assessment Methodology</b>
<b>CIfA Standard and guidance for archaeological geophysical survey 2014<sup>131</sup></b>	Sets out standards for archaeological geophysical survey.	<b>Section 6.7: Assessment Methodology</b>

## 6.3 Consultation

6.3.1 Consultation with Historic England and the relevant LPA archaeologists and Conservation Officers will be undertaken at two key points during the preparation of the application for development consent:

<sup>128</sup> CIfA (2017). Standard and guidance for archaeological desk-based assessment. (Online) Available at [https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA\\_4.pdf](https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf) (Accessed 12 November 2021).

<sup>129</sup> CIfA (2014). Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment. (Online). Available at [https://www.archaeologists.net/sites/default/files/CIfAS%26GCommissioning\\_2.pdf](https://www.archaeologists.net/sites/default/files/CIfAS%26GCommissioning_2.pdf) (Accessed 12 November 2021).

<sup>130</sup> CIfA (2014). Standard and guidance for archaeological field evaluation. (Online). Available at [https://www.archaeologists.net/sites/default/files/CIfAS%26GFieldevaluation\\_3.pdf](https://www.archaeologists.net/sites/default/files/CIfAS%26GFieldevaluation_3.pdf) (Accessed 12 November 2021).

<sup>131</sup> CIfA (2014). Standard and guidance for archaeological geophysical survey. (Online). Available at [https://www.archaeologists.net/sites/default/files/CIfAS%26GGeophysics\\_3.pdf](https://www.archaeologists.net/sites/default/files/CIfAS%26GGeophysics_3.pdf) (Accessed 12 November 2021).

- in advance of the Preliminary Environmental Information Report (PEIR), to clarify and confirm requirements following the receipt of the Scoping Opinion and to agree the final scope of the assessment; and
- during preparation of the ES, to discuss any comments raised during the statutory consultation to ensure any necessary amendments can be incorporated.

## 6.4 Baseline Conditions

### Data gathering methodology

- 6.4.1 For this Scoping Report, the historic environment baseline has been established through a review of:
- National Heritage List for England (NHLE);
  - Historic England; Cheshire West and Chester; and Cheshire East conservation areas data;
  - Regional Research Framework North West England: Updated Framework 2018<sup>132</sup>;
  - Historic mapping;
  - Historic England's Aerial Archaeology Mapping Explorer<sup>133</sup>; and
  - National Historic Landscape Characterisation.
- 6.4.2 To establish a detailed baseline as part of the EIA, a desk study and site walkover will be completed. This will include:
- A review of desk-based data using the following sources:
    - ▶ Cheshire Historic Environment Record (HER);
    - ▶ Greater Manchester HER;
    - ▶ Merseyside HER;
    - ▶ Locally listed buildings and conservation areas provided by the unitary authorities;
    - ▶ Historic Landscape Characterisation for Cheshire, Merseyside and Greater Manchester;
    - ▶ Historic mapping and aerial photography;

<sup>132</sup> Research Frameworks (2021). North West Regional Research Framework (Online). Available at <https://researchframeworks.org/nwrf/introduction/> (Accessed 29 November 2021)

<sup>133</sup> Historic England (2021). Aerial Archaeology Mapping Explorer (Online). Available at <https://historicengland.org.uk/research/results/aerial-archaeology-mapping-explorer/> (accessed 13 December 2021)

- ▶ Environment Agency Light Detection And Ranging (LiDAR) data;
  - ▶ British Geological Survey; and
  - ▶ Readily available regional and local contextual studies, in particular the Regional Research Framework: The Archaeology of North West England (2006 and 2007).
- Site walkovers of the Project, access routes and construction compound areas, and site visits to offsite heritage assets to inform assessment of effects arising from change to setting;

6.4.3 Following completion of the desk study and site walkovers, and subject to consultation and the development of the project design, consideration will be given to the completion of:

- desk-based geoarchaeological assessment and deposit model; and
- archaeological evaluation of areas of medium – high archaeological potential likely to be directly impacted by construction activities. Evaluation may include non-intrusive geophysical survey and targeted intrusive survey through trial trenching. The evaluation programme would be agreed through consultation.

6.4.4 Where it is identified that there may be a significant effect on a heritage asset as a result of changes to its setting, baseline data will be collected on the setting of the asset and the degree to which this contributes to heritage significance, as set out in GPA3. This will involve a visit to the asset in question, as well as a review of:

- representative viewpoints for the Landscape and Visual Impact Assessment (LVIA) will be used to inform the setting assessment, where appropriate; and
- cross-referencing with the LVIA and other relevant workstreams to ensure an integrated approach to data gathering.

## Study Area

6.4.5 The Study Area for the assessment of effects on the historic environment has been defined through consideration of the nature of the Project, principally buried pipelines and above ground elements comprising Hydrogen Above Ground Installations (HAGIs) and Block Valve Installations (BVIs), and the sensitivity of the receiving historic environment. The Study Area extends 1km from the Scoping red line boundary, within which all the elements, including HAGI search areas, will be located. The defined Study Area will allow the establishment of archaeological and historical context and inform assessment of the potential for previously unrecorded buried archaeological remains. The Study Area is shown on **Figure 6.1**.

6.4.6 Given the dimensions and characteristics of the operational above ground elements of the Project<sup>134</sup> and the short-term temporary nature of the construction

<sup>134</sup> HAGI sites will range between 0.5 – 2 hectare (ha) in area and will be approximately 1.5 – 2m in height. Security fencing will extend to approximately 2.4m and site lighting may be up to 3m but will only be used during maintenance or during emergency requirements. IBV sites will be smaller, measuring up to 0.5 hectares and not exceeding the height of HAGIs. A detailed description of these can be found in **Chapter 2: The Project**.

phase<sup>135</sup>, it is considered that the Study Area described above will provide a proportionate area for the identification of heritage assets that may be subject to adverse effects arising through change to setting.

- 6.4.7 Consultation with stakeholders will be undertaken to identify assets outside the Study Area whose significance may be affected, and these will then be included within the assessment.
- 6.4.8 The Study Area will be reviewed and amended in response to any refinement of the Project; desk and site-based analysis, including the development of a Zone of Theoretical Visibility (ZTV); the identification of additional impact pathways; and through ongoing consultation.

## Current baseline

### *Designated heritage assets*

- 6.4.9 There are no World Heritage Sites, registered battlefields, or protected wrecks within either the Scoping red line boundary or the Study Area.
- 6.4.10 There are 32 scheduled monuments within the Study Area, and 12 of these are located within the Scoping red line boundary. The majority date to the medieval period and are identified as moated sites, a site type often indicative of manorial centres. There are several post medieval and modern monuments relating to industrial activity and 20<sup>th</sup> century defence. Finally, there are four prehistoric and two Roman monuments: three forts, two bowl barrows, and a settlement. Whilst no protected wrecks are recorded, one of the scheduled monuments is the wreck of the 18<sup>th</sup> century sailing barge, the Daresbury.<sup>136</sup>
- 6.4.11 There are six registered parks and gardens, all of which lie outside of the Scoping red line boundary, but within the Study Area. Four of these are medieval and post medieval, one was designed as a public park in the 1890s<sup>137</sup>, and one, the landscaped grounds at the former Pilkington's Headquarters, dates to the mid-20<sup>th</sup> century<sup>138</sup>.
- 6.4.12 There are 816 listed buildings within the Study Area, 126 of which are located within the Scoping red line boundary. There are 12 Grade I listed, including Sutton

<sup>135</sup> It is anticipated that construction of above ground elements will take between 3 – 6 months and that the rate of construction for the installation of the pipeline will progress at approximately 500m – 1km per day. See **Chapter 2: The Project** for details.

<sup>136</sup> Historic England (2021). NHLE 1417593. (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1417593> (Accessed 19 November 2021).

<sup>137</sup> Historic England (2021). NHLE 1001632. (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1001632> (Accessed 29 November 2021).

<sup>138</sup> Historic England (2021). NHLE 1412004. (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1412004> (Accessed 29 November 2021).

Hall in the village of Sutton Weaver.<sup>139</sup> There are 41 designated as Grade II\* and the remainder are Grade II.

6.4.13 These designated heritage assets are shown in **Figure 6.1**. Scheduled monuments, registered parks and gardens, and Grade I and II\* listed buildings are listed in **Appendix 6A** and labelled in **Figure 6.1**.

6.4.14 Nine conservation areas have been identified within the Scoping red line boundary:

- Trent and Mersey Canal;
- Bartington;
- Bostock;
- Great Budworth;
- Lower Whitley;
- Higher Whitley;
- Dunham Woodhouses;
- Daresbury; and
- Greenalls Brewery.

6.4.15 There are a further 39 conservation areas outside the Scoping red line boundary but within the Study Area. All conservation areas within the Study Area are listed in **Appendix 6A**.

6.4.16 Conservation areas have not been mapped in the Scoping Report as spatial data for some conservation areas was not available. This data will be obtained for use in future environmental reporting.

### *Non-designated heritage assets*

6.4.17 Data on non-designated heritage assets recorded within the relevant Historic Environment Records is being obtained from local authorities and will be included within the PEIR and ES. However, it has not yet been obtained and so has not been considered at the scoping stage. Whilst this data will form a key component of the baseline data to be collected as part of the EIA and will inform the assessment and mitigation proposals, it is not expected to affect the overall scope of the assessment.

### *Summary description*

6.4.18 The Project runs through a diverse landscape including the marshes on the banks of the Mersey, the historic salt production centres around Northwich, across

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<sup>139</sup> Historic England (2021). NHLE 1253572. (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1253572> (Accessed 19 November 2021).

heaths and to the Manchester Ship Canal, and north into the industrial landscape south of St Helen's.

- 6.4.19 In the West Corridor, the Project traverses the Elton, Ince and Helsby Marshes, areas of flat and low-lying land on the southern banks of the River Mersey. This landscape features small and scattered settlements and farms set within small, rectilinear fields bounded by drainage ditches. The marshes, particularly Ince Marsh, have high potential for Mesolithic and Neolithic palaeoenvironmental deposits which are significant for understanding changing climatic conditions<sup>140</sup>. Ridge and furrow has been identified across these marshes indicating arable farming in the post medieval, if not the medieval period.<sup>141</sup>
- 6.4.20 To the south of the marshes, the land rises to a string of larger settlements on the edge of the sandstone ridge: Helsby, Netherton, and Frodsham. The scheduled hillforts at Helsby (NHLE: 1013292)<sup>142</sup> and to the south of Netherton (NHLE: 1013297)<sup>143</sup>, and the medieval castle at Frodsham (no longer extant), highlight the significance of this topographic feature. Previously thought to have their origins in the Iron Age, the hillforts have been dated to the Bronze Age and are part of a concentration of Bronze Age and Iron Age activity in this part of Cheshire.<sup>144</sup> The Project continues east, below this high ground, turning south at the River Weaver.
- 6.4.21 The River Weaver bisects a landscape of scattered settlements divided by large, wooded areas such as Beckett's Wood and Bird's Wood. The productive nature of this valley can be seen in the high number of moated manors, mills, and granges, such as the Grade II\* Listed Hefferston Grange (NHLE: 1287121)<sup>145</sup>. Dog-leg boundaries are common and indicate the presence of extensive areas of former open fields. Overlooking this northern end of the valley lies another scheduled hillfort (NHLE: 1013296)<sup>146</sup> and opposite, guarding the other side of the river, a

<sup>140</sup> Myers, A. and Stallibrass, S. (2018). Regional Research Frameworks North West England: Early Prehistory. (Online). Available at <https://researchframeworks.org/nwrf/resource-assessments/early-prehistory/early-prehistory/> (Accessed 29 November 2021).

<sup>141</sup> Historic England (2021). Aerial Archaeology Mapping Explorer. (Online). Available at <https://historicengland.org.uk/research/results/aerial-archaeology-mapping-explorer/> (Accessed 30 November 2021).

<sup>142</sup> Historic England (2021). NHLE 1013292. (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1013292> (Accessed 23 November 2021).

<sup>143</sup> Historic England (2021). NHLE 1013297 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1013297> (Accessed 23 November 2021).

<sup>144</sup> Nevell, M. (2018). Regional Research Frameworks North West England: Later Prehistory. (Online). Available at <https://researchframeworks.org/nwrf/resource-assessments/later-prehistory/> (Accessed 29 November 2021).

<sup>145</sup> Historic England (2021). NHLE 1287121 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1287121> (Accessed 23 November 2021).

<sup>146</sup> Historic England (2021). NHLE 1013296 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1013296> (Accessed 23 November 2021).

scheduled anti-aircraft gun from World War II (NHLE: 1019849)<sup>147</sup>. Two further World War II installations, barrage balloon sites<sup>141</sup>, are positioned at the confluence of the River Weaver and the Manchester Ship Canal, in the area of the spur connecting to Weston Point and Runcorn.

- 6.4.22 Further south, in the Project's western option for the South Corridor, lies an area of large, designed landscapes centred on historic country houses, such as Delamere House, near Cuddington; Pettypool Park, near Marton; and Vale Royal Monastery, part of which is a scheduled monument (NHLE: 1016862)<sup>148</sup>.
- 6.4.23 This contrasts distinctly with the adjacent towns of Wharton, Middlewich, and Northwich. Northwich lies between the two route options for the Southern Corridor, while Wharton and Middlewich lie to the south. These towns have long industrial histories stretching back in places to the Roman period, due to the extraction of salt at these locations. Nucleated industrial settlements, such as Wilderspool in Warrington<sup>149</sup>, are found throughout the region in the Roman period and were not just involved in the production of salt, with pottery, iron, copper alloy, glass and tile all being made<sup>150</sup>. Roman activity is still legible in the region through the preservation and continued use of several their roads. The A530, King Street, and the A559, Manchester Road, out of Northwich are excellent examples, with long straight sections characteristic of Roman engineering.
- 6.4.24 Between the salt centres, on the eastern option for the Southern Corridor, lay a large expanse of open heath, with few settlements and numerous scattered farmsteads, such as the Grade II listed Marsh Farmhouse south of Lach Dennis (NHLE: 1330183)<sup>151</sup>. The fields associated with these farms are small and irregular and frequently contain ponds and drains. In the early 20<sup>th</sup> century, a soda ash and later calcium nitrate works was built at Plumley, utilising the brine sources which supplied the salt industry in the region. The site and ruins of the works are a scheduled monument (NHLE: 1450800)<sup>152</sup>.

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<sup>147</sup> Historic England (2021). NHLE 1019849 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1019849> (Accessed 23 November 2021).

<sup>148</sup> Historic England (2021). NHLE 1016862 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1016862> (Accessed 23 November 2021).

<sup>149</sup> Historic England (2021). NHLE 1006769 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1006769> (Accessed 30 November 2021).

<sup>150</sup> Philpott, R. (2018). Regional Research Frameworks North West England: Roman. (Online). Available at <https://researchframeworks.org/nwrf/resource-assessments/roman/> (Accessed 29 November 2021).

<sup>151</sup> Historic England (2021). NHLE 1330183 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1330183> (Accessed 23 November 2021).

<sup>152</sup> Historic England (2021). NHLE 1450800 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1450800> (Accessed 23 November 2021).

- 6.4.25 In the area of the Project's Central Hub, around the villages of Antrobus, Comberbach and the Whitleys, nucleated settlements are common, interspersed with enclosed former open fields and wooded copses.
- 6.4.26 Along the East Corridor, lie some very large, designed landscapes, like Arley Park, which is designated as a Grade II\* park and garden (NHLE: 1000637)<sup>153</sup>. North and east of here, areas of woodland become noticeably larger and the historic core of settlements, such as Broomedge, are linear strings of adjacent farms.
- 6.4.27 To the east, at the end of the East Corridor, the land then drops away to the Manchester Ship Canal, which links the city of Manchester to the Mersey and the Irish Sea. The settlements along its course have historically benefited from industry associated with the canal and are typically larger than their neighbours.
- 6.4.28 The character of the land where the North Corridor leaves the area of the Central Hub, around Daresbury and Hatton, is similar to that around the Whitley's but their aspect slopes north towards the River Mersey and across a landscape tightly packed with post medieval transport routes: the Bridgewater, the Runcorn and Inchford, the St Helen's and the Manchester Ship Canals, and the various branches of the London and North Western Railway. This infrastructure traverses the flat, low-lying marsh either side of the River Mersey, a sparse area of occasional agricultural buildings, some woods, and a few lanes. Where the Northern Corridor crosses the Ship Canal, a World War II military installation once stood, adjacent to Moore Lane Bridge, protecting this important nexus of routeways<sup>141</sup>.
- 6.4.29 On the northern banks of the Ship Canal, a spur extends from the North Corridor to Warrington. This area of low-lying former marsh and meadow developed as an important industrial area in the post medieval and modern periods, due to the intersection of regional and national transport routes. Latchford Tannery, Warrington Borate Works, Mostyn Tube Works, and Wilderspool Brewery, now a conservation area, were all located here. Around these employment hubs, and across this whole area, urban development spread in the later 20<sup>th</sup> century. As previously mentioned, remains of a Roman settlement have been identified at Wilderspool. The settlement was built along an arterial road and, to date, 36 rectangular buildings along with pottery manufacturing have been identified<sup>150</sup>.
- 6.4.30 Further along the North Corridor, the land gradually rises north of the River Mersey and the settlements here are typically larger than those to the south and have a history of large-scale industry: Penketh's tannery, the Sankey wire mills, the chemical works of Widnes. The character of the landscape around surviving villages, like Bold Heath, with regular, rectilinear enclosures, scattered settlements, plantations, and placenames including *heath* and *green*, indicate common use of this landscape into the post medieval period. These heaths surrounded a huge park centred on Old Bold Hall, now a scheduled monument

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<sup>153</sup> Historic England (2021). NHLE 1000637 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1000637> (Accessed 23 November 2021).



(NHLE: 1010703)<sup>154</sup>. While the park is not a designated landscape and has largely been converted to agriculture, and part was formerly part of Clock Face Colliery, it can still be seen in the landscape through the position of woodland, mature treed boundaries, and placenames such as Ladies' Walk Plantation.

- 6.4.31 North of Bold Hall, towards the end of the North Corridor, and within the former common lands, a major industrial landscape developed in the 19<sup>th</sup> and 20<sup>th</sup> centuries, including Clock Face colliery, Micklehead Green ultramarine and smalts works, Roughdales brick and tile works, Marshall's Cross pottery, Lea Green Colliery, and Sutton Heath collieries. These extractive industries were served by railway branches linking to nearby St Helens and on to the canal from where their goods could be shipped across the country and around the world.

## Future baseline

- 6.4.32 It might reasonably be expected that large parts of the Study Area comprising arable land would experience some degradation of any extant earthworks and shallowly buried archaeological deposits through continued agricultural activity. Urban development, particularly around Runcorn, Widnes, Northwich, and the western suburbs of Greater Manchester would also alter the baseline.
- 6.4.33 The future baseline will be revisited in light of proposals that emerge or are identified on a project-wide basis during the course of the EIA.

## 6.5 Embedded environmental measures

- 6.5.1 Best practice measures regarding the design and finish of completed infrastructure and restoration of historic landscape features (e.g., hedgerows) will be considered within the assessment as appropriate and the influence of these measures would be considered in determining magnitude of change. Considerate construction practices aimed at reducing noise, dust, and visual intrusion of works in progress or minimising duration of construction and construction hours would also be considered within the assessment.
- 6.5.2 Where adverse effects to heritage assets cannot be avoided through embedded environmental measures, secondary mitigation or "additional measures" will be identified as part of the assessment process. It is anticipated that an overarching Written Scheme of Investigation (WSI) would be produced and agreed with relevant consultees to set out a programme of archaeological investigation to mitigate effects to buried archaeological remains and built heritage. The scope of the WSI would be agreed through the assessment process. Other additional measures will be identified as appropriate for mitigating effects to the settings of heritage assets.

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<sup>154</sup> Historic England (2021). NHLE 1010703 (Online). Available at <https://historicengland.org.uk/listing/the-list/list-entry/1010703> (Accessed 23 November 2021).

## 6.6 Scope of the assessment

### Temporal scope

- 6.6.1 Construction phase activity is expected to commence in 2025 with commissioning in 2027. The design life of the pipeline and HAGIs is 40 years.
- 6.6.2 Disturbance of archaeological remains is likely to occur during construction phase activity. However, change to the setting of heritage assets may occur either during construction or during operation, through the continued presence of HAGIs in the landscape. Consequently, both construction and operational phases are scoped into the assessment.

### Spatial scope

- 6.6.3 The spatial scope for assessment during construction will be defined by the Study Area as described above and refined through consultation with key stakeholders.
- 6.6.4 Due to the buried nature of the pipeline, the spatial scope of assessment during the operation phase will be confined to a maximum 1km study area around each of the HAGI search areas. This may be refined following the selection of HAGI locations and consideration of topography and the sensitivity of surrounding heritage assets. Any refinements will be agreed through consultation with key stakeholders.

### Potential receptors

- 6.6.5 Initial receptors that could be significantly affected will be identified with reference to GPA3 and on the basis of their heritage significance/sensitivity and the magnitude of change to that significance to which they are exposed as a result of the Project.
- 6.6.6 Individual receptors have not been identified at scoping due to the early stage of the design, though a development of this type has the potential to affect elements of the historic environment through:
- direct disturbance of heritage assets within the development footprint;
  - physical changes to heritage assets outside of the development footprint arising from changes to groundwater levels or other changes resulting from construction; and
  - changes to the settings of heritage assets.
- 6.6.7 Once the construction and operation components of the Project have been fixed, the following principles will be used to identify receptors for assessment:
- Built heritage assets and archaeological remains within the construction footprint will be assessed for direct effects.
  - Archaeological remains outside the construction red line boundary that may be affected by dewatering during construction will be assessed for direct effects.

- Heritage assets within 1km of the construction footprint whose significance may be affected through change to setting caused by the construction of the Project. Further, heritage assets within 1km of the HAGI search areas whose significance might be affected through change to setting caused by the operation of the Project. This will include non-designated heritage assets whose significance may be affected. Factors to be considered in the identification of asset will include distance to the asset; topography; relationship to other assets; and duration of any effect. Effects are not confined to visual change but will include changes from noise, dust, vibration, and severance.

6.6.8 The list of receptors will be defined following design freeze of the construction and operational components, receipt of the scoping responses, subsequent in/formal consultation and engagement with Historic England, plus the relevant LPA conservation officers.

6.6.9 The defined list of receptors will be visited for the purposes of assessment in the ES. The site visits will inform understanding of:

- the nature of the asset and character of its setting;
- how significance is drawn from its setting; and
- how the Project may impact its setting.

### Likely significant effects

6.6.10 In line with the EIA Regulations 2017, the EIA for the Project will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

6.6.11 The likely significant Historic Environment effects that will be taken forward for assessment in the ES are summarised in **Table 6.3**.

6.6.12 The scoping assessment is based on a combination of the scope and description of the Project (see **Chapter 2: The Project**), understanding of the baseline conditions at this stage, the evidence base for historic environment effects, and professional judgement.

Table 6.3 Likely significant historic environment effects

Activity	Effect	Receptor
<b>Construction</b>		
<b>Land preparation (earthworks, excavation)</b>	Permanent loss of archaeological remains	Designated and non-designated heritage assets within the development footprint
	Damage to below ground remains arising from changes to drainage	Sub-surface archaeological remains
	Loss of historic landscape features	Historic Landscape Character
<b>All construction phases</b>	Temporary change to setting of heritage assets	Designated and non-designated heritage assets within the Study Area
<b>Operation</b>		
<b>All above ground infrastructure</b>	Perceptual change to historic landscape features	Historic Landscape Character
	Permanent change to setting of heritage assets	Designated and non-designated heritage assets within the Study Area

## 6.7 Assessment Methodology

6.7.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**, and specifically in Section 4.3. However, whilst this has informed the approach that has been used in this Historic Environment chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the Historic Environment assessment in the ES.

### Assessment of heritage significance

6.7.2 The significance of a heritage asset is the product of the value it holds for this and future generations as a result of its historic, archaeological, architectural, or artistic interests<sup>155,125,126,122</sup>.

<sup>155</sup> Department of Energy and Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). (Online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf) (Accessed November 2021).

- historical interest – through association with past events or past people; or where a heritage asset is illustrative of a particular asset type, theme, or period;
- archaeological interest – through the potential to hold evidence about the past that can be retrieved through specialist investigation; and
- architectural/artistic interest – through value derived from contemporary appreciation of a heritage asset’s aesthetics.

6.7.3 National Policy Statement (NPS) EN-1<sup>155</sup> notes that setting contributes to a heritage asset’s significance but does not provide an explicit definition of setting. Setting is defined in the NPPF<sup>123</sup> and GPA3 as:

*“The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate an asset, or may be neutral.”*

6.7.4 For the purposes of this historic environment assessment, the heritage significance of an asset will be assigned to one of four classes, with reference to the heritage interests described above and professional judgement informed by policy and guidance (**Table 6.2** and **Table 6.3**). In particular, NPS EN-1<sup>155</sup> distinguishes between the heritage significance of designated and non-designated assets.

6.7.5 To align with other workstreams in this assessment, heritage significance is referred to as a receptor’s sensitivity in **Table 6.4**.

**Table 6.4 Classification of sensitivity of receptors**

Sensitivity	Criteria	Receptor Type
<b>High</b>	Assets of national importance, which have significance for an outstanding level of historic, archaeological, architectural, and/or artistic interest.	Designated heritage assets, or non-designated heritage assets of demonstrable equivalence, of national importance.
<b>Medium</b>	The sensitivity of these assets will largely be dependent upon their current setting and their character. Asset has significance for a high level of historic, archaeological, architectural and/or artistic interest.	Non-designated heritage assets of regional importance.
<b>Low</b>	Assets of local interest, which have significance for elements of historic, archaeological, architectural and/or artistic interest.	Non-designated heritage assets of local importance.

Sensitivity	Criteria	Receptor Type
Negligible	Due to its nature of form/condition/survival, cannot be considered as an asset.	Non-extant HER asset.

### Assessment of magnitude of change

- 6.7.6 Magnitude of change is a measure of the extent to which the heritage significance of an asset is affected, which can be influenced by several factors:
  - the permanence of the impact (temporary, permanent, or reversible);
  - physical changes caused by the impact (positive or negative); and
  - the extent of the asset or its setting that would be affected and contribution of that part to significance.
- 6.7.7 In respect of buried archaeological deposits, where no remains are visible above ground, change would arise from direct disturbance or removal of archaeological material resulting in the loss of archaeological interest. In certain instances, elements of architectural and historic interest can also be affected. Direct loss, damage or alteration of a structure would primarily affect architectural interest, although historic and archaeological interests may also be affected.
- 6.7.8 The effects of change in the setting of a heritage asset depends on the contribution of setting to the heritage significance of the asset, and assessments must be, by their nature, specific to the individual assets being considered. Significance is a qualitative measure of value and any assessments of effect will be drawn from professional judgement exercised within a context defined by statute, policy and guidance.
- 6.7.9 All assessments will be presented as a narrative, setting out the nature and extent of the change to an asset’s interests arising from the Project, the permanence of change and the impact, whether positive or negative, of those changes, before assigning those changes to a magnitude of change as set out in **Table 6.5**.
- 6.7.10 Change can be beneficial or adverse. NPS EN-1<sup>155</sup> expects developers to make, where possible, a positive contribution or beneficial impact to the historic environment.

**Table 6.5 Classification of magnitude of change**

Change	Criteria Adverse	Criteria Beneficial
High	Loss of significance resulting from irreversible total or substantial demolition or disturbance of a heritage asset or from the total disassociation of an asset from its setting.	Sympathetic restoration of an at-risk or otherwise degraded heritage asset and/or its setting. Bringing an at-risk heritage asset into sustainable use, with robust long-term management secured.

Change	Criteria Adverse	Criteria Beneficial
<b>Medium</b>	Loss of significance arising from partial disturbance or inappropriate alteration of asset which will adversely affect its importance. Change to the key characteristics of an asset’s setting, which gives rise to lasting harm to the significance of the asset, but which still allows its historic, archaeological, architectural, and/or artistic interest to be appreciated.	Appropriate stabilisation and/or enhancement of a heritage asset and/or its setting that better reveal the significance of the asset or contribute to a long-term sustainable use or management regime.
<b>Low</b>	Very minor alteration to an asset, which presents minimal change to heritage significance, including minor and/or short term or reversible change to setting which does not affect key characteristics.	Very minor alteration to an asset, which presents minimal change to heritage significance, including minor and/or short term or reversible change to setting.
<b>Negligible</b>	Very minor alteration to an asset which presents minimal change to heritage significance, including minor and/or short term or reversible change to setting which does not affect the significance of the asset.	Very minor alteration to an asset which presents minimal change to heritage significance, including minor and/or short term or reversible change to setting.

**Assessment of significance of effect**

- 6.7.11 The classification of the significance of an effect is judged by the relationship of the magnitude of change to the assessed heritage significance (sensitivity) of an asset (see **Table 6.6**).
- 6.7.12 As a rule, major and moderate effects are considered to be significant whilst minor and negligible effects are considered not significant. However, professional judgement is applied, and this may be amended as appropriate.
- 6.7.13 All assessments will be presented as narrative descriptions that set out the significance of a heritage asset, including, where appropriate, the contribution of its setting to significance, anticipated magnitude of change to significance and a resulting significance of effect.

**Table 6.6 Classification of effect**

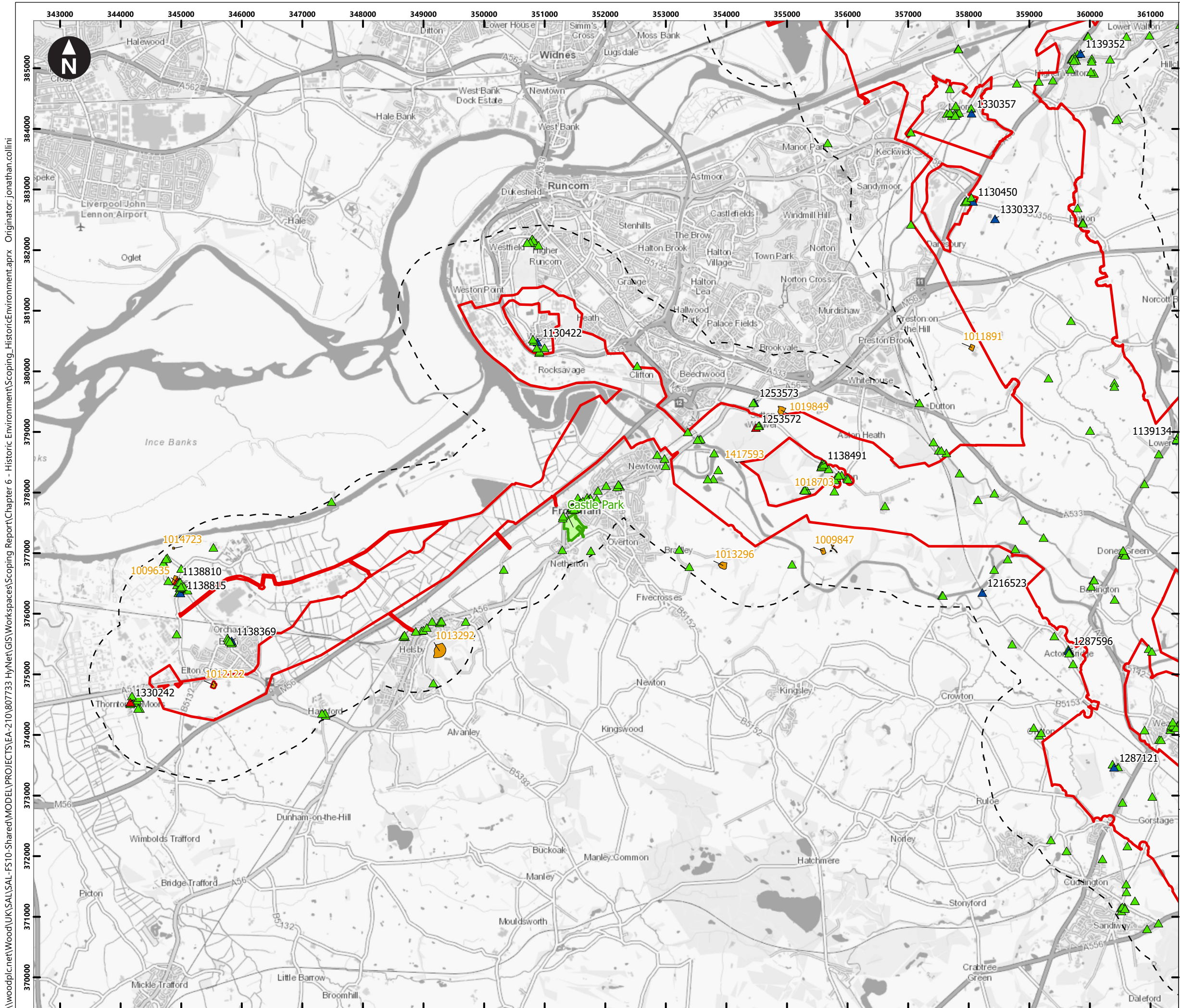
Sensitivity	Magnitude of Change			
	High	Medium	Low	Negligible
High	Major (significant)	Major (significant)	Moderate (potentially significant)	Minor (not significant)
Medium	Major (significant)	Moderate (potentially significant)	Minor (not significant)	Minor (not significant)
Low	Moderate (potentially significant)	Minor (not significant)	Minor (not significant)	Negligible (not significant)
Negligible	Minor (not significant)	Minor (not significant)	Negligible (not significant)	Negligible (not significant)

**Assessment of harm and substantial harm**

- 6.7.14 Harm and substantial harm are distinguished in NPS EN-1<sup>155</sup>. For this assessment, adverse change of negligible to medium magnitude to a designated asset or a non-designated asset of equivalent heritage significance would normally be considered as harm, while a high magnitude of adverse change would normally be considered substantial harm. This follows the case of *Hall vs City of Bradford* 2019 that determined that even a negligible magnitude of change to a designated heritage asset would constitute harm<sup>156</sup>. The fact that the harm may be limited or negligible will contribute to the weight to be afforded to it as part of the planning balance as recognised in Paragraph 5.8.15 in NPS EN-1<sup>155</sup>.
- 6.7.15 Professional judgment will be applied to the case of each individual asset and comments on the magnitude of any harm arising will be noted in the narrative of each assessment.

<sup>156</sup> Royal Courts of Justice (2019). Neutral Citation Number: (2019) EWHC 2899 (Admin). (Online). Available at: <https://www.kingschambers.com/assets/files/News/James%20Hall%20v%20City%20of%20Bradford.pdf> (accessed 12 November 2021).



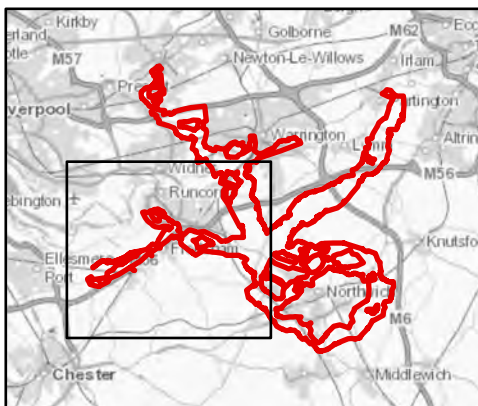


**Key**

- Scoping Boundary
- Historic Environment Study Area
- Registered Parks and Gardens
- Scheduled Monuments

**Listed Buildings**

- ▲ I
- ▲ II\*
- ▲ II



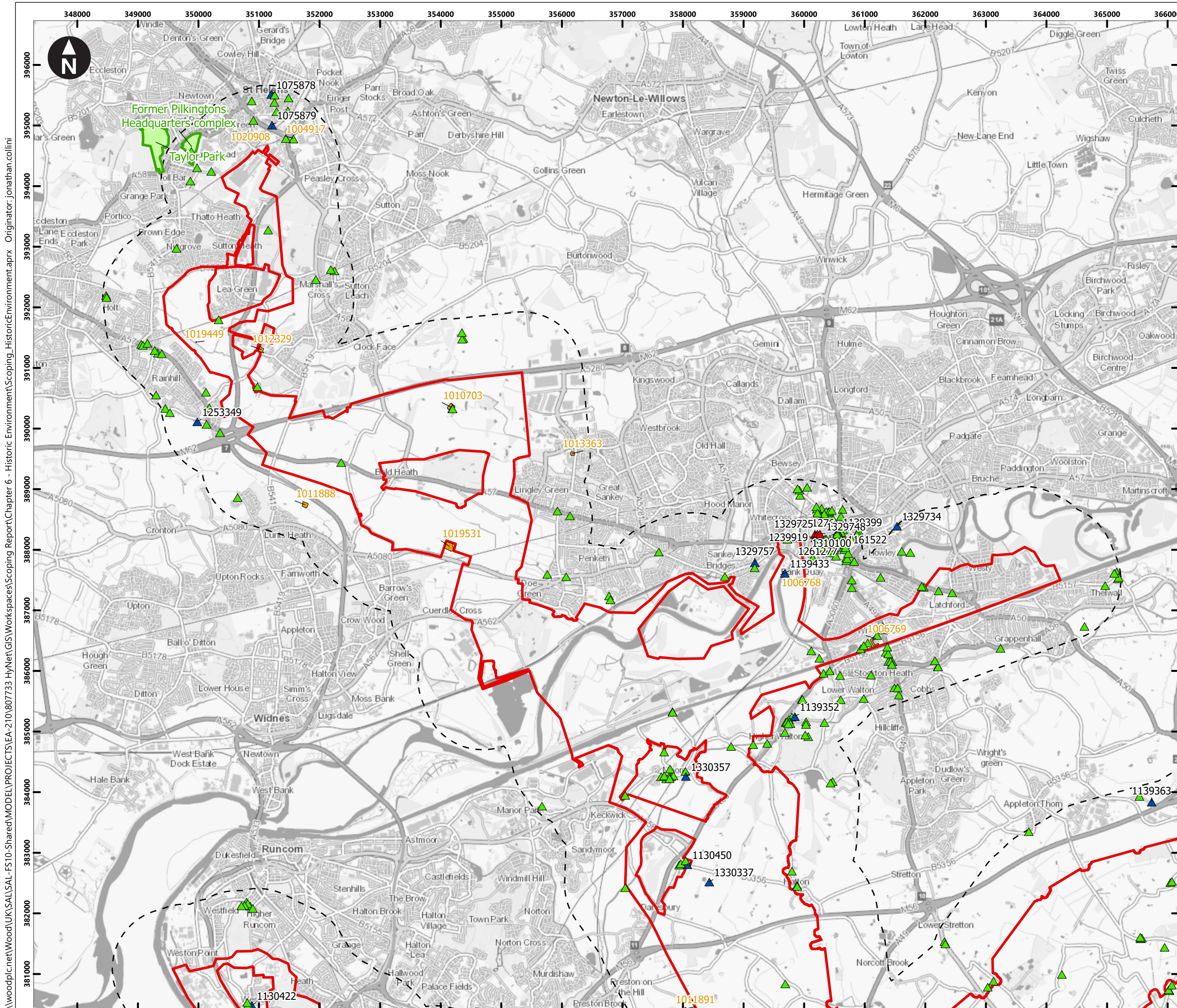
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HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 6 - Historic Environment

**Figure 6.1**  
**Historic Environment Study Area and Designated Assets**

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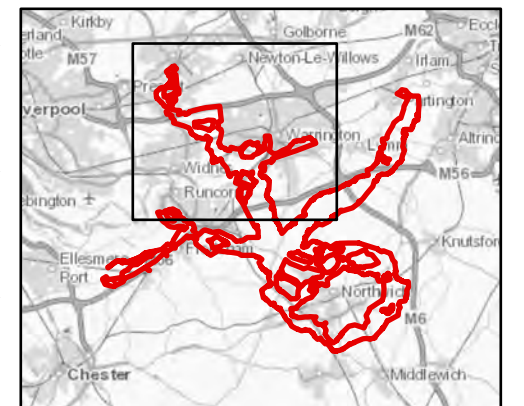


**Key**

- Scoping Boundary
- Historic Environment Study Area
- Registered Parks and Gardens
- Scheduled Monuments

**Listed Buildings**

- ▲ I
- ▲ II\*
- ▲ II



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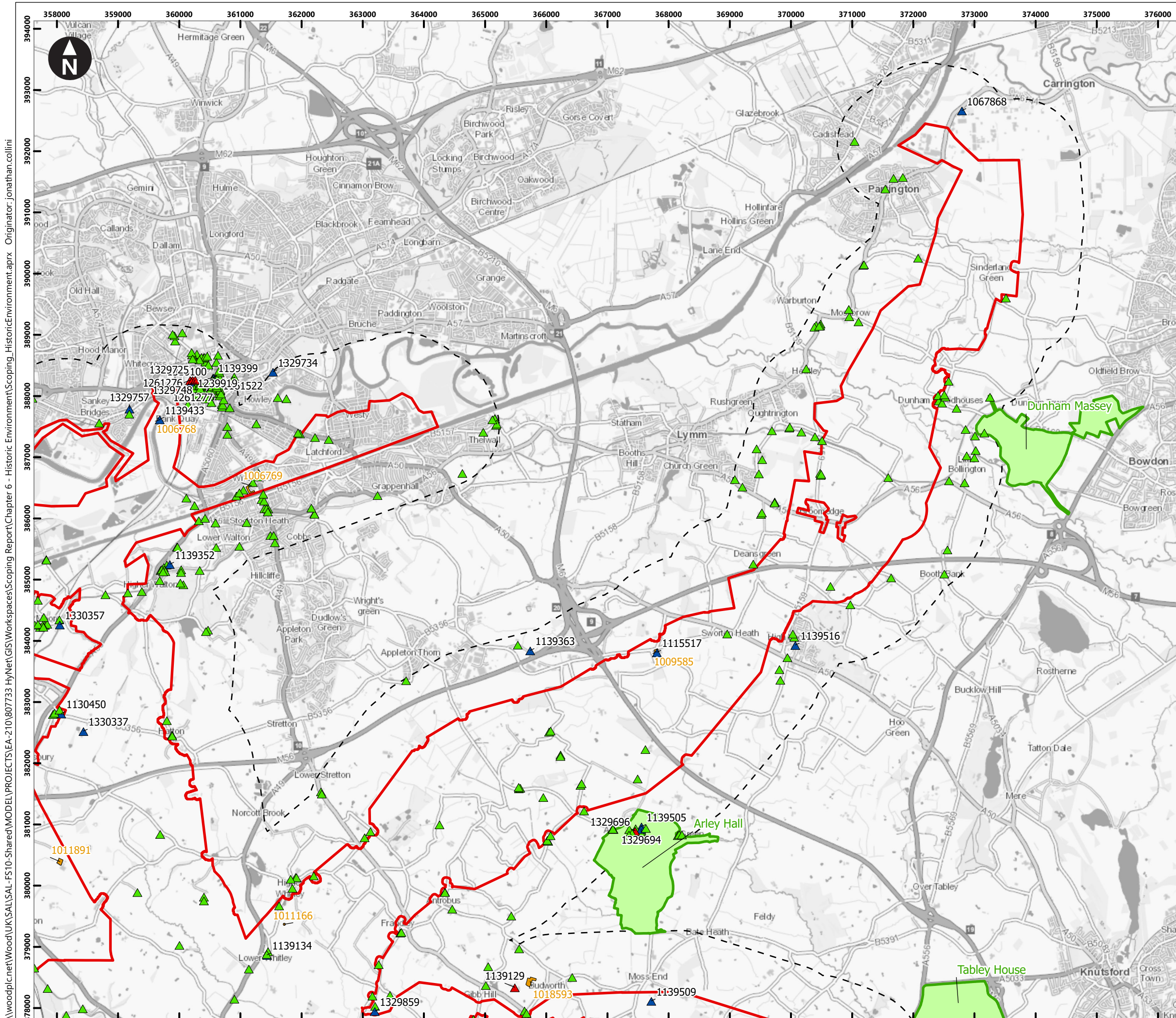
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**Figure 6.1**  
**Historic Environment Study Area and Designated Assets**

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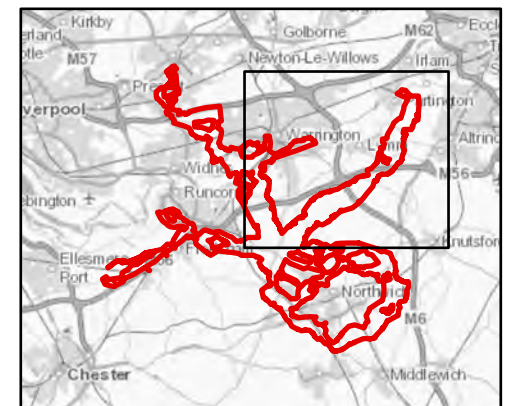


**Key**

- Scoping Boundary
- Historic Environment Study Area
- Registered Parks and Gardens
- Scheduled Monuments

**Listed Buildings**

- ▲ I
- ▲ II\*
- ▲ II



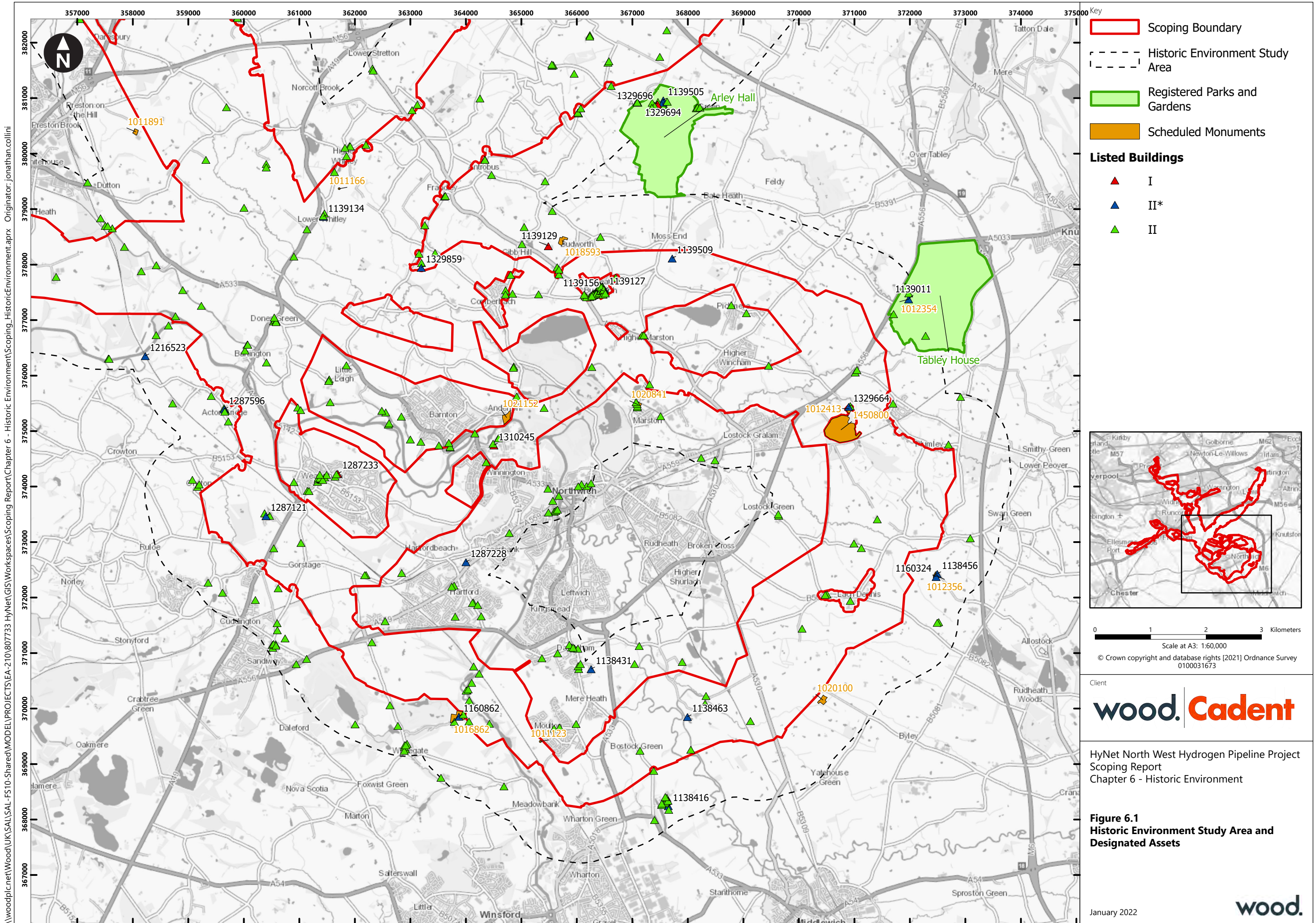
0 1 2 3 Kilometers  
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Client  
**wood. Cadent**

HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 6 - Historic Environment

**Figure 6.1**  
**Historic Environment Study Area and Designated Assets**

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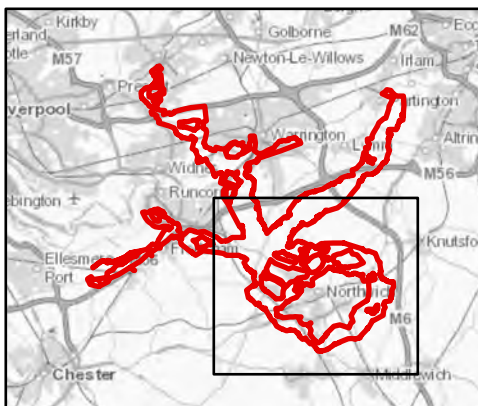


**Key**

- Scoping Boundary
- Historic Environment Study Area
- Registered Parks and Gardens
- Scheduled Monuments

**Listed Buildings**

- ▲ I
- ▲ II\*
- ▲ II



0 1 2 3 Kilometers  
 Scale at A3: 1:60,000  
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Client  
**wood. Cadent**

HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 6 - Historic Environment

**Figure 6.1**  
**Historic Environment Study Area and Designated Assets**

\\woodplc.net\Wood\UK\SAL\SAL-FS10-Shared\MODEL\PROJECTS\EA-210\807733 HyNet\GIS\Workspaces\Scoping Report\Chapter 6 - Historic Environment\Scoping\_HistoricEnvironment.aprx Originator: jonathan.collini

## 7. Water Environment

### 7.1 Introduction

7.1.14 The Water Environment assessment will consider the likely significant effects on groundwater and surface water receptors that may arise from the construction and operation of the Project. Receptors will be defined in terms of the water environment (all inland controlled waters), water resources (abstractions and associated catchment areas) and flood risk (property and infrastructure at risk of flooding). This chapter of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of the EIA.

7.1.15 The water environment interfaces with many other aspects and particularly with the following:

- **Chapter 5: Ecology;**
- **Chapter 12: Ground Conditions;** and
- **Chapter 13: Agriculture and Soil Resources.**

### Assumptions and limitations

7.1.16 Please refer to **Chapter 2: The Project**, for the parameters on which this Scoping Report is based.

7.1.17 The scope of this chapter is based on the Scoping red line boundary (see **Section 7.6**) and will be reviewed and amended in response to such matters as refinement of the route and associated components. The Study Area has a wider extent (also defined in **Section 7.6**), based on the identification of potential impact pathways and will be further developed in response to feedback from future consultation, where appropriate.

7.1.18 The pipeline would be constructed predominantly using open cut techniques, but trenchless crossing techniques would be used at key locations including crossings of motorways and A roads, rail, rivers and canals. As the preferred pipeline route is developed further, consideration will be given to the use of trenchless crossings at other points, e.g. where it may not be possible to avoid sensitive environmental constraints.

### 7.2 Relevant legislation and technical guidance

7.2.1 This section sets out the legislation and guidance in the context of the water environment. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

- 7.2.2 There are two key groups of regulators with respect to the water environment in the vicinity of the Scoping red line boundary:
- The Environment Agency (comprised of individual operational areas) - regulates flood risk with regards to main rivers<sup>157</sup> as well as water quality and Water Framework Directive compliance for all water bodies; and
  - Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards (IDBs) - regulate land drainage as well as flood risk from ordinary watercourses and groundwater.
- 7.2.3 LLFAs are county councils and unitary authorities, whereas IDBs are independent public bodies within their district. The Project interfaces with:
- One Environment Agency Area - North: Greater Manchester, Merseyside and Cheshire (GMC); and
  - Six LLFAs – District Council areas: Cheshire West and Chester, Cheshire East, Halton, and Warrington; and Metropolitan Districts: Trafford Council and St. Helens.
- 7.2.4 There are no specific IDBs within the Study Area, however, in some areas of the north west the Environment Agency undertakes this role.

## Legislation

- 7.2.5 Key legislative drivers relating to the water environment considered in this assessment include, but not limited to, those listed in **Table 7.1**.

**Table 7.1 Legislation relevant to the Water Environment**

Legislation	Legislative context	Section considered
<b>Control of Pollution Act 1974<sup>158</sup></b>	An Act to make further provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Scope of the assessment</b>

<sup>157</sup> Main rivers are a statutory type of watercourse in England and Wales, usually larger streams and rivers, but also some smaller watercourses. ‘Main River’ has a specific defined legal meaning: “main river means a watercourse or part of a watercourse designated as main river on the statutory main river map held by the Environment Agency”. Effectively a main river is any watercourse over which the EA exercises its flood defence powers and flood risk activity permitting powers. All other watercourses are referred to as ‘Ordinary Watercourses’ and are the Lead Local Flood Authority’s or Internal Drainage Board’s responsibility.

<sup>158</sup> UK Government (1974). Control of Pollution Act 1974. (online). Available at <https://www.legislation.gov.uk/ukpga/1974/40> (Accessed 22 November 2021).

Legislation	Legislative context	Section considered
<b>Reservoirs Act 1975<sup>159</sup> (as amended by the Flood and Water Management Act, 2010<sup>160</sup>)</b>	Reservoirs present a potential flood risk to the project. The Reservoirs Act 1975 provides regulation for the operation and maintenance of reservoirs to ensure the design is fit for purpose, and that maintenance (including frequent inspections of reservoir embankments) ensures the condition of the embankments. As such, the chance of them failing and giving rise to flooding problems is remote.	<b>Section 7.4: Baseline conditions</b> <b>Section 7.6: Scope of the assessment</b>
<b>Environment Protection Act 1990<sup>161</sup></b>	The Environmental Protection Act 1990 makes provision for the improved control of pollution arising from certain industrial and other processes. It re-enacts the provisions of the Control of Pollution Act 1974 relating to waste on land, including modifications to the functions of the regulatory and other authorities concerned in the collection and disposal of waste and makes further provision in relation to such waste.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Scope of the assessment</b>
<b>Land Drainage Act 1991 and 1994<sup>162</sup></b>	The Land Drainage Act (as amended), in combination with the Water Resources	<b>Section 7.4: Baseline conditions</b>

<sup>159</sup> UK Government (1975). Reservoirs Act 1975. (online). Available at: <https://www.legislation.gov.uk/ukpga/1975/23> (Accessed 22 November 2021).

<sup>160</sup> UK Government (2010). The Flood and Water Management Act 2010, (online). Available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents> (Accessed 22 November 2021).

<sup>161</sup> UK Government (1990). Environmental Protection Act 1990. (online). Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> (Accessed 22 November 2021).

<sup>162</sup> UK Government (1994) Land Drainage Act 1994. (online). Available at: <https://www.legislation.gov.uk/ukpga/1994/25/contents> (Accessed 22 November 2021).

Legislation	Legislative context	Section considered
	Act, stipulates that before work on or near an 'Ordinary Watercourse' is carried out, an Ordinary Watercourse Consent was required. The Flood Defence Consent regime for Main Rivers, which used to be part of this Act, was replaced by flood risk activities permits under the Environmental Permitting Regulations 2016.	<p><b>Section 7.5: Embedded environmental measures</b></p> <p><b>Section 7.6: Scope of the assessment</b></p>
<b>Countryside and Rights of Way Act 2000<sup>163</sup></b>	Sets out the framework for the notification to local planning authorities of areas of special scientific interest) SSSIs and agreements between the Nature Conservancy Council and those with interests in such land.	<b>Section 7.6: Scope of the assessment</b>
<p><b>Water Resources Act 1991<sup>164</sup></b></p> <p><b>Water Act 2003<sup>165</sup></b></p>	The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters <sup>166</sup> . The Act was revised by the Water Act 2003, which sets out regulatory controls for water abstraction, water impoundment and protection of water	<b>Section 7.5: Embedded environmental measures</b>

<sup>163</sup> UK Government (2000). Countryside and Rights of Way Act 2000. (online). Available at: <https://www.legislation.gov.uk/ukpga/2000/37/contents>

<sup>164</sup> UK Government (1991). Water Resources Act 1991. (online). Available at: <https://www.legislation.gov.uk/ukpga/1991/57/contents> (Accessed 22 November 2021).

<sup>165</sup> UK Government (2003). Water Act 2003, (online). Available at: <https://www.legislation.gov.uk/ukpga/2003/37/contents> (Accessed 22 November 2021).

<sup>166</sup> The term 'controlled waters' refers to: 'Rivers, streams, estuaries, lakes, canals, ditches, ponds and groundwater as far out as the UK territorial limit. The statutory definition is provided in Section 104 (1) of the Water Resources Act 1991 and Section 30A (d) of the Control of Pollution Act 1974.



Legislation	Legislative context	Section considered
	resources. Important for the Project is the requirement to obtain a licence for dewatering of engineering works and to ensure that any impact on the environment can be mitigated. Provisions for the regulation of water discharges to controlled waters are set out in the Environmental Permitting (England and Wales) Regulations 2016. These have replaced provisions in the earlier Acts.	
<b>Environment Act 1995<sup>167</sup></b>	The Environment Act 1995 established the Environment Agency and gave it responsibility for environmental protection and flood defence.	The principal regulator considered throughout the document.
<b>Water Resources (Environmental Impact Assessment) Regulations (England and Wales) 2003 (as amended)<sup>168</sup></b>	The regulation sets out the requirement for an assessment of the impact on the environment of projects likely to have significant effects on the water environment.	<b>Section 7.6: Scope of the assessment</b>
<b>*The European Union (EU) Floods Directive (2007/60/EC), as enacted into domestic law by the Flood Risk Regulations 2009<sup>169</sup></b>	The EU Floods Directive is enacted into domestic law by the Flood Risk Regulations 2009. It requires that in accordance with flood risk management plans, there should be a	<b>Section 7.4: Baseline conditions</b>  <b>Section 7.5: Embedded environmental measures</b>

<sup>167</sup> UK Government (1995). Environment Act 1995. (Online) Available at:

<https://www.legislation.gov.uk/ukpga/1995/25/contents> (Accessed December 2021).

<sup>168</sup> UK Government (2003). The Water Resources (Environmental Impact Assessment) (England and Wales) Regulations 2003. (Online) Available at:

<https://www.legislation.gov.uk/uksi/2003/164/contents> (Accessed December 2021).

<sup>169</sup> UK Government (2009). The Flood Risk Regulations (2009). (online). Available at: <http://www.legislation.gov.uk/uksi/2009/3042/contents/made> (Accessed 22 November 2021).

Legislation	Legislative context	Section considered
	focus on the prevention of flooding, through avoidance of planned development in present and future flood prone areas, and protection by taking measures to reduce the likelihood of flooding.	<b>Section 7.6: Scope of the assessment</b>
<b>*The EU Water Framework Directive (2000/60/EC) (WFD) as enacted into domestic law by the Water Environment WFD (England and Wales) (Amendment) Regulations 2017<sup>170</sup></b>	<p>The EU WFD is enacted into domestic law by the Water Environment (WFD) (England and Wales) Regulations 2017. It replaced the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 and transposed the WFD into law in England and Wales to establish a legislative framework for the protection of surface waters (including rivers, lakes, transitional waters and coastal waters) and groundwater throughout the EU.</p> <p>A fundamental requirement of the Water Framework Directive (WFD) is to attain Good Ecological Status, or Good Ecological Potential within each defined water body, by December 2027 at the latest and to ensure that any deterioration in status is prevented.</p>	<p><b>Section 7.4: Baseline conditions</b></p> <p><b>Section 7.5: Embedded environmental measures</b></p>
<b>*Priority Substances Directive (2008/105/EC)</b>	Sets out environmental quality standards in the field	<b>Section 7.4: Baseline conditions</b>

<sup>170</sup> UK Government (2017). Water Resources, England and Wales, The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. (online). Available at: [https://www.legislation.gov.uk/ukxi/2017/407/pdfs/ukxi\\_20170407\\_en.pdf](https://www.legislation.gov.uk/ukxi/2017/407/pdfs/ukxi_20170407_en.pdf) (Accessed 22 November 2021).

Legislation	Legislative context	Section considered
<b>Revision of the Priority Substances Directive (2013/39/EU)<sup>171</sup></b>	of water policy for Europe, with the aim of minimising the threat to the aquatic environment and effects such as acute and chronic toxicity to aquatic organisms, accumulation in the ecosystem and losses of habitats and biodiversity, as well as a threat to human health.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Scope of the assessment</b>
<b>Flood and Water Management Act 2010<sup>160</sup></b>	The Flood and Water Management Act sets out the Government's proposals to improve flood risk management, water quality and ensure water supplies are more secure. The Act includes consideration and responsibilities for managing flood risk and consideration of drainage including the use of SuDS.	<b>Section 7.4: Baseline conditions</b> <b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Scope of the assessment</b>
<b>The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015<sup>172</sup></b>	Sets out the environmental standards to be used for the second cycle of river basin plans. Along with the updated Water Environment (WFD) (England and Wales) Regulations 2003, they transpose Directive 2013/39/EC on environmental quality standards for priority substances.	<b>Section 7.4: Baseline conditions</b> <b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Scope of the assessment</b>

<sup>171</sup> European Parliament, Council of the European Union (2013). Directive 2013/39/EU of The European Parliament and of The Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy. (online). Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32013L0039> (Accessed 22 November 2021).

<sup>172</sup> UK Government, (2015). The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015, (online). Available at: [https://www.legislation.gov.uk/ukxi/2015/1623/pdfs/ukxi0d\\_20151623\\_en\\_003.pdf](https://www.legislation.gov.uk/ukxi/2015/1623/pdfs/ukxi0d_20151623_en_003.pdf) (Accessed 22 November 2021).

Legislation	Legislative context	Section considered
<b>Water Quality (Water Supply) Regulations 2016 (as amended)</b> <sup>173</sup>	This regulation is primarily concerned with the quality of water supplied in England for drinking, washing, cooking and food preparation, and for food production, and with arrangements for the publication of information about water quality.	<b>Section 7.4: Baseline conditions</b>  <b>Section 7.5: Embedded environmental measures</b>
<b>Private Water Supplies (England) Regulations 2016</b> <sup>174</sup>	The Regulations require Local Authorities to monitor Private Water Supplies.	<b>Section 7.4: Baseline conditions</b>
<b>Environmental Permitting (England and Wales) Regulations (EPR), 2016 (as amended)</b> <sup>175</sup>	The 2016 Environmental Permitting Regulations (as amended) replace the previous 2010 regulations. They provide a consolidated framework for environmental permits and exemptions for waste operations and water discharge activities (previously consented under the Water Resources Act 1991, and the Control of Pollution Act 1974), and groundwater activities. They also set out the powers, functions and duties of the regulators.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Scope of the assessment</b>

<sup>173</sup> UK Government (2016). The Water Supply (Water Quality) Regulations 2016. (online). Available at: <https://www.legislation.gov.uk/ukxi/2016/614/contents/made> (Accessed 22 November 2021).

<sup>174</sup> UK Government (2016). The Private Water Supplies (England) Regulations 2016. (online). Available at: <https://www.legislation.gov.uk/ukxi/2016/618/contents> (Accessed 22 November 2021).

<sup>175</sup> UK Government (2016). The Environmental Permitting (England and Wales) Regulations 2016 together with subsequent amendments. (online). Available at: [https://www.legislation.gov.uk/ukxi/2016/1154/pdfs/ukxi\\_20161154\\_en.pdf](https://www.legislation.gov.uk/ukxi/2016/1154/pdfs/ukxi_20161154_en.pdf) (Accessed 22 November 2021).

Legislation	Legislative context	Section considered
<b>Conservation of Habitats and Species Regulations 2017<sup>176</sup></b>	<p>The Conservation of Habitats and Species Regulations 2017 are enacted within England and Wales to transpose the EU Habitats Directive (92/43/EEC) and aspects of the Wild Birds Directive (2009/147/EC). The Regulations cover the selection, designation, registration and management of European sites (also known as Natura 2000 sites), and list European protected species of animals and plants. Conservation Objectives must ensure that the European protected species identified as qualifying features of a Natura 2000 site remain or reach favourable condition (such as by maintaining the extent and distribution of habitats of qualifying features).</p> <p>This means that where a proposed development may affect a Conservation Objective of a Natura 2000 site, the design will need to include appropriate measures to ensure the Conservation Objectives are not adversely affected.</p>	<p><b>Section 7.4: Baseline conditions</b></p> <p><b>Section 7.5: Embedded environmental measures</b></p> <p><b>Section 7.6: Scope of the assessment</b></p>
<b>Flood and Water Management Act 2010<sup>177</sup></b>	The Flood and Water Management Act sets out the Government's proposals to improve flood	<b>Section 7.4: Baseline conditions</b>

<sup>176</sup> UK Government (2017). The Conservation of Habitats and Species Regulations 2017. (online). Available at: <https://www.legislation.gov.uk/ukxi/2017/1012/contents/made> (Accessed 22 November 2021).

<sup>177</sup> UK Government (2010). Flood and Water Management Act 2010. (Online) Available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents> (Accessed December 2021).

Legislation	Legislative context	Section considered
	risk management, water quality and ensure water supplies are more secure. The Act includes consideration and responsibilities for managing flood risk and consideration of drainage including the use of SuDS.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Scope of the assessment</b>
<b>The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015<sup>178</sup></b>	Sets out the environmental standards to be used for the second cycle of river basin plans. Along with the updated Water Environment (WFD) (England and Wales) Regulations 2003, they transpose Directive 2013/39/EC on environmental quality standards for priority substances.	<b>Section 7.4: Baseline conditions</b>  <b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Scope of the assessment</b>
<b>Environment Act 2021<sup>179</sup></b>	Set out provisions to establish a post-Brexit set of statutory environmental principles and ensure environmental governance and binding targets on water quality.	

\*EU legislation which applied directly or indirectly to the UK before 31 December 2020 has been retained in UK law through the European Union (Withdrawal) Act (2018) <https://www.legislation.gov.uk/eu-legislation-and-uk-law>.

## Technical Guidance

7.2.6 A summary of the technical guidance relevant to the water environment is provided in **Table 7.2**.

<sup>178</sup> UK Government (2015). The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. (online) Available at: [https://www.legislation.gov.uk/uksi/2015/1623/pdfs/uksiod\\_20151623\\_en\\_auto.pdf](https://www.legislation.gov.uk/uksi/2015/1623/pdfs/uksiod_20151623_en_auto.pdf) (Accessed December 2021).

<sup>179</sup> UK Government (2021). The Environmental Act 2021. (online). Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted> (Accessed 22 November 2021).

Table 7.2 Technical guidance relevant to the Water Environment

Technical Guidance Document	Context	Section considered
<b>Construction Industry Research and Information Association (CIRIA) reports</b>		
<b>Report C532: Control of Water Pollution from Construction Sites (2001)</b> <sup>180</sup>	Provides practical support for consultants and contractors on how to plan and manage construction projects to control water pollution.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>Report C624: Development and Flood Risk - Guidance for the Construction Industry (2004)</b> <sup>181</sup>	Guidance for developers and the construction industry on the implementation of good practice in the assessment and management of flood risk as part of the development process and is intended to promote development that is sustainable in terms of flood risk.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>Report C648: Control of Water Pollution from Linear Construction Projects (2006)</b> <sup>182</sup>	Guidance for clients, consultant, designers, contractors and regulators on how to plan and manage water pollution from linear construction projects.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>Report C649: Control of Water Pollution from Linear Construction Projects - Site Guidance (2006)</b> <sup>183</sup>	Guidance specifically aimed at on-site construction personnel working on linear infrastructure construction projects.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>

<sup>180</sup> Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Hendrie, M. and Owens, D. (2001) Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors. C532. London: CIRIA.

<sup>181</sup> Lancaster, J., Preene, M. and Marshall, C. (2004) Development and Flood Risk – Guidance for the Construction Industry. C624. London: CIRIA.

<sup>182</sup> Murnane, E., Heap, A. and Swain, A. (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance. C648. London: CIRIA.

<sup>183</sup> Murnane, E., Heap, A. and Swain, A. (2006) Control of water pollution from Linear Construction Projects – Site Guide. C649. London: CIRIA.

Technical Guidance Document	Context	Section considered
<b>Report C650: Environmental Good Practice on Site, second edition (2005)</b> <sup>184</sup>	Provides practical guidance about managing construction on-site to control environmental impacts.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>Report C651: Environmental Good Practice - Pocket Book (2005)</b> <sup>185</sup>	Contains a series of good practice checklists to follow while working on a project, from design and planning through the construction phase on-site, to project completion.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>Report C689: Culvert Design and Operation Guide (2010)</b> <sup>186</sup>	Comprehensive guidance covering a range of issues pertinent to the management and design of culverts.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>Report C692: Environmental Good Practice on Site (2010)</b> <sup>187</sup>	General good practice guidance and practical advice for the management of construction sites to minimise environmental impacts.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>Report C698: Site Handbook for the Construction of SuDS (2007)</b> <sup>188</sup>	Guidance for site engineers and SuDS practitioners on the construction of SuDS to facilitate their effective implementation within developments.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>

<sup>184</sup> Charles, P. and Connely, S. (2005) Environmental Good Practice Site Guide (second edition). C650. London: CIRIA.

<sup>185</sup> Chant-Hall, G., Charles, P. and Connolly, S. (2005) Environmental good practice on site – pocket book. C651. London: CIRIA.

<sup>186</sup> Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. (2010) Culvert design and operation guide. C689. London: CIRIA.

<sup>187</sup> Audus, I., Charles, P. and Evans, S. (2010) Environmental good practice on site (third edition). C692. London: CIRIA.

<sup>188</sup> Woods Ballard, B., Kellagher, R., Martin, P., Jefferies, C., Bray, R. and Shaffer, P. (2007) Site Handbook for the Construction of SUDS. C698. London: CIRIA



Technical Guidance Document	Context	Section considered
<b>Report C753: The SuDS Manual (2015)</b> <sup>189</sup>	Best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>Pollution Prevention Guidance Notes (PPGs) and Guidance for Pollution Prevention Notes (GPPs)</b> <sup>190</sup>		
<b>GPP 1: A general guide to preventing pollution (October 2020)</b> <sup>191</sup>	Guidance document based on relevant legislation and reflects current good practice.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>GPP 2: Above ground oil storage tanks (January 2017)</b> <sup>192</sup>	Guidance to support the safety of above ground oil storage tanks and minimise the risk of causing pollution.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>PPG 3: Use and design of oil separators in surface water drainage systems (April 2006)</b> <sup>193</sup>	Guidelines to support decision making on whether an oil separator is needed for a site, and if so what	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>

<sup>189</sup> Woods Ballard, S., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. (2015). The SuDS Manual. C753. London: CIRIA.

<sup>190</sup> PPGs and GPPs are maintained by NetRegs and provide environmental good practice guidance for the whole UK, and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only. For businesses in England, regulatory guidance is available from GOV.UK instead

<sup>191</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2020). GPP 1: A general guide to preventing pollution. (online). Available at: <https://www.netregs.org.uk/media/1835/gpp-1.pdf> (Accessed 22 November 2021).

<sup>192</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017). Above ground oil storage tanks: GPP 2. (online). Available at: <https://www.netregs.org.uk/media/1475/gpp-2-pdf-jan-2018.pdf> (Accessed 22 November 2021).

<sup>193</sup> Environment and Heritage Service, Scottish Environmental Protection Agency and Environment Agency (2006). Use and design of oil separators in surface water drainage systems: PPG 3. (online). Available at: <https://www.netregs.org.uk/media/1671/ppg-3.pdf> (Accessed 22 November 2021).

Technical Guidance Document	Context	Section considered
	size and type of separator is appropriate.	
<b>GPP 5: Works and maintenance in or near water (February 2018)<sup>194</sup></b>	Guidance document based on relevant legislation and reflects current good practice for working in or near water.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>PPG 6: Working at construction and demolition sites (2012)<sup>195</sup></b>	Practical advice and guidance to help prevent pollution from construction and demolition sites. Sets out legislative requirements and good practice measures to reduce the risk of a pollution incident.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>PPG 7: Safe storage - The safe operation of refuelling facilities (July 2011)<sup>196</sup></b>	Guidelines for liquid refuelling facilities, based on relevant legislation and reflects current good practice.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>
<b>GPP 8: Safe storage and disposal of used oils (July 2017)<sup>197</sup></b>	Guidance based on relevant legislation and reflects current good practice for the safe storage and disposal of used oils.	<b>Section 7.5: Embedded environmental measures</b> <b>Section 7.6: Assessment Methodology</b>

<sup>194</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). Works and maintenance in or near water: GPP 5. Version 1.2. (online). Available at: [https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm\\_source=website&utm\\_medium=social&utm\\_campaign=GPP5%2027112017](https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017) (Accessed 22 November 2021).

<sup>195</sup> Environment Agency (2012). Working at construction and demolition sites: PPG6. Second edition. Bristol: Environment Agency.

<sup>196</sup> Environment Agency, Scottish Environmental Protection Agency and Northern Ireland Environment Agency (2011) The safe operation of refuelling facilities: PPG 7. (online). Available at: <https://www.netregs.org.uk/media/1673/ppg-7> (Accessed 22 November 2021).

<sup>197</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) GPP 8 Safe storage and disposal of used oils. (online). Available at: <https://www.netregs.org.uk/media/1435/gpp-8-v3-swni.pdf> (Accessed 22 November 2021).

Technical Guidance Document	Context	Section considered
<b>GPP 13 Vehicle washing and cleaning (April 2017)</b> <sup>198</sup>	Guidance for businesses that wash vehicles.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Assessment Methodology</b>
<b>PPG 18: Managing fire water and major spillages (June 2000)</b> <sup>199</sup>	Guidance to assist in the identification of the equipment and techniques available to prevent and mitigate the damage to the water environment caused by fires and major spillages.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Assessment Methodology</b>
<b>GPP 19: Vehicles: Service and Repair (June 2017)</b> <sup>200</sup>	Guidance aimed at businesses that deal with vehicles (applicable to other machinery, plant and equipment).	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Assessment Methodology</b>
<b>GPP 20: Dewatering underground ducts and chambers (January 2018)</b> <sup>201</sup>	Guidelines for dewatering underground ducts and chambers, based on relevant legislation and reflects current good practice.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Assessment Methodology</b>

<sup>198</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) GPP 13: Vehicle washing and cleaning. (online). Available at: <https://www.netregs.org.uk/media/1414/gpp-13-v2-plussepa-plusniea-plusnrw.pdf> (Accessed 22 November 2021).

<sup>199</sup> Environment and Heritage Service, Scottish Environmental Protection Agency and Environment Agency (n.d.) Managing fire water and major spillages: PPG18. (online). Available at: <https://www.netregs.org.uk/media/1674/ppg-18.pdf> (Accessed 22 November 2021).

<sup>200</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (n.d.) GPP 19: Vehicles: Servicing and Repairs. (online). Available at: <https://www.netregs.org.uk/media/1437/new-gpp-19-pdf.pdf> (Accessed 22 November 2021).

<sup>201</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (n.d.) GPP 20 Dewatering underground ducts and chambers. (online). Available at: <https://www.netregs.org.uk/media/1477/gpp-20-publisher-pdf-version.pdf> (Accessed 22 November 2021).

Technical Guidance Document	Context	Section considered
<b>GPP 21: Pollution incident response planning (July 2017)</b> <sup>202</sup>	Guidelines setting out current best practice for producing an incident response plan.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Assessment Methodology</b>
<b>GPP 22: Dealing with spills (October 2018)</b> <sup>203</sup>	Guidance applicable to those responsible for storing and transporting materials that could cause pollution if they spill. It may also be useful for those who respond to spills, or those responsible for transporting or storing waste from spills.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Assessment Methodology</b>
<b>GPP 26 Safe storage - drums and intermediate bulk containers (IBCs) (July 2018)</b> <sup>204</sup>	Guidance aimed at site operators and those responsible for the storing and handling of drums and IBCs.	<b>Section 7.5: Embedded environmental measures</b>  <b>Section 7.6: Assessment Methodology</b>
<b>The Flood Risk and Coastal Change Planning Practice Guidance (PPG) supporting NPPF</b> <sup>205</sup>		

<sup>202</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017) GPP 21: Pollution Incident Response Plans. (online). Available at: <https://www.netregs.org.uk/media/1436/gpp-21-final.pdf> (Accessed 22 November 2021).

<sup>203</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). Dealing with spills: GPP 22. Version 1. (online). Available at: <https://www.netregs.org.uk/media/1643/gpp-22-dealing-with-spills.pdf> (Accessed 22 November 2021).

<sup>204</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). GPP 26: Safe storage of Drums and Intermediate Bulk Containers (IBCs). (online). Available at: <https://www.netregs.org.uk/media/1693/gpp-26-safe-storage-of-drums-and-ibcs.pdf> (Accessed 22 November 2021).

<sup>205</sup> Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government Guidance Flood risk and coastal change. (online). Available at: <https://www.gov.uk/guidance/flood-risk-and-coastal-change> (Accessed 22 November 2021).

Technical Guidance Document	Context	Section considered
Environment Agency Guidance Flood risk assessments: climate change allowances <sup>206</sup>		

## 7.3 Consultation

- 7.3.1 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the wider stakeholder engagement programme. This will include the Environment Agency and LLFAs, and other local authorities<sup>207</sup> as appropriate. Other consultees will include the Canal and Rivers Trust and Peel Ports, who own Manchester Ship Canal. Embedded environmental measures will be developed in consultation with the wider environment team and engineering design team to ensure that the best environmental and technically feasible option for the proposed infrastructure is selected.
- 7.3.2 In addition, support will also be given to consultation led by other disciplines as required, for example this could include supporting terrestrial ecology consultation with Natural England. Engagement with relevant stakeholders will be ongoing during the preparation of the Preliminary Environmental Impacts Report (PEIR) and Environmental Statement (ES) submissions to supplement desk-based analysis and site-based observations, as the assessment of potential effects on water environment progresses.

## 7.4 Baseline conditions

- 7.4.1 The pipeline route corridors and indicative HAGI locations, as described in **Chapter 2: The Project**, are described spatially in terms of the West Corridor; North Corridor; East Corridor and South Corridor Option A (West of Northwich) and South Corridor Option B (East of Northwich) (**Figure 7.1**)<sup>208</sup>.
- 7.4.2 The description of the baseline conditions in this section is based on the Study Area defined within **Section 7.6: Scope of the Assessment** (see **Figure 7.1**) but can be summarised as the Scoping red line boundary plus buffers of 250m, enlarged to 500m around HAGI search areas.

<sup>206</sup> Environment Agency (2021). Flood risk assessments: climate change allowances. (online). Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> (Accessed 22 November 2021).

<sup>207</sup> Comprising: District Borough Unitary Districts: St. Helens District; Halton District; Warrington District; Trafford District; Cheshire East District and Cheshire West and Chester District.

<sup>208</sup> Within the chapter pipeline route corridors have been described in terms of the Scoping red line boundary.

## Data gathering methodology

7.4.3 Data gathering to date has been prepared primarily via a desk-study exercise undertaken in November 2021. The sources of baseline information used are documented in **Table 7.3**.

Table 7.3 Key Sources of water environment data

Source	Date	Summary	Coverage of Study Area
<b>Ordnance Survey (OS)</b>	15 November 2021	OS topographic maps 1:25,000 and 1:50,000 scale <sup>209</sup> Identification of topography, watercourses, springs, lakes and other watercourses.	Full coverage of the Study Area.
<b>Meteorological Office (Met Office)</b>	15 November 2021	Rainfall data and locations of stations <sup>210</sup>	Full coverage of the Study Area.
<b>Environment Agency/Defra</b>	15 November 2021	Environment Agency spatial datasets available from the Data Services Platform <sup>211</sup> Data including: Flood Map for Planning; Statutory Main River Map; WFD Groundwater bodies; WFD Surface Waterbodies; WFD Transitional and Coastal Catchments; Canal Waterbodies; Groundwater Dependent Terrestrial Ecosystems (GWDTE); and Groundwater Source Protection Zones (SPZ).	Full coverage of the Study Area and downstream areas where appropriate.

<sup>209</sup> Microsoft (2021). Bing maps. Images courtesy of OS. Available at: <https://www.bing.com/maps> (Accessed: 15 November 2021).

<sup>210</sup> Met Office (2021). UK climate averages. Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcx57w9fb> (Accessed: 19 November 2021).

<sup>211</sup> Environment Agency (2021). Data.gov portal. (online). Available at <https://environment.data.gov.uk/> (Accessed 15 November 2021).

Source	Date	Summary	Coverage of Study Area
		WFD waterbody status from the Environment Agency Catchment Data Explorer <sup>212</sup>	
<b>Centre for Ecology and Hydrology (CEH)</b>	15 November 2021	Summary river flow statistics for Environment Agency flow gauges from the online National River Flow Archive (NRFA) <sup>213</sup>	Full coverage of the Study Area.
<b>British Geological Survey (BGS)</b>	15 November 2021	Geological mapping and observation borehole data from the BGS Geology of Britain Viewer, the BGS Onshore GeoIndex, BGS Memoirs and the 1:625,000 scale Hydrogeological Map of England and Wales <sup>214</sup>	Full coverage of the Study Area.
<b>Defra</b>	15 November 2021	Interactive maps from the MAGIC natural environment map viewer <sup>215</sup> Including statutory and non-statutory designated nature conservation sites and aquifer designations	Full coverage of the Study Area.
<b>Cranfield University</b>	15 November 2021	Landis Soilscales Map <sup>216</sup> Information on Soil types	Full coverage of the Study Area.

<sup>212</sup> Environment Agency (2021). Catchment Data Explorer. (online). Available at: <https://environment.data.gov.uk/catchment-planning/> (Accessed 15 November 2021).

<sup>213</sup> Centre for Ecology and Hydrology, (2021). National River Flow Archive. (online). Available at: [Search Data | National River Flow Archive \(ceh.ac.uk\)](https://www.ceh.ac.uk/nrfa) (Accessed 15 November 2021).

<sup>214</sup> British Geological Survey (2021) Geology of Britain viewer (classic). (online). Available at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> (Accessed 15 November 2021).

<sup>215</sup> Defra (2021) MAGIC. (online). Available at: <http://www.magic.gov.uk/MagicMap.aspx> (Accessed 15 November 2021).

<sup>216</sup> Cranfield Soil and AgriFood Institute (2021). Soilscales map, (online). Available at: <http://www.landis.org.uk/soilscales/> (Accessed 15 November 2021).



## Current baseline

### Climate

- 7.4.4 The Met Office gives 30-year rainfall averages from 1981-2010 for a range of climate stations across the UK. Hawarden Airport Climate (10 metres above Ordnance Datum (mAOD)) is the closest climate station to the Study Area and is located at SJ 34192 64553, approximately 13km south-west of the West Corridor. The average annual rainfall is 726mm and average monthly rainfall is 61mm. Annual rainfall values for north-west England and North Wales areas are given on the Met Office website as 1,318mm, which indicates that the Study Area is likely to lower than average rainfall than the overall area.

### Topography and watercourses

- 7.4.5 OS 1:25,000 mapping indicates that the Study Area covers a range of elevations (see **Figure 7.1**). The lowest elevations are present in the west of the Study Area along the West Corridor at Frodsham Marsh, at around 5mAOD. The areas within the Study Area adjacent to the Manchester Ship Canal and Weaver Navigation are also 5mAOD to 10mAOD. However, elevations rise steeply up from these lows to areas within Runcorn up to 70mAOD on Runcorn Hill, and the South Corridor within the Scoping red line boundary which continues south-east towards Northwich rises to 50mAOD in parts. The parts of the Study Area to the west of Northwich, between Winnington and Barnton, levels drop to around 12mAOD in the centre of the town in areas surrounding the watercourses but for the areas of the Study Area which surround Northwich levels rise up to between 40mAOD to 50mAOD.
- 7.4.6 Within Warrington, the Study Area is mostly adjacent to the Manchester Ship Canal and therefore also at low elevations of around 5mAOD to 10mAOD. The North Corridor of the Scoping red line boundary to the west of Warrington, which heads north to St Helens rises from lows of 10mAOD adjacent to the Manchester Ship Canal up to highs of 70mAOD in St Helens. The Partington Gas Works is set at 15 to 20mAOD with the northern extent of the North Corridor remaining at similar elevations as it continues south before rising to 50mAOD south of the Bridgewater Canal, continuing to rise to a high point of 70mAOD adjacent to High Leigh before falling as it continues to the south-west down to 40mAOD in Partington.
- 7.4.7 The Study Area extends over 25 WFD catchments (see **Figure 7.1**), and multiple Environment Agency Main Rivers, ordinary watercourses and canals. The WFD catchments are covered in the WFD section below, with the majority being surface waterbodies but with the Mersey also being classed as a Transitional Waterbody at its downstream extent.
- 7.4.8 Within the Study Area the Main Rivers can be divided into three WFD Management Catchments, the Upper and Lower Mersey and the Weaver Goway. Within these are eight operational catchments, each containing multiple Main Rivers. The key Main Rivers within the Study Area are the Weaver, Dane, Manchester Ship Canal (classed as a Main River in parts), Bollin and Mersey. Alongside these are also the Smoker, Sinderland, Whittle, Sutton, Sankey,

Hardshaw, Crowton, Gale, Puddinglake, Forge, Cuddington, Dog Clog, Wade, Peckmill, Arley, Keckwick, Cogshall and Padgate Brooks. Each of these Main Rivers has associated tributaries and multiple ordinary watercourses draining into them, including the Bogart Brook<sup>217</sup> (which is the only WFD surface water body in the Study Area that is not also a Main River).

- 7.4.9 While there are a number of small ponds within the Study Area, there are no lakes which are classed as WFD waterbodies. The Study Area does intersect lakes, such as Budworth Mere and Pick Mere, and there are a number of lakes downstream of the Study Area or within the surface water catchment that may be affected by the Project, so these are considered within the Study Area and will be considered as potential surface water body receptors.
- 7.4.10 The canals within the Study Area are the Sankey Canal, Bridgewater Canal, Trent and Mersey Canal, Weaver Navigation and the Manchester Ship Canal.
- 7.4.11 There are a number of river flow gauges for the watercourses that intersect the Study Area, as summarised in **Table 7.4**.

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<sup>217</sup> This is the only WFD waterbody that is not also a Main River.

Table 7.4 Flows for Gauges within the Study Area taken from the National River Flow Archive

Gauge Number	Gauge Name	Watercourse	NGR	Catchment Area (km <sup>2</sup> )	Mean Flow (m <sup>3</sup> /s)	Q95 (m <sup>3</sup> /s)	Record start and end date
68003	Rudheath	River Dane	SJ667718	407.1	5.182	0.991	1949-2020
68007	Lostock Gralam	Wincham Brook	SJ697757	148.0	1.926	0.384	1962-2014
68011	Gore Farm	Arley Brook	SJ696799	36.5	0.455	0.017	1975-1982
69030	Causey Bridges	Sankey Brook	SJ587922	154.0	2.576	0.721	1977-2020
69006	Dunham Massey	River Bollin	SJ726875	257.6	4.330	1.178	1955-2002
69045	Bollington Mill Total	River Bollin	SJ730870	256.7	4.101	1.280	2009-2020
69013	Partington	Sinderland Brook	SJ725904	44.8	0.519	0.17	1976-2020
69037	Westy	River Mersey	SJ628883	2030	36.772	9.082	1986-2020

Note: Date from is from the Centre for Ecology and Hydrology, (2021). National River Flow Archive. (online). Available at: <https://nrfa.ceh.ac.uk/> (Accessed 15 November 2021).

## Geology

- 7.4.12 BGS mapping<sup>214</sup> (1:625,000) and (1:50,000) indicates that the predominant bedrock of the North Corridor, surrounding and south of the River Mersey crossing is Triassic rock consisting of Bollin Mudstone, Tarporley Siltstone, Helsby Sandstone, Wilmslow Sandstone and the Chester Formation (**Figure 7.2**). North of the Mersey crossing, there is an area of bedrock geology comprising mainly of Permian rock which consists of the Kinnerton Sandstone formation. North of this is a band of the Warwickshire Group consisting of the Etruria Formation made up of mudstone, sandstone and conglomerate. Towards St Helens, the bedrock changes to the Pennine Middle Coal Measures formation consisting of intersecting bands of sandstone and mudstone, siltstone and sandstone.
- 7.4.13 BGS mapping<sup>214</sup> (1:625,000) and (1:50,000) indicates that the underlying bedrock geology of the East Corridor is dominated by Triassic rock consisting of Bollin Mudstone Member, Tarporley Siltstone, Helsby Sandstone, and Wilmslow Sandstone Formations and the Northwich Halite Member (comprising halite and mudstone).
- 7.4.14 The underlying geology of the West Corridor is indicated by BGS mapping<sup>214</sup> (1:625,000) and (1:50,000) as being predominantly Triassic rock, consisting of the Bollin Mudstone Member, Tarporley Siltstone, Helsby Sandstone, Wilmslow Sandstone, Chester Sandstone and the Kinnerton Sandstone Formations.
- 7.4.15 For the South Corridor (Option A), BGS mapping<sup>214</sup> indicates that the bedrock geology is Triassic rock, consisting of the Bollin Mudstone, Northwich Halite and Sidmouth Mudstone Members.
- 7.4.16 The BGS mapping<sup>214</sup> also indicates that the bedrock geology of South Corridor (Option B) is again Triassic rock, which consists of Bollin Mudstone and Northwich Halite Members.
- 7.4.17 BGS mapping<sup>214</sup> (1:625,000) and (1:50,000) also indicates a range of superficial deposits underlying the Study Area (see **Figure 7.3**). Much of the Study Area is underlain by superficial deposits of till – Diamicton. The mapping also indicates large areas of alluvium (clay, silt sand and gravel), blown sand (Shirdley Hill Sand Formation), and river terrace deposits (glaciofluvial deposits of Devensian sand and gravel) surrounding the River Mersey and its tributaries, including the flow path of the River Weaver and the River Bollin. Superficial deposits of glacial sand and gravel (glaciofluvial deposits) are also present in scattered clusters throughout the central area of the Study Area.

## Soils and Land Use

- 7.4.18 Soils mapping<sup>216</sup> indicates a number of soil types within the Study Area. The predominant soil type in the Scoping Area is slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage. Freely draining slightly acid sandy soils are also present, predominantly along the southern bank of the River Mersey, the River Bollin and the River Weaver. Loamy and clayey soils of coastal flats with naturally high groundwater are present on the River Mersey crossing zone on the North Corridor. Two areas of naturally wet Fen Peat soils are present along the East Corridor.

- 7.4.19 Due to the size of the Study Area, there are a number of different land uses. Agricultural land with arable farming makes up the vast majority of the land use outside of the urban areas within the Study Area. Interspersed between these there are small areas of farm buildings and small settlements and local roads along with small wooded areas.
- 7.4.20 There are a number of motorways within the Study Area, including the M56 and M6, along with multiple dual carriageways, A and B roads, and residential streets. The Study Area also includes multiple railway lines, canals and two golf courses.
- 7.4.21 The Scoping red line boundary excludes settlements, where possible, such as the villages of Comberbatch and Great Budworth. However, these are still within the Study Area which also includes land within the larger urban areas of Northwich, Runcorn, Warrington, Partington and St Helens. The urban areas within the Study Area are predominantly industrial, including the land at the Partington Gas Works, but also contain areas of residential development and urban green space.

### *Aquifer status and hydraulic properties*

- 7.4.22 The Defra MAGIC<sup>215</sup> Aquifer Designation Map identifies the bedrock geology of Triassic rocks consisting of Bollin and Sidmouth Mudstone, Tarporley Siltstone and Helsby and Wilmslow Sandstone, in the East Corridor and South Corridor of the Scoping red line boundary, as Secondary B Aquifers. These are mainly lower permeability layers that may store and yield limited amounts of groundwater. The BGS 1:625,000 scale hydrogeological map identifies these as the Mercia Mudstones, which are largely argillaceous (clay rich) sequences with occasional sandstones, yielding less than 0.5 litres per second (l/s) of water that can be highly mineralised. These sequences confine the underlying Sherwood Sandstone Principal Aquifer.
- 7.4.23 The bedrock geology underlying the North Corridor and West Corridor of the Scoping red line boundary is identified as a Principal Aquifer, which is associated to the west with the Wilmslow, Helsby and Kinnerton Sandstone Formations and to the north by the Wilmslow, Kinnerton and Chester Sandstone Formations. The BGS 1:625,000 scale hydrogeological map identifies this as the Sherwood Sandstone Aquifer. It is up to 600m thick and yields up to 12.5l/s and is good quality but hard water (water containing a high mineral content), becoming saline where it is confined beneath the Mercia Mudstone.
- 7.4.24 The Aquifer Designation Map also identifies that there are Secondary A and Secondary (undifferentiated) aquifers within superficial drift deposits throughout the Study Area. The superficial deposits beneath Northwich itself, south-west of Northwich and including a band running along the River Weaver are predominantly a Secondary A Aquifer, which comprise of permeable layers that can support local water supplies and may form an important source of base flow to rivers. The area to the north-east of Northwich and the area north of the River Mersey is predominantly classed as a Secondary Undifferentiated Aquifer, which is a designation assigned in places for which it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type.

- 7.4.25 There are five WFD groundwater bodies which intersect the Study Area, this includes the Wirral and West Cheshire Permo-Triassic Sandstone aquifer; the Weaver and Dane Quaternary Sand and Gravel aquifer; the Manchester and East Cheshire Permo-Triassic Sandstone Aquifer; the Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone aquifers; and the Sankey and Glaze Carboniferous aquifer.

### *Abstractions and discharges*

- 7.4.26 Abstraction licence and discharge consent details will be requested from the Environment Agency based upon the WFD surface water body areas which intersect the Study Area. Private water supply data will also be requested from the Local Authorities and historical abstractions and discharges data within the Study Area will be obtained from an Envirocheck or Groundsure equivalent data report.
- 7.4.27 BGS online mapping shows the locations of a number of wells within the Study Area, ranging from shallow wells below 10m to wells with depths greater than 30m. Each of these wells can be considered as possible current abstraction wells, this will need to be confirmed either by an Envirocheck report or consultation with the Environment Agency and Local Authorities
- 7.4.28 The Study Area is situated in mainly rural catchments and groundwater quality pressures arise predominantly from diffuse pollution from rural sources. As of December 2020, the Study Area is predominantly within Nitrate Vulnerable Zones (NVZs). Surface water and groundwater quality data will be requested from the Environment Agency.
- 7.4.29 MAGIC<sup>215</sup> and SPZ<sup>215</sup> data indicate that the Study Area intersects a number of SPZs, which are designated to protect public groundwater supply abstractions. SPZs generally consist of three main zones, the Inner Zone SPZ1, the Outer Zone SPZ2 and the Total Catchment Zone SPZ3<sup>218</sup>.
- 7.4.30 The north part of the Study Area intersects a Zone 3 Total Catchment SPZ south-west of St Helens. The east of the Study Area also intersects a Zone 3 Total Catchment SPZ east of the Village of Lymm. South of the River Mersey, the north of the Study Area intersects a full SPZ zone (Zone 1, Zone 2 and Zone 3). The north of the Study Area also intersects a Zone 2 Outer Protection Zone, north-east of Daresbury in Higher Walton, south of Manchester Ship Canal. Details of the abstractions linked to these SPZs will be provided after responses to the Environment Agency data requests are obtained.

### *Water quality and Water Framework Directive status*

- 7.4.31 All of the surface water and groundwater WFD waterbodies whose basins intersect the Study Area have been listed within **Table 7.5** and **Table 7.6**. In 2019 (the most recent year for which data are available), none of the WFD surface water bodies

<sup>218</sup> SPZ1 has a 50-day travel time from pollutant to source with a 50m default minimum radius. SPZ2 has a 400-day travel time of pollutant to source and has a 250m or 500m minimum radius around the source depending on the amount of water taken. SPZ3 is the area around a supply source within which all the groundwater ends up at the abstraction point.

attained an overall Good status and all of the WFD groundwater bodies received an overall Poor status a result of ecological and physico-chemical quality issues.

7.4.32 The current (2019) status of all WFD surface water bodies within the Study Area (see **Figure 7.4**) are presented in **Table 7.5** and all WFD groundwater bodies within the Study Area (see **Figure 7.5**) in **Table 7.6**.

Table 7.5 WFD Cycle 2 (2019) River Waterbody details

Waterbody Name, ID/management catchment	Heavily modified?	Overall waterbody status	Status	Supporting elements, less than good status/potential	Issues preventing the attainment of good status
<b>Arley Brook (Source to Gale Brook) GB112068060420/Weaver Lower</b>	Not designated artificial or heavily modified.	Moderate	Ecological status – Moderate Chemical status - Fail	Macrophytes and Phytobenthos Combined - Moderate. Ammonia and dissolved oxygen - moderate. Mercury and its compounds, Polybrominated diphenyl ethers (PBDE) – Fail.	Poor soil management, poor livestock management, poor nutrient management- Agriculture and rural management. Private sewage treatment – urban and transport.
<b>Cogshall Brook GB112068060510/Weaver Lower</b>	Not designated artificial or heavily modified.	Moderate	Ecological status - Moderate Chemical status - Fail	Phosphate, Moderate. Mercury and its compounds, PBDE – Fail.	Poor soil management, Poor livestock management, poor nutrient management, farm/site management – Agriculture and land management.
<b>Cuddington Brook GB112068060480/Weaver Lower</b>	Not designated artificial or heavily modified.	Moderate	Ecological status- Moderate Chemical status -Fail	Invertebrates, Macrophytes and Phytobenthos Combined - Moderate. Ammonia – Moderate. Phosphate – Poor. Mercury and its compounds, Perfluorooctane sulphonate (PFOS), PBDE – Fail.	Sewage discharge – Water industry. Poor soil management – Agriculture and rural land management.
<b>Crowton Brook GB112068060550/Weaver Lower</b>	Not designated artificial or heavily modified.	Poor	Ecological status – Poor. Chemical status – Fail	Fish – Poor. Ammonia – Poor. Phosphate – Bad. Benzo(g-h-i)perylene, PFOS, PBDE– Bad.	Sewage discharge – Water industry. Poor soil management, farm/site infrastructure, poor nutrient management, poor livestock management – Agriculture and rural land management. Private sewage treatment – No sector responsible. Surface water abstraction – Industry. Private sewage treatment – Domestic general public.
<b>Forge (Kidd) Brook GB112068060400/Weaver Lower.</b>	Not designated artificial or heavily modified.	Poor	Ecological status - Poor Chemical status - Fail	Invertebrates – Moderate. Macrophytes and Phytobenthos Combined - Poor. Phosphate – Poor. Mercury and its compounds, PBDE – Fail.	Contaminated land – urban and transport. Poor nutrient management, poor soil management, farm/site infrastructure – Agriculture and rural land management.
<b>Gale Brook GB112068060430/Weaver Lower.</b>	Not designated artificial or heavily modified.	Moderate	Ecological status - Moderate Chemical status - Fail	Macrophytes and Phytobenthos Combined – Moderate. Phosphate – Moderate. Mercury and its compounds, PBDE– Fail.	Poor nutrient management, poor soil management, poor livestock management, farm/site management – Agriculture and rural land management.



Waterbody Name, ID/management catchment	Heavily modified?	Overall waterbody status	Status	Supporting elements, less than good status/potential	Issues preventing the attainment of good status
<b>Keckwick Brook GB112068060520/Weaver Lower.</b>	Heavily Modified.	Moderate	Ecological status - Moderate Chemical status - Fail	Fish – Poor. Invertebrates – Bad. Phosphate – poor. Mercury and its compounds, PBDE – Fail.	Poor livestock management, barriers ecological discontinuity – Agriculture and rural land management. Urbanisation/urban development – Urban and transport. Ecological recovery time – sector under investigation. Other and unknown physical modifications.
<b>Peover Eye GB112068060390/Weaver Lower.</b>	Not designated artificial or heavily modified.	Bad	Ecological status - Bad Chemical status - Fail	Fish – Bad. Macrophytes and Phytobenthos Combined – Moderate. Mercury and its compounds, PBDE – Fail.	Poor livestock management, farm/site management, poor nutrient management, poor livestock management – Agriculture and rural land management. Sewage discharge – water industry. Barriers/ecological discontinuity, surface water abstraction – Industry. Water transfer scheme – Recreation.
<b>Smoker Brook (Gale Brook to Wincham Brook) GB112068060410/Weaver Lower.</b>	Not designated artificial or heavily modified.	Bad	Ecological status – Bad Chemical status - Fail	Fish – Bad. Phosphate – Moderate. Mercury and its compounds, PBDE – Fail.	Poor livestock management, poor nutrient management, poor soil management, farm/site management – Agriculture and rural land management.
<b>Wade Brook GB112068060370/Weaver lower.</b>	Not designated artificial or heavily modified.	Poor	Ecological status – Poor Chemical status - Fail	Invertebrates – Moderate. Macrophytes and Phytobenthos Combined – Poor. Ammonia - Bad. Phosphate – Moderate. Cadmium and Its Compounds – Fail. PBDE – Fail. Trichloromethane – Fail.	Trade/industry discharge, contaminated land, landfill leaching – Industry. Poor nutrient management, poor livestock management, poor soil management, farm/site management – Agriculture and rural land management.
<b>Weaver (Dane to Frodsham) GB112068060500/Weaver Lower.</b>	Heavily Modified.	Moderate	Ecological status - Moderate Chemical status - Fail	Invertebrates – Bad. Ammonia – Moderate. Phosphate – Poor. Mercury and its compounds, PBDE – Fail. Cypermethrin (Priority hazardous) – Fail.	Physical modification (other), inland boating and structures – Navigation. Trade/industry – Industry. Poor soil management, poor nutrient management, poor livestock management, farm/site management – Agriculture and rural land management. Urbanisation/urban development – Urban and transport. Sewage discharge – Water industry.
<b>Dog Clog Brook (including Mill Brook) GB112069060690/Mersey Lower/Ditton.</b>	Heavily modified.	Moderate	Ecological status – Moderate Chemical status – Fail	Invertebrates – Moderate. Ammonia – Moderate. Mitigation measures assessment –	Pollution incidents – Waste treatment and disposal. Poor soil management, poor nutrient

Waterbody Name, ID/management catchment	Heavily modified?	Overall waterbody status	Status	Supporting elements, less than good status/potential	Issues preventing the attainment of good status
				Moderate or less. Mercury and its compounds, PFOS, PBDE – Fail. Cypermethrin (Priority hazardous) – Fail.	management – Agriculture and rural land management. Abandoned mine – Mining and quarrying. Private sewage treatment – Urban and transport/Domestic General. Other – Local and Central Government.
<b>Mersey (Bollin confluence to Howley Weir) including Padgate Brook GB112069061012/Glaze.</b>	Heavily modified.	Moderate	Ecological status – Moderate Chemical status – Fail	Invertebrates – Bad. Ammonia, dissolved oxygen – Moderate. Phosphate – Poor. Mitigation measures assessment – Moderate or less. Benzo(g-h-i)perylene, Mercury and its compounds, PFOS, PBDE, Tributyltin Compounds – Fail. Cypermethrin (Priority Hazardous) – Fail.	Sewage discharge– Water industry. Contaminated water body bed sediments – Industry. Inland boating and structures – Navigation. Flood Protection Structures, Urbanisation and urban development – Urban and transport.
<b>Dane (Wheelock to Weaver) GB112068060470/Dane.</b>	Not designated artificial or heavily modified.	Moderate	Ecological status - Moderate Chemical status - Fail	Fish, Macrophytes and Phytobenthos Combined – Moderate. Phosphate- Poor. Mercury and its compounds, PBDE – Fail. Cypermethrin (Priority hazardous) – Fail.	Poor nutrient management, poor livestock management, riparian/in-river activities (inc bankside erosion), poor soil management, farm/site management – Agriculture and rural land management. Sewage discharge – Water industry. Urbanisation/urban development – Urban and transport.
<b>Puddinglake Brook GB112068060220/Dane.</b>	Not designated artificial or heavily modified.	Poor	Ecological status - Poor Chemical status - Fail	Invertebrates – moderate. Macrophytes and Phytobenthos Combined – Poor. Ammonia, Dissolved oxygen, Phosphate – Poor. Mercury and its compounds, PBDE – Fail.	Riparian/in-river activities (inc bankside erosion), poor nutrient management, poor livestock management, private sewage treatment, farm/site infrastructure, poor nutrient management – Agriculture and rural land management.
<b>Weaver (Marbury Brook to Dane) GB112068060460/Weaver Upper.</b>	Not designated artificial or heavily modified.	Poor	Ecological status - Poor Chemical status -Fail	Fish, Invertebrates, Macrophytes and Phytobenthos Combined – Poor. Ammonia – Moderate. Phosphate – Poor. Mercury and its compounds, PFOS, PBDE – Fail.	Poor pesticide management, poor livestock management, poor soil management, poor nutrient management, farm/site infrastructure – Agriculture and rural land management. Sewage discharge – Water industry. Urbanisation/urban development – Urban and transport. Recreation – Navigation. Trade/industry discharge – Industry. Barriers/ecological discontinuity.

Waterbody Name, ID/management catchment	Heavily modified?	Overall waterbody status	Status	Supporting elements, less than good status/potential	Issues preventing the attainment of good status
<b>Bogart Brook GB112068060540/Weaver Upper.</b>	Not designated artificial or heavily modified.	Moderate	Ecological status – Moderate Chemical status – Fail	Macrophytes and Phytobenthos Combined – Moderate. Phosphate – Moderate. Mercury and its compounds, PFOS, PBDE – Fail.	Poor nutrient management, poor livestock management, farm/site management, poor soil management – Agriculture and rural land management. Sewage discharge – Water industry.
<b>Peckmill Brook, Hoolpool Gutter at Ince Marshes GB112068060330/Gowy.</b>	Not designated artificial or heavily modified.	Moderate	Ecological status – Moderate Chemical status - Fail	Fish, Macrophytes and Phytobenthos Combined – Moderate. Ammonia, Phosphate – Poor. Mercury and its compounds, PBDE – Fail.	Poor livestock management, poor soil management, poor pesticide management, farm/site infrastructure – Agriculture and rural land management. Sewage discharge – Water industry. Contaminated land, Urbanisation/urban development – Urban and transport.
<b>Bollin (Ashley Mill to Manchester Ship Canal) GB112069061382/Bollin Dean Mersey Upper.</b>	Heavily modified.	Moderate	Ecological status – Moderate Chemical status -Fail	Fish – Poor. Phosphate - Poor. Mercury and its compounds, PBDE – Fail.	Sewage discharge – Water industry. Urbanisation/urban development, other – Urban and transport. Poor livestock management – Agriculture and rural land management. Other – Local and central government.
<b>Mersey/Manchester Ship Canal (Irwell/Manchester Ship Canal to Bollin) GB112069061011/Bollin Dean Mersey Upper.</b>	Heavily Modified.	Moderate	Ecological status - Moderate Chemical status - Fail	Invertebrates – Bad. Ammonia – Moderate. Dissolved oxygen – Bad. Phosphate- Poor. Mercury and its compounds, PFOS, PBDE, Cypermethrin – Fail.	Sewage discharge, contaminated water body bed sediments – Water industry. Inland boating and structures – Navigation. Contaminated water body bed sediments – Industry. Contaminated water body bed sediments – Urban and transport.
<b>Sinderland Brook GB112069060980/Bollin Dean Mersey Upper.</b>	Not designated artificial or heavily modified.	Poor	Ecological status - Poor. Chemical status -Fail.	Fish, Macrophytes and Phytobenthos Combined – Moderate. Invertebrates – poor. Phosphate – Poor. Mercury and its compounds, PFOS, PBDE – Fail.	Sewage discharge – Water industry. Urbanisation/urban development – Urban and transport. Misconnections – Domestic general public. Barriers ecological discontinuity, flood protection structures – Local and Central Government.
<b>Hardshaw (Windle) Brook GB112069061210/Sankey.</b>	Heavily Modified.	Moderate	Ecological status – Moderate Chemical status -Fail	Invertebrates, Macrophytes and Phytobenthos Combined – Moderate. Phosphate – Moderate. Mitigation Measures Assessment – Moderate or Less. Benzo(g-h-i)perylene, Mercury and its compounds, PBDE – Fail.	Surface water abstraction – Water industry. Urbanisation/urban development, contaminated land, other – Urban and transport. Poor nutrient management – Agriculture and rural management. Misconnections – Domestic general public. Other – Local and Central Government.

Waterbody Name, ID/management catchment	Heavily modified?	Overall waterbody status	Status	Supporting elements, less than good status/potential	Issues preventing the attainment of good status
<b>Sankey Brook (Hardshaw Brook to Rainford Brook)</b> GB112069061180/Sankey.	Heavily Modified.	Moderate	Ecological status – Moderate Chemical status - Fail	Ammonia – Poor. Dissolved oxygen – Bad. Mitigation Measures Assessment – Moderate or less. Mercury and its compounds, PBDE, Cypermethrin (Priority hazardous) – Fail.	Flow, unknown activity, under investigation. Physical modification, other – Urban and transport.
<b>Sutton Brook</b> GB112069061170/Sankey.	Heavily Modified.	Moderate	Ecological status – Moderate Chemical status - Fail	Invertebrates, Macrophytes and Phytobenthos Combined- Moderate. Ammonia, Phosphate – Moderate. Mitigation Measures Assessment – Moderate or less. Mercury and its compounds, PBDE – Fail.	Urbanisation/urban development, contaminated land, other – Urban and transport. Sewage discharge – Water industry.
<b>Whittle Brook (Mersey Estuary)</b> GB112069060990/Sankey.	Heavily Modified.	Moderate	Ecological status – Moderate Chemical status - Fail	Invertebrates – Moderate. Phosphate – Moderate. Mitigation Measures Assessment – Moderate or less. Benzo(g-h-i)perylene, Mercury and its compounds, PBDE – Fail.	Other, Flood protection structures, Urbanisation/urban development – Urban and transport. Other – Local and Central Government. Misconnections – Domestic general public. Poor soil management, poor nutrient management – Agriculture and rural land management.

Note: Data from is from the Environment Agency Portal<sup>219</sup>.

<sup>219</sup> Environment Agency (2021). Data.gov portal. (online). Available at: <https://environment.data.gov.uk/> (Accessed 15 November 2021)

Table 7.6 WFD Cycle 2 (2019) Groundwater body details

Waterbody name, ID/management catchment	Overall waterbody status (2019)	Status	Supporting elements, less than good status/potential	Issues preventing the attainment of good status
<b>Wirral and West Cheshire Permo-Triassic Sandstone Aquifers Water Body GB41101G202600/North West GW.</b>	Poor	Quantitative status – Good. Chemical status – Poor. Trend Assessment – Upward trend.	Chemical Drinking Water Protected Area – Poor.	Poor livestock management, poor nutrient management, forestry – Agriculture and rural land management. Private sewage treatment, other – domestic general public. Other – Water Industry.
<b>Weaver and Dane Quaternary Sand and Gravel Aquifers, GB41202G991700/North GW.</b>	Poor	Quantitative status – Good. Chemical status – Poor. Trend Assessment – Upward trend.	Chemical Dependant Surface Water Body Status, Chemical GWDTEs test, General Chemical Test – Poor. Trend Assessment – Upward Trend.	Poor nutrient management – Agriculture and rural land management. Unknown – Sector under investigation. Not applicable – No Sector responsible.
<b>Manchester and East Cheshire Permo-Triassic Sandstone Aquifers GB41201G101100/North West GW.</b>	Poor	Quantitative status – Poor. Chemical status – Poor. Trend Assessment – Upward trend.	Quantitative Saline Intrusion – Poor. Chemical Saline Intrusion – Poor.	Unknown – Sector under investigation. Natural saline or other intrusion – No sector responsible.

Waterbody name, ID/management catchment	Overall waterbody status (2019)	Status	Supporting elements, less than good status/potential	Issues preventing the attainment of good status
<b>Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers GB41201G101700/North West GW.</b>	Poor	Quantitative status – Poor. Chemical status – Poor. Trend Assessment – Upward trend	Quantitative Saline Intrusion – Poor. Chemical Dependant Surface Water Body status, Chemical Drinking Water Protected Area, Chemical Saline Intrusion, General Chemical Test – Poor.	Poor nutrient management, poor pesticide management – Agriculture and rural land management. Other – Water industry. Saline or other intrusion – No sector responsible. Unknown – Sector under investigation.
<b>Sankey and Glaze Carboniferous aquifers GB41202G100100/North West GW.</b>	Poor	Quantitative status – Good. Chemical status – Poor. Trend Assessment – No Trend.	Chemical Dependant Surface Water Body status, general chemical test – Poor.	Abandoned mine – Mining and quarrying activity.

Note: Data is from the Environment Agency portal<sup>211</sup>.

- 7.4.33 Much of the Study Area sits within the Weaver Gowy Management Catchment, with 16 of the 25 WFD Surface Water Bodies located within this catchment. None of the surface water bodies within this catchment attained the WFD target of Good status as a result of ecological and physico-chemical quality issues. Many of the water bodies were found to have issues with levels of phosphate, ammonia, fish, macrophytes, phytobenthos, mercury, Perfluorooctane sulphonate (PFOS), Polybrominated diphenyl ethers (PBDE) and in limited cases Cypermethrin and Trichloromethane. These ecological and physico-chemical quality issues are associated with activities from a range of sectors including Agriculture and Rural Land Management; Urban and Transport; Urbanisation and Urban Development; Recreation; Water industry; Navigation; and Transport.
- 7.4.34 There are also six WFD waterbodies located within the Mersey Lower Management Catchment whose basins intersect the Study Area. None of these waterbodies attained the WFD target of Good status as a result of similar ecological and physico-chemical quality issues to the Weaver Gowy Management Catchment, as well as a Benzo(g-h-i)perylene Fail status in Whittle Brook.
- 7.4.35 The Mersey Upper Management Catchment contains three WFD waterbodies whose basins interact with the Study Area. None of these waterbodies attained the WFD target of Good status as a result of similar ecological and physico-chemical quality issues to the Weaver Gowy Management Catchment and the Mersey Lower Management Catchment.
- 7.4.36 With regard to the WFD Groundwater bodies, five are present within the Study Area. As shown in **Table 7.6**, all of them are classified as being at Poor overall status. The predominant issues preventing the attainment of Good status are poor nutrient and livestock management, with also abandoned mines, saline intrusion and private sewage treatment. There are no WFD Lake waterbodies within the Study Area. There is one Transitional Waterbody within the Study Area, the Mersey (ID GB531206908100), which is at Moderate status. This is due to suspected water management issues of contaminated water body bed sediments and zinc.

### Conservation Sites

- 7.4.37 MAGIC<sup>215</sup> shows a number of statutory and non-statutory designated conservation sites are located within and downstream of the Study Area, however, only the sites within the Mersey Estuary are considered to be dependent on freshwater inputs. These sites are briefly described below, however, more detailed descriptions of these conservation sites can be found within **Chapter 5: Ecology**.
- 7.4.38 The Mersey Estuary is a triple designated area covering Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and Ramsar site. It covers a total area of 1,120 hectares (ha) across two parcels which are centred at grid references (SJ488797) and (SJ SJ500838). These are all water dependent<sup>220</sup> and

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<sup>220</sup> Natural England (2014). European Site Conservation Objectives for Mersey Estuary SPA (UK9005131) (Online). Available at: <http://publications.naturalengland.org.uk/publication/5790848037945344> (Accessed December 2021).

have a water environment pathway within the Study Area as many of the Mersey Estuary's upstream tributaries intersect this area.

## Flood Risk

### Fluvial and tidal flood risk

- 7.4.39 The Environment Agency Flood Map for Planning<sup>221</sup> was used to identify different flood zone areas and the extent of fluvial or tidal flooding possible within the Study Area as well within downstream catchments. The Environment Agency Flood Map for Planning is shown in **Figure 7.6**. The North Corridor is within a number of Flood Zone 3 (high likelihood of fluvial or tidal flooding) and Flood Zone 2 (medium likelihood of fluvial or tidal flooding) areas<sup>222</sup>.
- 7.4.40 The North Corridor (on the Mersey crossing) intersects a large area of Flood Zone 3 and Flood Zone 2 associated with the River Mersey and its tributaries. The River Mersey is a tidal watercourse, as such the area stated above is likely to be associated with both tidal and fluvial flooding. Flood defences are present along sections of the Mersey; however, these defences could be overtopped or could breach, which could cause extensive flooding of the land with significant flood depths and high velocities.
- 7.4.41 Further upstream, the River Bollin and Red Brook pass through the East Corridor; along these two watercourses there are areas of Flood Zone 2 and Flood Zone 3. The East Corridor also intersected by an area of Flood Zone 2 and 3 associated with the downstream section of the River Weaver.
- 7.4.42 The central area, around the proposed location of the 'Central Hub' HAGI, and South Corridor is also associated with areas of Flood Zone 2 and Flood Zone 3. Multiple watercourses run through these parts of the Study Area, including the River Dane, the River Weaver (Upstream), Puddinglake Brook, Gad Brook, Hume Colvert, Peover Eye, Wincham Brook, Whitley Brook and Cogshall Brook, all of which have associated areas of Flood Zone 2 and 3.

### Groundwater flood risk

- 7.4.43 The Cheshire East Preliminary Flood Risk Assessment (PFRA)<sup>223</sup> reviewed the Environment Agency's Areas Susceptible to Groundwater Flooding (ASStGWF) data set. None of the Study Area within the Cheshire East Borough was deemed to be at risk of groundwater flooding. The PFRA also showed that there are no

<sup>221</sup> Environment Agency (2021). Flood Map for Planning. (online). Available at: <https://flood-map-for-planning.service.gov.uk/> (Accessed 21 November 2021)

<sup>222</sup> Flood Zone 3 is formally defined as land having a 1% Annual Exceedance Probability (AEP) or greater of fluvial flooding or a fluvial flooding, or a 0.5% AEP or greater of tidal flooding. Flood Zone 3 is defined as land having between a 0.1% and 1% AEP of fluvial flooding, or between a 0.1% and 0.5% AEP of tidal flooding

<sup>223</sup> Cheshire East Council (2017). Preliminary Flood Risk Assessment. (online). Available at: [PFRA Cheshire East Council 2017.pdf \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/644442/PFRA_Cheshire_East_Council_2017.pdf) (Accessed 26 November 2021).



records of groundwater flooding within the areas of Study Area within the Cheshire East Borough.

- 7.4.44 The St Helens PFRA<sup>224</sup> reviewed the AStGWF data set and Environment Agency and Council flooding records and concluded that there is no locally significant risk of groundwater flooding in the borough. It can therefore be concluded that there is no locally significant risk of groundwater within the areas of the Study Area situated within the St Helens borough.
- 7.4.45 The Cheshire West and Chester Council PFRA<sup>225</sup> states that there are known locations with high groundwater levels within the Borough. There are no specific records or reported incidents of groundwater flooding within the areas of the Study Area within the Cheshire West and Chester Borough. However, much of the West Corridor and North Corridor, covering Runcorn, Warrington and also the areas of Partington, is classed as being above a Principal Aquifer. This indicates it is highly transmissible and may carry a greater quantity of groundwater which may pose a risk of groundwater flooding, should the water table rise above ground level.
- 7.4.46 The bedrock geology beneath the west of the Study Area is classed as being a Principal Aquifer. However, local topography is a determining factor in groundwater flood risk so the presence of a Principal Aquifer does not necessarily indicate a high risk, merely that it is capable of being an area at high risk where the water table intersects the ground surface. The superficial deposits beneath much of the Study Area are classed as being Secondary (undifferentiated) Aquifers which indicates a very low risk of groundwater emergence.

### Surface water flood risk

- 7.4.47 The Environment Agency Risk of Surface Water Flooding map<sup>226</sup> shows that there are areas at risk of surface water flooding throughout the Study Area. These are particularly associated with low lying areas around watercourse, urban areas, localised depressions and areas of managed drainage.
- 7.4.48 The Cheshire West and Cheshire County Council Strategic Flood Risk Assessment (SFRA) (2016)<sup>227</sup> states that based on the Flood Map for Surface Water, surface water flooding is prevalent across the Borough over the flat ground where surface water is able to accumulate and the higher ground of the central area of the Borough is much less at risk.

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<sup>224</sup> St Helens Council (2011). Preliminary Flood Risk Assessment. (online). Available at: <https://www.sthelens.gov.uk/media/2713/st-helens-pfra.pdf> (Accessed 26 November 2021).

<sup>225</sup> Cheshire West and Chester Council (2017). Preliminary Flood Risk Assessment. (online). Available at: [PFRA \(publishing.service.gov.uk\)](https://publishing.service.gov.uk) (Accessed 26 November 2021).

<sup>226</sup> Environment Agency (2021). Long term flood risk service. (online). Available at: <https://check-long-term-flood-risk.service.gov.uk/map> (Accessed 22 November 2021).

<sup>227</sup> Cheshire West and Cheshire County Council (2016). Strategic Flood Risk Assessment, (online). Available at: <https://consult.cheshirewestandchester.gov.uk/portal/cwc/ldf/cw/lp/part-two/ev-base/sfra-2016?tab=files> (Accessed 18 November 2021).

- 7.4.49 The Cheshire East SFRA<sup>228</sup> states there the overall risk of surface water flooding is moderate, this is due to the flat level of the topography and number of culverted ordinary watercourses in urban areas.
- 7.4.50 The Manchester City, Salford City and Trafford Council SFRA Level 2<sup>229</sup> states that the Trafford South Critical Drainage Area has a number of dispersed surface water hotspots. Though these are not within the Study Area, they are upslope and may contribute to increased surface water flows in downslope areas.
- 7.4.51 The St Helens SFRA<sup>230</sup> states that surface water flooding can occur anywhere in the St Helens Borough where ground levels and profiles cause surface water to flow and accumulate, however they are yet to produce a Surface Water Management Plan and are awaiting further information regarding the areas surface water risk. The St Helens PFRA<sup>224</sup> has identified that there have been no recorded historically significant harmful consequences from surface water flooding.

### Artificial flood risk

- 7.4.52 The Environment Agency's Long Term Flood Risk map<sup>226</sup> indicates that there is some risk of reservoir flooding along many of the watercourses within the Study Area. The map also indicates that there would be extensive reservoir flooding which coincide with fluvial flood zones in the Study Area.
- 7.4.53 Due to its predominantly rural setting, sewer flooding records should not be needed for the whole of the Study Area. However, where the Study Area intersects more urban areas, records of sewer flooding will be requested from United Utilities.
- 7.4.54 There are also several canals which intersect the Study Area, including the Manchester Ship Canal. Information on canal flooding will be requested from the Canal and Rivers Trust (CRT) and Peel Ports.

### Future baseline

#### Climate change

- 7.4.55 As a result of climate change, it is predicted that winters will become generally wetter and summers generally drier. It is also likely that peak rainfall intensities could increase and that the magnitude of flood events could also increase as a consequence. The Environment Agency provides guidance<sup>206</sup> on the potential future increases in river flood flows and extreme rainfall intensity to guide flood

<sup>228</sup> JBA Consulting (2013). Cheshire East Council Strategic Flood Risk Assessment Final Report. (Online) Available at: <https://www.cheshireeast.gov.uk/pdf/planning/spatial-planning/researchand-evidence/strategic-flood-assessment/cheshire-east-council-sfra-final-report-v4.0.pdf> (Accessed December 2021).

<sup>229</sup> Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA. (online). Available at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/manchester-salford-and-trafford-councils-level-2-hybrid-sfra-level-1-sfra-march-2011.pdf> (Accessed 18 November 2021).

<sup>230</sup> JBA Consulting (2014). St Helens Council Strategic Flood Risk Assessment Final Report. (online) Available at: <https://www.sthelens.gov.uk/media/329412/flo001-st-helens-council-strategic-flood-risk-assessment-2014.pdf> (Accessed December 2021).

management scheme design. The potential increase in these parameters that should be designed for is dependent on the development's expected lifetime.

7.4.56

The Environment Agency Guidance<sup>206</sup> states that for essential infrastructure the higher central climate change allowances should be used for both the design, and when assessing safe access and egress. The Study Area covers three different management catchments and within each of these the peak river flows have varying amounts of potential change (**Table 7.7**). The Environment Agency have also provided guidance on the potential future increases in peak rainfall intensity in small catchment or urban drainage catchments, included in **Table 7.8**. These values are provided for the whole of England and both the central and upper end allowances will need to be taken account of in the design of sustainable drainage and flood risk from pluvial flooding.

**Table 7.7 Environment Agency peak river flow climate change allowances**

Allowance category	Potential change anticipated for the 2020s	Potential change anticipated for the 2050s	Potential change anticipated for 2080s
<b>Peak river flows – Weaver Goway Management Catchment</b>			
Central	19%	24%	36%
Higher central	30%	40%	64%
Upper	52%	67%	106%
<b>Peak river flows – Lower Mersey Management Catchment</b>			
Central	18%	22%	32%
Higher central	27%	35%	55%
Upper	44%	57%	90%
<b>Peak river flows – Upper Mersey Management Catchment</b>			
Central	13%	17%	27%
Higher central	22%	31%	51%
Upper	41%	53%	85%

**Table 7.8 Environment Agency peak rainfall intensity allowances for England**

Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper End	10%	20%	40%
Central	5%	10%	20%

7.4.57 The Environment Agency also provides guidance on climate changed induced future sea level rise<sup>206</sup>. This can be seen in **Table 7.9**; as the whole of the Study Area is within the north-west river basin district, only these predicted sea level rises have been included. This will need to be accounted for in the design of the Project in low lying areas adjacent to tidal waterbodies as the design is refined and all specific elements are assessed. As the Project is a Nationally Significant Infrastructure Project, the Environment Agency Guidance requires that the H++ credible maximum scenario for sea level rise (1.9m for the total sea level rise to 2100) will also need to be assessed, along with sensitivity test allowances for offshore wind speed and extreme wave height and an additional 2mm for each year on top of sea level allowances from 2017 for storm surge.

**Table 7.9 Environment Agency sea level allowances for the North West river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline)**

Allowance category	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (m)
Higher central	4.5 (158)	7.3 (219)	10 (300)	11.2 (336)	1.01
Upper end	5.7 (200)	9.9 (297)	14.2 (426)	16.3 (489)	1.41

Note: the total sea level rise for each epoch is in brackets

**Land use change**

7.4.58 Land use change can affect the permeability of the ground, which can affect surface water run-off. Given that much of the land within the Study Area is currently used for agriculture, it is unlikely that the future run-off regime will change significantly within the Study Area. However, there may be further urban expansion within some of these areas which would result in an increase in surface water runoff. However, all development will be required to utilise SuDS in order to manage the rates and volumes of runoff to no greater than pre-development levels, and as such this is not expected to pose a significant change in runoff within the Study Area.

**WFD change**

7.4.59 Given the current Ecological Status/Potential of all the WFD surface waterbodies within the Study Area is Less Than Good, and all of the Groundwater bodies are Poor, it is anticipated that in future their status will improve, ultimately to one of Good Status/Potential, as required by the WFD.

7.4.60 It may be appropriate to assess construction related effects against the existing baseline surface water environment, however potential operational effects should take account of a future baseline environment that assumes Good Ecological Status/Potential will be attained during the lifetime of the Project. This is because the WFD is still in effect and requires progression towards Good Ecological Status/Potential within that timeframe.

**7.5 Embedded environmental measures**

7.5.1 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on the water environment (see **Table 7.10**). These will evolve over the development process as the EIA progresses and where appropriate in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements.

**Table 7.10 Relevant water environment embedded environmental measures**

<b>Environmental measure</b>	<b>How the environmental measures will be secured</b>
<b>A Code of Construction Practice (CoCP) would be adopted to minimise disturbance and/or pollution to the water environment and would provide details of measures to protect environmental receptors.</b>	CoCP and Development Consent Order (DCO) requirement
<b>The pipeline will be, where possible, completely buried underground, and will therefore have no effect on surface runoff pathways and flood conveyance/storage in flood zone areas once completed.</b>	DCO works plans, description of development and requirements
<b>At sensitive crossing locations the working width will be reduced as far as practicable.</b>	DCO works plans, description of development and requirements
<b>All watercourses, railways and roads that form part of the Strategic Highways Network will be crossed by HDD or other trenchless technology where this represents the best environmental solution and is financially and technically feasible.</b>	DCO works plans and order limits

Environmental measure	How the environmental measures will be secured
<p>Where practical, sensitive sites will be avoided by the temporary and permanent Project footprint, including SSSIs, the Mersey Estuary RAMSAR/SPA, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, Royal Society for the Protection of Birds (RSPB) reserves, Local Nature Reserves, Local Wildlife Sites, National Trust Land, Listed Buildings and Scheduled monuments.</p>	<p>DCO works plans and order limits</p>
<p>During construction and operation, refuelling of machinery will be undertaken within a designated area where spillages can be easily contained. Any tanks and pipework will be double-skinned and provided with intermediate leak detection equipment. Areas at risk of spillage will be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or local watercourses.</p>	<p>CoCP and DCO requirement</p>
<p>No blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods.</p>	<p>CoCP and DCO requirement</p>
<p>During construction topsoil and subsoil will be stored within the temporary working corridor of the pipeline corridor. The topsoil and subsoil will be stored in separate stockpiles in line with industry best practice, i.e. Defra 2009 CoCP for the Sustainable Use of Soils on Construction Sites PB13298, to prevent silty runoff contaminating local surface waters. Any suspected or confirmed contaminated soils will be separated, contained and tested before removed (if required).</p>	<p>CoCP and DCO requirement</p>
<p>In areas (or during periods of adverse weather) there may be the requirement to import aggregates to create a stable surface for construction traffic movements. Options such as bog-matting and geotextiles will be considered by the principal contractor for sensitive sections of the route to reduce impact habitats and excess runoff into local surface waters.</p>	<p>CoCP and DCO requirement</p>
<p>Where HDD techniques are not required or are not practical, the crossing of drainage ditches or engineered channels maybe crossed by open cut techniques or the installation of culverts or bridges to</p>	<p>CoCP and DCO requirement</p>

Environmental measure	How the environmental measures will be secured
<p>allow water to continue flowing. Where this is the case this will be done in accordance with advice notes, guidance documents and Environment Agency Pollution Prevention Guidelines (PPGs). Appropriate environmental permits or land drainage consents will be applied for works from the Environment Agency (e.g. for Main Rivers, works on or near sea defences/flood defence structures or in a flood plain) or from the Lead Local Flood Authority (for ordinary watercourse crossings). Appropriate temporary site drainage and sediment management will be provided at temporary watercourse crossings and fluming and overpumping, during construction activities, undertaken as necessary.</p>	
<p>A crossing schedule will be prepared which includes crossing methodology for each crossing of road, rail, canal, public right of way and watercourse.</p>	<p>CoCP and DCO requirement</p>
<p>The pipeline will be constructed in stages discrete sections and are constructed within the pipeline “spread” or temporary working width which is a corridor of land extending along the route. The trenches will be excavated, the pipe will be laid, the trenches backfilled and the reinstatement process commenced. Pipeline construction typically starts in the spring and each of the construction activities can advance at approximately (typically 500m to 1km per day), with successive activities following behind. Pipe laying is normally planned to be complete by the autumn.</p>	<p>CoCP and DCO requirement</p>
<p>Vegetation will be retained where possible to minimise ground disturbance and reduce changes in runoff rates and generation of excess suspended sediments.</p>	<p>DCO works plans and CoCP and DCO articles/requirement</p>
<p>Where possible micro-siting will be undertaken during detailed design to avoid all ponds.</p>	<p>CoCP and DCO requirement, DCO works plans</p>
<p>All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2007.</p>	<p>CoCP and DCO requirement</p>
<p>Following construction compounds will be returned to the standard stipulated by the landowner and the relevant Local Planning Authority.</p>	<p>CoCP and DCO requirement</p>

Environmental measure	How the environmental measures will be secured
<p>Particular care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. Temporary cut-off drains will be installed parallel to the trench-line, before the start of construction, to intercept soil and groundwater before it reaches the trench. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release. If the dewatering of trenches is required, e.g. in the event that groundwater is present, further design and an assessment process will consider the risks, potential dewatering methods and associated good practice measures.</p>	<p>CoCP and DCO requirement</p>
<p>The depth and width will vary with pipeline diameter but will allow a minimum reinstated cover of 1.2m over the top of the pipeline. Deeper trenches may be required at specific crossing locations (such as watercourses). In sensitive areas, the amount of topsoil removed will be the width of the trenches only rather than across the entire temporary construction corridor. Also the material excavated will be stored separately from the topsoil to avoid mixing.</p>	<p>CoCP and DCO requirement</p>
<p>Site access tracks will be based on the particular conditions at the access point. This can vary from stripping the topsoil to allow vehicles to run on the subsoil, to use of bogmats or laying a thickness of crushed stone on a geotextile membrane. Geotextiles or other membranes may be used to temporarily control and minimise erosion or transport of sediment from construction sites in areas that are considered unprotected.</p>	<p>CoCP and DCO requirement</p>
<p>Drainage infrastructure and control of overland flow pathways. Drainage design to manage and, if necessary, treat surface water run-off will be included in all elements of temporary and permanent infrastructure. Drainage design will follow the SuDS hierarchy with preference being given to local infiltration of surface water run-off from new areas of hardstanding, where possible. Where the development intersects overland flow pathways or areas of known surface water flooding appropriate measures will be embedded into the design.</p>	<p>CoCP and DCO requirement</p>



Environmental measure	How the environmental measures will be secured
<p><b>Management of subsurface flow pathways. All subsurface infrastructure will be designed to facilitate subsurface flow pathways to avoid any localised increases in groundwater flooding.</b></p>	<p>CoCP and DCO requirement</p>
<p><b>Interaction with areas of significant flood risk. Construction and permanent development in floodplains these areas will be avoided wherever possible. Where this is not possible (for example, at major watercourse crossings) mitigation will be developed to ensure the works are National Planning Policy Framework (NPPF) compliant. Any works in areas of significant flood risk will only be undertaken in line with the NPPF exception and sequential tests.</b></p>	<p>CoCP and DCO requirement</p>
<p><b>Pollution control strategy. In line with good practice, pollution prevention plans will be drawn up to detail how ground and surface waters will be protected in construction and operation. These will include information on the storage of any fuels, oils and other chemicals and pollution incidence response planning. These will include measures for the protection of licenced and private abstractions. This could include a monitoring regime associated with critical or very proximate receptors.</b></p>	<p>CoCP and DCO requirement</p>
<p><b>Management of dewatering activities. Dewatering of excavations will be undertaken in line with good practice. Effects of dewatering on potential receptors will be incorporated into the proposed approaches for each piece of infrastructure. Appropriate treatment will be installed before discharge to surface or groundwater; this may include the use of siltbusters (or similar) before discharge to surface waters, if required. Appropriate licences and permits will be applied for.</b></p>	<p>CoCP and DCO requirement</p>
<p><b>Measure related to the provision of alternative water supplies. Licensed and private water supplies will be avoided where practicable; if any impacts are anticipated then appropriate measures will be put in place to avoid impact on the quantity and quality of the supply.</b></p>	<p>CoCP and DCO requirement</p>
<p><b>To minimise the potential for impacts to watercourses, a stand-off distance from all watercourses/waterbodies will be established (with</b></p>	<p>CoCP and DCO requirement</p>

Environmental measure	How the environmental measures will be secured
<p>the exception of crossings and where existing field access roads are already located adjacent to watercourses are to be utilised). Where possible, works within 8m of a Main River banktop and for non-tidal; 16m for a tidal Main River, will be minimised to reduce the number of Flood Risk Activity Permits (FRAP) required. Typically, LLFAs and IDBs do not specify standoff distances as a requirement for Ordinary Watercourse Consents (OWC), however, these vary between the local administrations and will be reviewed when available</p>	
<p>Pre-commissioning testing abstraction licences/discharge permits and regulatory approval for abstraction and discharge. Environmental good practice applying temporal and percentage river volume flow abstraction restrictions/limits. Treated test water safely transferred, neutralised and stored prior to disposal/discharge.</p>	<p>CoCP and DCO requirement</p>

7.5.2 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the assessment.

## 7.6 Scope of the Assessment

### Study Area

7.6.1 The Study Area for the Water environment assessment is based on the Scoping red line boundary plus buffers of 250m, enlarged to 500m around HAGI search areas (see **Figure 7.1**). The buffers are based on previous experience and professional judgement on the likely zone of influence on the water environment from the associated works. The variation in distance is based on the depth of intrusive works likely to be undertaken.

7.6.2 The Study Area will be reviewed and amended in response to such matters as refinement of the Project design and the identification of additional impact pathways, and also in response where appropriate to feedback from consultation.

### Potential receptors

7.6.3 The baseline characterisation identifies potential hydrology and flood risk receptors (**Figure 7.7**), covered under the water environment assessment, within the following three broad receptor types:

- Aquatic environment receptors;
- Water resources receptors; and
- Flood risk receptors (people, property, and infrastructure at risk of flooding).

7.6.4 Considered within the water environment assessment are:

- The WFD surface water bodies (river and transitional) which are intersected by, and are downstream of the Study Area (see **Figure 7.1**); and
- The WFD groundwater bodies which the Study Area intersects (see **Figure 7.1**).

7.6.5 Each of these receptor types are discussed in this section.

### *Aquatic environment receptors*

7.6.6 Aquatic environment receptors are defined within this assessment as either WFD surface water bodies or water-dependent designated nature conservation sites. The basic unit for identification of aquatic environment receptors is WFD surface water bodies, as defined in the Environment Agency's Cycle 2 RBMPs.

7.6.7 The assessment will consider the potential effects on the water quality and hydromorphology supporting elements of WFD ecological status. The biological elements of ecological status for river water bodies (macroinvertebrates and fish) will not be part of future water environment assessments within the EIA. However, the potential for indirect effects on biology elements, which could occur as a direct result of changes to the water quality or the hydromorphology of a water feature will be identified within this chapter and part of the future biodiversity assessment, if required. Direct effects on fish populations and other water dependent protected species (for example as a result of light, noise or vibration) will also be addressed under **Chapter 5: Ecology**.

7.6.8 WFD chemical status will also be considered as part of the assessment of effects on the water environment. Whilst it is unlikely that the Project would result in new emissions of priority substances or priority hazardous substances into the environment, it is possible that construction works could lead to the disturbance of existing sources of pollution. If required, the assessment of potential effects from such impacts would be reported within the future Ground Conditions chapter at PEIR and ES.

7.6.9 WFD monitoring and classification data are typically derived from the principal watercourses within the catchment (the so-called 'blue line' watercourses). It should be noted however that within the assessment all watercourses within WFD catchments would be considered to ensure that any potential effects are captured and managed to an acceptable level for all catchment receptors.

7.6.10 The EIA will be supported by a standalone WFD compliance assessment, which will consider impacts of the Project on compliance for both surface and groundwater bodies.

7.6.11 The potential for impacts on the supporting water quality and hydromorphology for freshwater dependent sites will also be considered. This includes all sites that are internationally and nationally designated for nature conservation purposes (i.e.

SAC, SPA, Ramsar Sites, SSSI and National Nature Reserves (NNR)); and local nature conservation designations (i.e. Local Nature Reserves (LNR) and County Wildlife Sites (CWS)). In this context, the potential surface water dependence, and consequent impacts on water quality and hydromorphology arising from the Project will be considered in respect of the condition and conservation objectives of each designated site.

### Water resources receptors

- 7.6.12 Water resources receptors are defined within this scoping chapter as surface water and groundwater abstractions including their associated catchment areas. The potential for impacts on water quality and water balance/flow regime in the catchments upstream of abstraction locations will be assessed in order to determine potential effects on the abstractions themselves. The future assessment of abstractions will consider both those from surface water and groundwater sources. Any groundwater level and water quality impacts on WFD groundwater bodies will be assessed within the future EIA under the water environment topic.
- 7.6.13 Discharges to surface water will also be considered, although there is little scope for effects of the Project during construction on discharges, apart from direct physical impingement, which will be avoided through imposition of suitable stand-off distances between working areas and discharge infrastructure. During pre-commissioning testing all necessary permits/licences for abstraction and discharge to the environment will be sought. Chemically treated test water will be safely transferred, neutralised and stored prior to disposal/discharge.

### Flood risk receptors

- 7.6.14 Flood risk receptors are defined as property and infrastructure that could be at risk of flooding. Their sensitivity is defined in terms of the flood risk vulnerability classification set out in Table 2 of the Planning Practice Guidance on Flood Risk and Coastal Change<sup>231</sup> that supports the NPPF. It is recognised that the primary purpose of the NPPF flood vulnerability classification is to guide flood risk assessment requirements for new development, but it is also considered to be a useful tool for assessing the relative sensitivity of external receptors for flood risk effects from new development. Further detail regarding the identification of flood risk receptors will be set out in the Flood Risk Assessment (FRA).

### Likely significant effects

- 7.6.15 As required by the EIA Regulations 2017, the EIA will consider those impacts where there is a risk of a likely significant effect only. The interpretation of current water environment constraints are shown within **Figure 7.8**. The following section draws on industry experience and expertise to identify those source-receptor pathways for effects that may potentially lead to a significant impact. Where experience and available evidence indicates a source-receptor pathway effect that

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<sup>231</sup> UK Government: Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2021). Guidance: Flood risk and coastal change (online). Available at <https://www.gov.uk/guidance/flood-risk-and-coastal-change> (Accessed 22 November 2021).

will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is 'scoped out' from assessment.

- 7.6.16 The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for 'scoping out' certain effects, and therefore not considering them further in the EIA, is presented in **Section 7.6**.
- 7.6.17 The scoping assessment is based on a combination of the project definition (as defined in **Chapter 2: The Project**), current understanding of the baseline conditions, embedded environmental measures, the existing evidence for water environment effects and professional judgement.
- 7.6.18 Potential effects on the water environment are most likely to be generated during the construction phase. The effects on the water environment receptors from the construction and operation of the Project, which have the potential to be significant, and have been taken forward for detailed assessment are summarised in **Table 7.11**.

**Table 7.11 Likely significant Water Environment effects**

Activity	Effect	Receptor
<b>Construction Phase</b>		
<b>Construction activities, e.g. topsoil stripping, excavations and watercourse crossings</b>	Deterioration in the water quality of aquatic environment receptors via generation of sediment laden run-off.	Aquatic environment receptors and water resource receptors
<b>The accidental spillage of pollutants (e.g. fuel or oil)</b>	Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance (including from new watercourse crossings).	
<b>Subsurface interactions (excavation/ piling and drilling)</b>	Deterioration in the water quality of aquatic environment receptors affected by pollutant spills.	
	The potential effects noted above for surface water aquatic environment	

Activity	Effect	Receptor
	<p>receptors could also have implications for surface water resource availability.</p> <p>Deterioration in groundwater quality and/or groundwater levels via the contamination of the groundwater environment.</p>	
<p><b>Construction activities, e.g. creation of temporary access tracks and working areas, watercourse crossings, excavations and soil stockpiling</b></p>	<p>Changes to fluvial flood risk associated with loss of floodplain storage and/or change in floodplain flow conveyance.</p>	<p>Flood risk and building development receptors</p>
<p><b>Ground disturbance and creation of impermeable surfaces</b></p>	<p>Changes to fluvial flood risk associated with compartmentalisation of the floodplain.</p> <p>Changes to watercourse flow conveyance. This has the potential not only to affect the morphology of aquatic environment receptors, but to increase the risk of flooding to flood risk receptors.</p>	
<p><b>Spill or leakage of fuels/chemicals during periodic maintenance and refurb activities. These activities are unlikely to require heavy plant, or excavations or the need to construct new temporary access roads</b></p>	<p>Changes to surface water flood risk due to changes in runoff rates</p> <p>Deterioration in the water quality of aquatic environment receptors.</p> <p>The potential effects noted above for surface water aquatic environment receptors could also have implications for surface</p>	<p>Aquatic environment receptors and water resource receptors</p>

Activity	Effect	Receptor
<b>Testing and pre-commissioning</b>	water resource availability.	Aquatic environment receptors and water resource receptors
	Deterioration in the water quality of aquatic environment receptors affected by surface water discharge.	
	The potential effects noted above for surface water aquatic environment receptors could also have implications for surface water resource availability.	

- 7.6.19 Given the nature of the Project, once the specific infrastructure locations are known and taking into account the embedded environmental measures, construction activities are not anticipated to give rise to any significant effects on aquatic environment or water resource receptors.
- 7.6.20 If flood modelling is required for any areas, then a detailed assessment will be undertaken to support the FRA.

**Impacts scoped out of assessment**

- 7.6.21 At this early stage, few potential effects have been ‘scoped out’ from further assessment resulting from a conclusion of no likely significant effect. However, based on the knowledge of the baseline environment, the nature of planned works and existing best practice, and the evidence from other large infrastructure projects the operation and maintenance activities would not involve dewatering works and therefore no impact on groundwater levels is anticipated.
- 7.6.22 Further to this given the only surface manifestation of the Project will be the HAGIs, if these are constructed to be NPPF compliant there should be no flood risk issues. With embedded mitigation in place and no routine discharges and/or dewatering operations, there is minimal chance of leakage of hazardous substances to impact surface or groundwater quality. The construction of HAGIs within Flood Zones 2 and 3 would be avoided as far as possible, and where this cannot be avoided, suitable flood risk mitigation measures would be specified in the FRA. Therefore, the operational phase of the Project has been scoped out of this assessment.

7.6.23 As stated in **Chapter 2: The Project**, decommissioning of the Project is scoped out from detailed assessment and has therefore not been considered further.

## 7.7 Assessment Methodology

### Introduction

7.7.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the water environment assessment. Cumulative effects on the water environment resulting from the Project and other developments will also be assessed.

### Significance evaluation methodology

7.7.2 The significance level attributed to each effect will be assessed based on the 'sensitivity' of the affected receptor and the magnitude of change resulting from the development. The level of significance is then determined by the combination of receptor sensitivity and magnitude of change.

7.7.3 Receptor sensitivity is assessed on a scale of high, medium, low and very low, whilst magnitude of change is assessed on a scale of high, medium, low and negligible. The criteria for defining sensitivity and magnitude can be found in

7.7.4 **Table 7.12** and **Table 7.13**, along with example applications. These criteria are defined and applied based on professional judgement, using recognised approaches to classification relevant to the receptor types, including WFD, the NPPF and Design Manual for Roads and Bridges (DMRB), all of which represent good practice for water environment assessments within EIAs.

### Sensitivity of receptor

7.7.5 Definitions of receptor sensitivity used in the assessment are provided in **Table 7.12**, with examples of receptors that would be placed in each class.

**Table 7.12 Definitions of receptor sensitivity**

Sensitivity	Criteria	Examples
High	<p>Aquatic environment feature with a high quality and rarity at an international scale, with little potential for substitution.</p> <p>Water resources supporting human health and economic activity at a regional scale.</p>	Conditions supporting sites with international conservation designations (SAC, SPA, Ramsar sites), where the designation is based specifically on aquatic features.



Sensitivity	Criteria	Examples
	Property and infrastructure with a very high vulnerability to flooding.	<p>High status WFD water bodies (main 'blue line'<sup>232</sup> watercourse and all smaller tributary watercourses not on 'blue line').</p> <p>Regionally important public surface water supplies.</p> <p>Large-scale permitted discharges (e.g. city-scale Wastewater Treatment Works (WWTW) treated effluent discharges).</p> <p>Infrastructure classified in Table 2, Flood risk vulnerability classification, of the NPPF Planning Practice Guidance as 'Essential infrastructure' or the emergency service infrastructure categorised as 'Highly vulnerable'. This includes electricity generating power stations and grid and primary substations as well as essential transport infrastructure. Emergency service infrastructure includes police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.</p>
<b>Medium</b>	<p>Aquatic environment feature with a high yield and/or quality and rarity at a national scale, with a limited potential for substitution.</p> <p>Water resources supporting human health and economic activity at a local scale.</p>	<p>Conditions supporting sites with national conservation designations (e.g. SSSI, NNR) where the designation is based specifically on aquatic features.</p> <p>Any designated WFD surface waterbody at less than High WFD Status (main 'blue line' feature within waterbody catchment).</p> <p>Local public surface water supplies. Licensed non-public surface water supply abstraction which are large</p>

<sup>232</sup> The WFD "blue line" network can be used to determine if a watercourse is significant. Environment Agency (2012). Water Quality Planning: no deterioration and the Water Framework Directive. (online) Available at: [http://www.fwr.org/WQreg/Appendices/No deterioration and the WFD 50 12.pdf](http://www.fwr.org/WQreg/Appendices/No_deterioration_and_the_WFD_50_12.pdf) (Accessed 22 November 2022).

Sensitivity	Criteria	Examples
	Property and infrastructure with a high vulnerability to flooding.	<p>relative to available resource, or where raw water quality is a critical issue, e.g. industrial process water.</p> <p>Medium-scale permitted discharges (e.g. town-scale WWTW treated effluent discharges).</p> <p>Property and infrastructure classified in Table 2, Flood risk vulnerability classification, of the NPPF PPG defined as ‘Highly Vulnerable’ and ‘More Vulnerable’. Includes all residential premises (including hotels and caravan parks) public buildings (e.g. hospitals, schools, libraries, leisure centres), industrial premises (e.g. power stations, chemical plants, incinerators) and waste disposal sites requiring hazardous substances consent.</p>
<b>Low</b>	<p>Aquatic environment feature with a medium yield and/or quality at a regional scale, or good quality at a local scale, with some potential for substitution.</p> <p>Water resources supporting human health and economic activity at household/individual business scale.</p> <p>Property and infrastructure s with a moderate to low vulnerability to flooding.</p>	<p>Sites with local conservation designations (e.g. LNRs, County Wildlife Sites and Sites of Importance for Nature Conservation (SINCs)), where the designation is based specifically on aquatic features.</p> <p>Smaller tributary watercourses within the WFD waterbody not on main ‘blue line’ (for water bodies at good status or below)</p> <p>Licensed non-public surface water supply abstractions which are small relative to available resource, or where raw water quality is not important, e.g., cooling water, spray irrigation. Unlicensed potable surface water abstractions, e.g. private domestic water supplies.</p> <p>Small-scale permitted discharges (e.g. village-scale WWTW discharges)</p> <p>Property and infrastructure classified in Table 2, Flood risk vulnerability classification, of the NPPF Planning</p>

Sensitivity	Criteria	Examples
		Practice Guidance as ‘Less Vulnerable’. Includes general industrial, commercial, and retail premises, car parks, mineral extraction sites, and buildings used for forestry and agriculture.
<b>Very Low</b>	<p>Aquatic environment feature with a low yield and/or quality at a local scale, with good potential for substitution.</p> <p>Water resources that do not support human health, and of only limited economic benefit.</p> <p>Property and infrastructure that are resilient to flooding.</p>	<p>Small, artificial, or heavily modified watercourses with low habitat potential, e.g. agricultural, forestry or road-side drainage ditches.</p> <p>Unlicensed non-potable surface water abstractions, (e.g., livestock supplies).</p> <p>Small discharges exempt from permitting subject to adherence to general binding rules (e.g., package plants from small residential developments or commercial premises in rural areas).</p> <p>Infrastructure classified in Table 2, Flood risk vulnerability classification, of the NPPF Planning Practice Guidance as ‘Water Compatible’. This is infrastructure required in a fluvial, tidal, or coastal location and which is resilient to flooding (e.g., flood control infrastructure, water transmission infrastructure). Also, rural land such as forestry and agricultural land that does not contain any built development.</p>

**Magnitude of change**

7.7.6 The magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change, and relevant legislation, policy standards and guidance. **Table 7.13** provides examples of how various magnitudes of change could be determined with respect to water features.

Magnitude of change may be either positive or negative. The criteria and examples in **Table 7.13** focus on negative changes, but positive changes may also occur and will be considered on a case-by-case basis as required.

**Table 7.13 Definitions of magnitude of change**

Magnitude	Criteria	Examples
<b>High</b>	Results in complete loss or major change to feature, of sufficient magnitude to affect its use/integrity.	<p>Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant COs or non-temporary downgrading (deterioration) of WFD surface water body status (including downgrading of individual WFD elements), or resulting in the inability of the surface water body to attain Good status by the relevant deadline in line with the measures identified in the RBMP.</p> <p>Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of WFD groundwater body status, or the inability of the groundwater body to attain Good status in line with the measures identified in the RBMP.</p> <p>Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract.</p> <p>Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.</p>
<b>Medium</b>	Results in partial loss or noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances.	<p>Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of surface water body status (including potential temporary downgrading of individual WFD elements), although not affecting the ability of the surface water body to achieve future WFD objectives.</p> <p>Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of WFD groundwater body status, although not affecting the ability of the groundwater body to achieve future WFD objectives.</p> <p>Moderate reduction in water availability and/or quality, which may compromise the ability of the water user to abstract on a</p>

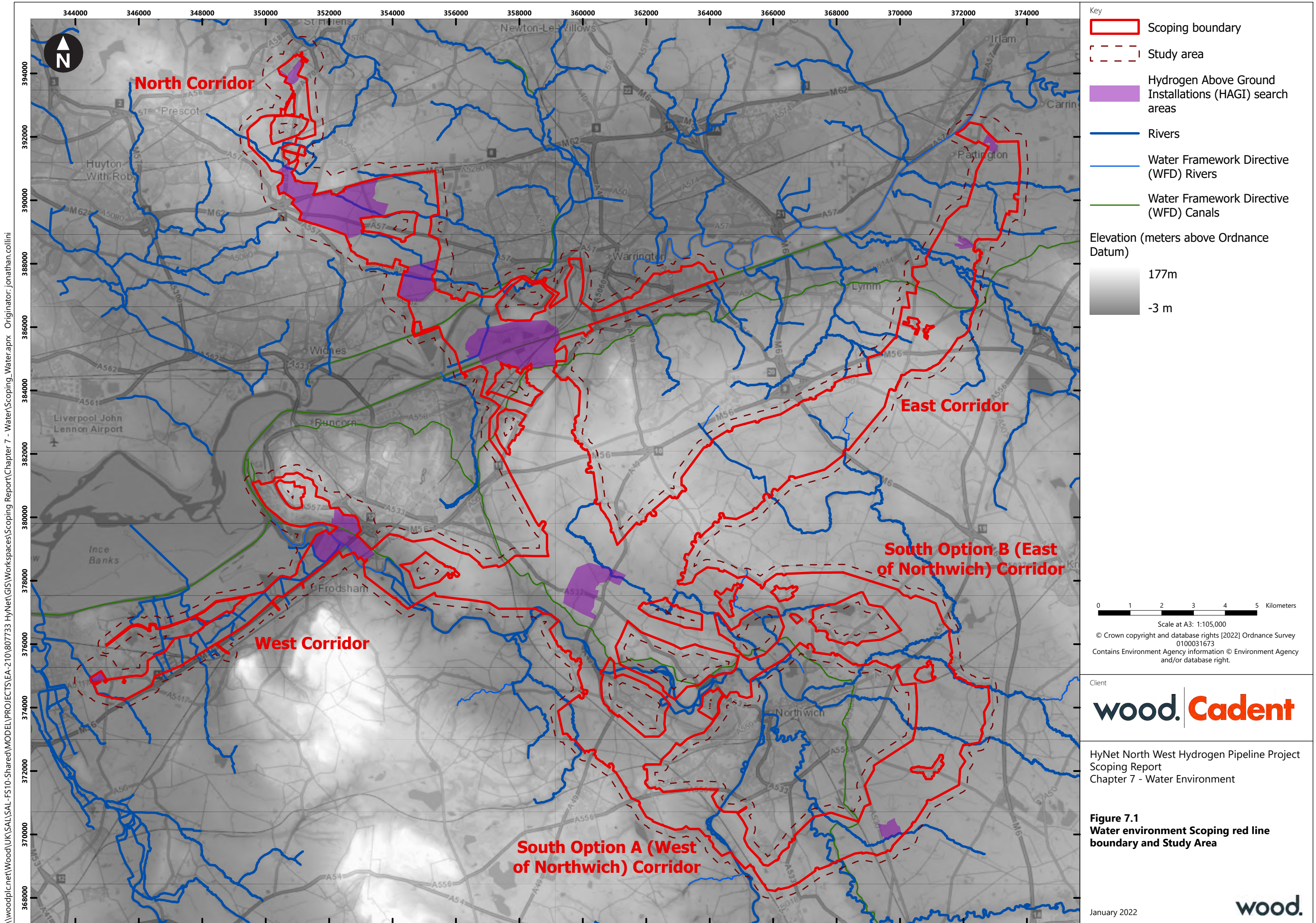
Magnitude	Criteria	Examples
<b>Low</b>	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances.	<p>temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used.</p> <p>Change in flood risk resulting in potential for moderate damage to the property or infrastructure.</p> <p>Measurable effect on river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term or permanent change to WFD surface water body status (of overall status or element status).</p> <p>Measurable effect on groundwater levels, flows or water quality, but with no short-term or permanent downgrading of WFD groundwater body status.</p> <p>Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract.</p> <p>Change in flood risk resulting in potential for minor damage to property or infrastructure.</p>
<b>Negligible</b>	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity	<p>No measurable effect on river flow regime, morphology or water quality, and no consequences in terms of COs or surface water body status.</p> <p>No measurable effect on groundwater levels, flows or water quality, and no consequences in terms of WFD groundwater body status.</p> <p>No measurable change in water availability or quality and no change in ability of the water user to exercise licensed rights.</p> <p>Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.</p>

7.7.7 During the assessment of effects for each identified receptor the sensitivity value in

7.7.8 **Table 7.12** will be combined with the magnitude of change from **Table 7.13** to produce an overall significance rating based on the evaluation matrix shown in **Table 7.14**. A ‘significant’ effect is assessed as a Major rating whereas a Moderate rating will be considered to be ‘potentially significant’ at this stage of the EIA process. The latter will be subject to further investigation as part of the PEIR and ES, following refinement of design information. This approach will be based on professional judgement and carried out on a precautionary basis.

**Table 7.14 Significance evaluation matrix**

		<b>Magnitude of change</b>			
		<b>High</b>	<b>Medium</b>	<b>Low</b>	<b>Negligible</b>
<b>Sensitivity</b>	<b>High</b>	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	<b>Medium</b>	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	<b>Low</b>	Moderate (Significant/Not Significant)	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)
	<b>Very Low</b>	Moderate (Potentially significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)



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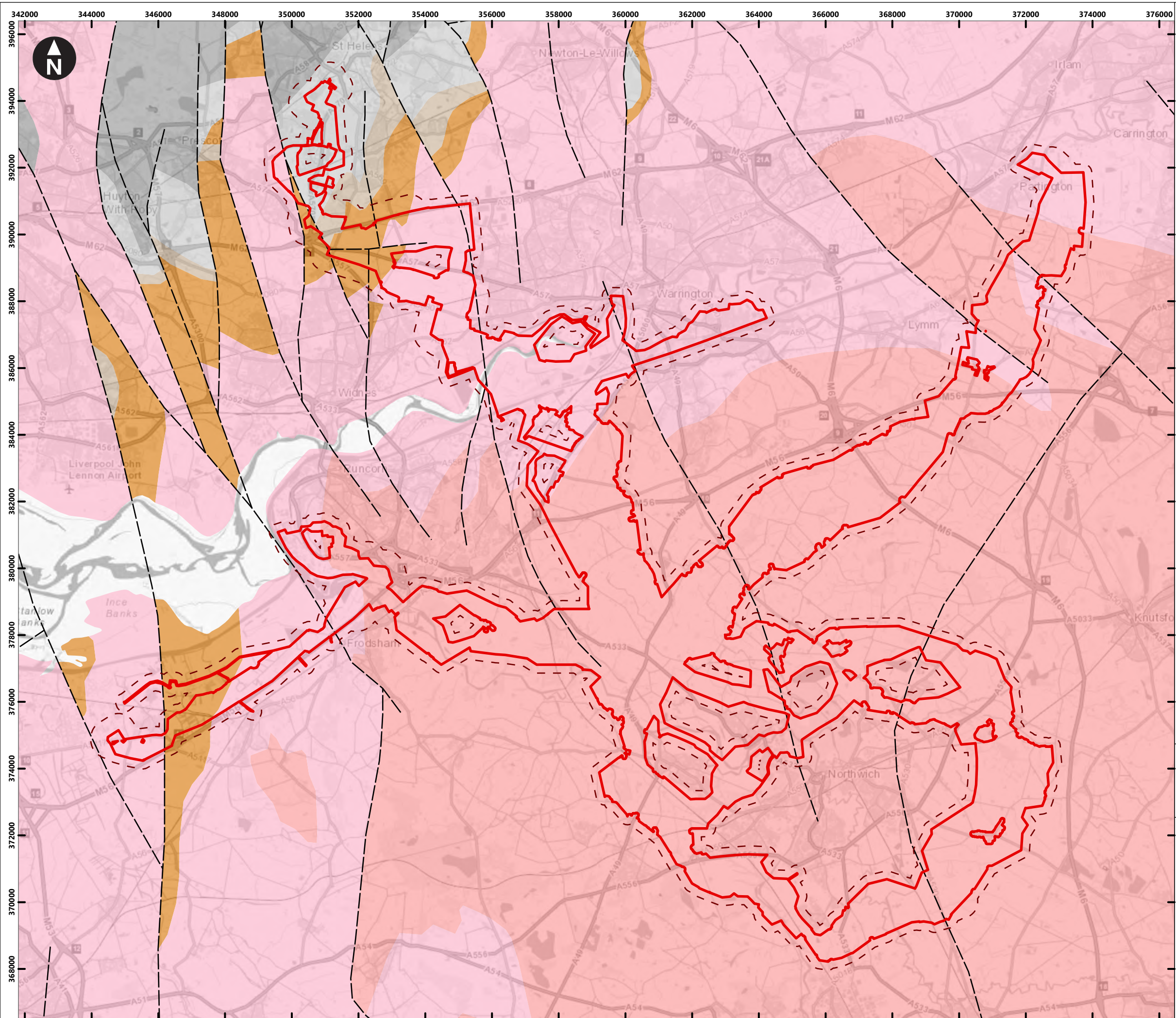
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**Figure 7.1**  
Water environment Scoping red line boundary and Study Area

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Key

- Scoping boundary
- Study area

**British Geological Survey (BGS)  
625K Bedrock Geology**

- Triassic Rocks (Undifferentiated) - Mudstone, Siltstone and Sandstone
- Triassic Rocks (Undifferentiated) - Sandstone and Conglomerate, Interbedded
- Permian Rocks (Undifferentiated) - Sandstone and Conglomerate, Interbedded
- Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation (Undifferentiated)
- Warwickshire Group - Siltstone and Sandstone with Subordinate Mudstone
- Pennine Lower Coal Measures Formation and South Wales Lower Coal Measures Formation (Undifferentiated)
- Faults

0 1 2 3 4 5 Kilometers

Scale at A3: 1:110,000

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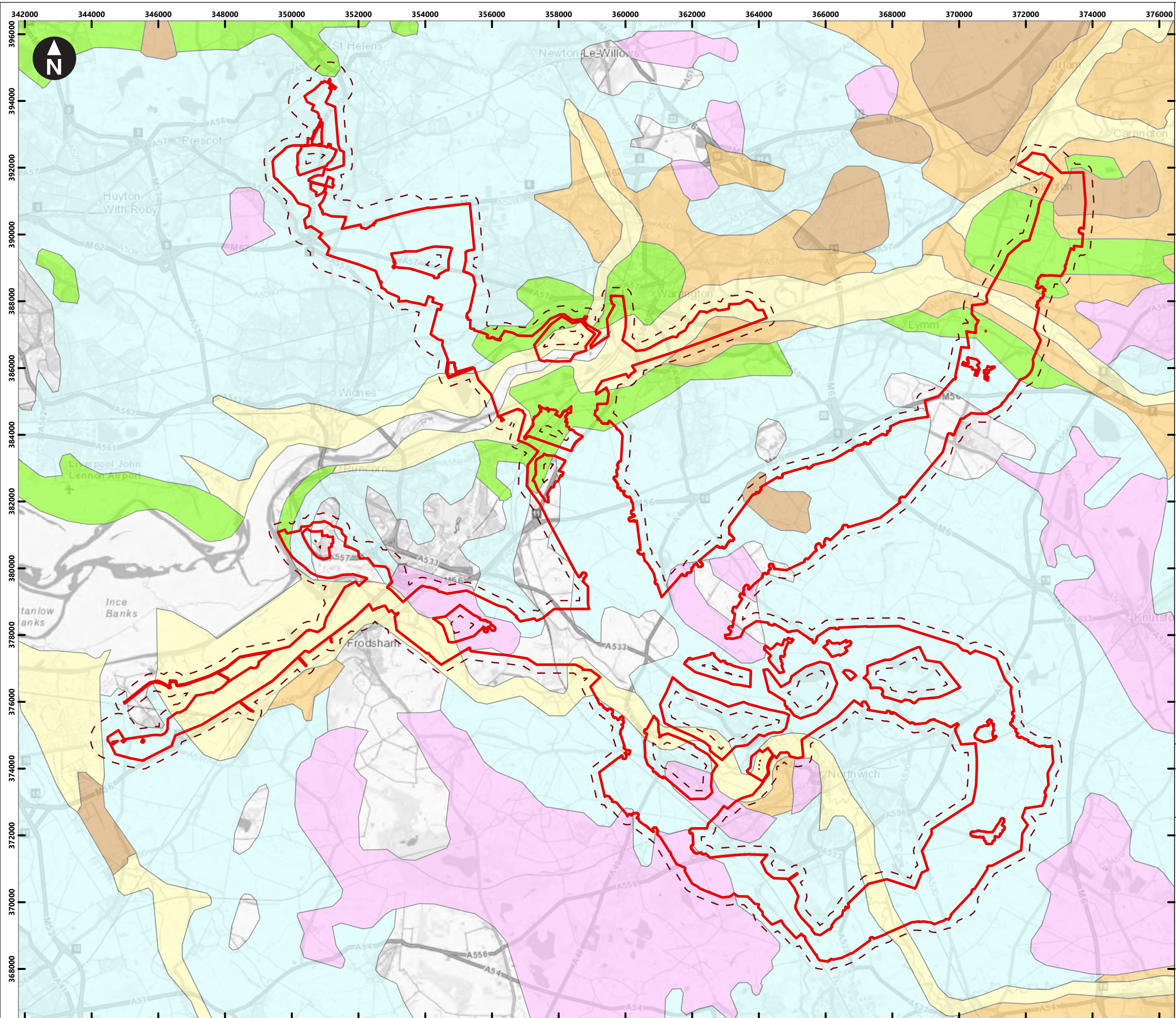
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**Figure 7.2  
Solid Geology**



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Key

- Scoping boundary
- Study area

**British Geological Survey (BGS) 625K Superficial Geology**

- Alluvium - clay, silt and sand
- Blown sand - sand
- Glacial sand and gravel
- Peat
- River terrace deposits - sand and gravel
- Till - diamicton

0 1 2 3 4 5 Kilometers

Scale at A3: 1:110,000

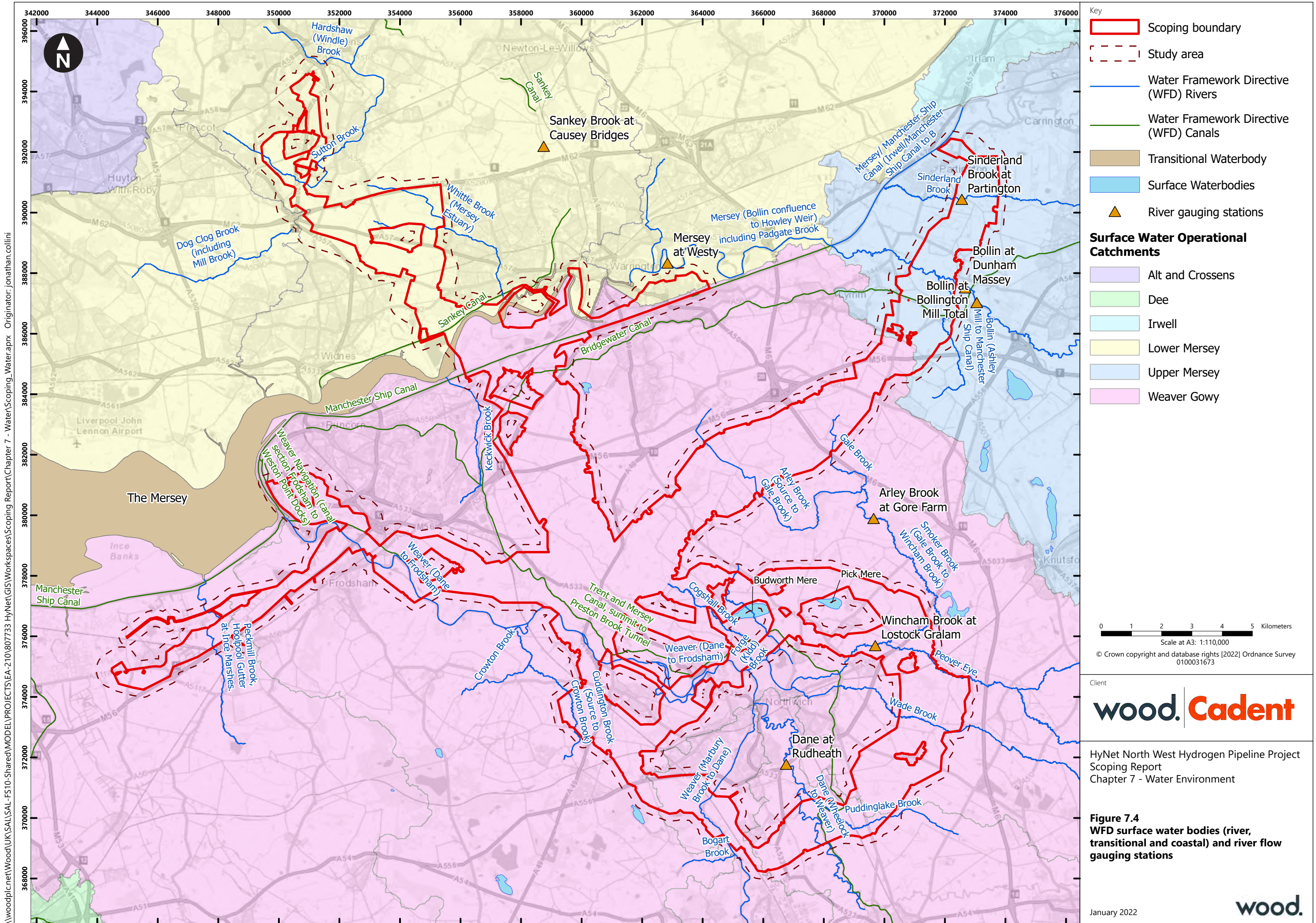
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**Figure 7.3**  
**Superficial Geology**



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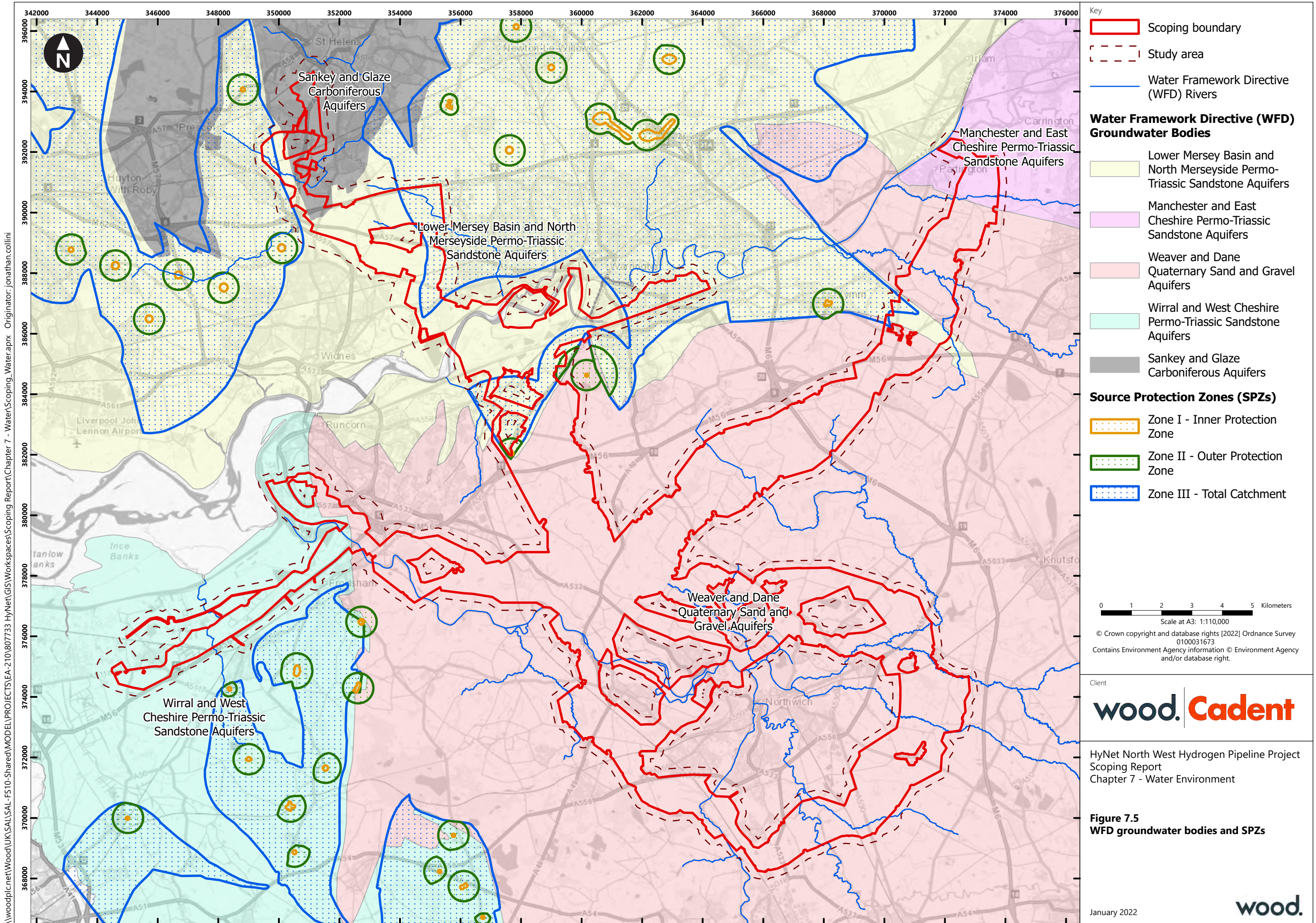
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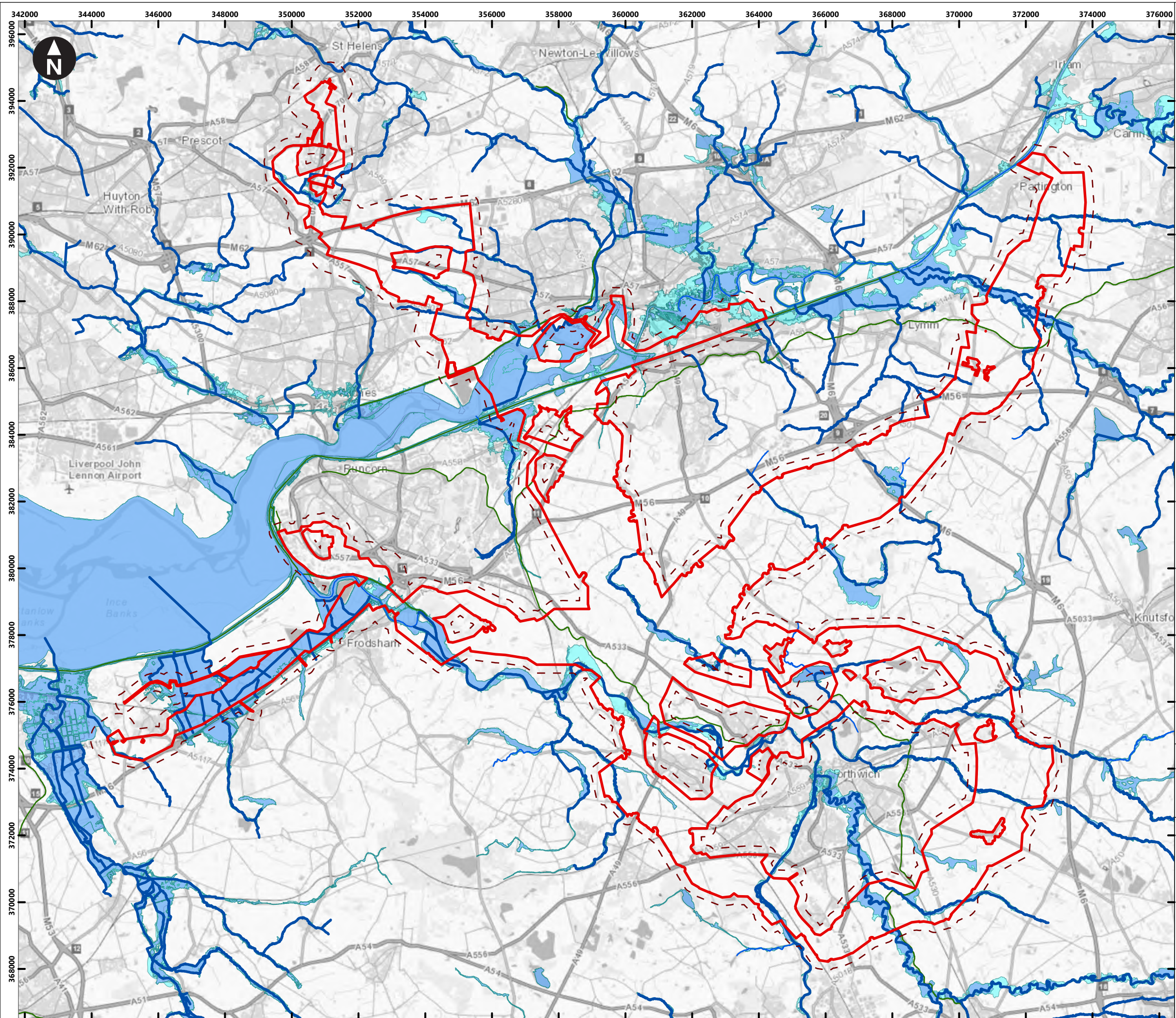
**Figure 7.4**  
**WFD surface water bodies (river, transitional and coastal) and river flow gauging stations**

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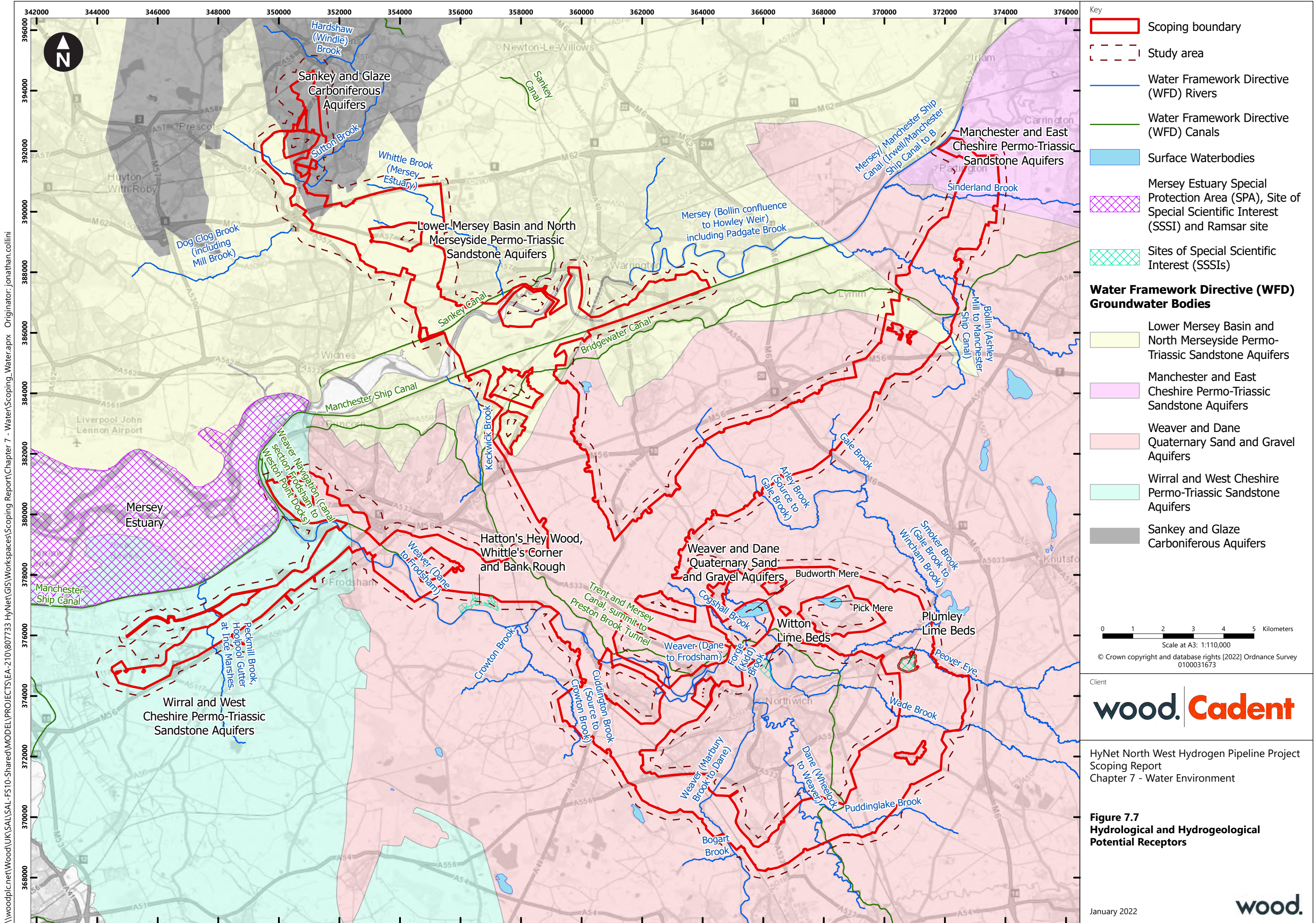
- Key
- Scoping boundary
  - Study area
  - Rivers
  - Water Framework Directive (WFD) Rivers
  - Water Framework Directive (WFD) Canals
  - Flood Zone 2
  - Flood Zone 3

0 1 2 3 4 5 Kilometers  
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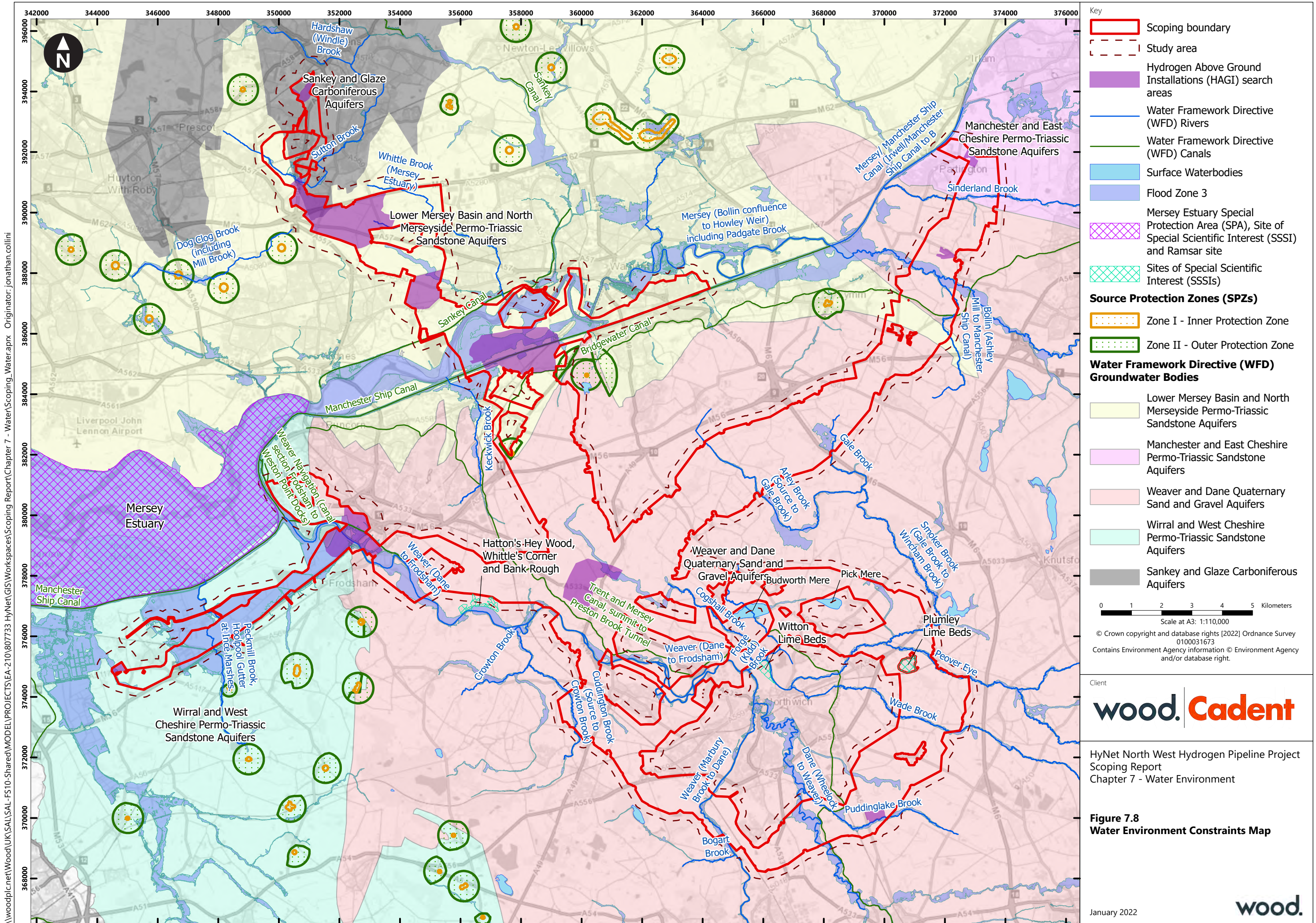


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**Figure 7.6**  
**Flood zones**



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Scoping Report  
Chapter 7 - Water Environment

**Figure 7.8**  
**Water Environment Constraints Map**

January 2022



## 8. Landscape and Visual

### 8.1 Introduction

8.1.1 The Landscape and Visual Assessment (LVIA) will consider the likely significant effects on landscape and visual receptors that may arise from the construction and operation of the Project. This chapter of the Scoping Report describes the methodology to be used within the LVIA, the datasets to be used to inform the LVIA, an overview of relevant baseline conditions, the likely significant effects to be considered within the LVIA, and how these likely significant effects will be assessed for the purpose of LVIA and EIA.

8.1.2 Landscape and visual considerations interact with several other environmental topics and, as such, should be considered alongside:

- **Chapter 5: Ecology;**
- **Chapter 6: Historic Environment;**
- **Chapter 10: Noise and Vibration;** and
- **Chapter 11: Traffic and Transport.**

#### Assumptions and limitations

8.1.3 Please refer to **Chapter 2: The Project** for the parameters on which this Scoping Report is based. The location of each HAGI site within the HAGI search area is to be confirmed, with the final HAGI sites typically ranging in footprint between 0.5 hectares (ha) to 2ha.

### 8.2 Relevant legislation and technical guidance

8.2.1 This section sets out the legislation and guidance in the context of the water environment. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

#### Legislation

8.2.2 A summary of relevant legislation is given in **Table 8.1**.

**Table 8.1 Legislation relevant to Landscape and Visual**

Legislation	Legislative context	Section considered
<b>The European Landscape Convention</b> <sup>233</sup>	A Council of Europe initiative that provides a broad framework for landscape planning and management across all member states including the UK, which ratified the European Landscape Convention (ELC) in 2007. The status of this convention is not affected by Brexit. These commitments are implemented by existing domestic policy and legislation rather than through any ELC-specific framework. The ELC defines landscape as, “ <i>an area, as perceived by people, whose character is the result of the action and interaction of natural. and/or human factors</i> ” and is committed to several core principles and actions.	All sections, especially <b>Section 8.7: Assessment methodology</b>
<b>Hedgerow Regulations</b> <sup>234</sup>	Hedgerows are protected under these Regulations that may be relevant to the LVIA, specifically the assessment of impacts upon landscape elements, and the development of embedded and/or optional additional mitigation.	All sections - noting ecological and heritage professionals, where appropriate, will input into the assessment on whether a hedgerow is considered ‘Important’, under the Regulations.

## Technical Guidance

8.2.3 A summary of the relevant technical guidance is given in **Table 8.2**.

**Table 8.2 Technical guidance relevant to Landscape and Visual**

Technical Guidance Document	Context	Section considered
<b>Guidelines for Landscape and Visual Impact</b>	The third edition of this guidance (known as ‘GLVIA3’) is regarded as	All sections, especially <b>Section 8.7: Assessment methodology</b>

<sup>233</sup> The Council of Europe, (2000), The European Landscape Convention. Council of Europe, Florence, Italy.

<sup>234</sup> UK Government (1997). The Hedgerow Regulations 1997 (Online). Available at: <https://www.legislation.gov.uk/ukxi/1997/1160/contents/made> (Accessed 30 November 2021).



Technical Guidance Document	Context	Section considered
<b>Assessment Third Edition (2013)</b> <sup>235</sup>	the 'industry standard' document guiding LVIA. GLVIA3 provides the framework within which the remaining sections of this chapter have been undertaken and informs the methodology by which the LVIA will be undertaken, as set out in <b>Section 8.6</b>	
<b>Technical Guidance Note 06/19</b> <sup>236</sup>	Visual Representation of Development Proposals	All sections, especially <b>Section 8.7: Assessment methodology</b>
<b>Technical Information Note 01/17</b> <sup>237</sup>	Tranquillity – An overview	All sections, especially <b>Section 8.7: Assessment methodology</b>

## 8.3 Consultation

8.3.1 It is intended that this Scoping Report shall form the basis for consultation with Natural England and all the local authorities that fall within the Study Area, namely:

- Cheshire West and Chester Council;
- Cheshire East Council;
- Halton Borough Council;
- Warrington Borough Council;
- Trafford Council;

<sup>235</sup> The Landscape Institute and Institute of Environmental Management & Assessment (2013). Guidelines for Landscape and Visual Impact Assessment Third Edition. Routledge, Oxfordshire, UK.

<sup>236</sup> The Landscape Institute (2019), Technical Guidance Note 06/19 (Online). Available at: [https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI\\_TGN-06-19\\_Visual\\_Representation.pdf](https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf) (Accessed 30 November 2021).

<sup>237</sup> The Landscape Institute (2017), Technical Information Note 01/2017 (Online). Available at: <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2017/02/Tranquillity-An-Overview-1-DH.pdf> (Accessed 30 November 2021).

- St. Helens Metropolitan Borough Council;
- Salford City Council; and
- Knowsley Metropolitan Borough Council.

8.3.2 The spatial scope of the Study Area is defined on **Figure 8.1** and **Figure 8.2** and comprises a 1km offset from the outer edge of the HAGI search areas for both the construction and operational phases of the Project. Further details covering the rationale of the Study Area definition are provided at **Section 8.6**.

8.3.3 Agreement will be sought on the extent of the Study Area, the baseline sources of information and the approach to the LVIA methodology that is to be adopted. It is not possible at this early stage to provide specific viewpoint locations to be used to inform the LVIA. However, as the Project details progress further, it is intended to agree, where possible, a series of viewpoint locations from where photography would be obtained and computer-generated visualisations prepared in accordance with best practice guidance<sup>236</sup>.

## 8.4 Baseline conditions

### Data gathering methodology

8.4.1 The scoping exercise has been undertaken with reference to **Chapter 2: The Project**, supported by review of several data sources. The principal data sources used to inform this chapter comprise of the following:

- Ordnance Survey (OS) 1:50,000 scale mapping;
- Aerial photography (Google Earth Pro);
- MAGIC.gov.uk website<sup>238</sup>;
- Sustrans National Cycle route network<sup>239</sup>;
- Long Distance Walkers Association long distance footpath routes and other promoted routes<sup>240</sup>;
- National Character Area (NCA) profiles prepared by Natural England (further detail provided in paragraph 8.4.6 onwards);
- Local landscape designations (further detail provided in paragraph 8.4.11 onwards); and

<sup>238</sup> Defra (2021). Multi-Agency Geographic Information for the Countryside (MAGIC) website (Online). Available at <https://magic.defra.gov.uk/magicmap.aspx> (Accessed 30 November 2021).

<sup>239</sup> Sustrans (2021). Sustrans website (Online). Available at: [https://www.sustrans.org.uk/national-cycle-network/?gclid=EAIaIQobChMIzJihsaiu9AIVGLd3Ch1jfAEZEAYASABEgLOWvD\\_BwE](https://www.sustrans.org.uk/national-cycle-network/?gclid=EAIaIQobChMIzJihsaiu9AIVGLd3Ch1jfAEZEAYASABEgLOWvD_BwE) (Accessed 30 November 2021).

<sup>240</sup> Long Distance Walkers Associations (2021). LDWA website (Online). Available at <https://www.ldwa.org.uk/> (Accessed 30 November 2021).

- Local Authority landscape character assessments (further detail provided below).

8.4.2 Baseline conditions have been reviewed in relation to the Study Area described in **Section 8.6**.

## Current baseline

### Landscape Designations

8.4.3 There are no national landscape designations (i.e. National Parks, Areas of Outstanding Natural Beauty, or Heritage Coasts) in the Study Area. The closest national designation is the Peak District National Park, which is located ~20km south-east of the Study Area.

8.4.4 Local landscape designations within the Study Area are illustrated in **Figure 8.1** and comprise the Weaver Valley Areas of Special County Value (ASCV) within Cheshire West and Cheshire Borough.

8.4.5 Other local landscape designations on **Figure 8.1** that fall outside the Study Area are:

- Helsby and Frodsham ASCV;
- Willington ASCV;
- Delamere/Ukinton ASCV; and
- Halton Special Landscape Area.

### National Landscape Character Areas

8.4.6 Natural England has divided the country into 159 NCAs. With reference to **Figure 8.1**, the NCAs within the Study Area are:

- the Shropshire, Cheshire and Staffordshire Plain (NCA 61);
- the Cheshire Sandstone Ridge (NCA 62);
- the Mersey Valley (NCA 60); and
- the Lancashire Coal Measures (NCA 56).

8.4.7 The Shropshire, Cheshire and Staffordshire Plain (NCA 61) is described as *‘an expanse of flat or gently undulating, lush, pastoral farmland’* and *‘a series of small sandstone ridges cut across the plain and are very prominent features within this open landscape’* with *‘the lower slopes of the ridge and the surrounding plain and is punctuated by numerous ponds and meres’*.

8.4.8 The Cheshire Sandstone Ridge (NCA 62) is described as a *‘discontinuous ridge, but is very prominent, rising sharply from the gently rolling topography of the surrounding NCAs’*, and *‘compared with the surrounding plain, the NCA has a strong mosaic of broadleaved mixed woodland’*. Glacial till covers the lower slopes of the ridge, resulting in the establishment of large areas of bog.

- 8.4.9 The Mersey Valley (NCA 60) is described as consisting of a ‘*wide, low-lying river valley landscape focusing on the River Mersey, its estuary, associated tributaries and waterways*’ and ‘*encompasses a complex mix of extensive industrial development and urban areas, with high-quality farmland in between*’. ‘*There is a dense communication network of major roads, railways, canals and transmission lines.*’
- 8.4.10 The Lancashire Coal Measures (NCA 56) is described as a ‘*varied topography of gentle hills and valleys*’ and ‘*the area is dominated by its industrial heritage, long associated with mining activity. The resulting landscape is a complex mosaic of farmland, scattered urban centres, industry, active mineral sites and derelict or reclaimed workings, giving this area a strong and distinctive identity*’.

### Local Landscape Character Areas

- 8.4.11 Landscape Character Areas (LCA) and/or Landscape Character Types (LCT) that fall within the zone of theoretical visibility (ZTV) of the final HAGIs will be scoped in as landscape receptors within the PEIR. The following landscape character assessments currently fall within the Study Area:
- A Landscape Strategy for Cheshire West and Chester Borough, 2016<sup>241</sup>;
  - Halton Landscape Character Assessment, 2009<sup>242</sup>;
  - St. Helens Borough Landscape Character Assessment, 2006<sup>243</sup>;
  - Warrington Landscape Character Assessment, 2007<sup>244</sup>;
  - Cheshire East Landscape Character Assessment, 2018<sup>245</sup>;

<sup>241</sup> Bayou Bluenvironment Ltd and The Planning & Environment Studio Ltd (2016), *A Landscape Strategy for Cheshire West and Chester Borough* (Online). Available at: [https://www.cheshirewestandchester.gov.uk/documents/planning-and-building-consultancy/total-environment/landscape-assessment/CWaC\\_LandscapeStrategyPart1\\_Final\\_March2016.pdf](https://www.cheshirewestandchester.gov.uk/documents/planning-and-building-consultancy/total-environment/landscape-assessment/CWaC_LandscapeStrategyPart1_Final_March2016.pdf) (Accessed 30 August 2021).

<sup>242</sup> TEP (2009), *Halton Landscape Character Assessment* (Online). Available at: [https://www3.halton.gov.uk/Documents/planning/planning%20policy/evidencebase/green/Halton\\_Landscape\\_Character\\_Assessment\\_\(2009\).pdf](https://www3.halton.gov.uk/Documents/planning/planning%20policy/evidencebase/green/Halton_Landscape_Character_Assessment_(2009).pdf) (Accessed 30 August 2021).

<sup>243</sup> Land Use Consultants (2006), *Landscape Character Assessment for St Helens*. (Online). Available at: <https://www.sthelens.gov.uk/media/329495/nat001-st-helens-landscape-character-assessment-2006.pdf> (Accessed 30 August 2021).

<sup>244</sup> Agathoclis Beckmann Landscape Architects (2007), *Warrington: A Landscape Character Assessment* (Online). Available at: [https://www.warrington.gov.uk/sites/default/files/2019-08/landscape\\_character\\_assessment\\_2007.pdf](https://www.warrington.gov.uk/sites/default/files/2019-08/landscape_character_assessment_2007.pdf) (Accessed 30 August 2021).

<sup>245</sup> LUC (2018). *Cheshire East Landscape Character Assessment* (Online). Available at: [https://www.cheshireeast.gov.uk/planning/spatial-planning/cheshire\\_east\\_local\\_plan/site-allocations-and-policies/sadpd-examination/documents/examination-library/ED10-Cheshire-East-LCA.pdf](https://www.cheshireeast.gov.uk/planning/spatial-planning/cheshire_east_local_plan/site-allocations-and-policies/sadpd-examination/documents/examination-library/ED10-Cheshire-East-LCA.pdf) (Accessed 30 August 2021).

- Landscape Character Assessment of Knowsley Metropolitan Borough, 2007<sup>246</sup>; and
- Salford City Council Landscape Character Assessment, 2007<sup>247</sup>.

### Landscape Elements

8.4.12 The LVIA will cross refer to the baseline descriptions of structural vegetation and landcover contained within **Chapter 5: Ecology**.

### Visual Receptors

8.4.13 Visual receptors within the Study Area may have the potential to experience significant visual effects where they lie within the ZTVs of the HAGIs. The preliminary ZTV and receptor categories at **Figure 8.2** indicate that receptors fall within the following categories, with further details provided in **Section 8.6**.

- Settlements:
  - ▶ consisting of residents in parts of St. Helen's, Prescott, Bold Heath, Widnes, Warrington, Moore, Higher Walton, Runcorn, Frodsham, Elton, Elton Green, Thornton le-Moors, Dones Green, Bartington, Lower Whitley, Dunham Woodhouses, Carr Green, Mossbrow, Partington and Carrington;
- Registered Parks and Gardens (noting that Alexandra Park in St. Helen's falls within the study area but is outside the ZTV);
- National and regional cycle routes:
  - ▶ consisting of routes NCR 5, 62, 562 and RCR 70.
- Long distance footpaths and other promoted recreational walking routes:
  - ▶ consisting of parts of the Trans Pennine Trail, Mersey Way, Bridgewater Way, Timberland Trail, North Cheshire Way, Trent and Mersey Canal, Bollin Valley Way, Delamere Way, Sandstone Trail and Weaver Way.
- Public rights of way (PRoW) and open access land:
  - ▶ as shown on the OS 1:50,000 scale mapping.
- Canals and rivers:
  - ▶ consisting of parts of the Trent and Mersey Canal, Weaver Navigation, Manchester Ship Canal and Bridgewater Canal.

8.4.14 It is not possible at this early stage to provide specific viewpoint locations as only search areas for each HAGI have been identified, however as the Project details

<sup>246</sup> 2020 Knowsley Ltd (2007), *Landscape Character Assessment of Knowsley Metropolitan Borough* (Online). Available at: [http://www.knowsley.gov.uk/pdf/eb20\\_landscapecharacterassessment.pdf](http://www.knowsley.gov.uk/pdf/eb20_landscapecharacterassessment.pdf) (Accessed 30 August 2021).

<sup>247</sup> Salford City Council (2007), *Landscape Character Assessment* (Online). Available at: <https://www.salford.gov.uk/media/385604/lca-final-document.pdf> (Accessed 30 August 2021).

evolve, it is intended to agree, where possible, a series of viewpoint locations from where photography would be obtained to inform the LVIA. It is anticipated that between 1 and 3 viewpoints per HAGI are likely to be sufficient to inform the LVIA.

## Future baseline

8.4.15 Landscape change is an ongoing and inevitable process and will continue across the Study Area irrespective of whether the Project proceeds. Change can arise through natural processes (e.g. the maturity of woodlands) and natural systems (e.g. river erosion) or, as is often the case, occurs due to human activity, land use, management, or neglect.

8.4.16 Climate change is increasingly acknowledged as a key driver of future landscape change. The NCA profiles identify that increased rainfall, periods of drought and more frequent storm events, are likely to result in changes to the character of the landscape within the Study Area. Periods of drought may change the suitability of current agricultural crops and will make veteran trees in exposed locations more susceptible to loss by wind throw. The changes in weather will encourage the spread of non-native insect pests and pathogens with oak and ash particularly at threat of being significantly impacted. Location-specific changes cited include the higher risk of fluvial flooding of Northwich.

8.4.17 Other key drivers identified across the NCAs within the Study Area include increased demand for land for housing, road improvements, industry, renewable energy installations and telecommunications infrastructure. Agricultural changes leading to larger land holdings with larger more centralised buildings are likely in many places. Increased recreational and tourism may threaten sensitive habitats and tranquillity in places.

8.4.18 Notable development projects that will have an impact on baseline landscape character and visual amenity include HS2, passing east of Northwich and west of Altrincham.

## 8.5 Embedded environmental measures

8.5.1 A Code of Construction Practice (CoCP) would be produced prior to commencement of construction which will detail measures to be implemented (via a Construction Environmental Management Plan (CEMP)) to help ensure protection of existing vegetation, where possible, and to minimise direct and indirect construction related effects upon landscape and visual receptors.

8.5.2 As the location of the HAGIs and construction compounds are confirmed and the design of these elements and associated infrastructure including access roads evolves, appropriate embedded landscape measures will be developed. These will involve, but not be limited to, maximising the use of existing screening elements, and minimising both the footprint and height of any permanent infrastructure. The evolving designs will also be reviewed against the potential to introduce low level earth mounding, screen fencing and/or new planting, taking into consideration technical restrictions relating to issues such as clearance and security.

## 8.6 Scope of the assessment

### Study Area

8.6.1 The spatial scope of the Study Area is defined on **Figure 8.1** and **Figure 8.2** and comprises a 1km offset from the outer edge of the HAGI search areas for both the construction and operational phases of the Project. The definition of the spatial scope of the Study Area has been assisted by a visual angle calculation of a HAGI at 3m high above ground over a range of distances (see **Table 8.3**). Professional experience of assessing development projects in accordance with GLVIA3<sup>235</sup> indicates that when the vertical angle subtended is less than 0.3 degrees, the new structures would be barely discernible and/or would occupy a very small part of the view. Consequently, a magnitude greater than Very Low is highly unlikely. The Study Area, comprising relatively flat topography, can therefore be conservatively defined at a distance of 1km from the HAGIs, with a high level of confidence that no potentially significant effects would be experienced by high sensitivity receptors beyond this distance, in accordance with **Table 8.10** in **Section 8.7**.

**Table 8.3 Visual angle calculation in relation to distance from a HAGI<sup>248</sup>**

Distance from viewer of a 3m high object	Vertical angle subtended
0.1km	1.72°
0.2km	0.86°
0.5km	0.34°
1.0km	0.17°
1.5km	0.11°
2.0km	0.09°

8.6.2 With reference to **Chapter 2: The Project**, the construction of a HAGI would typically take between 3-6 months. Apart from the HAGIs, the pipeline will be buried along the entire route and consequently during the operational period the pipeline has been scoped out of the LVIA as it will not be visible.

8.6.3 The pipeline will be predominantly constructed using open cut techniques and trenchless crossing at key locations including motorways, A roads, rail, main rivers and canals. Pipe laying can be likened to a production line with successive activities moving along the spread. Pipeline construction activities can advance at approximately 500m to 1km per day, with successive activities following behind. Given the very short timescales (i.e. several days) when there is likely to be any discernible adverse effect upon high sensitivity landscape and visual receptors, it

<sup>248</sup> Elvers (no date), Visual Angle Calculator (Online). Available at: <https://elvers.us/perception/visualAngle/> (Accessed 13 December 2021)

is assessed that there is no potential for significant effects and the pipeline construction has been scoped out of the ES.

- 8.6.4 Additional temporary construction compounds, separate from the laydown areas, could be required at some distance from the HAGI to facilitate the pipeline crossing construction. Subject to further details and the proposed footprint, duration and proximity of sensitive receptors assessment of these elements of the Project may be scoped into the LVIA. Agreement would be sought with the appropriate local authority when this information is further developed.
- 8.6.5 The temporal scope of the assessment will cover construction phase effects of the HAGI installations and associated construction compounds. The operational phase assessment is proposed to be confined to the HAGI installations given that these are the only elements of above ground infrastructure that will be visible and have the potential to result in significant landscape and visual effects within the Study Area.
- 8.6.6 The Study Area will be finalised following further desk and site-based analysis and evolution of the Project design.

## Potential receptors

- 8.6.7 Landscape and visual receptors within the Study Area most likely to be significantly affected tend to be those which are of higher sensitivity, located closest to the HAGI and construction compounds, incurring a direct and/or higher magnitude or level of effect. Viewpoint analysis and site survey, which includes an assessment of sensitivity and magnitude, will be used as part of the assessment to identify those receptors which are most likely to be significantly affected.

## Likely significant effects

- 8.6.8 The potentially significant landscape and visual effects that will be taken forward for assessment are summarised in **Table 8.4**. Due to the iterative nature of project design, it is possible that some of these receptors will be scoped out in the PEIR/ES as the design evolves for the following reasons:
- The receptor no longer falls within the final LVIA Study Area when the final location of the HAGIs and construction compounds are confirmed; or
  - The receptor within the final LVIA Study Area falls outside of the ZTV of the HAGIs and construction compounds.

**Table 8.4 Potentially significant landscape and visual effects**

Activity	Effect	Receptor
<b>Construction Phase: Construction activity within the LVIA Study Area associated with the temporary construction compounds and HAGIs</b>	Direct changes to the fabric of the landscape due to the loss or changes to high value landscape elements.	Landscape Receptors: High value landscape elements within the draft LVIA Study Area.



Activity	Effect	Receptor
<p><b>Construction Phase: Perception of construction activity within the LVIA Study Area associated with the temporary construction compounds and HAGIs under construction comprising traffic, plant and cranes</b></p> <p><b>Operational Phase: Views of the HAGIs and associated above ground infrastructure including permanent access tracks during the operational phase</b></p>	<p>Indirect effects related to the visibility of construction activity and HAGI infrastructure, causing potentially significant adverse effect upon landscape character.</p> <p>Effects on views and visual amenity resulting from visibility of construction activity and HAGI infrastructure experienced by high sensitivity visual receptors including residents, users of public rights of way, other recreational routes and public open space.</p>	<p>Landscape Receptors: Host LCA and/or LCT and locally designated landscapes within the draft LVIA Study Area.</p> <p>Visual Receptors: High sensitivity receptors comprising residents in parts of St. Helen’s, Prescott, Bold Heath, Widnes, Warrington, Moore, Higher Walton, Runcorn, Frodsham, Elton, Elton Green, Thornton le-Moors, Dones Green, Bartington, Lower Whitley, Dunham Woodhouses, Carr Green, Mossbrow, Partington and Carrington.</p> <p>Users of recreational routes including national and regional cycle routes (NCR 5, 62, 562, and RCR 70), promoted long distance footpath routes (Trans Pennine Trail, Mersey Way, Bridgewater Way, Timberland Trail, North Cheshire Way, Trent and Mersey Canal, Bollin Valley Way, Delamere Way, Sandstone Trail and Weaver Way).</p> <p>Users of rivers and canals including the Trent and Mersey Canal, Weaver Navigation, Manchester Ship Canal, and Bridgewater Canal.</p> <p>Users of local public rights of way and open access land that fall within the ZTV of the final Study Area.</p>

8.6.9 The effects scoped out from further assessment are proposed to be:

- Site clearance, including any localised vegetation removal for temporary access roads and land preparation comprising earthworks for open cut trenching for pipeline and crossing points (HDD). This vegetation removal will be assessed in **Chapter 5: Ecology**. From past experience of similar infrastructure projects, changes to landscape elements along pipeline routes are localised in extent and would not be of a sufficient magnitude to result in significant effects upon individual landscape elements. Any larger scale clearance associated with the HAGIs, construction compounds and permanent access would however be scoped into the construction phase assessment as part of the landscape receptor assessment (see **Table 8.4** above);
- Visibility of fleeting construction activity along the pipeline route comprising traffic, plant and cranes (see paragraph 8.6.3 above), noting that construction phase effects associated with any temporary construction compounds located away from the HAGI would be scoped in when further details are available;
- Movement of vehicles and activity associated with maintenance visits to the HAGIs in the operational phase, given the infrequent maintenance requirements set out in **Chapter 2: The Project**;
- Assessment of the impact of the Project upon national landscape character areas because the scale of change from the Project is unlikely to result in significant effects to an NCA during either the construction or operational phases of the Project. The proposal to scope out the NCA's accounts for the expansive geographical extent of the NCAs and the transitory nature of landscape impacts associated with the construction phase of the Project and the localised effects that would occur during the operational phase. Assessment of NCA would also duplicate the detailed assessment based on local landscape character areas/types that will be scoped in;
- Views experienced by visitors to Registered Parks and Gardens and Country Parks that lie just within or close to the edge of the study area but outside the ZTV of the Project, as no operational elements of the Project would be visible; and
- Visual receptors that are likely to fall into the medium and low sensitivity categories including road users, railway passengers, retail and industrial estates, schools, people at their place of work, and people engaging in active sports, where the focus is not on the landscape. Given the reduced sensitivity of the receptors, the magnitude of change resulting from the Project would need to be greater than Low to result in potentially significant visual effects. This scenario is not predicted to occur based on the receptor locations and the draft ZTV of the HAGI search areas.

## 8.7 Assessment methodology

8.7.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**, and specifically in Section 4.3. Whilst this has informed the approach that has been used in this chapter, it is necessary to

set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the LVIA in the ES.

- 8.7.2 The methodology outlined in this section, which will be followed when completing the landscape and visual impact assessment presented in the ES, is based on GLVIA3<sup>235</sup>. GLVIA3 states that the assessment of significance of landscape and visual effects is *"an evidence-based process combined with professional judgement."*<sup>235</sup> All assessments and judgements must be transparent and capable of being understood by others.

## Landscape Assessment

- 8.7.3 The sensitivity of a landscape receptor e.g. a landscape character area, to a Project is determined by the susceptibility of that landscape receptor to the changes identified as a result of the construction and/or operation of the Project and the landscape receptor's value. The methodology describes landscape sensitivity as high, medium, or low.
- 8.7.4 Landscape value is determined by taking into consideration a range of attributes including: the presence or absence of landscape designations; landscape and scenic qualities; rarity and representativeness; conservation interests; recreational value; perceptual qualities; and historic and cultural value. It is also concerned with landscape quality and the physical state of a landscape receptor. This could include consideration of the landscape receptor's intactness and the condition of individual landscape elements. The absence of landscape planning designations does not automatically mean that an area or landscape receptor is of low landscape value. These attributes are determined by review of extant landscape character assessments, management guidelines and other similar documentation supplemented by observations made during site visits.
- 8.7.5 Landscape susceptibility concerns the ability of a landscape receptor to accommodate the Project without undue consequences for the maintenance of the baseline situation.
- 8.7.6 The landscape assessment will include analysis for each landscape receptor of the factors that have been assessed in the determination of its landscape value and the assessment of its susceptibility to the Project. These will be set out in a proforma completed for each landscape receptor, in accordance with GLVIA3<sup>235</sup>, that will show how the assessment of the landscape value and landscape susceptibility have been combined to determine that landscape receptor's sensitivity (see **Table 8.5**).

**Table 8.5 Evaluation of Landscape Sensitivity**

Value	Susceptibility		
	High	Medium	Low
High	High	High or Medium	Medium
Medium	High or Medium	Medium	Medium or Low
Low	Medium	Medium or Low	Low

8.7.7 The magnitude of landscape change resulting from the operation of the Project will be assessed as high, medium, low, or very low (see **Table 8.6**). In accordance with GLVIA3<sup>235</sup> the magnitude of landscape change will consider:

- The size and/or scale of the change that would result from each identified landscape effect acting upon a landscape receptor;
- The geographical extent over which each identified landscape effect would be experienced; and
- The duration and reversibility of each identified landscape effect.

**Table 8.6 Establishing the magnitude of landscape change**

Magnitude	Criteria
<b>High</b>	<p>A large-scale change that may include the loss of key landscape elements/characteristics or the addition of uncharacteristic new features or elements that would alter the perceptual characteristics of the landscape.</p> <p>The size or scale of landscape change could create new landscape characteristics and may change the overall distinctive landscape quality and character, typically, but not always affecting a larger geographical extent.</p>
<b>Medium</b>	<p>A medium-scale change that may include the loss of some key landscape characteristics or elements, or the addition of some uncharacteristic new features or elements that could alter the perceptual characteristics of the landscape.</p> <p>The size or scale of landscape change could create new landscape characteristics and may lead to a partial change in landscape character, typically, but not always affecting a more localised geographical extent.</p>
<b>Low</b>	<p>A small-scale change that may include the loss of some landscape characteristics or elements of limited characterising influence, or the addition of some new features or elements of limited characterising influence. They may be a small partial change in landscape character, typically, but not always affecting a localised geographical extent.</p>

Magnitude	Criteria
<b>Very Low</b>	A very small-scale change that may include the loss or addition of some landscape elements of limited characterising influence. The landscape characteristics and character would be unaffected.

## Visual Assessment

8.7.8 The sensitivity of visual receptors will consider the susceptibility of the visual receptor to the visual change identified and the value that is likely to be attributed by the visual receptor to their baseline view. These are described as high, medium or low. The main influencing factors are:

- The occupation or activity of the visual receptor at each location;
- The extent to which the visual receptors' attention or interest is focused upon the available views;
- The importance and/or popularity of the view;
- The typical numbers of visual receptors to whom that view is available;
- In a link with landscape considerations, the context of a viewpoint in terms of landscape value and quality within a view; and
- Any indication of a view being valued such as the presence of interpretation boards, parking, and seating facilities, it being referenced in a guidebook or marked on a published map.

8.7.9 **Table 8.7** details the basis for assessing visual receptor sensitivity.

**Table 8.7 Evaluation of Visual Sensitivity**

Sensitivity	Criteria
<b>High</b>	<p><u>Susceptibility:</u> Visual receptors in this category would generally include residents, tourists/visitors, walkers, cyclists and horse riders, either stationary or travelling through the landscape, and/or undertaking outdoor recreational activities where the focus of the activity involves an appreciation of the landscape: Residential properties or settlements and related community outdoor spaces. Outdoor tourist and visitor attractions. Recreational routes (national trails, long distance footpaths and PRowWs; Sustrans national and regional cycle routes; open access land/beaches and recognised scenic driving routes); and People generally, undertaking recreational activity where the focus of the activity involves an appreciation of the landscape (especially within internationally or nationally designated landscapes).</p>

Sensitivity	Criteria
	<p><u>Value:</u> Notable specific value attached for example in relation to heritage assets, references in literature/art and or promoted by planning designation. Likely inclusion of facilities at or near viewpoint e.g. parking places, sign boards and interpretative material. Likely to be of high scenic quality and located within or overlooking a designated landscape</p>
Medium	<p><u>Susceptibility:</u> Visual receptors in this category would generally include people travelling through the landscape on road, rail or other transport routes as rail passengers and road users and people undertaking recreational and sporting activities where it is likely that their surroundings have some influence upon their enjoyment (e.g. angling and golfing).</p> <p><u>Value:</u> Some indicators of value are present e.g. views well known at a local level and/or may be part of wider visual amenity experienced along a locally promoted footpath route. Likely to be of moderate scenic quality.</p>
Low	<p><u>Susceptibility:</u> Visual receptors in this category would generally include people for whom their surroundings are unlikely to be a primary concern or affect how they undertake their current activity. Receptors are likely to include people at their place of work, people travelling on main roads through built up areas, dual-carriageways or motorways or taking part in activities not involving an appreciation of the landscape (e.g. playing team sports).</p> <p><u>Value:</u> No indication of any value attached to view/s or visual amenity. Likely to be of low scenic quality.</p>

8.7.10

The visual assessment will include analysis for each visual receptor of the factors that have been assessed in the determination of the value of views and the assessment of its susceptibility to the Project. These will be set out in a proforma completed for each landscape receptor, in accordance with GLVIA3<sup>235</sup>, that will show how the assessment of the value and susceptibility have been combined to determine that visual receptor's sensitivity (see **Table 8.8**).

**Table 8.8 Evaluation of Visual Sensitivity**

Value	Susceptibility		
	High	Medium	Low
High	High	High or Medium	Medium
Medium	High or Medium	Medium	Medium or Low
Low	Medium	Medium or Low	Low

8.7.11 **Table 8.9** details the basis for assessing the magnitude of change that would be experienced by visual receptors.

**Table 8.9 Establishing the magnitude of visual change**

Magnitude	Criteria
<b>High</b>	A large and prominent change to the view, appearing in the fore to middle ground and involving the loss/addition of several features, which is likely to have a strong degree of contrast and benefits from little or no screening. The view is likely to be experienced at static or low speed and is more likely to be continuously/sequentially visible from a route.
<b>Medium</b>	A moderate and prominent/noticeable change to the view, appearing in the middle ground and involving the loss/addition of features and a degree of contrast with the existing view. There may be some partial screening. The view is likely to be experienced at static or low to medium speed and is more likely to be intermittently or partially visible from a route.
<b>Low</b>	A noticeable or small change, affecting a limited part of the view that may be obliquely viewed or partly screened and/or appearing in the background of the view. This category may include rapidly changing views experienced from fast-moving road vehicles or trains.
<b>Very Low</b>	A small or negligible change to the view that may be obliquely viewed and mostly screened and/or appearing in the distant background or viewed at high speed over short periods and capable of being missed by the casual observer.

## Evaluation of significance of landscape and visual effects

8.7.12 The level of landscape and visual effects will be determined with reference to landscape or visual sensitivity and the magnitude of landscape or visual change likely to be experienced in accordance with GLVIA3<sup>235</sup>. Likely significant landscape and visual effects arising from the construction and operation<sup>249</sup> of the Project

<sup>249</sup> HAGIs only

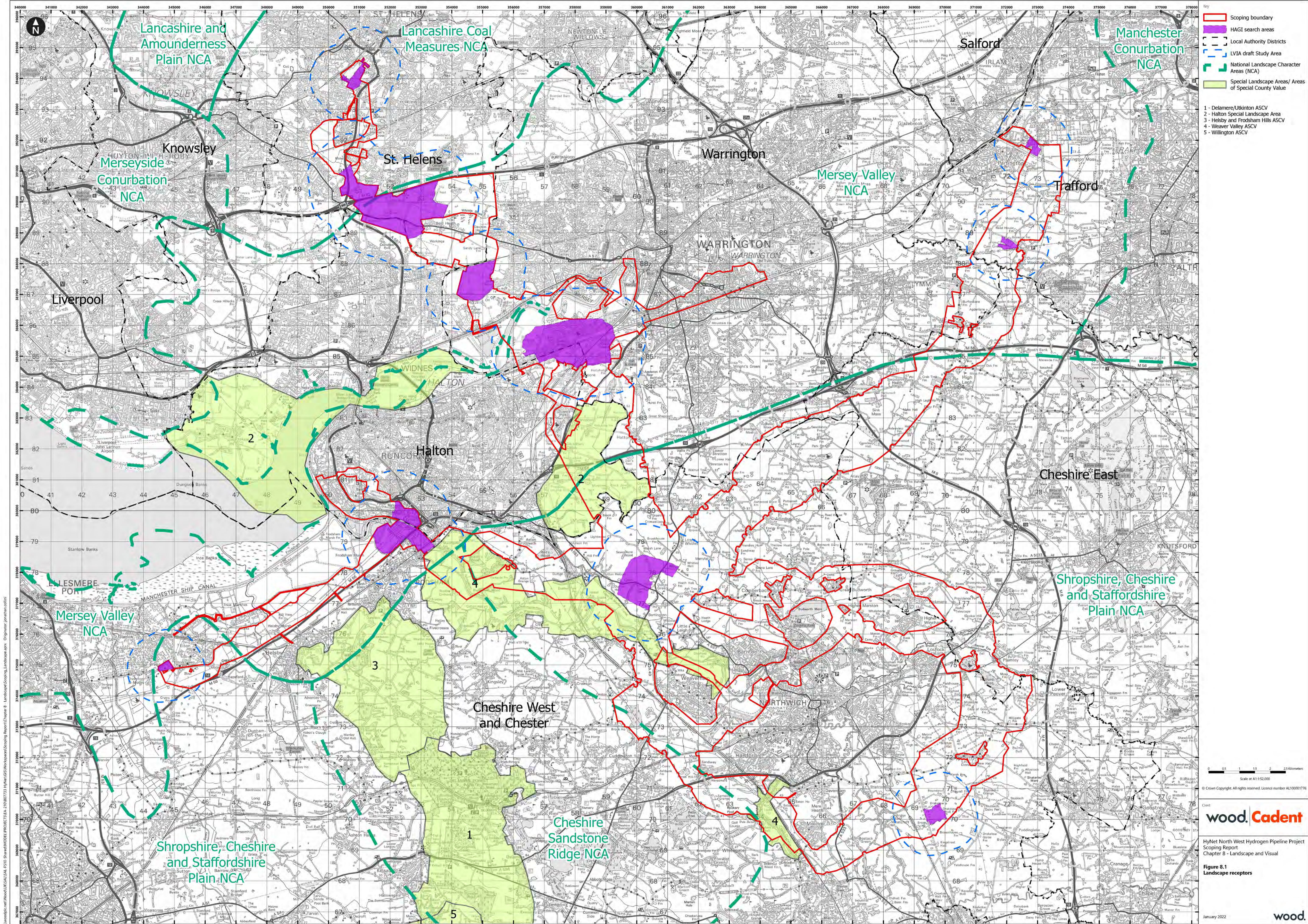
would be effects that are assessed as being likely to result in effects that would be greater than a ‘moderate’ level. In addition, effects assessed at a ‘moderate’ level may be classified as significant, based on professional judgement. Effects assessed as being less than ‘moderate’ would be assessed as not significant. In line with the emphasis placed in GLVIA3<sup>235</sup> upon application of professional judgement, the adoption of an overly mechanistic approach through reliance upon a matrix will be avoided. This will be achieved by the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor over and above the outline assessment provided by use of a matrix (see **Table 8.10**). Wherever possible cross references will be made to a visual assessment at the proposed viewpoints and figures to support and explain the rationale.

**Table 8.10 Evaluation of Landscape and Visual Effects**

Value	Susceptibility			
	High	Medium	Low	Very Low
High	Major (Significant)	Major/Moderate (Significant)	Moderate* (potentially Significant)	Minor (Not Significant)
Medium	Major/Moderate (Significant)	Moderate* (potentially Significant)	Minor (Not Significant)	Minor/Negligible (Not Significant)
Low	Moderate* (potentially Significant)	Minor (Not Significant)	Minor/Negligible (Not Significant)	Negligible (Not Significant)

\*Note: Moderate levels of effect may or may not be significant subject to the assessor’s opinion which shall be clearly explained.





- Key
- Scoping boundary
  - HAGI search areas
  - Local Authority Districts
  - LVIA draft Study Area
  - National Landscape Character Areas (NCA)
  - Special Landscape Areas/ Areas of Special County Value

- 1 - Delamere/Utkinton ASCV
- 2 - Halton Special Landscape Area
- 3 - Helsby and Frodsham Hills ASCV
- 4 - Weaver Valley ASCV
- 5 - Willington ASCV

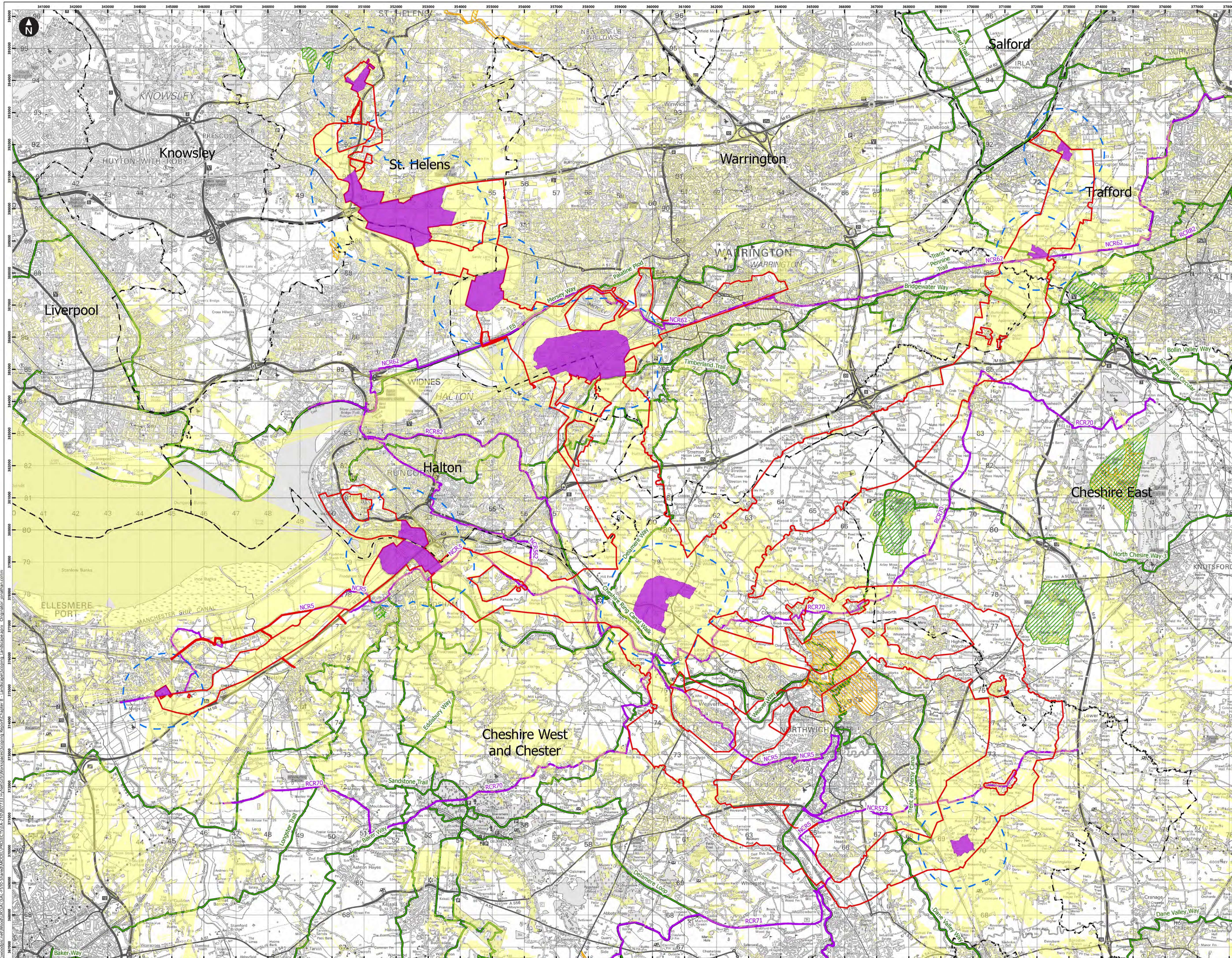
Scale at A1:152,000

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HyNet North West Hydrogen Pipeline Project Scoping Report Chapter 8 - Landscape and Visual

Figure 8.1 Landscape receptors

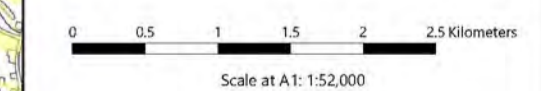


- Scoping boundary
- HAGI search areas
- Local Authority Districts
- LVIA draft Study Area
- Registered Parks and Gardens
- Country Parks
- National/Regional Cycle Routes
- Long Distance Footpaths
- Zone of Theoretical Visibility (ZTV)

This drawing is based upon a computer generated Zone of Theoretical Visibility (ZTV) using the viewshed analysis in the ESRI ArcGIS Suite.

The ZTV is created using Environment Agency 5m LIDAR Digital Terrain Model (DTM) data with additional heights for Ordnance Survey VectorMap District buildings and woodlands modelled at 8m and 12m respectively.

The figure has been based on the following parameters (in metres Above Ground Level (m AGL)):  
 HAGI area = 3m AGL  
 Observer = 1.8m AGL



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 Scoping Report  
 Chapter 8 - Landscape and Visual

Figure 8.2  
 Visual Receptors and Zone of Theoretical Visibility (ZTV) of Hydrogen Above Ground Installations (HAGIs)

## 9. Air Quality

### 9.1 Introduction

9.1.1 The air quality assessment will consider the likely significant effects on human and ecological receptors that may arise from the construction and operation of the Project. This chapter of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

9.1.2 Air Quality interfaces with other topics and as such, should be considered alongside these:

- **Chapter 5: Ecology;** and
- **Chapter 11: Traffic and Transport.**

#### Assumptions and limitations

9.1.3 For the purposes of scoping, the methodology for pipeline construction defined in **Chapter 2: The Project** has been assumed.

### 9.2 Relevant legislation and technical guidance

9.2.1 This section identifies the relevant legislation and guidance which has informed the scope of the assessment relevant to Air Quality. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each topic.

#### Legislation

9.2.2 A summary of the relevant legislative documents relevant to the air quality topic are given in **Table 9.1**.

**Table 9.1** Legislation relevant to the Air Quality assessment

Legislation	Legislative context	Section considered
<b>The Environment Act 2021<sup>250</sup></b>	The Environment Act 2021 has introduced legally-binding duties on the	Not considered yet - air quality targets not yet

<sup>250</sup> UK Government (2021). Environment Act 2021. (Online). Available from: <https://www.legislation.gov.uk/ukpga/2021/30/section/2/enacted> (Accessed December 2021).

Legislation	Legislative context	Section considered
	<p>government to bring forward at least two air quality targets by October 2022.</p> <p>The first target should look at reducing the annual average of Particulate Matter smaller than 2.5 <math>\mu\text{m}</math> (PM<sub>2.5</sub>), and the second air quality target should be a long-term target. This recognises the long-term health impacts of which air pollution can impose.</p>	brought forward by the Government.
<b>Directive 2008/50/EC on ambient air quality and cleaner air for Europe<sup>251</sup> (the ‘Ambient Air Directive’)</b>	<p>Consolidates previously existing European Union (EU) wide air quality legislation (with the exception of Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air) and provides a new regulatory framework for PM<sub>2.5</sub>.</p> <p>The Ambient Air Directive sets limit values (for the protection of human health) and critical levels (for the protection of vegetation and ecosystems) for selected pollutants that are to be achieved by specific dates, and details procedures EU Member States should take in assessing ambient air quality. Regulated pollutants include sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), particulate matter</p>	<b>Section 9.6: Scope of the Assessment</b>

<sup>251</sup> The European Commission (2008). Directive 2008/50/EC of the European Parliament and of The Council of 21 May 2008 on ambient air quality and cleaner air in Europe. (Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=en> (Accessed December 2021).

Legislation	Legislative context	Section considered
	<p>smaller than 10 µm (PM<sub>10</sub>), particulate matter smaller than 2.5 µm (PM<sub>2.5</sub>), lead (Pb), benzene (C<sub>6</sub>H<sub>6</sub>) and carbon monoxide (CO).</p> <p>The limit values and critical levels are legally binding limits on concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The values are based on the assessment of the effects of each pollutant on human health, taking into account the effects on sensitive groups such as children, the elderly and those with health conditions, or on vegetation and ecosystems.</p> <p>The limit values and critical levels relate to concentrations in ambient air. The Ambient Air Directive defines ambient air as outdoor air, and explicitly excludes workplaces and other places to which members of the public do not have regular access.</p>	
<b>The Environmental Protection Act 1990<sup>252</sup></b>	Provides the framework for the control of nuisance from dust and odour.	<b>Section 9.6: Scope of the Assessment</b>
<b>The Environment Act 1995<sup>253</sup></b>	Since Part IV of the Environment Act 1995 came into force, local authorities have been required to periodically review	<b>Section 9.4: Baseline Conditions</b>

<sup>252</sup> UK Government (1990). The Environmental Protection Act 1990. (Online). Available from: <https://www.legislation.gov.uk/ukpga/1990/43/introduction> (Accessed December 2021).

<sup>253</sup> UK Government (1995). Environment Act 1995. (Online). Available from: <https://www.legislation.gov.uk/ukpga/1995/25/contents> (Accessed December 2021).

Legislation	Legislative context	Section considered
	<p>concentrations of the UK Air Quality Strategy pollutants within their areas and to identify areas where the Air Quality Objectives (AQOs) may not be achieved by their relevant target dates. This process of Local Air Quality Management (LAQM) is an integral part of delivering the Government's AQOs detailed in the Strategy. When areas are identified where some or all of the AQOs might potentially be exceeded and where there is relevant public exposure, i.e. where members of the public would regularly be exposed over the appropriate averaging period, the local authority has a duty to declare an Air Quality Management Area (AQMA) and to implement an Air Quality Action Plan to reduce air pollution levels towards the AQOs.</p>	
<p><b>The Air Quality Standards Regulations 2010<sup>254</sup></b></p>	<p>These came into force on 11 June 2010 and transpose Directive 2008/50/EC, including the limit values, into UK legislation. The Air Quality Standards Regulations 2010 impose a duty on the Secretary of State to meet these limit values.</p> <p>Similar to Directive 2008/50/EC, the Air Quality Standards Regulations 2010</p>	<p><b>Paragraph 9.2.5</b></p>

<sup>254</sup> UK Government (2010). Statutory Instrument 2010 No. 1001 Environmental Protection – The Air Quality Standards Regulations 2010. (Online). Available from: <https://www.legislation.gov.uk/ukSI/2010/1001/contents/made> (Accessed December 2021).

Legislation	Legislative context	Section considered
	define ambient air as outdoor air, and explicitly exclude workplaces and other places to which members of the public do not have regular access.	
<b>Wildlife and Countryside Act 1981<sup>255</sup></b>	This provides the basis for the regulatory framework for the designation of Sites of Special Scientific Interest (SSSI). Sites in England are designated by Natural England if they have special interest by reason of any of their flora, fauna, or geological or physiographical features.	<b>Section 9.6: Scope of the Assessment</b>

9.2.3 The Air Quality Standards Regulations 2010<sup>254</sup> currently set out the AQOs in the UK. The Regulations outline an Air Quality Objective of  $40\mu\text{g m}^{-3}$  for annual mean concentrations of  $\text{NO}_2$  and  $\text{PM}_{10}$ . There is an EU limit of  $25\mu\text{g m}^{-3}$  for the annual mean concentration of  $\text{PM}_{2.5}$ . Currently these are the air pollutants of principal concern with respect to human health in the UK. **Table 9.2** provides the Air Quality Standards (AQS) and AQOs relevant to Air Quality Assessments.

**Table 9.2 Relevant Air Quality Standards and Objectives**

Pollutant	Averaging period	Value ( $\mu\text{g m}^{-3}$ )
$\text{NO}_2$	Annual mean	40
$\text{NO}_2$	1 hour mean, not to be exceeded more than 18 times a year (equivalent to 99.79 <sup>th</sup> percentile)	200
$\text{PM}_{10}$	Annual mean	40
$\text{PM}_{10}$	24 hours mean, not to be exceeded more than 35 times a year (equivalent of 90.4 <sup>th</sup> percentile)	50
$\text{PM}_{2.5}$	Annual mean	25

<sup>255</sup> UK Government (1981). Wildlife and Countryside Act 1981. (Online). Available from: <https://www.legislation.gov.uk/ukpga/1981/69> (Accessed December 2021).

## Technical Guidance

9.2.4 A summary of the technical guidance relevant to Air Quality is provided in **Table 9.3**.

**Table 9.3 Technical guidance relevant to Air Quality**

Technical Guidance Document	Context	Section considered
<b>Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), Land-use Planning and Development Control: Planning for Air Quality (2017)</b> <sup>256</sup>	Provides a procedure for screening potential air quality effects of new development and a procedure for assessing the significance of air quality effects in planning applications.  This guidance also promulgates the term air quality assessment level (AQAL) as a generic term for the various standards, objectives, limit values etc. against which impacts need to be assessed.	<b>Section 9.6: Scope of Assessment and 9.7: Assessment Methodology</b>
<b>IAQM, A guide to the assessment of air quality impacts on designated nature conservation sites (2020)</b> <sup>257</sup>	Provides guidance on the air quality impacts of development on designated nature conservation sites but establishes that the assessment of the effects that air quality impacts may have on habitats and species should be the responsibility of a suitability qualified and experienced ecologist.	<b>Section 9.7: Assessment Methodology</b>

<sup>256</sup> Environmental Protection UK and Institute of Air Quality Management (IAQM) (2017). Land-Use Planning & Development Control: Planning For Air Quality. (Online). Available at: <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf> (Accessed December 2021).

<sup>257</sup> Institute of Air Quality Management (2019). A guide to the assessment of air quality impacts on designated nature conservation sites. (Online). Available from: <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf> (Accessed December 2021).



Technical Guidance Document	Context	Section considered
IAQM, Guidance on the assessment of dust from demolition and construction (2016) <sup>258</sup>	Provides a four-step process for evaluating the risk associated with dust emissions from construction and demolition sites on different types of receptor to dust soiling, health effects and ecological effects.	Section 9.7: Assessment Methodology

## 9.3 Consultation

9.3.1 No consultation has occurred to date with respect to Air Quality. However, in respect of air quality, focussed engagement (through both informal and formal consultation) will be undertaken and recorded throughout the pre-application stages of the Project. Engagement will be undertaken with the Environmental Health teams in the local authority areas within the Study Areas (see **Section 9.6** which provides further detail covering the rationale of the Study Area definitions applied).

## 9.4 Into dataBaseline conditions

### Data gathering methodology

- 9.4.1 As detailed information on locations and construction traffic routes is not yet available, baseline air quality information has been collected for an area 10km around the Scoping red line boundary. Beyond this distance it is thought that construction traffic will have dispersed on the road network such that impacts on air quality would be negligible.
- 9.4.2 The data sources which have been used to inform this baseline study area are summarised in **Table 9.4**.

**Table 9.4 Data sources used to inform the Air Quality assessment**

Source	Date	Summary	Coverage
Department for Environment, Food	30 November 2020	Background maps of forecast air	Full coverage

<sup>258</sup> Institute of Air Quality Management (2014). Guidance on the assessment of dust from demolition and construction. (Online). Available from: [http://iaqm.co.uk/wp-content/uploads/guidance/iaqm\\_guidance\\_report\\_draft1.4.pdf](http://iaqm.co.uk/wp-content/uploads/guidance/iaqm_guidance_report_draft1.4.pdf) (Accessed December 2021).

Source	Date	Summary	Coverage
and Rural Affairs (Defra) (2020) <sup>259</sup>		quality concentrations	
Cheshire West and Chester Council Annual Status Report (ASR) (2021) <sup>260</sup>	30 June 2021	Monitoring data and supporting information on AQMAs	Monitoring sites in Cheshire West and Chester Council area
Cheshire East Council ASR (2020) <sup>261</sup>	30 June 2020	Monitoring data and supporting information on AQMAs	Monitoring sites in Cheshire East Council area
Halton Borough Council ASR (2018) <sup>262</sup>	30 June 2018	Monitoring data and supporting information on AQMAs	Monitoring sites in Halton Borough Council area
Warrington Borough Council ASR (2020) <sup>263</sup>	30 June 2020	Monitoring data and supporting information on AQMAs	Monitoring sites in Warrington Borough Council area
Greater Manchester Combined	30 June 2021	Monitoring data and supporting information on AQMAs	Monitoring sites in Greater Manchester area

<sup>259</sup> Defra (2020). Background Mapping data for local authorities. (Online) Available at: <https://uk-air.defra.gov.uk/data/laqm-background-home> (Accessed December 2021).

<sup>260</sup> Cheshire West and Chester Council (2021). 2020/2021 Air Quality Annual Status Report (ASR). (Online) Available at: <https://www.cheshirewestandchester.gov.uk/documents/pests-pollution-food-safety/pollution-and-air-quality/air-quality-review-and-assessment/reports/air-quality-annual-status-report-2020-21.pdf> (Accessed December 2021).

<sup>261</sup> Cheshire East Council (2020). 2020 Air Quality Annual Status Report (ASR). (Online) Available at: <https://moderngov.cheshireeast.gov.uk/ecminutes/documents/s80967/Appendix%201%20CEC.ASR.2020.4%20Final%20Report.pdf> (Accessed December 2021).

<sup>262</sup> Halton Borough Council (2018). 2018 Air Quality Annual Status Report (ASR). (Online) Available at: <https://www3.halton.gov.uk/Documents/planning/airquality/AirQualityReview2018.pdf> (Accessed December 2021).

<sup>263</sup> Warrington Borough Council (2020). 2020 Air Quality Annual Status Report (ASR). (Online) Available at: [https://www.warrington.gov.uk/sites/default/files/2020-12/asr\\_warrington\\_2020.pdf](https://www.warrington.gov.uk/sites/default/files/2020-12/asr_warrington_2020.pdf) (Accessed December 2021).

Source	Date	Summary	Coverage
<b>Authority ASR (2021)<sup>264</sup></b>			
<b>St. Helens Council ASR (2020)<sup>265</sup></b>	30 June 2020	Monitoring data and supporting information on AQMAs	Monitoring sites in St. Helens Council area

## Current baseline

9.4.3 **Figure 9.1** presents the AQMAs in the vicinity of the Scoping red line boundary. Four of these AQMAs have been identified within 50m of areas where construction traffic is expected to be generated by the Project. The AQMAs within 50m of construction traffic are reported in **Table 9.5**, alongside the local authority which has declared the respective AQMA, a description of the AQMA and the distance of the AQMA to the Scoping red line boundary. Traffic generated by the Project has the potential to affect air quality within these AQMAs. Each AQMA, except for Thornton-le-Moors AQMA, has been declared for exceedances of the NO<sub>2</sub> AQO. Thornton-le-Moors AQMA has been declared for exceedances of the SO<sub>2</sub> AQO.

**Table 9.5 AQMAs declared within 10km of the red line boundary**

Local Authority	AQMA name	Description	Distance to the Scoping red line boundary
<b>Cheshire West and Chester Council</b>	Frodsham AQMA Cheshire West and Chester	An area at the junction of Fluin Lane with the A56 High Street.	0.5km
<b>Cheshire West and Chester Council</b>	Thornton le Moors AQMA No. 4	An area encompassing the entire village of Thornton le Moors, its surroundings and parts of the adjacent area of Stanlow.	Within the West Corridor of the Scoping red line boundary

<sup>264</sup> Greater Manchester Combined Authority (2021). 2020 Air Quality Annual Status Report (ASR). (Online) Available at: [https://assets.ctfassets.net/tlpgbvy1k6h2/4IY6QAZe4MdkqcedBIbgE8/a343eef4385f33f4710bb9f08c70f59f/GM\\_2020\\_Air\\_Quality\\_Annual\\_Status\\_Report.pdf](https://assets.ctfassets.net/tlpgbvy1k6h2/4IY6QAZe4MdkqcedBIbgE8/a343eef4385f33f4710bb9f08c70f59f/GM_2020_Air_Quality_Annual_Status_Report.pdf) (Accessed December 2021).

<sup>265</sup> St Helens Council (2020). 2020 Air Quality Annual Status Report (ASR). (Online) Available at: [https://www.sthelens.gov.uk/media/329249/asr\\_st-helens\\_2020\\_v2-signed.pdf](https://www.sthelens.gov.uk/media/329249/asr_st-helens_2020_v2-signed.pdf) (Accessed December 2021).

Local Authority	AQMA name	Description	Distance to the Scoping red line boundary
<b>Greater Manchester Authority</b>	AQMA Greater Manchester	An area covering the ten districts of Greater Manchester, including arterial routes, district centres, and airport. This is also the boundary of the Manchester Clean Air Zone (CAZ) <sup>266</sup> which will be introduced from 30 May 2022 and introduce a charge for the most polluting commercial and passenger vehicles.	1.3km
<b>Warrington Borough Council</b>	Warrington AQMA No.1	A 50m continuous strip on both sides of the M6, M62 and M56 motorway corridors.	Within the Scoping red line boundary

### Background

- 9.4.4 The UK-AIR website provides data for background concentrations of NO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>. The background concentrations represent 1km<sup>2</sup> grid squares. **Figure 9.2 to Figure 9.5** presents the background concentrations reported by Defra for each of these pollutants within the Baseline Study Area. These figures show that annual average background concentrations of each pollutant are below the respective AQOs reported in **Table 9.2**.
- 9.4.5 For NO<sub>2</sub> annual average background concentrations, **Figure 9.2** shows that there is a slight gradient moving from the south to north of the Baseline Study Area. This shows increases in concentrations moving north into the jurisdictional areas of Halton, Warrington, St Helens and Trafford. There are also increases in concentrations moving north-west of the Cheshire West and Chester area. **Figure 9.1** shows maximum annual average concentrations of NO<sub>2</sub> of 23.5ug/m<sup>3</sup>.

<sup>266</sup> Clean Air Greater Manchester (undated). Clean Air Greater Manchester website. (Online). Available at: <https://cleanairgm.com/> (Accessed January 2022).

9.4.6 Within the Baseline Study Area, **Figure 9.2** shows maximum annual average concentrations of  $\text{NO}_x$  of  $35\mu\text{g}/\text{m}^3$ , **Figure 9.3** shows maximum annual average concentrations of  $\text{PM}_{10}$  of  $14.8\mu\text{g}/\text{m}^3$ , and **Figure 9.4** shows maximum annual average concentrations of  $\text{PM}_{2.5}$  of  $10.9\mu\text{g}/\text{m}^3$ . All concentrations are below the respective AQO's as outlined in **Table 9.2**.

### *Automatic monitoring*

9.4.7 Automatic monitoring of  $\text{NO}_2$  was undertaken by the following local authorities during the period of 2013 - 2020:

- Cheshire West and Chester Council: six automatic monitoring locations;
- Halton: three automatic monitoring locations, only one monitoring site with monitoring data reported;
- Warrington: three automatic monitoring locations;
- Cheshire East: one automatic monitoring site;
- Trafford: three automatic monitoring locations; and
- St Helens: four automatic monitoring locations.

9.4.8 The location of the  $\text{NO}_2$  automatic monitoring sites within 10km of the Scoping red line boundary is reported in **Appendix 9A**, with the concentrations of  $\text{NO}_2$  for the monitoring period 2013 – 2020 also reported in **Appendix 9A**. The location of both the automatic monitoring sites and passive monitoring sites in relation to the Scoping red line boundary are shown in **Figure 9.6**.

9.4.9 All local authorities except for Cheshire East undertook automatic monitoring of  $\text{PM}_{10}$  during the period 2013 – 2020. Warrington Borough Council was the only local authority to have undertaken automatic monitoring of  $\text{PM}_{2.5}$  during this period. The concentrations for this period for  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  are also reported in **Appendix 9A**.

9.4.10 Automatic monitoring of  $\text{NO}_2$  for the monitoring period of 2013 – 2020 has shown there were 13 exceedances of the AQO for  $\text{NO}_2$ . The last two years have only seen two exceedances.

### *Passive monitoring*

9.4.11 Passive diffusion tube monitoring of  $\text{NO}_2$  concentrations was undertaken by the six local authorities from 2013 – 2020. The number of passive monitoring locations each local authority undertook monitoring for during this period is reported below:

- Cheshire West and Chester Council: 88 passive monitoring locations;
- Halton: 16 passive monitoring locations;
- Warrington: 33 passive monitoring locations;
- Cheshire East: 133 passive monitoring locations;
- Trafford: 18 passive monitoring locations; and
- St Helens: 33 passive monitoring locations.

- 9.4.12 **Appendix 9A** reports the details of the monitoring sites within 10km of the Scoping red line boundary covered by these local authorities, and **Figure 9.6** shows the location of these monitoring sites in relation to the Project. Concentrations of NO<sub>2</sub> at these monitoring sites are reported in **Appendix 9A**.
- 9.4.13 The NO<sub>2</sub> annual mean AQO was exceeded at 19 of the 197 monitoring locations used in 2019. This shows that the annual mean AQO is only exceeded at certain roadside locations and that concentrations across the majority of the area are below the AQO.

## Future baseline

- 9.4.14 It is expected there will be a gradual decline in pollutant concentrations in the atmosphere as a result of measures such as the implementation of the Government's Clean Air Strategy, improvements in real world emissions performance of road vehicles, and more stringent emission limits for industrial sources as environmental permits for operators covering the various industrial sectors are updated in a phased manner to bring them in line with the requirements of the Industrial Emissions Directive<sup>267</sup>.
- 9.4.15 With regard to the potential effects of climate change on the future air quality baseline, the 2007 report produced by the Air Quality Expert Group (AQEG)<sup>268</sup> indicated that the Winter season may become windier with fewer less stable weather conditions by the end of the century, whilst Summer seasons are anticipated to become hotter and sunnier, with an increase in unstable weather conditions by the 2040s. The net effect of these anticipated changes on the baseline air quality is difficult to establish but is unlikely to significantly alter the baseline air quality to an extent that it would affect the outcome of any assessment. Other factors such as changes in technology and the move away from combusting fossil fuels, driven by climate change abatement would potentially lead to decreases in emissions of the key pollutants considered in this assessment and a corresponding decrease in background concentrations of air pollutants into the future.

## 9.5 Embedded environmental measures

- 9.5.1 As part of the project design process, a number of embedded measures are proposed to reduce the potential for impacts on air quality (see **Table 9.6**). These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard

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<sup>267</sup> European Commission (2010). Directive 2010/75/EU of the European Parliament and of the Council. (Online). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN> (Accessed December 2021).

<sup>268</sup> Air Quality Expert Group (2007). Air Quality and Climate Change: A UK Perspective. (Online) Available at: <https://uk-air.defra.gov.uk/library/assets/documents/reports/aqeg/fullreport.pdf> (Accessed December 2021).

practice and include actions that would be undertaken to meet existing legislation requirements.

**Table 9.6 Embedded environmental measures relating to Air Quality**

Environmental measure proposed	How the environmental measures will be secured
<p><b>Where practical, sensitive sites will be avoided by the temporary construction compounds and permanent Project elements including SSSIs, Local Nature Reserves, Local Wildlife Sites, Ancient Woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination, National Trust Land, Listed Buildings and Scheduled monuments.</b></p>	<p>Development Consent Order (DCO) works plans and order limits</p>
<p><b>Best practice air quality management measures will be applied as described in IAQM guidance on the Assessment of Dust from Demolition and Construction<sup>258</sup>.</b></p>	<p>Code of Construction Practice (CoCP) and DCO requirement</p>

## 9.6 Scope of the assessment

### Study Area

9.6.1 There will be different study areas for different emissions to air associated with the Project. Each emission source has a different Zones of Influence (Zoi) which are dependent upon the location of the emission source(s), the magnitude of the emissions, the extent to which they are dispersed and diluted in the atmosphere, and the relative location of the human and ecological receptors. These air quality emissions include:

- Construction road traffic emissions;
- Construction dust emissions;
- Construction Non-Road Mobile Machinery (NRMM) emissions; and
- Operational road traffic emissions.

9.6.2 The methodological approach to deciding upon the spatial extent of the Study Area for air quality has been informed by the IAQM (2014<sup>258</sup> and 2017<sup>256</sup>) guidance documents. The guidance documents will be used to determine the assessment requirements, including the areas to be considered. Details of the approach to determining the study areas for different air quality pollutants is provided below where the various emissions are discussed separately.

### Road traffic emissions

- 9.6.3 A screening exercise will be undertaken using the criteria summarised in **Table 9.7** to determine if a detailed air quality assessment of road traffic emissions is required once further details on traffic movements associated with the Project are available. When considering ecological receptors, a screening criterion of 200m from affected roads will be used. Consultation will then be made with the ecological team to decide if the identified ecological receptors are sensitive to the Projects impacts.

**Table 9.7 Screening criteria for detailed air quality assessment of road traffic emissions**

Nature of Impact	Screening criteria for a detailed air quality assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: <ul style="list-style-type: none"> <li>more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA; and</li> <li>more than 500 AADT elsewhere.</li> </ul>
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: <ul style="list-style-type: none"> <li>more than 25 AADT within or adjacent to an AQMA; and</li> <li>more than 100 AADT elsewhere.</li> </ul>
Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
Introduce a new junction or remove an existing junction near to relevant receptors.	The introduction of a new junction or removal of a junction will lead to a detailed air quality assessment when this addition/ removal causes traffic to significantly change vehicle acceleration or deceleration, e.g. traffic lights, or roundabouts.

Taken from IAQM guidance Land-Use Planning & Development Control: Planning For Air Quality<sup>256</sup>

### Construction dust and fine particle emissions

- 9.6.4 Construction activities associated with the Project with the potential to give rise to dust and fine particle emissions will include the construction of Hydrogen Above Ground Installations (HAGIs) and works related to the installation of underground pipelines. The activities associated with the construction phase of the Project include earthworks, construction and vehicle movements that could cause track-out of material.



9.1.1 The following Zols will be used where an assessment of dust emissions from these activities is required:

- A human receptor within:
  - ▶ 350m of the boundary of the construction site considered; or
  - ▶ 50m of the route(s) used by construction vehicles; and
  - ▶ Vehicles on the public highway, up to 500m from the construction site entrance(s).
- An ecological receptor within:
  - ▶ 50m of the boundary of the construction site considered; or
  - ▶ 50m of the route(s) used by construction vehicles; and
  - ▶ On the public highway, up to 500m from the construction site entrance(s).

## Potential receptors

9.6.5 Receptors potentially affected by the Project comprise residents living near to the construction sites or along roads that may be affected by traffic associated with the Project<sup>269</sup>. Residents living near construction sites may be subject to both the impacts of road traffic emissions and dust nuisance. In addition, there are also internationally and nationally designated nature conservation sites in the locality of the Scoping red line boundary which may be susceptible to direct exposure to air pollutants emitted during the construction phase of the Project and through indirect effects associated with nitrogen and acid deposition.

9.6.6 Guidance from Defra in LAQM.TG16<sup>270</sup> establishes that exceedances of the human health-based AQOs should only be assessed at outdoor locations where members of the general public are regularly present over the averaging time of the objective.

9.6.7 **Table 9.8** provides examples of those locations that may be relevant for different averaging periods, as extracted from LAQM.TG16<sup>270</sup>.

**Table 9.8 Examples of locations where Air Quality Objectives apply**

Averaging period	Objectives should apply	Objectives should not apply
<b>Annual mean</b>	All locations where members of the public might be regularly exposed.	Building facades of offices or other places of work where members of the

<sup>269</sup> Effects on construction workers are considered under the appropriate workplace health and safety regulations

<sup>270</sup> Defra (2018). Local Air Quality Management Technical Guidance (TG16). 2018. (online). Available from: <https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf> (Accessed December 2021).

Averaging period	Objectives should apply	Objectives should not apply
	Building facades of residential properties, schools, hospitals, care homes etc.	public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
<b>24-hour mean, and 8-hour mean</b>	All locations where the annual mean objectives would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
<b>1-hour mean</b>	All locations where the annual mean and: 24 and 8-hour mean objectives would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. Any outdoor locations at which the public may be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
<b>15-min mean</b>	All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	

- 9.6.8 Ecological receptors (internationally and nationally designated nature conservation sites) have been provisionally identified as those within 350m of the Scoping red line boundary. These ecological receptors may be susceptible to impacts of the emission of air pollutants associated with the construction of the Project (see **Table 9.9**). These are provisional and the list will be refined upon further consultation with the Project Ecology consultants and the Traffic and Transport consultants once construction routes are finalised. The list will also be refined based on the sensitivity of these sites to nitrogen deposition.
- 9.6.9 Additional ecological receptors may be identified once construction routes are finalised. This is since this preliminary list is based upon an assumed distance of 350m from the Scoping red line boundary, in the absence of construction traffic routes. Ecological receptors within 200m of affected roads will be identified once construction routes are finalised.

**Table 9.9 Ecological receptors within 350m of the Scoping red line boundary**

Sites of Special Scientific Interest (SSSI)	Ancient Woodland	Local nature reserves
<b>Brookheys Covert</b>	Alder and Hey Woods	Daresbury Firs
<b>Hatton's Hey Wood, Whittle's Corner and Bank Rough</b>	Bank Rough	Oxmoor Wood
<b>Pettypool Brook Valley</b>	Beechmill Wood	Thatto Heath Meadows
<b>Plumley Lime Beds</b>	Big Wood	
<b>Beechmill Wood and Pasture</b>	Birds and Longacre Woods	
	Blackamoor Wood	
	Brookheys Covert	
	Chapel/Dell Woods	
	Dutton Dean	
	Dutton Hollows	
	Eaton Bank Wood	
	Eaton House Wood	
	Garden Wood	
	Hawton Clough and Bradley Meadow Wood	

Sites of Special Scientific Interest (SSSI)	Ancient Woodland	Local nature reserves
	Heys Wood	
	Hobbins Way Wood	
	Leonards And Smoker Woods	
	Lodge Wood	
	Lowes Wood	
	Old Moat Wood/The Coppice	
	Outer Wood	
	Park Brow	
	Poors Wood	
	Round and Rinks Woods	
	Rows Wood	
	Rye Grass Pipes 2	
	Winnington Wood	

### Likely significant effects

9.6.10 The likely significant Air Quality effects that will be taken forward for assessment in the PEIR and ES are summarised in **Table 9.10**.

**Table 9.10 Likely significant Air Quality effects**

Activity	Effect	Receptor
<b>Construction</b>		
<b>Construction of Project infrastructure</b>	Fugitive dust emissions and increases in PM <sub>10</sub> and PM <sub>2.5</sub>	Human and ecological receptors
<b>Use of road vehicles for the construction of the Project</b>	Combustion product emissions arising from the construction related traffic will add to pollutants included in The Air Quality	Human and ecological receptors

Activity	Effect	Receptor
	Standards regulations 2010 <sup>254</sup> currently set out the AQOs in the UK. These are reported in <b>Table 9.2</b> .	

9.6.11 The effects scoped out from further assessment are:

- The effect of pollutant emission from NRMM. Emissions are controlled by the NRMM (Emission of Gaseous and Particulate Pollutants) Regulations 1999 (as amended)<sup>271</sup> and the scale, duration and distance of construction activity to relevant receptors is not considered to be of a magnitude that would require detailed assessment. As it is a linear project, there is unlikely to be a concentration of NRMM close to receptors for a long duration. This is also the case for the HAGI locations, which are unlikely to be within 20m of residential properties.
- The effect of combustion product emissions from operational road traffic emissions. As per the maintenance schedule detailed in **Chapter 2: The Project**, maintenance activities mostly include less than 10 personnel, and any maintenance requiring more will only occur periodically every 5 to 15 years. Therefore, it is not considered that the magnitude of these traffic flows would exceed the UPUK and IAQM criteria (detailed in **Table 9.7**) for a detailed air quality assessment. This is also highlighted in **Section 11.7: Effects scoped out of assessment** within **Chapter 11: Traffic and Transport**.

## 9.7 Assessment methodology

9.7.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this air quality chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the air quality assessment in the ES.

9.7.2 The definitions of the magnitude of impacts and receptor sensitivity for the Air Quality assessment will follow the IAQM guidance documents for construction dust<sup>258</sup>, planning and development<sup>256</sup> and ecological designated sites<sup>257</sup> and is discussed further in the following section.

### *Construction Phase – dust emissions*

9.7.3 A desktop assessment will be undertaken to assess the effects of dust emissions to air. The IAQM Guidance on the assessment of dust from demolition and construction<sup>258</sup> will be used for this air quality assessment. Consideration will be given towards the

<sup>271</sup> UK Government (2018). The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018. (Online). Available from: <https://www.legislation.gov.uk/ukxi/2018/764/contents/made> (Accessed December 2021).

potential for the mobilisation of contaminated materials from the disturbance of land located adjacent to or running through industrial areas. This will include discussions with the technical experts authoring **Chapter 12: Ground Conditions**.

- 9.7.4 The dust emitting activities that may take place during the construction phase of the Project can be divided into four different types:
- Demolition – an activity involved with the removal of an existing structure or structures;
  - Earthworks – the processes of soil-stripping, ground-levelling, excavation and landscaping;
  - Construction – an activity involved in the provision of a new structure; and
  - Activities that cause Trackout – the transport of dust and dirt from the site onto the public road network. This arises when lorries leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground on-site.
- 1.1.2 The IAQM Guidance on the assessment of dust from demolition and construction<sup>258</sup> assessment methodology considers three separate dust impacts:
- Annoyance due to dust soiling;
  - The risk of health impacts due to an increase in exposure to PM<sub>10</sub>; and
  - Harm to ecological receptors.
- 9.7.5 Detailed air quality assessment involves a three-stage process:
- Stage 1 - construction sites are classified according to the risk of dust impacts (based upon the scale and nature of the works, plus the proximity of sensitive receptors);
  - Stage 2 - appropriate site-specific mitigation measures are identified; and
  - Stage 3 - the significance of effects is then determined.
- 9.7.6 The methodology for the classification of construction sites according to the risk of effects is described within the *Determination of significance* section.

### Construction Phase – road traffic emissions

- 9.7.7 EPUK and IAQM provides guidance<sup>256</sup> on when it is appropriate to carry out a detailed air quality assessment of a development that generates road traffic. The key criteria where a detailed assessment may be required are reported in **Table 9.7**.
- 9.7.8 If a detailed assessment of road traffic emissions is required, annual average concentrations NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> will be determined using the ADMS-Roads atmospheric dispersion model (version 5.0). Annual average concentrations of NO<sub>2</sub> will be calculated from the annual average concentrations of NO<sub>x</sub> and by using Defra's NO<sub>x</sub> to NO<sub>2</sub> calculator.

- 9.7.9 Road traffic data will be provided as part of the Traffic and Transport assessment at a later stage of the EIA. Emission factors obtained from Defra's Emission Factor Toolkit v11.0 (EFT) will be used to predict emissions which can subsequently be imported into ADMS-Roads.
- 9.7.10 Model verification will be a required step in the air quality assessment. This will be undertaken as a separate model scenario as described below. This scenario seeks to compare NO<sub>2</sub> concentrations from monitored data and the NO<sub>2</sub> concentrations calculated as a result of modelling a verification scenario. This enables the calculation of a verification factor to adjust modelling results for proceeding model scenarios. This scenario will model NO<sub>x</sub> concentrations at existing monitoring locations on the affected roads.
- 9.7.11 Modelling will be undertaken using the following scenarios:
- Scenario A: Current baseline. 2019 will be used as the latest year unaffected by the COVID-19 pandemic. This will include baseline year emission factors, and baseline year traffic Annual Average Daily traffic Flows (AADTs). This should represent a full year of air quality monitoring and traffic data. This will be used for model verification;
  - Scenario B: Do minimum (future baseline). This scenario will include committed developments within the area and exclude the Project; and
  - Scenario C: Do something. A future scenario including the Project and committed developments to determine the impact of the Project.

### *Designated nature conservation sites*

- 9.7.12 There are two categories of pollutants which are important to the air quality assessment for designated nature conservation sites. These are pollutants which have an effect on vegetation/habitats in a gaseous form and those which have an impact through deposition. **Table 9.11** reports a summary of the relevant air quality standards, objectives, environmental assessment levels and targets relevant to the assessment of air quality impacts on ecological receptors.
- 9.7.13 The assessment will be undertaken in consultation with the experts delivering **Chapter 5: Ecology** to ensure consistency between the two topics. The Air Pollution Information System (APIS)<sup>272</sup> provides background deposition data and critical loads and levels for deposition assessments. Unlike for the AQS and EAL values, critical loads differ depending on species sensitivity.
- 9.7.14 Provisional designated nature conservation sites have been identified, as discussed in paragraph 9.6.8, and are reported in **Table 9.9**.

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<sup>272</sup> APIS (2021). Air Pollution Information System (APIS). (Online). Available at: <http://www.apis.ac.uk/> (Accessed December 2021).

**Table 9.11 Summary of relevant assessment criteria for ecological receptors**

Pollutant	AQS/Environmental Assessment Level (EAL)/Target	Objective (UK)	AQS/EAL/Target
NO <sub>x</sub>	AQS	30 µgm <sup>-3</sup>	Annual Mean
	AQS	200 µgm <sup>-3</sup>	Daily Mean
	EAL	75 µgm <sup>-3</sup>	Daily Mean

- 9.7.15 In light of the Wealden judgement<sup>273</sup>, the air quality effects associated with the construction phase of the Project will be considered alone and in-combination with other relevant projects or plans. This is because a series of individually modest impacts may, in-combination, produce a significant effect on ecological receptors identified for assessment.
- 9.7.16 This means that it is no longer appropriate to scope out the need for a detailed assessment of an individual project or plan using, for example, the 1,000 annual AADT increase in the DMRB<sup>274</sup> or the 1% of the critical level or load used by the Environment Agency without first considering the in-combination impact with other projects and plans.
- 9.7.17 Concentrations of NO<sub>x</sub> will be determined by undertaking the dispersion modelling assessment. Modelling results will be used to calculate nitrogen deposition rates at designated nature conservation sites. SO<sub>2</sub> and acid deposition rates will also be considered depending on the content of sulphur in the fuel.
- 9.7.18 The surface roughness in the wider area will affect the modelled ground level concentration of a pollutant. A suitable value will be selected, in line with model guidance.
- 9.7.19 For road transport sources, ecological receptors along a transect, or along a series of transects at suitable intervals, perpendicular to the road up to 200m will be used.
- 9.7.20 To determine the concentrations/deposition rates, the process contribution (PC) is added to the baseline concentrations/deposition rates. These may be taken from measurement data or other appropriate sources such as Defra<sup>259</sup> or the APIS<sup>272</sup> background maps. The concentration/deposition rate is known as the predicted environmental concentration (PEC).
- 9.7.21 All deposition rates will be quantified and compared to critical loads using data from the APIS<sup>272</sup>.

<sup>273</sup> Wealden DC v SSCLG (2017) EWHC 351.

<sup>274</sup> Highways England (2007). Design manual for Roads and Bridges. Volume 11, section 3. (online). Available at: <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section3.htm>. (Accessed December 2021).



### *Determination of significance – dust emissions*

- 9.7.22 To consider the significance of the dust emissions associated with the Project, step 1 described in paragraph 9.7.5 is completed. The following section describes the methodological approach that will be used to complete step 1 and determine the risk dust impacts.
- 9.7.23 Firstly, the magnitude of each of the dust emitting activities will be considered in isolation. The magnitude is based on the scale of the proposed construction activities and will be categorised according to the small, medium or large categorisation provided in the IAQM guidance<sup>258</sup>.
- 9.7.24 The magnitude of the dust emitting activities concluded at the beginning of the assessment and the overall sensitivity of the area surrounding the construction activities will be used as part of a matrix to determine the risk of dust impacts for the four dust activities (demolition, earthworks, construction and trackout). The risk of impacts will be defined as either high, medium, low or negligible risk and based professional judgment and the guiding principles as stated in the IAQM guidance<sup>258</sup>.
- 9.7.25 Based on the overall risk assessment for the four activities, site specific mitigation measures may need to be adopted depending on the risk of the impact identified. Should the levels be rated as high, medium or low risk, mitigation measures will need to be developed as part of a dust management plan and implemented. The approach to determine the most applicable or effective mitigation measures, for the risk level determined, is based on professional judgement and the guiding principles as stated in the IAQM guidance<sup>258</sup> (**Table 9.12**). However, should the risk level be negligible, no additional mitigation measures may be required other than those required by legislation.
- 9.7.26 The assessment of the significance of dust effects will be undertaken after applying the site-specific mitigation. This would take account of the risk of dust impacts, and other factors that might affect the risk of dust effects arising, even after any site-specific mitigation has been implemented. The overall significance of the effects arising from the entire construction phase of the Project will be based on professional judgement, taking into account the risk of the effects of each of the four activities.

**Table 9.12 Matrices for determining risk of impacts from construction dust**

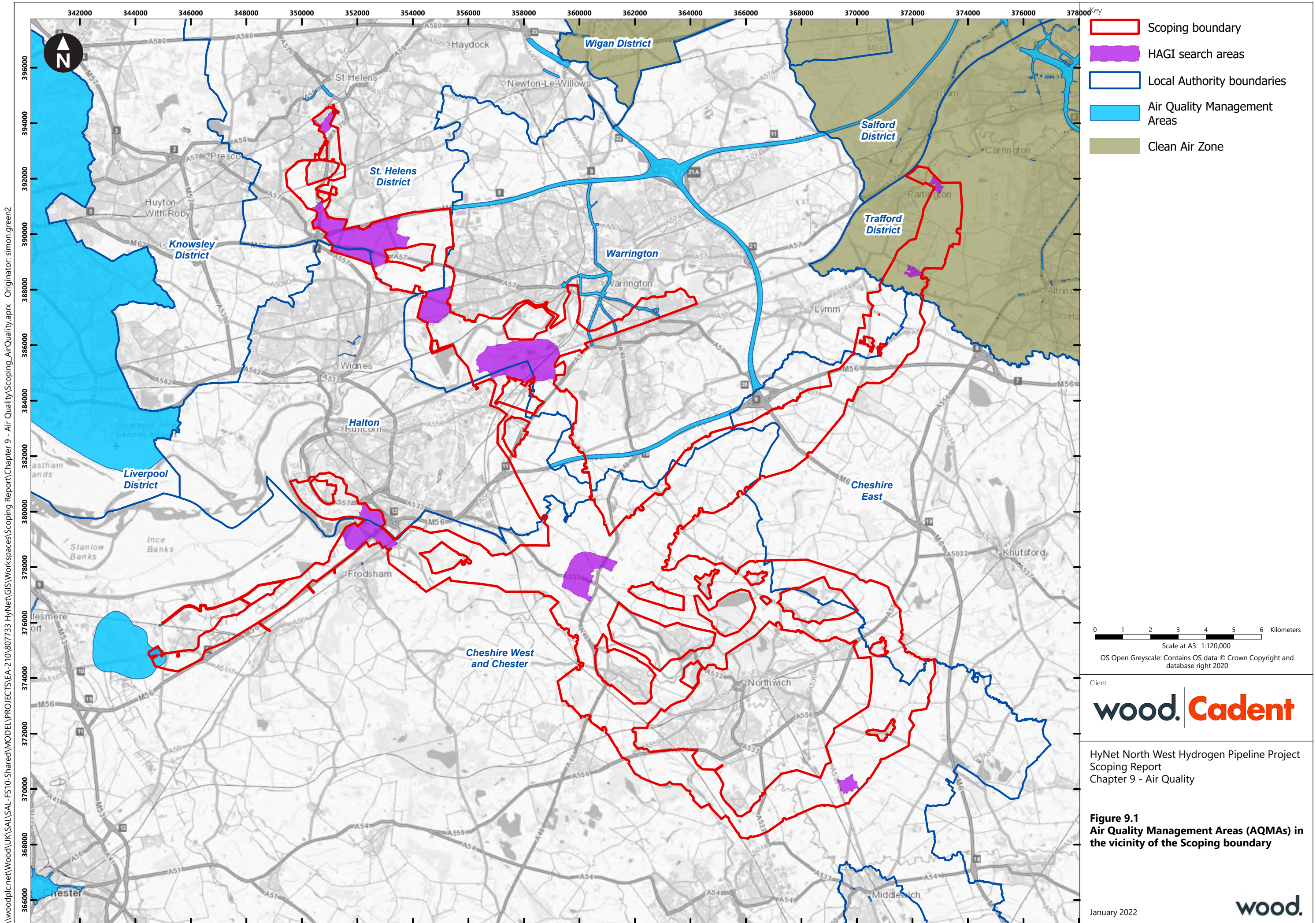
Category Type	Sensitivity of Area	Dust Emission Magnitude		
		Large	Medium	Small
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Trackout	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Low Risk	Negligible
	Low	Low Risk	Low Risk	Negligible

**Determination of significance – road traffic emissions**

- 9.7.27 Using IAQM guidance the magnitude of change due to an increase/decrease in the annual mean concentration of NO<sub>2</sub> and PM<sub>10</sub> and other pollutants due to the Project will be described using the criteria in **Table 9.13**. Criteria are based on the change in concentration of a pollutant at an existing receptor location due to a new development, as a percentage of the Air Quality Assessment Level (AQAL) (i.e. the AQO). When describing the effect at a specific receptor, the percentage change in concentration relative to AQAL is considered in combination with the long-term average concentration at a receptor in the assessment year, using the approach detailed in **Table 9.13**.

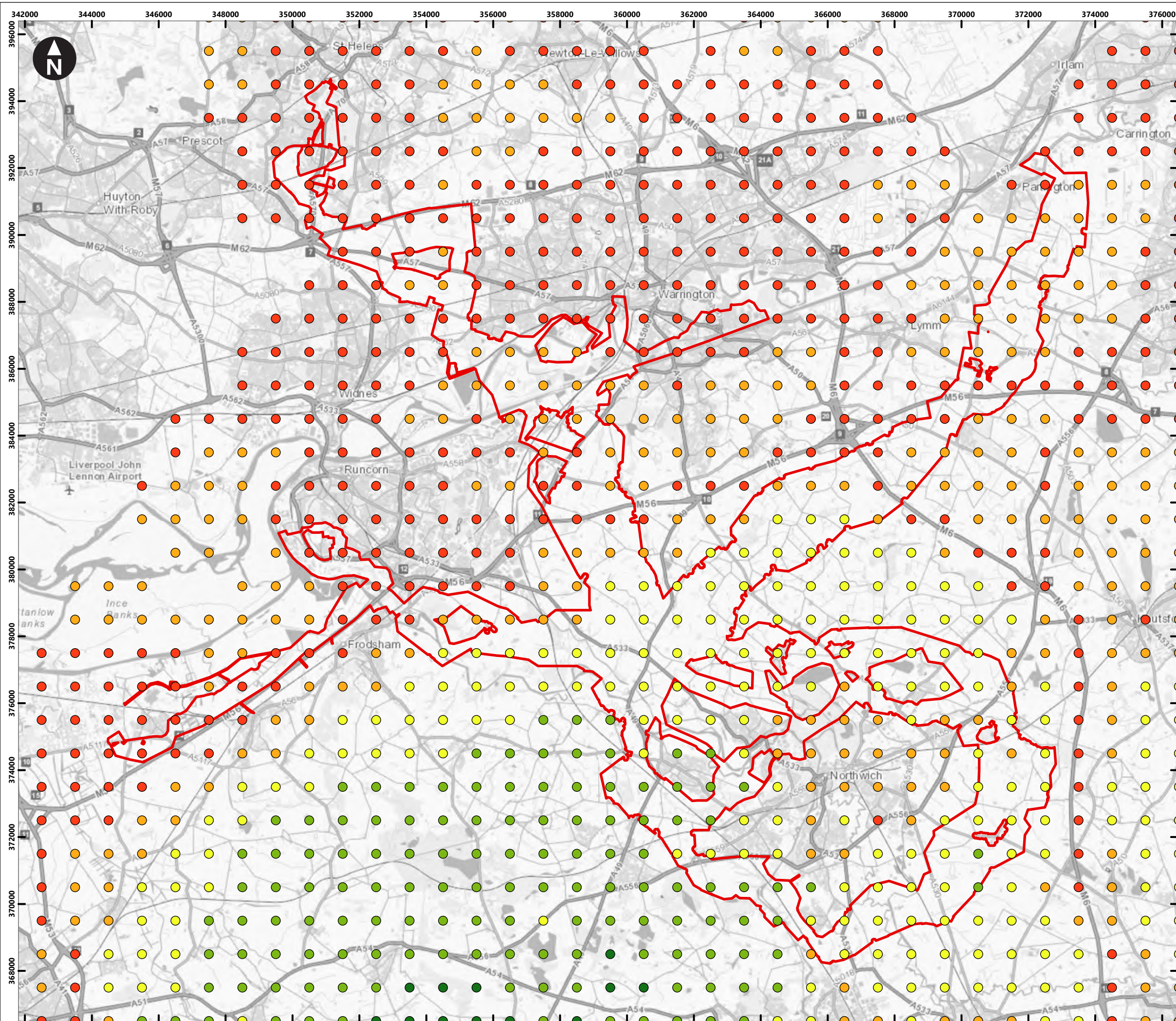
**Table 9.13 Impact descriptors for individual receptors**

Absolute concentration with Proposed Development, relative to assessment level	% change in Concentration Relative to Assessment Level				
	0%	1%	2–5%	6-10%	>10%
75% or less	Negligible	Negligible	Negligible	Slight	Moderate
76–94%	Negligible	Negligible	Slight	Moderate	Moderate
95–102%	Negligible	Slight	Moderate	Moderate	Substantial
103–109%	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more	Negligible	Moderate	Substantial	Substantial	Substantial



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Key  
Scoping boundary

**NO<sub>2</sub> concentration**

- < 6
- 6 - 7.5
- 7.5 - 9
- 9 - 11.5
- > 11.5

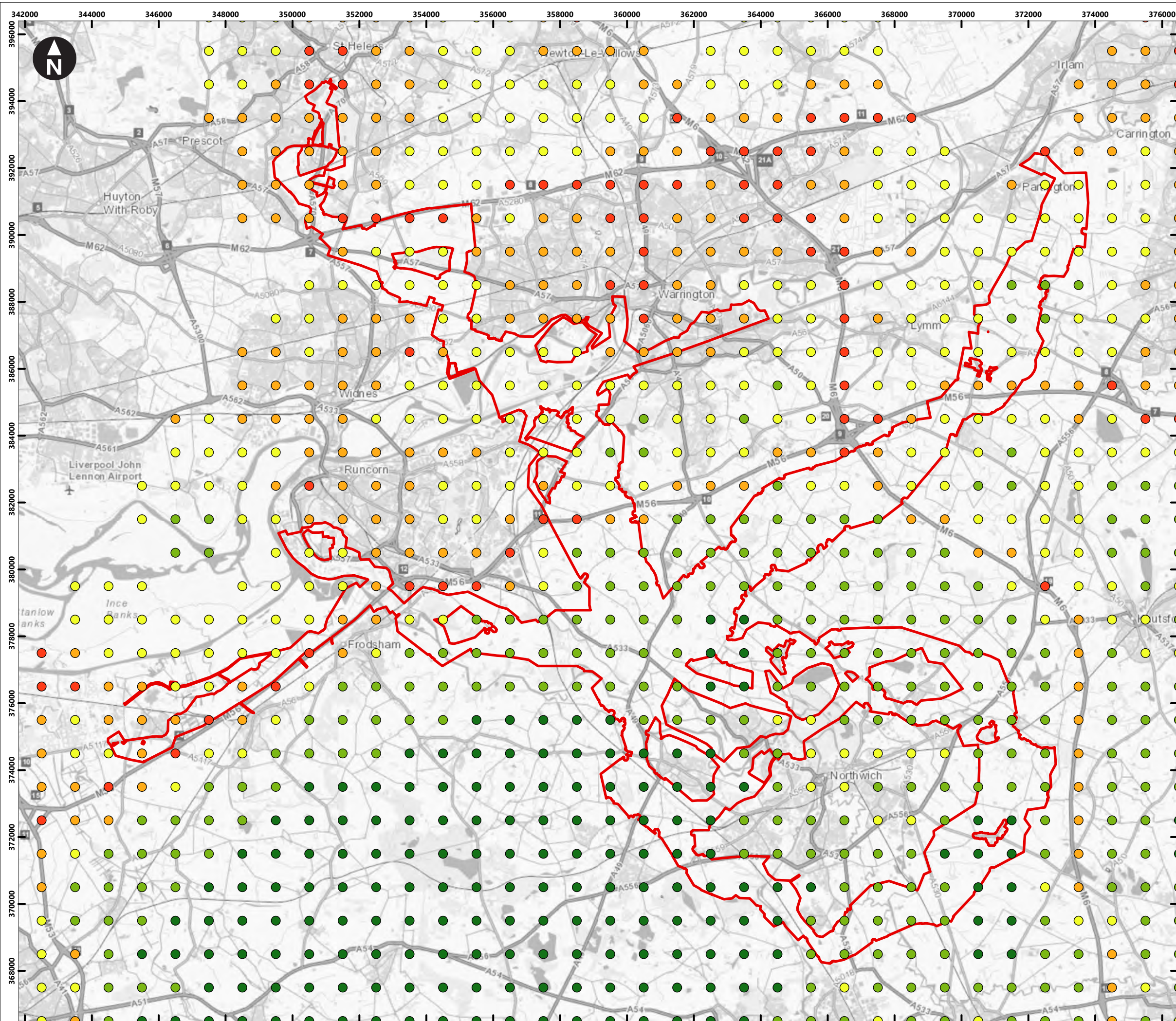
0 1 2 3 4 5 Kilometers  
Scale at A3: 1:110,000  
OS Open Greyscale: Contains OS data © Crown Copyright and database right 2020

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**Figure 9.2**  
Background NO<sub>2</sub> concentrations

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Key  
Scoping boundary

**NOx concentration**

- < 10
- 10 - 13
- 13 - 16.5
- 16.5 - 21.5
- > 21.5

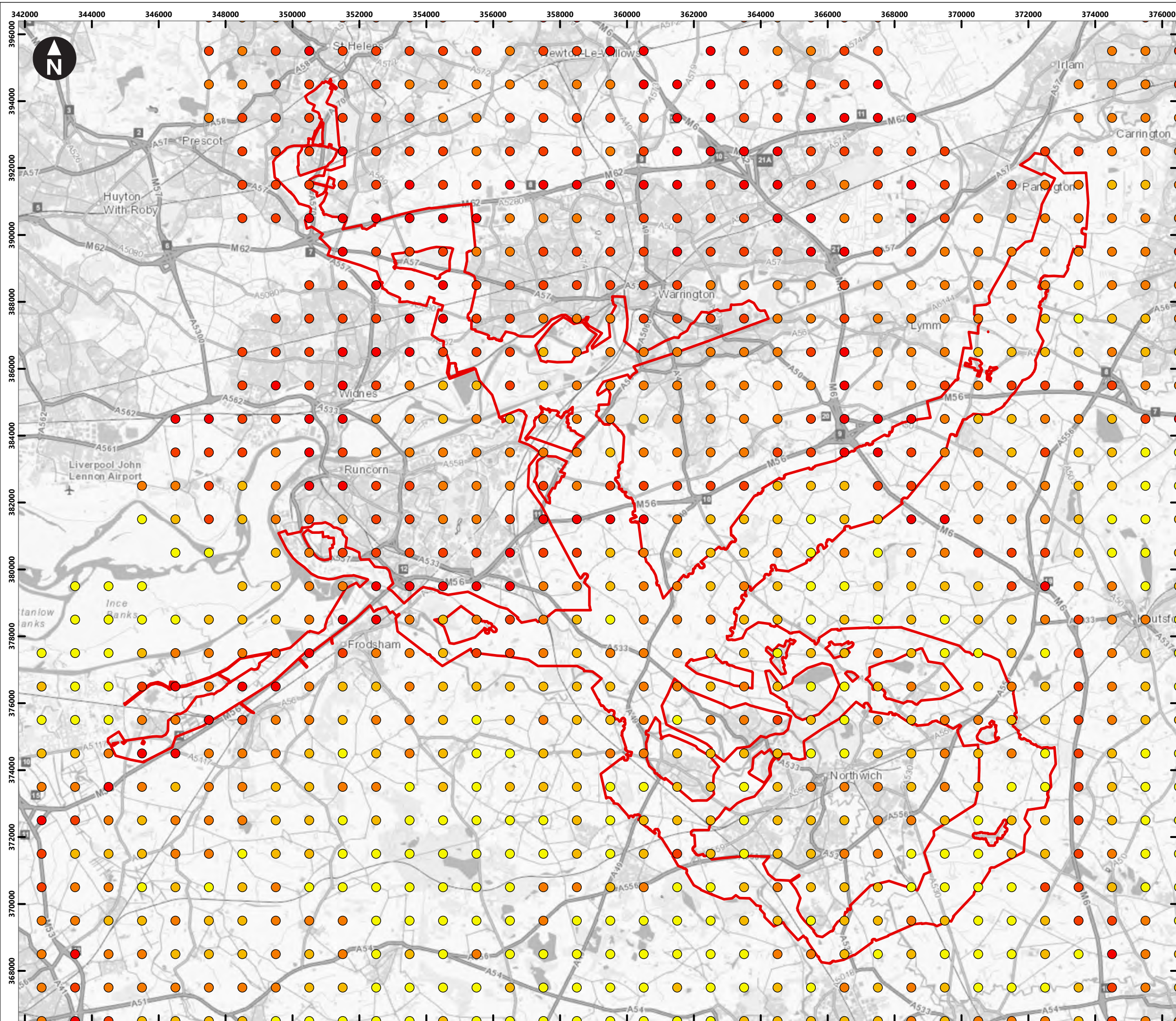
0 1 2 3 4 5 Kilometers  
Scale at A3: 1:110,000  
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**Figure 9.3**  
Background NOx concentrations

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Key  
Scoping boundary

**PM10 concentration**

- < 10
- 10 - 10.5
- 10.5 - 11.5
- 11.5 - 12.5
- > 12.5

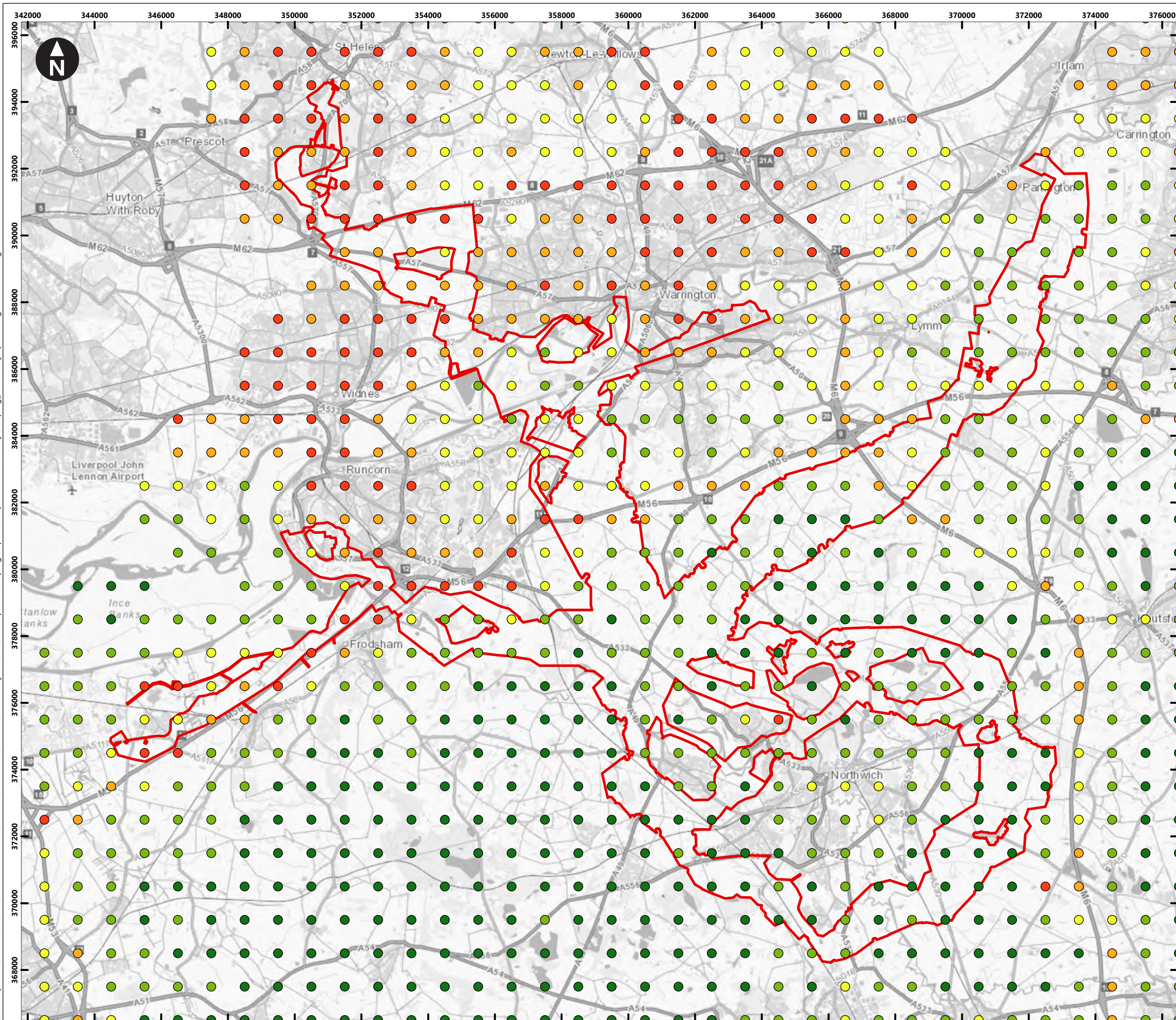
0 1 2 3 4 5 Kilometers  
Scale at A3: 1:110,000  
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**Figure 9.4**  
Background PM10 concentrations

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Key  
Scoping boundary

**PM2.5 concentration**

- < 6.5
- 6.5 - 7
- 7 - 7.5
- 7.5 - 8
- > 8

0 1 2 3 4 5 Kilometers  
Scale at A3: 1:110,000  
OS Open Greyscale: Contains OS data © Crown Copyright and database right 2020

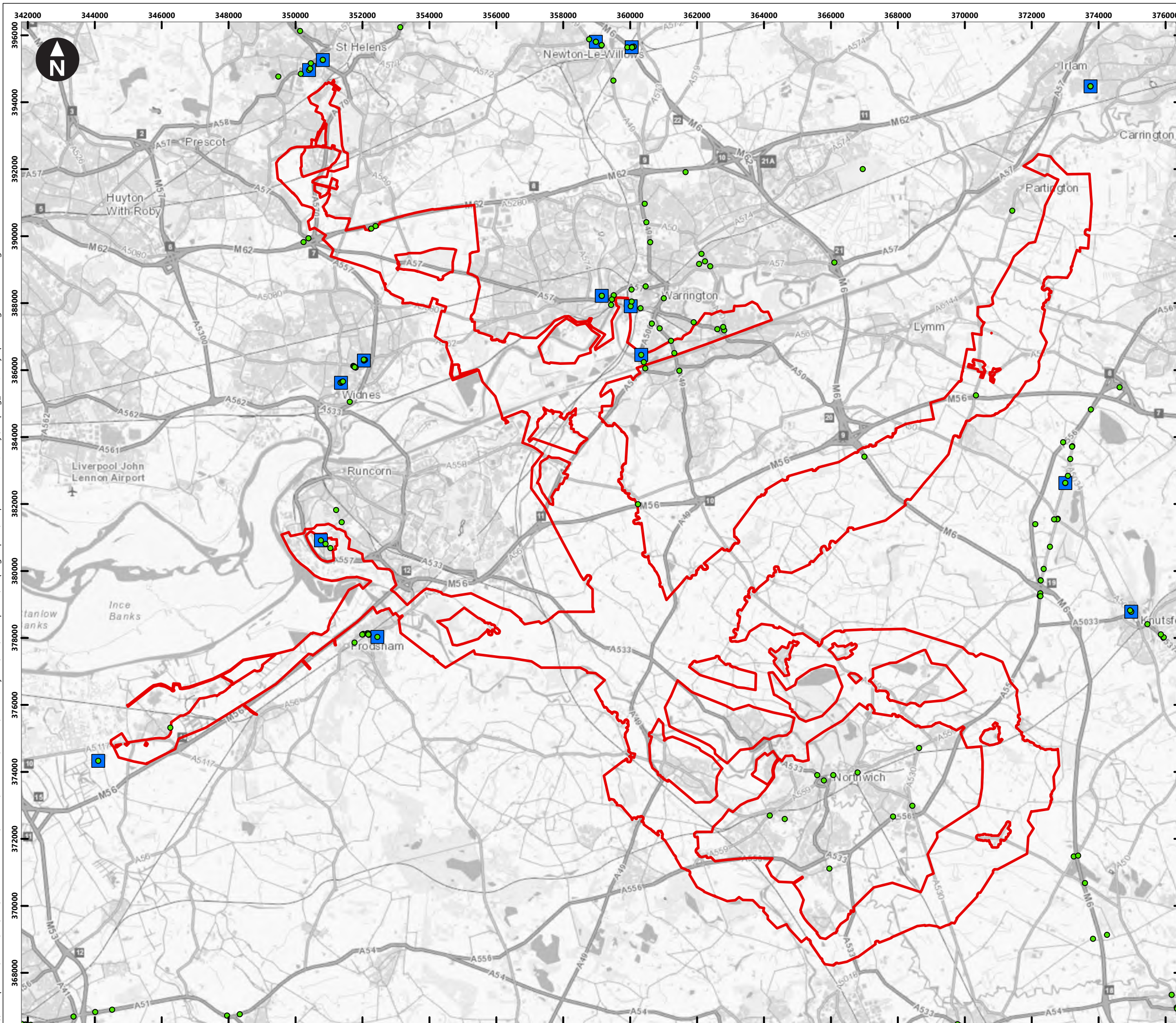


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**Figure 9.5**  
Background PM2.5 concentrations



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- Key
- Scoping boundary
  - Passive monitoring location
  - Automatic monitoring location

0 1 2 3 4 5 Kilometers  
 Scale at A3: 1:110,000  
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**Figure 9.6**  
**Air quality monitoring locations**

# 10. Noise and Vibration

## 10.1 Introduction

10.1.1 The Noise and Vibration assessment will consider the likely significant effects on residential and non-residential receptors that may arise from the construction and operation of the Project. This chapter of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed.

10.1.2 Noise and vibration interfaces with many other topics and as such, should be considered alongside the following chapters:

- **Chapter 5: Ecology;**
- **Chapter 6: Historic Environment;**
- **Chapter 8: Landscape and Visual Impact; and**
- **Chapter 11: Traffic and Transport.**

## Assumptions and limitations

10.1.3 Please refer to **Chapter 2: The Project** for the parameters on which this Scoping Report is based.

10.1.4 To date, no noise surveys have taken place, limiting the baseline data to a desk study. Baseline noise surveys are planned for 2022, with further detail provided in **Section 10.4**.

10.1.5 It is not proposed to carry out baseline noise monitoring for a construction noise assessment along the route of the buried pipework, except where this is considered critical for establishing an elevated baseline (for instance at receptor locations adjacent to a motorway potentially affected by horizontal drilling). For the majority of the assessment of construction noise along the proposed pipeline routes, an absolute level will be used based on British Standard criteria (the lowest 'Category A' within BS 5228-1:2009 + A1:2014: 'Code of practice for noise and vibration control on construction and open sites'<sup>275</sup>), which will provide a worst-case assessment. Where baseline measurements are carried out for the assessment of operational noise, or for the operation of construction compounds, data will be used for the construction noise assessment, where considered suitable.

10.1.6 The Project has been based on the principle that measures have been 'embedded' into the Project design to minimise effects where these could be significant (**Section 10.5**). This approach is informed by the iterative design process.

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<sup>275</sup> British Standards Institute (2008). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1 - Noise. London, BSI.

Additionally, the Project would ensure that standard good practice construction measures are adopted via a Code of Construction Practice (CoCP), and practically implemented through a Construction Environmental Management Plan (CEMP). The scoping of potential effects therefore assumes that both design mitigation and good practice measures are in place.

## Noise sources

- 10.1.7 As described in **Chapter 2: The Project**, the nature of the construction works and the construction methodologies are typical for trenching activities and the construction of structures and buildings. The noise generated during the construction phase will reflect this.
- 10.1.8 For the operational phase, Hydrogen Above Ground Installations (HAGIs), which include Pressure Reduction Units (PRUs) and metering units, and associated above ground pipework have the potential to give rise to noise, which may be audible outside the perimeter of the HAGI. The noise will be similar to that typical of natural gas installations, many of which exist around the country. Noise is produced by gas flowing through pressure reduction valves or equipment whilst working, which then re-radiates from the above ground pipework and valve bodies. This noise tends to be mid and high frequency in nature and is therefore mitigable using conventional noise reduction measures such as enclosures, barriers and cladding.
- 10.1.9 For Block Valves, the valve itself (where noise might be generated) is underground, with only the actuator and the control units being located above ground, the latter being housed in a kiosk. Block Valves are therefore not considered as potential sources of noise that could be audible beyond the perimeter of the HAGI.
- 10.1.10 Instrumentation and Control (I&C) kiosks do not contain equipment that would give rise to noise, so are not considered as sources within the EIA.
- 10.1.11 Pigging facilities will be used for maintenance and have the potential to give rise to noise of the same nature as the PRUs and metering units. This plant and its use are discussed further in **Section 10.7**.

## 10.2 Relevant legislation and technical guidance

- 10.2.1 This section identifies the relevant legislation and guidance which has informed the scope of the assessment relevant to noise and vibration. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

### Legislation

- 10.2.2 A summary of the legislation relevant to the Noise and vibration assessment is provided in **Table 10.1**.

Table 10.1 Legislation relevant to noise and vibration

Legislation	Legislative context	Section considered
<b>Environmental Protection Act 1990<sup>276</sup></b> (as amended)	This Act sets out the duty for local authorities to investigate and, where identified, take abatement action against noise nuisance. The Act provides the definition of 'Best Practicable Means' (BPM) to minimise noise (including vibration), the basis for defence against noise abatement action taken by local authorities (section 80). The Act also provides for individuals to seek for abatement action to be taken by a magistrate's court against noise nuisance (Section 82).	This Act has been used to inform embedded noise control measures ( <b>Section 10.7: Assessment methodology</b> )
<b>Control of Pollution Act 1974<sup>277</sup></b>	This Act provides the definition of BPM to minimise noise (including vibration), the basis for defence against noise abatement action taken by a local authority (section 60). The Act also provides for, i) persons responsible to seek prior consent for works on construction sites including BPM steps to minimise noise and, ii) the basis for defining codes of practice (applies to BS 5228: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites, Part 1: Noise and Part 2: Vibration).	This Act has been used to inform embedded noise control measures for construction ( <b>Section 10.7: Assessment methodology</b> )

<sup>276</sup> UK Government (1990). The Environmental Protection Act 1990 (Online). Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents/made> (Accessed 22 November 2021).

<sup>277</sup> UK Government (1974). The Control of Pollution Act 1974 (Online). Available at <https://www.legislation.gov.uk/ukpga/1974/40/contents/made> (Accessed 22 November 2021).

Legislation	Legislative context	Section considered
<b>The Planning Act 2008</b> <sup>278</sup>	In respect of noise nuisance, the Act confers the defence of statutory authority against proceedings for nuisance unless there is a provision in a granted Development Consent Order (DCO) to the contrary.	
<b>Environmental Noise (England) Regulations 2006, as amended</b> <sup>279</sup>	<p>The regulations require regular noise mapping and the production of Noise Action Plans for the management of noise.</p> <p>These regulations also provide the legal means by which 'Quiet Areas' and noise 'important areas' are defined and protected</p>	<b>Section 10.7: Assessment methodology</b>
<b>Noise Insulation Regulations 1975, as amended</b> <sup>280</sup>	<p>Sets out the eligibility criteria for noise insulation from upgraded highways schemes.</p> <p>These regulations are also utilised for criteria regarding construction traffic noise (although not used for the purposes of eligibility)</p>	<b>Section 10.7: Assessment methodology</b>

## Technical Guidance

10.2.3 A summary of the technical guidance relevant to the Noise and vibration assessment is given in Table 10.2.

<sup>278</sup> UK Government (2008). Planning Act 2008 (Online). Available at: <https://www.legislation.gov.uk/ukpga/2008/29/contents/made> (Accessed 22 November 2021).

<sup>279</sup> UK Government (2006). The Environmental Noise (England) Regulations 2006 (Online). Available at: <https://www.legislation.gov.uk/uksi/2006/2238/contents/made> (Accessed 22 November 2021).

<sup>280</sup> UK Government (1975). The Noise Insulation Regulations 1975 (Online). Available at: <https://www.legislation.gov.uk/uksi/1975/1763/contents/made> (Accessed 22 November 2021).

Table 10.2 Technical guidance relevant to noise and vibration

Technical Guidance Document	Context	Section considered
<b>BS 4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial sound (British Standards Institution, 2008)<sup>281</sup></b>	Describes methods for rating and assessing sound of an industrial nature, such as from factories, industrial premises or fixed installations affecting people who might be inside or outside a dwelling.	<b>Section 10.5: Embedded environmental measures and Section 10.7: Assessment methodology</b>
<b>BS 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise<sup>275</sup></b>	Provides a recommended scope for construction and demolition noise assessment. Annex E gives example threshold values for potential significant effects at noise sensitive receptors based upon the results of ambient sound monitoring.	<b>Section 10.7: Assessment methodology</b>
<b>BS 5228-2:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration<sup>282</sup></b>	Provides guidance on the assessment of ground-borne vibration associated with activities such as demolition and construction. Annex provides guidance of the effect of vibration levels on people.	<b>Section 10.7: Assessment methodology</b>
<b>BS 6472-1: 2008 Guide to evaluation of humans to vibration exposure in buildings: Part 1: Vibration sources other than blasting sound<sup>283</sup></b>	Provides guidance on how people inside buildings respond to building vibration. Includes vibration dose value ranges which might result in adverse comment within buildings.	<b>Section 10.7: Assessment methodology</b>
<b>BS 7385-2: 1993 Evaluation and measurement for vibration in buildings. Part 2: Guide to damage</b>	Provides guidance on the levels of vibration above which building structures could be damaged, the factors which influence vibration response of buildings, and describes the basic procedure for carrying out measurements.	<b>Section 10.7: Assessment methodology</b>

<sup>281</sup> British Standards Institute. BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. London, BSI, 2014, 2019.

<sup>282</sup> British Standards Institute. BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2 - Vibration. London, BSI, 2008.

<sup>283</sup> British Standards Institute. BS 6472-1: 2008 Guide to evaluation of humans to vibration exposure in buildings: Part 1: Vibration sources other than blasting sound. London, BSI, 2019.

Technical Guidance Document	Context	Section considered
<b>levels from groundborne vibration<sup>284</sup></b>		
<b>British Standard (BS) 7445:2003 Description and measurement of environmental noise<sup>285</sup></b>	BS 7445:2003 provides the framework within which environmental noise should be quantified. Part 1 provides a guide to quantities and procedures and Part 2 a guide to the acquisition of data pertinent to land use. Part 3 provides a guide to the application of noise limits. The standard also refers to BS EN 61672 'Electroacoustics: Sound Level Meters Specifications' (2013), which prescribes the equipment necessary for such measurements.	<b>Section 10.7: Assessment methodology</b>
<b>Calculation of Road Traffic Noise (CRTN)<sup>286</sup></b>	Provides a calculation methodology for road traffic noise.	<b>Section 10.7: Assessment methodology</b>
<b>Design Manual for Roads and Bridges LA111: Noise and Vibration (DMRB)<sup>287</sup></b>	Presents a methodology for determining impacts on noise sensitive receptors from changes in road traffic noise due to road projects.	<b>Section 10.7: Assessment methodology</b>
<b>TRL (2002) Transport and Road Research Laboratory – Converting the UK traffic noise index LA<sub>10,18hr</sub> to EU Noise indices for noise mapping (TRL PR/SE/451/02)<sup>288</sup></b>	A method for converting the road traffic noise indexes described in CRTN to produce outputs in the form of European Union indices, in particular TRL Method 2 which outlines the conversion of the LA <sub>10, 18hr</sub> noise indices to the LA <sub>eq, 16hr</sub> and LA <sub>eq, 8hr</sub> indices.	<b>Section 10.7: Assessment methodology</b>

<sup>284</sup> British Standards Institute (1993). BS 7385-2: 1993 Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from groundborne vibration, London, BSI.

<sup>285</sup> British Standards Institute (1988). BS 7445-1:2003 Description and measurement of environmental noise. Part 1: Basic quantities and procedures. London, BSI, 2003.

<sup>286</sup> Department for Transport (DfT), *Calculation of Road Traffic Noise*. London, HMSO.

<sup>287</sup> Highways England. Design Manual for Roads and Bridges, LA 111 – Noise and Vibration (Revision 2)(2019) (Online). Available at:

<https://www.standardsforhighways.co.uk/dmrb/search/cc8cfcf7-c235-4052-8d32-d5398796b364> (Accessed 30 July 2020).

<sup>288</sup> Transport and Road Research Laboratory – Converting the UK traffic noise index LA<sub>10,18hr</sub> to EU Noise indices for noise mapping (TRL PR/SE/451/02) (Online). Available at:

[https://www.researchgate.net/publication/311964809\\_METHOD\\_FOR\\_CONVERTING\\_TH](https://www.researchgate.net/publication/311964809_METHOD_FOR_CONVERTING_TH)

Technical Guidance Document	Context	Section considered
<b>BS 4142:2014+A1:2019: Technical Note</b> <sup>289</sup>	Provision of guidance and clarifications for British Standard.	<b>Section 10.7: Assessment methodology</b>
<b>Guidelines for Environmental Noise Impact Assessment</b> <sup>290</sup>	Presents guidelines on how the assessment of noise effects should be presented within the EIA process. The IEMA guidelines cover aspects such as: scoping, baseline, prediction and example definitions of significance criteria.	<b>Section 10.5: Embedded environmental measures and Section 10.7: Assessment methodology</b>
<b>ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation</b> <sup>291</sup>	Defines a method for calculating the attenuation of sound during propagation outdoors, to predict the levels of environmental noise at distances from a source.	<b>Section 10.5: Embedded environmental measures and Section 10.7: Assessment methodology</b>
<b>Guidelines for Community Noise</b> <sup>292</sup>	Provides guidelines and recommendations for protecting health, giving internal and external guideline limits.	<b>Section 10.7: Assessment methodology</b>
<b>Night Noise Guidelines for Europe</b> <sup>293</sup>	Provides guidelines and recommendations for health protection during the night-time period.	<b>Section 10.7: Assessment methodology</b>

### [E UK ROAD TRAFFIC NOISE INDEX LA1018h TO THE EU NOISE INDICES FOR ROAD NOISE MAPPING](#) (Accessed 22 November 2021)

<sup>289</sup> Association of Noise Consultants (2020). BS 4142:2014 + A1:2019 Technical Note. (Online). Available at: <https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2020/07/ANC-BS-4142-Guide-March-2020.pdf> (Accessed 27 August 2021).

<sup>290</sup> Institute of Environmental Management and Assessment (2014). Guidelines for Environmental Noise Impact Assessment. London, IEMA.

<sup>291</sup> International Organization for Standardization (1996). ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors: Part 2 General Method of Calculation. London, ISO.

<sup>292</sup> World Health Organization (1999). Guidelines for community noise. Geneva, WHO.

<sup>293</sup> World Health Organization (2009). Night noise guidelines for Europe. Copenhagen, WHO.



Technical Guidance Document	Context	Section considered
<b>Environmental Noise Guidelines for the European Region</b> <sup>294</sup>	Analysis of exposure – response relationship related to specific noise sources and provision of guidelines for levels to protect human health.	<b>Section 10.7: Assessment methodology</b>

## 10.3 Consultation

- 10.3.1 Consultation will be undertaken with the relevant local authorities to agree the details of the survey and assessment methods, including the specification of monitoring locations within the Study Area.
- 10.3.2 The spatial scope of the Study Areas for the construction phase comprises: a 100m offset from the source for construction vibration, 300m for construction noise (reducing to 100m for pipe laying activities) and properties within 50m of a road for construction traffic noise. For operation, the Study Area comprises a 500m offset from the HAGIs. Further details covering the rationale of the Study Area definitions are provided at **Section 10.6**.

## 10.4 Baseline conditions

### Data gathering methodology

- 10.4.1 Information regarding the potential need for baseline sound monitoring has been based on examination of the potential route corridors as defined in the Scoping red line boundary and facility locations available at this stage of the Project (as represented by the HAGI search areas illustrated in **Figure 1.2**), and their proximity to potentially noise and vibration sensitive receptors.
- 10.4.2 It is proposed to scope out baseline surveys for the following:
- vibration monitoring, as vibration will be assessed as an absolute (not relative) value;
  - noise monitoring within the vicinity of the I&C Kiosks and Block Valves. It is proposed that operational noise from these facilities will be scoped out and therefore background and ambient baseline sound measurements will not be required for these sites. Further detail is provided in **Section 10.6**; and
  - monitoring of existing road traffic noise as this will be determined through calculation using traffic flow data, except where baseline traffic flows are too low to comply with predictions requirements.

<sup>294</sup> World Health Organization. *Environmental Noise Guidelines for the European Region*. 2018 (Online). Available at: [https://www.euro.who.int/data/assets/pdf\\_file/0008/383921/noise-guidelines-eng.pdf](https://www.euro.who.int/data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf) (Accessed 26 August 2021).

- 10.4.3 Baseline sound surveys will be carried out in 2022 and will be reported in the ES for the following elements:
- obtain and understand the background and ambient baseline sound environment at locations where operational noise may be observed beyond the site boundaries, to provide context to the assessment of operational noise in accordance with BS 4142:2014 + A1:2019<sup>281</sup>;
  - obtain background and ambient baseline sound measurements at the site of, and at representative sensitive receptors sufficiently close to be adversely affected by the proposed HAGIs that contain PRU, metering facilities and pigging facilities; and
  - obtain background and ambient sound measurements at locations representative of residences near to the proposed construction compounds.
- 10.4.4 The exact location of the HAGIs will be subject to further design, consultation and environmental assessment. Search areas in which the HAGIs will be located are shown in **Figure 1.2**. The following facility locations are currently anticipated to require baseline sound surveys if they contain facilities listed above, which trigger the need for a survey:
- HAGIs:
    - ▶ Connection to Hydrogen Production Facility – Stanlow.
    - ▶ West Corridor – Rocksavage, Runcorn.
    - ▶ North Corridor – St Helens, Clock Face, Burtonwood, Cuerdley and Higher Walton.
    - ▶ East Corridor – Warburton and Partington.
    - ▶ Connection to Hydrogen Storage Facility south of Northwich.
    - ▶ Central Hub – in the vicinity of the junction between the A533 Northwich Road, Tarporley Road and Warrington Road.
- 10.4.5 Where it is not proposed to undertake noise measurements, the following assumptions will be made about the baseline sound levels of the area:
- for assessment of construction noise along the pipe routes, the lowest 'Category A' (BS 5228-1:2009 + A1:2014<sup>275</sup>, specifically Appendix E) acoustic environment will be assumed; and
  - road traffic noise levels will be determined using CRTN<sup>286</sup> and expressed as the basic noise level (BNL) for use in the assessment.
- 10.4.6 Proposals for specific monitoring locations are not included in this Scoping Report, as there is still uncertainty regarding the siting of noise generating operational plant. When proposed plant location options have been further refined prior to the submission of the DCO application, baseline monitoring locations will be proposed for discussion with local planning authorities. If required, modification of the proposed monitoring locations will be made, following receipt of comments from the local planning authorities, Historic England and Natural England.

- 10.4.7 Baseline sound monitoring is proposed to be undertaken as a combination of long-term unattended surveys with attended observations, and shorter-term sampling. Timing will preferably be chosen to avoid local school holidays.
- 10.4.8 Where carried out for the assessment of operational noise, measurements will be suitable for later assessment using BS 4142:2014 + A1:2019<sup>281</sup>.

### Current baseline

- 10.4.9 As surveys have not yet been carried out, the description of the existing baseline sound climate is based on professional judgement following examination of the potential route corridors for the pipelines (see **Figure 1.1**).
- 10.4.10 Land use in the construction and operation Study Areas (see **Section 10.6**) is predominantly rural, but does also include more built-up areas, both of an industrial and residential nature. It is anticipated that the baseline ambient noise levels in the rural and residential areas will generally be of a low magnitude except where close to major transportation routes. Near to industrial and commercial sites, as well as major transportation routes, it is anticipated that baseline noise levels will be higher than those in rural or residential areas.
- 10.4.11 To determine whether there are Noise Important Areas (NIAs) in the vicinity of the search areas, a review was carried out of the noise exposure data from Round 3 noise mapping<sup>295</sup>. Twenty-five NIAs were identified which are either close to the current search areas or overlap them. All the NIAs identified were the result of road traffic noise, and most result from noise from motorways. The majority of the NIAs are located where the proposed pipeline route crosses major roads, or runs parallel with them. Information regarding the proximity of NIAs to potential receptors and the noise Study Area will be provided in future environmental reporting.
- 10.4.12 Given the geographical extent of the Study Area, and that the baseline and ambient sound surveys have not yet been undertaken, no further description of the baseline conditions has been provided at this stage.

### Future baseline

- 10.4.13 The future baseline sound climate is not anticipated to change for the majority of the areas where the Project is proposed to be located.
- 10.4.14 Where new industrial or residential development occurs within the Zone of Influence (Zol) for noise and vibration of the Project, local sound levels would be expected to change if that use was new to the area.
- 10.4.15 There may be a small increase as a result of natural traffic growth close to more major roads. Should HS2 Phase 2b go ahead, an increase in noise levels would be expected close to the alignment of the new railway line. A small decrease in

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<sup>295</sup> Department for Environment, Food and Rural Affairs (2019). Noise Exposure data - Round 3, 2019 (Online). Available at: <https://data.gov.uk/dataset/d461bbc1-eb51-4852-8a9a-45dbf28aa230/noise-exposure-data-round-3> (Accessed January 2022).

sound levels in the medium to long term could occur near roads with traffic speeds below about 20km/hr, as a result of a move to a higher proportion of electric cars.

## 10.5 Embedded environmental measures

- 10.5.1 As part of the design process, several embedded environmental measures will be adopted to reduce the potential for adverse noise and vibration effects. These embedded environmental measures will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process.
- 10.5.2 Embedded environmental measures include all measures usually assumed to be in place during construction/operation and are generally regarded as industry standard or best practice. This includes production of a CEMP that will detail the best practice methods to be adopted during the construction phase, in addition to the environmental management measures.
- 10.5.3 Construction traffic vibration has the potential to give rise to adverse impacts where heavy vehicles pass close to roadside residential receptors on lightly trafficked roads that do not normally carry heavy vehicles. Impacts typically only occur where the road surface is in poor condition. Highways condition surveys will be undertaken before, during and after the construction phase and repairs conducted to any damage to highways, as a result of construction heavy goods vehicles (HGVs) on the highways related to the Project and included within the HGV Access Strategy. This commitment is included within this chapter as it minimises the risk from vibration effects at residences from HGVs passing over holes in the road.
- 10.5.4 For the operational period, sources of sound are set out in **Section 10.1**. Noise will be typical of that found on natural gas installations, which are common throughout the country. Noise from such plant is controlled using conventional and readily available noise control measures such as enclosures and pipe lagging. Enclosures and potentially lagging would be installed to limit noise should there be a noise sensitive receptor close enough to the installation for noise to give rise to a likely significant effect.
- 10.5.5 Administrative measures will be needed when pigging operations are to be carried out as part of operational maintenance. The EIA will identify the need for notifying noise sensitive receptors in the vicinity of HAGIs when pigging activities are expected.

## 10.6 Scope of the assessment

### Study area

- 10.6.1 The approach to defining the draft Order Limits for the DCO application is set out in **Chapter 2: The Project**. This has been used to inform the spatial scope of the noise and vibration assessment.

10.6.2 For the purposes of identifying potential receptors for the noise assessment, the scope has been defined depending on the specific installation and whether it was for the construction noise or operational noise assessment.

### *Spatial scope: construction*

10.6.3 *Construction noise from construction compounds and for HAGIs:* up to 300m from any construction activity or extent of identification of significant effects if this is beyond 300m. This distance is based on other recent major infrastructure projects, such as HS2. For pipe laying, 100m from the centreline of the pipe trench, or extent of identification of significant effects should calculations indicate these could extend beyond 100m, due to the smaller volume of plant used for this activity.

10.6.4 *Construction traffic noise:* where an increase or decrease in road traffic volumes or traffic types caused by the construction of the Project would be likely to cause a change in noise level exceeding 1dB  $L_{Aeq,T}$  during either the daytime (07:00 - 23:00) or night-time (23:00 - 07:00), as advocated in DMRB<sup>287</sup>. When estimating the number of properties affected by road traffic noise change, the row of properties closest to the road will be considered in built up areas and properties within 50m of the road where properties are sporadic.

10.6.5 *Construction vibration:* for the purposes of identifying potential receptors for the vibration assessment, a vibration study area has been defined as a 100m area from any likely significant vibration source, such as vibratory compaction or piling works.

10.6.6 Reference may be made to potential receptors outside of the Study Areas defined above, such as receptors of special interest (such as designated tranquil areas or precision engineering premises). Where this is the case, those potential receptors will also be considered as part of the noise and vibration assessment.

### *Spatial scope: operation*

10.6.7 The Study Areas for operation are limited to the areas around the HAGIs that are considered to have the potential to generate noise during operation. There is no mechanism for the propagation of sound from pipework and valves that are buried. Therefore, there will be no noise associated with the operation of the buried pipeline itself. Further, there will be no noise from the operation of the pipeline and its components, unless there are valve bodies or exposed pipework above ground (i.e. from HAGIs including only Block Valves and/or ICs).

10.6.8 The geography to which the Study Area extends has been defined depending on the type of plant expected at the installation. HAGIs including metering units and/or PRUs and/or pigging facilities have the potential for adverse noise impacts. A Study Area of 500m from these installations is proposed, based on scoping distances used for facilities for transportation of carbon dioxide, which have similar noise generating plant and plant layouts.

10.6.9 The activities associated with the operation of the Project are not expected to generate significant vibration levels. There is no rotating or reciprocating machinery to give rise to vibration associated with out-of-balance forces. Vibration from pipework that could be perceivable beyond the perimeter of the facilities is

highly unlikely because of the necessity to minimise vibration to maintain pipe and valve integrity, which are critical in a hydrogen transport facility.

### *Temporal scope: construction and commissioning*

- 10.6.10 The temporal scope of the assessment of noise and vibration is consistent with the period over which the Project will be carried out and therefore covers the construction period, currently proposed to take place from 2025 for approximately three years with some elements of the Project becoming operational in late 2027/early 2028, and the operational period thereafter. Commissioning would run from 2027 and may not occur simultaneously at all locations.
- 10.6.11 Site-based construction noise and vibration emissions for the Project will be assessed at a point and a time when the maximum plant is in use. For the linear pipe burying works, that same approach will be taken. Splitting the predictions into different phases of works will be considered where works are expected to be present in one location for more than one month, and there are different phases to the works. The decision to split predictions in this way will be based on the variety of activities taking place, level of information available, length of time of the works, and potential for significant effect.
- 10.6.12 Installation of the pipes crossing major roads and railways, and other infrastructure, may require overnight works to minimise daytime closures of these transport links. Twenty-four hour working could also be required for Horizontal Directional Drilling and micro-tunnelling (if used), for pipe drying, and for some testing operations. For the remainder of the Project, as stated in **Chapter 2: The Project**, it is assumed that construction work would be limited to daytime hours but would take place six days per week. Construction noise for the relevant periods will be assessed in future environmental reporting.
- 10.6.13 Noise from road traffic associated with construction will be assessed during the year of construction that sees the peak traffic flow week for that geographic section of the Project (e.g. North Corridor, East Corridor, see **Figure 1.1**).
- 10.6.14 Whilst the assessments will focus on points in time, consideration will be given to the duration of the effect, as relevant to the different phases, and activities within those phases (e.g. some construction effects may last for only days whilst some may last for weeks).

### *Temporal scope: operation*

- 10.6.15 As set out in **Chapter 2: The Project**, the Project is expected to begin operation in late 2027/early 2028. During operation, HAGIs would operate continuously in terms of gas flow (and any consequent noise) except when specific intrusive maintenance activities are occurring, e.g. pigging.
- 10.6.16 The only other operational noise would be associated with periodic attendance at site by personnel to carry out checks or maintenance, which would occur throughout the operational lifetime of the project. The following is set out in **Chapter 2: The Project**.

- 10.6.17 The HAGIs would generally be operated remotely from a central control room located off-site. The frequency of periodic maintenance undertaken on-site has yet to be determined but would typically include the following:
- Routine checks on a weekly basis requiring one-two personnel for a short period (approximately one hour);
  - Annual maintenance requiring two personnel for approximately one day;
  - Major maintenance requiring five personnel for approximately one week (every two to five years);
  - Pipeline pigging operations requiring ten personnel for approximately one week and undertaken every five to 15 years. Pigging operations involve an internal inspection of the pipe undertaken by a 'pig', an automatic inspection tool, which travels inside the pipeline from one HAGI to the next. Access to the pipeline between HAGIs is not required; and
  - Infrequent breakdown or emergency visits with access on a 24/7 basis if required.
- 10.6.18 The above site visits would involve a limited number of staff, arriving at site in cars or vans. Heavy vehicles would generally only be required in the event of replacement of large items of equipment. On rare occasions, equipment may need to be changed as a result of routine updating or failure.
- 10.6.19 Based on the minor nature of the above, in terms of noise generation, and the short duration of activities, maintenance activities are scoped out of the assessment. However, the EIA will identify the need for notifying noise sensitive receptors in the vicinity of HAGIs when pigging activities are expected.
- 10.6.20 As described in **Chapter 2: The Project**, decommissioning effects are scoped out from detailed assessment and are therefore not discussed in this chapter.

## Potential receptors

- 10.6.21 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of the construction and/or operation of the Project.
- 10.6.22 The types of noise and vibration receptors that have been identified as being potentially subject to effects are summarised in **Table 10.3**.

**Table 10.3 Summary of noise sensitive receptor types**

Receptor	Reason for Consideration
<b>Residential – residences, including private gardens where appropriate</b>	These dwellings, occurring within the Study Area of the Project, have the potential to experience a change as a result of the Project and potentially adverse noise and/or vibration effects.

Receptor	Reason for Consideration
<b>Community services – e.g. schools (during daytime periods), places of worship</b>	These sites, occurring within the Study Area of the Project, have the potential to experience adverse noise and/or vibration effects as a result of the Project.
<b>Commercial – e.g. offices, retail, entertainment venues and eateries, leisure facilities</b>	These sites, occurring within the Study Area of the Project, have the potential to experience adverse noise and/or vibration effects as a result of the Project.
<b>Leisure areas – e.g. local nature reserves</b>	These sites, occurring within the Study Area of the Project, have the potential to experience adverse noise and/or vibration effects as a result of the Project.
<b>Terrestrial ecology – e.g. designated sites include Special Protection Areas and Sites of Special Scientific Interest</b>	These sites and species have the potential to experience adverse noise and/or vibration effects as a result of the Project and are reported in <b>Chapter 5: Ecology</b> .
<b>Historic environment – e.g. scheduled monuments, listed buildings</b>	These sites and buildings have the potential to experience adverse noise and/or vibration effects as a result of the Project and are reported in <b>Chapter 6: Historic Environment</b> .

10.6.23 Based on the information set out in **Section** potential receptors will be identified based on their location relative to the Project components. Generally, the potential receptors will be residential dwellings which are considered to have a ‘medium’ sensitivity to noise and vibration. Potential receptors have been identified as individual dwellings or ‘community receptors’ as appropriate. Where community receptors have been used, the consideration of individual dwellings representative of the wider community may take place for the ES in the unlikely event that significant numbers are affected.

### Likely significant effects

10.6.24 The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

10.6.25 The likely significant noise and vibration effects that will be taken forward for assessment in the ES are summarised in **Table 10.4**. The scoping assessment is based on a combination of the project definition of at the scoping stage, embedded environmental measures, understanding of the baseline conditions at this stage,



the evidence base for noise and vibration effects and professional judgement. The approach to this assessment is set out in **Chapter 4: The EIA Process**.

10.6.26

The early identification of likely significant effects is used here as a tool aimed at delivering a proportionate approach to the EIA. In doing so, it sets out a high-level assessment of all potential effects, significant or not, and distinguishes between the level of assessment proposed for significant effects 'scoped in' as simple or detailed. The basis for scoping out certain effects, which are therefore no longer considered is presented after the table, supported by evidence base.

Likely significant effects arising from noise and vibration affecting biodiversity and heritage assets are set out in **Chapter 5: Ecology** and **Chapter 6: Historic Environment** respectively.

**Table 10.4 Likely significant noise and vibration effects**

Activity	Effect	Receptor
<b>Construction</b>		
<b>Construction road traffic, including use of specially constructed access routes</b>	Potential for significant effects should there be construction traffic on small roads with otherwise low traffic flow resulting in a potentially high magnitude of change in noise. HGVs on poorly maintained roads could result in vibration levels of medium magnitude.	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.
<b>Activities from HAGI construction resulting in noise from works and vibration from works if very close to sensitive receptors</b>	Potential for significant effects from piling noise (if required) and vibration, and vibration from vibratory ground compaction at the HAGIs on sensitive receptors.	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.
<b>If required, Horizontal Directional Drilling (HDD) resulting in noise disturbance especially if required 24 hours a day. Potential vibration effects if very close to sensitive receptors</b>	Potential for significant effect if the HDD sites (if required) are very close to sensitive receptors. Levels of noise and vibration could potentially result in a medium magnitude of change. In particular a requirement for 24-hour working could result in significant disturbance during the night-time.	Residential properties, educational, religious (if daytime) and medical premises, quiet or important outside leisure areas.
<b>Operation</b>		

Activity	Effect	Receptor
<b>Emissions from the operation of the HAGIs</b>	Potential for significant effects due to the proximity of the HAGIs and the quiet character of the existing noise environment would potentially result in changes to the baseline noise environment.	Residential properties, educational, religious and medical premises, quiet or important outside leisure areas.

## Processes and impacts scoped out

10.6.27 The effects scoped out from further assessment are set out in **Table 10.5**.

**Table 10.5 Elements proposed to be scoped out**

Activity/element	Reason element scoped out	Receptor
<b>Construction</b>		
<b>Pipe laying activities</b>	Pipe laying is a short-term activity (see <b>Chapter 2: The Project</b> ), using a limited amount of equipment at any one stage.	Where beyond 100m from centreline of pipe route: - human receptors, quiet or important outside leisure areas.
<b>Adverse health effects</b>	Given the level of construction works and temporary nature of the main element of the works, being the pipeline, noise levels from the construction is unlikely to be sufficiently high or for a duration to result in adverse health effects. The health of human receptors will be protected via the avoidance of noise levels above the SOAEL and controlled via a CoCP <sup>296</sup> .	Human receptors
<b>Operation</b>		

<sup>296</sup> It is stated within 'Public Health England, (2017). Health and Environment Impact Assessment: A Briefing for Public Health Teams in England (online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/629207/Health\\_and\\_environmental\\_impact\\_assessment.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/629207/Health_and_environmental_impact_assessment.pdf) (accessed 18/01/2022)' that population and human health "should only be scoped into an EIA where the likely health consequences of the project are considered to be significant."

Activity/element	Reason element scoped out	Receptor
<b>Noise from HAGIs where these only contain Block Valves</b>	Do not contain noise generating equipment.	All
<b>Effects due to vibration from operation of equipment at HAGIs</b>	There is no rotating machinery at HAGIs. Plant and pipework can give rise to vibration with the potential to result in vibration which might be perceived at distance from the source. For the safe and efficient operation of such equipment, vibration must be kept to a minimum through design, commissioning and continuously during operation through condition monitoring and maintenance. Due to the need for low levels of vibration in operation to prevent malfunction, to ensure long life and safe and efficient running and the distance between equipment/sensitive receptors, vibration is scoped out.	All
<b>Maintenance in operation</b>	Based on the minor nature of activities in terms of noise generation and the short duration of activities, maintenance activities are scoped out of the assessment. However, the EIA will identify the need for notifying noise sensitive receptors in the vicinity of HAGIs when pigging activities are expected.	All residential and non-residential noise sensitive receptors
<b>Road traffic for maintenance</b>	Attendance at HAGIs by maintenance staff involves car or van visiting site. Frequency is weekly at most and therefore considered insufficient to give rise to a likely significant effect.	All residential and non-residential noise sensitive receptors
<b>Adverse health effects</b>	Industrial type noise sources (i.e. those at certain HAGIs) become annoying before they reach a level sufficient to give rise to adverse health effects. Noise from industrial type sources will be	Human receptors

Activity/element	Reason element scoped out	Receptor
	<p>controlled through design and provision of mitigation, to levels established through assessment in accordance with BS4142<sup>281</sup>. Health effects resulting from industrial type sources were not included in the 2018 WHO Environmental Noise Guidelines<sup>294</sup> ‘...mainly due to the large heterogeneity and specific features of industrial noise, and the fact that exposure to industrial noise has a very localized character in the urban population’</p>	

## 10.7 Assessment methodology

### Establishing receptor sensitivity

- 10.7.1 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees and that not all of these are of sufficient concern to warrant detailed investigation through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are ‘likely to be significantly affected by the development’.
- 10.7.2 The EIA Regulations do not define significance and it is necessary to state how this is defined for EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.
- 10.7.3 The precise determination of the sensitivity of a receptor relies on professional judgement.
- 10.7.4 **Table 10.6** details the basis for assessing receptor sensitivity with respect to noise effects, which has been produced on the basis of experience of assessing similar facilities, and on professional judgement.

**Table 10.6 Establishing the sensitivity of receptors**

Sensitivity	Examples
High	Vulnerable subgroups including hospitals and pre-schools, care homes, hospices, recording studios.
Medium	Dwellings, schools, hotels.

Sensitivity	Examples
<b>Low</b>	Areas used primarily for leisure activities, including Public Rights of Way, sites of historic or cultural importance.
<b>Negligible</b>	All other areas such as those used primarily for industrial, commercial or agricultural purposes.

10.7.5 The sensitivity of a receptor will be used within the assessment to qualify adverse impacts which are initially identified via quantification. For instance, identified adverse impacts at residential premises based on noise level might not be significant at commercial premises at the same level, whereas lower impacts could still be significant if affecting vulnerable subgroups.

### Establishing magnitude of impact and significance

10.7.6 The precise determination of impact and significance for construction and operational noise are based on relevant guidance and professional judgement. For example, DMRB provides criteria which may be directly transposed to different impact magnitude categories for road traffic noise (both construction and operational). However, the assessment methodology for operational site noise in BS 4142:2014 + A1:2019<sup>281</sup> does not readily transpose to the Project in this way and provides a way to establish significance directly instead of using magnitude of impact. The approach to assessing significance for each element of the noise and vibration assessment is discussed in the following section.

### Construction assessment methodology

10.7.7 The increase in traffic noise due to construction traffic on the local road network as a result of the Project will be predicted using methodologies described in CRTN<sup>286</sup> (as advocated by DMRB). A BNL will be predicted 10m from each road used by construction traffic for both a 'without scheme' scenario and a 'with scheme' scenario. A comparison made between these scenarios will identify the change in noise level predicted to be experienced by noise sensitive receptors.

10.7.8 Construction noise (including noise due to slow-moving construction traffic on haul roads) will be predicted at noise sensitive receptors using the methodologies described in BS 5228-1:2009 + A1:2014<sup>275</sup>.

10.7.9 Construction vibration effects will be assessed for sensitive receptors within 100m of any vibration causing construction activities (such as piling, if required). Sensitive receptors may include precision engineering premises, healthcare premises and old dwellings with poorly constructed foundations. Railways and buried services such as gas and water mains may also be assessed, if they are identified as present and in need of assessment due to their presence in the geographic scope of the assessment and their vibration sensitivity.

10.7.10 A quantitative assessment of construction vibration will be undertaken in line with the methodology provided in BS 5228-2:2009 + A1:2014<sup>282</sup> in the event that piling

or vibratory compaction is expected to take place within 100m or a sensitive (human) receptor.

#### *Determination of significance – construction site noise and haul routes*

10.7.11 Values within Table E.1 in Annex E of BS 5228-1:2009 + A1:2014<sup>275</sup> (reproduced in **Table 10.7**) will be used to determine the significance of effect with reference to effect levels described in the NPSE (see **Table 10.2**). The 'lower cut-off' Category A levels presented in **Table 10.7** are considered to represent the Lowest Observed Adverse Effect Level (LOAEL) for construction noise with Category C levels correlating with the Significant Observed Adverse Effect Level (SOAEL). The daytime Category C threshold of 75 dB  $L_{Aeq, T}$  is taken from the 1963 'Wilson Committee' report on the Problem of Noise<sup>297</sup> and was set to avoid interference with normal speech indoors. This is considered a conservative approach given the improvement in construction methods and glazing specifications since 1963. The night-time Category C of 55 dB  $L_{Aeq, 8hr}$  is consistent with advice presented within the WHO Night Noise Guidelines for Europe<sup>293</sup>. The evening Category C (SOAEL) is set at 10 dB lower than the daytime criterion, based upon advice presented within the Advisory Leaflet 72 – Noise Control on Building Sites<sup>298</sup>.

**Table 10.7 Example threshold of potential significant effect at dwellings**

Assessment Category and Threshold Value Period	Threshold Value in Decibels (dB) ( $L_{Aeq, T}$ )		
	Category A <sup>A</sup> )	Category B <sup>B</sup> )	Category C <sup>C</sup> )
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends <sup>D</sup> )	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

NOTE 1: A potential significant effect is indicated if the  $L_{Aeq, T}$  noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total  $L_{Aeq, T}$  noise level for the period increases by more than 3dB due to site noise.

NOTE 3: Applied to residential receptors only.

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

<sup>297</sup> Ministry of Health Committee on the Problem of Noise, 1963

<sup>298</sup> Department of the Environment (1976). Advisory Leaflet 72 – Noise Control on Building Sites. London, HMSO.

Assessment Category and Threshold Value Period	Threshold Value in Decibels (dB) ( $L_{Aeq,T}$ )		
	Category A <sup>A)</sup>	Category B <sup>B)</sup>	Category C <sup>C)</sup>

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

10.7.12 The duration of the proposed works will be considered as a factor in the determination of significant effects. Exceedance of the Category A threshold values would be predicted to have adverse effects when lasting for one month or more (unless noise monitoring identifies that a higher threshold value would be more appropriate due to an elevated baseline noise environment). Exceedance of Category C would be predicted to have significant adverse effects when these are exceeded for at least 10 days within any consecutive 15 day rolling period or more than 40 days in any 6 consecutive months. These durations apply to residential receptors. Construction noise impacts at non-residential noise sensitive receptors will be considered on an individual and representative receptor basis and relevant local authorities will be consulted on the screening and assessment criteria.

#### *Determination of significance – construction traffic noise on public highways*

10.7.13 **Table 10.8** provides the proposed impact magnitude categories for assessing construction traffic noise, determined based on the guidance contained within DMRB<sup>287</sup> and using professional judgement.

**Table 10.8 Magnitude of impact of construction traffic at receptors**

Magnitude	Increase in BNL of closest public road used for construction traffic, dB
High	Greater than or equal to 5.0.
Medium	Greater than or equal to 3.0 and less than 5.0.
Low	Greater than or equal to 1.0 and less than 3.0.
Negligible	Less than 1.0.

10.7.14 A significant effect will be determined at residences if medium or high magnitudes of impact would be experienced for a period of 10 or more days in any 15 consecutive day period or more than 40 days in any 6 consecutive months.

- 10.7.15 Construction noise impacts at non-residential noise sensitive receptors will be considered on an individual and representative receptor basis and relevant local authorities will be consulted on the screening and assessment criteria.

### *Determination of significance – construction vibration*

#### *Human response*

- 10.7.16 The assessment of human response due to vibration from construction works will be assessed in accordance with BS 5228-2:2009+A1:2014<sup>282</sup>. BS 5228 2:2009+A1:2014<sup>282</sup> states that:

*“Whilst the assessment of the response to vibration in BS 6472 is based on the VDV (vibration dose value) and weighted acceleration, for construction, it is considered more appropriate to provide guidance in terms of the peak particle velocity (PPV), since the parameter is likely to be more routinely measured based upon more usual concern over potential building damage.”*

- 10.7.17 BS 5228-2:2009+A1:2014<sup>282</sup> provides guidance on the effect of vibration levels in terms of PPV in Table B.1, which has been replicated here in Table 10.9 and sets out typical effects at certain levels of vibration.

- 10.7.18 The effect levels that will be used as part of the assessment will also be applied to define trigger levels that can be included in the CEMP and will be used for compliance monitoring during construction.

- 10.7.19 For the purpose of identifying the possibility of significant effects from construction vibration, levels in excess of 1.0mm/s PPV will be considered as the threshold above which a significant effect could occur dependent on the duration of exposure. In the absence of British Standard guidance on the temporal factor to significance, the same criterion is applied as discussed in paragraph 10.7.14 for construction noise. Therefore, an exceedance of 1.0mm/s PPV would be considered significant if this is for a duration of at least 10 days within any consecutive 15 day rolling period.

**Table 10.9 Criteria for construction vibration – human response**

Vibration Level	Effect
<b>0.14 mm/s</b>	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
<b>0.3 mm/s</b>	Vibration might be just perceptible in residential environments.
<b>1.0 mm/s</b>	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.



Vibration Level	Effect
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

### Cosmetic damage to buildings

10.7.20 BS 7385-2:1993<sup>284</sup> sets out transient vibration values for cosmetic damage to buildings and these values are presented in **Table 10.10**.

**Table 10.10 Criteria for construction vibration – cosmetic damage**

Ref.	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4Hz to 15Hz	15Hz and above
1	Reinforced or framed structures. Industrial and heavy commercial buildings.	50 millimetres per second (mm/s) at 4Hz and above.	
22	Unreinforced or light framed structures. Residential or light commercial type buildings.	15mm/s at 4Hz increasing to 20mm/s at 15Hz.	20mm/s at 15Hz increasing to 50mm/s at 40Hz and above.
Note 1 Values referred to are at the base of the building.			
Note 2 At frequencies below 4Hz, a maximum displacement of 0.6mm (zero to peak) should not be exceeded.			

### Operational assessment methodology

- 10.7.21 The following sections refer to routine operation of the Project. Information regarding non-routine operation is included at the end of this methodology section.
- 10.7.22 Operational noise from HAGIs will be assessed using BS 4142:2014+A1:2019<sup>281</sup> Propagation of sound will be calculated using ISO 9613-2:1996<sup>291</sup>.
- 10.7.23 BS 4142:2014+A1:2019<sup>281</sup> provides a methodology and criteria for assessing new or existing industrial sound sources by comparing the operational sound (rating level) at the location of a sensitive receptor, with the background sound levels that are currently experienced without the development.
- 10.7.24 The rating level is defined as the specific sound level, with the addition of character corrections to consider certain acoustic features that could potentially

increase the significance of impact. A penalty will be applied to the specific sound level if a tonal, impulsive, intermittent or other characteristic is present or is expected to be present for new or modified sound sources.

10.7.25 The assessment methodology outlined in BS 4142:2014+A1:2019<sup>281</sup> indicates that the greater the difference of the rating level in comparison with the background sound level ( $L_{A90}$ ) the greater the significance of the impact, thus:

- a difference of +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
- the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant impact. A low impact is defined when the rating level does not exceed the measured background sound level.

#### *Determination of significance – above ground installations*

10.7.26 The language used in BS 4142:2014+A1:2019<sup>281</sup> does not readily align with that in EIA. In EIA terms, there is a point at which the differences in the bullet points above in (which in EIA terms would be described as impacts) would indicate a significant effect, depending on the context and the absolute level of the noise.

10.7.27 BS 4142:2014+A1:2019<sup>281</sup> emphasises the requirement to fully understand the context in which the sound occurs and therefore context will be considered in the assessment process before determining the potential significant effect resulting from the impacts identified (referred to as effects in the bullets in paragraph 10.7.25). For this reason, defining a semantic scale for magnitude of change, or values for the purposes of identifying LOAEL and SOAEL are not considered possible at this stage. However, the basis on which those decisions will be made is set out below. The levels will be reported in appropriate detail in the ES once baseline surveys have been completed.

10.7.28 The determination of significance for residential receptors exposed to operational noise from those HAGIs determined to be potential sources of likely significant effects will be based on the information in **Table 10.11** and professional judgement on the consideration of context.

10.7.29 A significant effect will be identified in two ways: (1) if the SOAEL is exceeded, as noise emitted by HAGIs in day-to-day operation will be continuous (unlike construction where a time factor has been included in the identification of significance) and/or (2) considering the advice of BS 4142:2014+A1:2019<sup>281</sup> based on the difference between the rating level and the background sound level, and contextual considerations (once established).

10.7.30 For operational sources, the LOAEL and SOAEL will be set with reference to absolute levels and BS 4142:2014+A1:2019<sup>281</sup> with the understanding of site context (once established). The absolute noise levels that will be considered in setting the LOAEL and SOAEL are based on WHO Community Noise Guidelines<sup>292</sup> for daytime and WHO Night Noise Guidelines for Europe<sup>293</sup> for night-

time. In **Table 10.11** no absolute value is suggested as the basis for daytime SOAEL, as this will be based on consideration of existing noise levels for each location.

**Table 10.11** Proposed LOAELs and SOAELs for assessing operational site noise

Assessment period	Basis	Metric, dB	LOAEL and SOAEL criteria
<b>Daytime (07:00 – 23:00 hours)</b>	BS 4142:2014+A1:2019 <sup>281</sup> Absolute level: WHO	$L_{Aeq}$ (16 hour)	LOAEL and SOAEL will be determined following site surveys as context is key to determination of significant effects, using the methodology outlined in BS 4142:2014+A1:2019 <sup>281</sup> .  Consideration of role of absolute levels: for LOAEL 50dB (free field).
<b>Night-time (23:00 – 07:00)</b>	BS 4142:2014+A1:2019 <sup>281</sup> Absolute level: WHO	$L_{Aeq}$ (8 hour)	As daytime, with consideration of role of absolute levels from WHO <sup>293</sup> : for LOAEL: 40dB for SOAEL: 55dB (free field)

10.7.31 Impacts and effects for non-residential noise sensitive receptors will be considered on an individual and representative receptor basis, initially guided by the sensitivities set out in Table 10.6. Relevant Local Planning Authorities will be consulted on the screening and assessment criteria.

### *Non-routine operation*

10.7.32 Noise levels from hydrogen venting and any other non-routine operations/infrequent maintenance operations will be limited by specification of the equipment. It is proposed that a  $L_{Aeq,T}$  of 70dB(A) over the duration of venting at the nearest noise sensitive receptor would be used as the design criterion. This would be achieved through the design of the vent and/or through the venting method.

10.7.33 Venting would only occur in an absolute emergency in the event of a pipeline leak/rupture. In this instance a temporary vent would be mobilised to a HAGI or block valve site and connected for purposes of blowdown. In this non-routine situation, safety rather than noise control is the primary consideration.

# 11. Traffic and Transport

## 11.1 Introduction

11.1.1 The Traffic and Transport assessment will consider the likely significant effects on receptors that may arise from the construction and operation (and maintenance) of the Project. Details of the Project are set out in **Chapter 2: The Project**.

11.1.2 This chapter of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

11.1.3 Traffic and Transport interfaces with many other topics and as such, should be considered alongside:

- **Chapter 9: Air Quality;**
- **Chapter 10: Noise and Vibration;** and
- **Chapter 17: Climate Change.**

## 11.2 Assumptions and limitations

11.2.1 Please refer to **Chapter 2: The Project** for the parameters on which this Scoping Report is based.

## 11.3 Relevant technical guidance

11.3.1 The following section sets out the technical guidance that will inform the Traffic and Transport assessment within the EIA for the Project. There is no legislation specifically relevant to the assessment of Traffic and Transport environmental effects. Information on policies relevant to the EIA is set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

### Technical guidance

11.3.2 A summary of the technical guidance of relevance to Traffic and Transport is provided in **Table 11.1**.

Table 11.1 Technical guidance relevant to Traffic and Transport

Technical Guidance Document	Context	Section considered
The Development for Transport (DfT) Circular 02/2013 “The Strategic Road Network and the Delivery of Sustainable Development Guidance” <sup>299</sup>	Sets out the ways in which Highways England will engage with communities and developers to deliver sustainable development and thus economic growth, whilst safeguarding the primary function and purpose of the Strategic Road Network.	Section 11.8: Assessment methodology
The Development for Transport (DfT) Circular 02/2013 <sup>299</sup> “Environmental Impact”	States that “ <i>developers must ensure all environmental implications associated with their proposals, are adequately assessed and reported so as to ensure that the mitigation of any impact is compliant with prevailing policies and standards. This requirement applies in respect of the environmental impacts arising from the temporary construction works and the permanent transport solution associated with the development, as well as the environmental impact of the existing trunk road upon the development itself</i> ”	Section 11.8: Assessment methodology
The Institute of Environmental Assessment (IEA) <sup>300</sup> publication Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic (GEART) <sup>301</sup>	Current guidance for assessing potentially significant environmental effects. This has been utilised within this assessment.	Section 11.8: Assessment methodology

## 11.4 Consultation

11.4.1 Whilst no consultation has taken place to date, engagement with the relevant statutory stakeholders is proposed to be undertaken, including with local highway

<sup>299</sup> Department for Transport (2013). The Strategic Road Network and the Delivery of Sustainable Development. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/237412/dft-circular-strategic-road.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/237412/dft-circular-strategic-road.pdf) (Accessed December 2021).

<sup>300</sup> Now the Institute of Environmental Management and Assessment, IEMA

<sup>301</sup> Institute of Environmental Assessment (1994). Guidelines on the Environmental Assessment of Road Traffic. Institute of Environmental Assessment; Lincolnshire, UK

authorities and National Highways. These discussions will aim to consider the following:

- Proposed traffic growth to future year;
- Committed highways schemes that may affect the future baseline;
- Committed development that may affect the future baseline;
- Scope of the assessment;
- Existing traffic data and data collection techniques considering potential lingering effects of the COVID-19 pandemic and lockdowns on road traffic in the area;
- Public Rights of Way (PRoW) management;
- potential traffic generation;
- HGV management;
- Identification of additional transport evidence base documents to support the Development Consent Order application, such as a Construction Traffic Management Plan (CTMP) and PRoW Management Plan; and
- Permanent access design to the Hydrogen Above Ground Installations (HAGIs).

11.4.2 It is proposed that consultation is undertaken with the following stakeholders:

- Cheshire East Council;
- Cheshire West and Chester Council;
- Warrington Borough Council;
- Greater Manchester Combined Authority;
- Transport for Greater Manchester;
- Trafford Council;
- Liverpool City Region Combined Authority;
- Halton Borough Council; and
- St Helens Council.

11.4.3 In addition, discussions will be held with National Highways regarding any potential impacts on the Strategic Road Network (SRN).

## 11.5 Baseline conditions

11.5.1 To understand the baseline conditions of the local and strategic highways network, the baseline assessment has been split into four distinct Study Areas relating to the Scoping red line boundary with reference to the North, East, South and West Corridors, including for the optionality on the South Corridor. The Corridors (and

associated spurs) are set out in **Figure 11.1** and described in **Chapter 2: The Project**. The Study Areas are illustrated on **Figure 11.2**.

## Study Area

11.5.2 The Study Area has been informed by:

- Roads providing access for construction traffic generated by the Project and points on the transport network that will be crossed by any element of the Scoping red line boundary. This has been estimated at this stage and will be confirmed in future environmental reporting. Temporary construction working areas and laydown areas will be required throughout the Project and will be located within the Scoping red line boundary; and
- The estimated key routes outside of the Scoping red line boundary that construction traffic will take to access the construction areas and permanent infrastructure of the Project.

11.5.3 The Study Area for each of the corridors are set out in **Figure 11.2**. These Study Areas will be reviewed and amended, if required, as the Project develops in response to the identification of any additional impact pathways, estimates of construction traffic levels, identification of working and laydown areas and in response to feedback from consultation.

## Data gathering methodology

11.5.4 The data sources used to inform this chapter are summarised in **Table 11.2**.

**Table 11.2 Key sources of transport data**

Source	Date accessed	Summary	Coverage of Study Area
<b>Ordnance Survey (OS) Mapping</b> <sup>302</sup>	15 November 2021	Use of online mapping of 1:50,000 and 1:25,000 OS Mapping	Scoping red line boundary. Transport Study Area.
<b>Google Traffic</b> <sup>303</sup>	16 November 2021	Use of online congestion data from Google Maps. Traffic data for key local roads was reviewed.	Scoping red line boundary. Transport Study Area.

<sup>302</sup> Microsoft (2021). Bing Maps. (Online) Available at: [www.bing.com/maps](http://www.bing.com/maps) (Accessed December 2021).

<sup>303</sup> Google (2021). Google Maps. (Online) Available at: [www.google.com/maps](http://www.google.com/maps) (Accessed December 2021).

Source	Date accessed	Summary	Coverage of Study Area
<b>Crashmap</b> <sup>304</sup>	15 November 2021	Use of Crashmap, a free online resource for looking at the accident record of road networks.	Scoping red line boundary. Transport Study Area.
<b>Google Street View</b>	14 November 2021	Use of street view views of local road network from Google Maps.	Scoping red line boundary. Transport Study Area.
<b>PRoW Information</b>	15 November 2021	<p>PRoW information from online PRoW maps for the following authorities:</p> <ul style="list-style-type: none"> <li>• Cheshire East<sup>305</sup></li> <li>• Chester West and Chester<sup>306</sup></li> <li>• Warrington Borough Council<sup>307</sup></li> <li>• Halton Borough Council<sup>308</sup></li> <li>• St Helens Borough Council<sup>309</sup></li> <li>• Trafford Council<sup>310</sup></li> </ul>	Scoping red line boundary. Transport Study Area.

<sup>304</sup> Crashmap (2020). Crashmap. (Online) Available at: <https://www.crashmap.co.uk/> (Accessed December 2021).

<sup>305</sup> Cheshire East Council (2021). Public Map Viewer. (Online) Available at: <https://maps.cheshireeast.gov.uk/ce/webmapping> (Accessed December 2021).

<sup>306</sup> Cheshire West and Chester Council (2021). Public Map Viewer. (Online) Available at: <https://maps.cheshirewestandchester.gov.uk/cwac/webmapping> (Accessed December 2021).

<sup>307</sup> Warrington Borough Council (2021). Public Map Viewer. (Online) Available at: <https://mapping.warrington.gov.uk/> (Accessed December 2021).

<sup>308</sup> Halton Borough Council (2021). Public Rights of Way Maps. (Online) Available at: <https://www3.halton.gov.uk/Pages/traffic/PublicRightsofWay.aspx> (Accessed December 2021).

<sup>309</sup> St Helens Borough Council (2021). My Council. (Online) Available at: <https://maps.sthelens.gov.uk/mycouncil.aspx> (Accessed December 2021).

<sup>310</sup> Trafford Council (2021). My Council. (Online) Available at: <https://maps.trafford.gov.uk/> (Accessed December 2021).



Source	Date accessed	Summary	Coverage of Study Area
Traffic Data <sup>311</sup>	14 November 2021	Review 2021 data at the DfT permanent count locations at key roads across the study areas <sup>312</sup>	Scoping red line boundary. Transport Study Area.

11.5.5 Further data will be required to inform the assessment of environmental traffic effects. These data sets will be collated, reviewed and updated as the Project progresses to enable a robust assessment to be undertaken. Some data such as traffic surveys rely on the baseline environment to reflect the normal situation. However, due to the COVID-19 pandemic in 2019/20 this was not possible. Currently (January 2022) traffic has returned broadly to post pandemic levels and as such traffic counts are now being accepted by Local Planning Authorities. It should be noted, however, that should further lockdowns be required in 2022 then flexibility will be sought from stakeholders regarding the timely completion of surveys and the provision of this information, with agreement sought for the use of historic traffic data as set out in **Table 11.2** to inform the assessment.

## Current baseline

11.5.6 The four corridors of the Scoping red line boundary have been considered separately, as due to the distances between these routes there are differing traffic and transport issues that need to be considered. This section will review the following route corridors:

- West Corridor;
- North Corridor;
- East Corridor; and
- South Corridor (Options A and B).

### West Corridor

#### Assessment scope

11.5.7 The scope of the assessment for the West Corridor (see **Figure 11.2**) covers a number of roads, and settlements alongside roads, which may compromise the receptors to be considered in the baseline once more information on traffic numbers and traffic routes is available. The main settlements within the scoping

<sup>311</sup> Department for Transport (2021). Road Traffic Statistics. (Online) Available at: <https://roadtraffic.dft.gov.uk> (Accessed December 2021).

<sup>312</sup> Department for Transport (2021). Road Traffic Statistics. (Online) Available at: <https://roadtraffic.dft.gov.uk/#13/53.9343/-1.1815/basemap-countpoints> (Accessed December 2021).

red line boundary for this route are Willow Green, Preston Brook, Sutton Weaver, Frodsham, Helsby and Elton.

### Road network

11.5.8 There are a number of 'A', 'B', 'C' and unclassified roads within the Study Area for the West Corridor which have the potential to be affected directly by the Project, either by a crossing by the proposed infrastructure or as an access route. Table 11.3 sets out the main 'A' and 'B' roads within this part of the Study Area including motorways. This will be refined through the EIA process when more is known about vehicle numbers and routes associated with the Project. Future environmental reporting will include a description of all the routes affected, including 'C' and unclassified roads.

**Table 11.3 Motorways, 'A' and 'B' Roads within the transport study area (West Corridor)**

Type of Road	Road Name
<b>Motorways and A Roads</b>	M56, A5117, A56, A557, A533, A49
<b>B Roads</b>	B5132

### Traffic data

11.5.9 Traffic data has been obtained from the latest available DfT permanent counts to understand the existing traffic flow on the SRN routes within the West Corridor Study Area. **Table 11.4** summarises the two-way traffic data on the Strategic Road Network (SRN) and other key 'A' Roads.

Table 11.4 Annual Average Daily Flow (West Corridor)

Road	Count ID	Two-Way Traffic Flow
A5117 – Southwest of Elton	17678	13,342
M56 - At Junction 12	73282	120,436
A557 – Near junction with A56, East of Frodsham	73281	12,058
A56 – Near Junction with A557, East of Frodsham	56540	19,119
A533 - Near Junction with A49	57276	7,810
A49 - Near Junction with A533	28775	17,677

### Public Rights of Way

11.5.10 **Figure 11.3** sets out the PRowWs which are crossed by the West Corridor. These include the strategic PRow routes the North Cheshire Way and the Cheshire Ring Canal Walk, and a number of other PRowWs.

### Cycling routes

11.5.11 Two routes of the National Cycle Network (NCN) cross the West Corridor are Routes 5 and 562, as illustrated on **Figure 11.4**.

### Rail network

11.5.12 The Warrington to Chester/Ellesmere Port line and Warrington to Crewe line are crossed by the West Corridor and will therefore potentially be affected by the Project.

### Navigable waterways

11.5.13 The West Corridor crosses the River Weaver and Trent and Mersey Canal.

## North Corridor

### Assessment scope

11.5.14 The scope of the assessment for the North Corridor (see **Figure 11.2**) covers a number of roads, and settlements alongside roads, which may comprise the receptors to be considered in the baseline. The main settlements within the Scoping red line boundary for this route are Willow Green, Lower Whitley, Higher Whitley, Norcott Brook, Dutton, Hatton, Daresbury, Stretton, Walton, Higher Walton, Moore, the wider Runcorn, St Helens, Widnes, Warrington areas and suburbs.

*Road network*

11.5.15 There are a number of 'A', 'B', 'C' and unclassified roads within the Study Area for the North Corridor which have the potential to be affected directly by the Project, either by a crossing by the proposed infrastructure or as an access route. Table 11.5 sets out the motorways, 'A' and 'B' roads within the Study Area for the North Corridor. This will be refined through the EIA process when more is known about vehicle numbers and routes. Future environmental reporting will include a description of all the routes affected including 'C' and unclassified roads.

**Table 11.5 Motorways, 'A' and 'B' Roads within the transport study area (North Corridor)**

Type of Road	Road Name
<b>Motorways and A Roads</b>	M56, M62, A533, A49, A56, A558, A562, A5080, A57, A569, A570, A558
<b>B Roads</b>	B5356, B5419, B5204

*Traffic data*

11.5.16 Traffic data has been obtained from the latest available DfT permanent counts to understand the existing traffic flow on the SRN routes within the North Corridor Study Area. Table 11.6 summarises the two-way traffic data on the motorways and 'A' Roads.

**Table 11.6 Annual Average Daily Flow (North Corridor)**

Road	Count ID	Two-Way Traffic Flow
<b>A533 - Near Junction with A49</b>	57276	7,810
<b>A49 - Near Junction with A533</b>	28775	17,677
<b>A56 - Near Junction with A558, North of Daresbury</b>	73449	26,998
<b>A562 - Between Junction with A5080 and Mowcroft Lane, West of Warrington</b>	7277	12,003
<b>A5080 - Between A562 and A557 West of Warrington</b>	47752	5,194
<b>A57 - Between Carsington Water and Lingley Green Avenue, West of Warrington</b>	77942	15,950
<b>A57 - Between Sandy Lane and Carsington Water, West of Warrington</b>	36583	15,792

Road	Count ID	Two-Way Traffic Flow
<b>A57 - Between B5419 and Tibbs Cross Lane, West of Warrington</b>	6560	7,957
<b>A570 - Between M62 Junction 7 and Chapel Lane, South of St Helens</b>	60005	25,236
<b>M56 – At Junction 14</b>	73282	120,436
<b>M62 - Between Junction 7 and 8</b>	80775	108,149
<b>A570 - Between Scorecross and B5204, South of St Helens</b>	77854	24,979

### *Public Rights of Way*

11.5.17 **Figure 11.3** sets out the PRowWs which are crossed by the North Corridor. These include the strategic routes the Cheshire Ring Canal Walk and Trans Pennine Trail, and a number of other PRowWs.

### *Cycling routes*

11.5.18 Route 62 of the NCN is crossed by the North Corridor, as illustrated on **Figure 11.3**.

### *Rail network*

11.5.19 The Warrington to Chester/Ellesmere Port line, Warrington to Crewe line, Warrington to Liverpool lines and Manchester to Liverpool line are crossed by the North Corridor and will therefore potentially be affected by the Project.

### *Navigable waterways*

11.5.20 The North Corridor crosses the Bridgewater Canal, Manchester Ship Canal, the Sankey Canal and the River Mersey.

## **East Corridor**

### *Assessment scope*

11.5.21 The scope of the assessment for the East Corridor (see **Figure 11.2**) covers a number of roads, and settlements alongside roads, which may comprise the receptors to be considered in the baseline. The main settlements within the Scoping red line boundary for this route are Lower Whitley, High Whitley, Antrobus, Arley, High Leigh, Lymm, Dunham Massey, the wider Altrincham area and suburbs and Partington.

*Road network*

11.5.22 There are a number of 'A', 'B', 'C' and unclassified roads within the Study Area for the East Corridor which have the potential to be affected directly by the Project, either by a crossing by the proposed infrastructure or as an access route. Table 11.7 sets out the 'A' and 'B' roads within the East Corridor Study Area including motorways. This will be refined through the EIA process when more is known about vehicle numbers and routes. Future environmental reporting will include a description of all the routes affected including 'C' and unclassified roads.

**Table 11.7 Motorways, 'A' and 'B' Roads within the transport study area (East Corridor)**

Type of Road	Road Name
<b>Motorways and A Roads</b>	M6, M56, A533, A49, A559, A50, A56
<b>B Roads</b>	B5159, B5160

*Traffic data*

11.5.23 Traffic data has been obtained from the latest available DfT permanent counts to understand the existing traffic flow on the SRN routes within the East Corridor Study Area. Table 11.8 summarises the two-way traffic data on the motorways and 'A' Roads.

**Table 11.8 Annual Average Daily Flow (East Corridor)**

Road	Count ID	Two-Way Traffic Flow
<b>A533 - Near Junction with A49</b>	57276	7,810
<b>A49 - Near Junction with A533</b>	28775	17,677
<b>A559 - Between Meg Lane and Lake Lane, North of Frandley</b>	47300	7,852
<b>A50 - Between Crabtree Lane and West Lane, West of High Legh</b>	89024	8,130
<b>M56 - Between Junction 8 and 9</b>	6048	87,582

*Public Rights of Way*

11.5.24 The East Corridor crosses the strategic PRow routes the North Cheshire Way, the Cheshire Ring Canal Walk and the Trans-Pennine Trail as well as a number of other PRow routes, as illustrated on **Figure 11.3**.

### Cycling routes

11.5.25 The East Corridor crosses Route 62 of the NCN, as illustrated on **Figure 11.4**.

### Rail network

11.5.26 No railway lines are crossed by the East Corridor.

### Navigable waterways

11.5.27 The East Corridor crosses the Bridgewater Canal and the Trent and Mersey Canal.

## South Corridor

### Assessment scope

11.5.28 The scope of the assessment for the South Corridor (see **Figure 11.2**) covers a number of roads, and settlements alongside roads, which may compromise the receptors to be considered in the baseline. For this corridor there are two corridor options, which widens the scope of the assessment. The main settlements within the Scoping red line boundary for the South Corridor are Lower Whitley, Comberbach, Great Budworth, Northwich, Wincham, Lostock Gralam, Pickmere, Lach Dennis, Bostock, Moulton, Davenham, Winsford, Sandiway, Whitegate, Weaverham and Acton Green.

### Road network

11.5.29 There are a number of 'A', 'B', 'C' and unclassified roads within the Study Area for the South Corridor, which have the potential to be affected directly by the Project, either by a crossing by the proposed infrastructure or as an access route. Table 11.9 sets out the 'A' and 'B' roads within this part of the Study Area. This will be refined through the EIA process when more is known about vehicle numbers and routes. Future environmental reporting will include a description of all the routes affected including 'C' and unclassified roads.

**Table 11.9 'A' and 'B' Roads within the transport study area (South Corridor)**

Type of Road	Road Name
<b>A Roads</b>	A533, A49, A559, A556, A530
<b>B Roads</b>	B5153, B5142, B5144, B5082, B5391, B5075

### Traffic data

11.5.30 Traffic data has been obtained from the latest available DfT permanent counts to understand the existing traffic flow on the SRN routes within the South Corridor Study Area. **Table 11.10** summarises the two-way traffic data on the motorways and 'A' Roads.

Table 11.10 Annual Average Daily Flow (South Corridor)

Road	Count ID	Two-Way Traffic Flow
A533 - Near Junction with A49	57276	7,810
A49 - Near Junction with A533	28775	17,677
A49 - Between B5153 and B5144, West of Weaverham	28854	12,780
A530 - Between Davenham Road and Yatehouse Lane, South of Northwich	47279	14,485

### Public Rights of Way

11.5.31 The South Corridor crosses the strategic PRow routes the North Cheshire Way, Dane Valley Way and the Cheshire Ring Canal Walk as well as a number of other PRowS, as illustrated on **Figure 11.3**.

### Cycling routes

11.5.32 The South Corridor crosses Routes 5, 71 and 573 of the NCN. There is also an on-road cycle route that is not on the NCN which runs between Route 62 near Heatley to route 5 near Stoak and the M56/M53, as illustrated on **Figure 11.4**.

### Rail network

11.5.33 The South Corridor crosses the following railway lines: the Warrington to Crewe line, Northwich to Crewe line, Northwich to Chester line and Northwich to Knutsford line.

### Navigable waterways

11.5.34 The South Corridor crosses the Trent to Mersey Canal and the River Weaver.

### Identified access pinch points

11.5.35 Based on the baseline assessment, there are a number of locations on the highways network that could be considered pinch points or have access issues that will be further considered as the Project evolves, as follows:

- A56: swing bridge over the Weaver Navigation;
- A56: 14"6' height restriction east of Sutton Weaver;
- Aston Lane: Unsuitable for Heavy Goods Vehicle (HGV) single track rail bridge;
- A49: Acton swing bridge;
- Littledales Lane: 12"9' height restriction;



- Agden Bridge: 2 tonne axel weight limit (Spring Lane);
- B5169: 9'0" height restriction;
- Woodhouse Lane: 9'0" height restriction;
- School Lane: 3 tonne weight limit;
- Warburton Bridge Lane: 3 tonne weight limit;
- Moor Lane: 15'6" height restriction and swing bridge; and
- A580: 15' 0" height restriction.

11.5.36 This is not a comprehensive list of local highways restrictions and will be updated as the Project progresses.

### *Wider high level accident assessment*

11.5.37 A review of accident data from Crashmap<sup>304</sup> has indicated that there have been hundreds of accidents in the last five years across the Study Area, with clusters of accidents noted in certain locations. As construction traffic routes for the Project are not yet fixed it is not possible at this stage to identify all clusters of accidents that need to be considered in detail, however the following have been noted as accident hotspot locations on the local road network:

- Junction 14 of the M56/A5117;
- A56 (High Street) in Frodsham;
- Junction of A56/Wood Lane West of Sutton Weaver;
- Junction of A50/B5158/M6 Junction 20;
- Junction of A56/A556 Southwest of Altrincham;
- Junction of A569/A570/Sherdley Road in St Helens;
- Junction of A57/A557/A570/M62 Junction 7;
- Junction of A557/A562 in Widnes;
- A562 Warrington Road in Penketh between Sandy Lane and Clifford Road;
- Junction of A57/A562 in Penketh;
- Junction of A56/M56 Junction 11;
- Junction of A558/A533 East of Runcorn;
- Junction of A533/B5155/Halton Link Road near Halton;
- Junction of A533/Murdishaw Avenue near Brookvale;
- Junction of A559/A47/M56 Junction 10;
- Junction of A556 Chester Road/School Lane/Dalefords Lane South Sandiway;
- Junction of A533/Jack Lane Southeast of Moulton;

- Junctions of B5082/B5081(Middlewich Road) and B5082/Byley Road North of Byley;
- Junction of A556/A533/London Road North of Davenham;
- Junction of A556/A5033 West of Knutsford; and
- Junction of A556/M6 Junction 19.

11.5.38 An accident assessment of key routes for construction traffic will be undertaken and presented in future environmental reporting.

## Future baseline

11.5.39 In accordance with GEART<sup>301</sup>, the period in which the level of traffic (future baseline plus traffic from the Project) is at its peak will be considered within the assessment. The peak construction period will be based on the indicative construction programme and the anticipated construction traffic movements. The future baseline will take into account traffic growth as a result of new development, which will be based on growth factors from the DfT National Trip End Model (NTEM) derived from the Trip End Model Presentation Programme (TEMPro). The use of TEMPro will include for cumulative traffic growth within the study area.

11.5.40 At this stage, the construction is expected to commence in 2025 and last for approximately three years with commissioning in 2027.

11.5.41 Engagement with the highways authorities will identify appropriate growth rates based on the traffic data available, future year of assessment and location of the project. This engagement will also seek to agree any significant development adjacent to the proposed Study Area that may need to be included as a specific committed development on top of the agreed TEMPro growth rate.

11.5.42 The future baseline will also consider the implications of changes to the transport infrastructure, such as changes to roads and or junctions and new infrastructure. This will be established during consultation.

## 11.6 Embedded environmental measures

11.6.1 As part of the project design process, a number of embedded measures will be proposed to reduce the potential for impacts on transport (see **Table 11.11**). These will evolve over the development process as the EIA progresses and in response to consultation and will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislative requirements.

11.6.2 As there is a commitment to implementing these environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

Table 11.11 Relevant transport embedded environmental measures

Environmental measures proposed	How the environmental measures will be secured
<b>A crossing schedule for the pipeline crossings will be prepared setting out crossing methodologies of all road, rail, PRow and watercourse crossings.</b>	Provided within the Preliminary CTMP and secured under the powers of the DCO
<b>Signage and/or temporary PRow diversions will be provided during construction where necessary to avoid the construction working areas.</b>	Provided within the Preliminary Public Rights of Way Management Plan (PRowWMP) and secured under the powers of the DCO
<b>Construction accesses to the public highway will be provided with required visibility splays, where permanent accesses are required as well as major construction accesses are proposed. All other locations will be managed via traffic management processes (signage, speed limit reductions and banksmen).</b>	Visibility splays will be provided on the relevant DCO plans and will be a requirement of the DCO
<b>The pipeline will be constructed predominantly using open cut techniques and trenchless crossing techniques at key locations including crossings of motorways and A roads, railway lines, main rivers and canals.</b>	Provided within the Preliminary CTMP and secured under the powers of the DCO
<b>A road and PRow condition survey will be undertaken on roads and PRows affected by construction traffic before, during and after the construction phase of the Project. The results of these surveys will be used to identify the requirement for any repairs needed as a result of project related damage.</b>	Provided within the Preliminary CTMP and secured under the powers of the DCO
<b>All road crossings will be agreed with the relevant highway authority. Road closures will be avoided where possible, and where they are required will be scheduled to avoid other local scheduled works on the highways network.</b>	Provided within the Preliminary CTMP and secured under the powers of the DCO
<b>Access locations and access routes from the SRN will be planned to avoid settlements and villages where possible. The use of haul roads and loop road arrangements will be proposed where appropriate and possible to mitigate proposed environmental effects of traffic and transport.</b>	Provided within the Preliminary CTMP and secured under the powers of the DCO

Environmental measures proposed	How the environmental measures will be secured
<p>Where possible the accesses from the SRN will avoid Air Quality Management Areas (AQMAS). It is proposed to entirely avoid the AQMAS within Warrington, Widnes, Middlewich and St Helens.</p>	<p>Provided within the Preliminary CTMP and secured under the powers of the DCO</p>

## 11.7 Scope of the assessment

### Potential receptors

- 11.7.1 The scope of the assessment provides comprehensive coverage of the routes surrounding the Project and will consider the potential traffic-related environmental effects from construction and operation of the Project on identified receptors, focused on a series of traffic and transport receptors on the local and strategic highways network. These receptor locations will be defined as the Project design develops in line with consultation with the relevant highway authorities.
- 11.7.2 Receptors are the users or beneficiaries of the highways network assets and facilities, such as pedestrians, cyclists, equestrians and drivers who travel within the vicinity of the Project.
- 11.7.3 GEART<sup>301</sup> identifies the following groups and special interest groups that may be affected:
- People at home;
  - People at work;
  - Sensitive groups including children, elderly and disabled;
  - Sensitive locations such as hospitals, churches and historical buildings;
  - Pedestrians;
  - Equestrians;
  - Cyclists;
  - Open spaces recreational areas and shopping areas;
  - Sites of ecological and nature conservation value; and
  - Site of tourist/visitor attractions.

### Likely significant effects

- 11.7.4 The likely significant effects that will be taken forward for assessment are summarised in **Table 11.12**. The scoping assessment is based on a combination of the definition of the Project (see **Chapter 2: The Project**), embedded environmental measures, understanding of the baseline conditions at this stage, the evidence base for traffic and transport effects and professional judgement.

Table 11.12 Likely significant Traffic and Transport effects

Activity	Effect	Receptor
<b>Construction</b>		
<b>Construction and installation of underground pipeline and associated earth working, establishing accesses and security measures resulting in potential impacts on the local and SRN</b>	<p>Construction traffic at sensitive highway receptors. Impact of construction traffic and proposed infrastructure on PRowWs.</p> <p>Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and mitigation to be identified. To be confirmed through assessment.</p>	<p>Transport receptors to be defined based on:</p> <ul style="list-style-type: none"> <li>• People at home;</li> <li>• People at work;</li> <li>• Sensitive groups;</li> <li>• Sensitive locations;</li> <li>• Pedestrians;</li> <li>• Cyclists;</li> <li>• Open spaces recreational areas and shopping areas;</li> <li>• Sites of ecological and nature conservation value;</li> <li>• Tourist/visitor attractions; and</li> <li>• Existing congestion</li> </ul>
<b>Construction of HAGIs and Block Valves (infrastructure) resulting in potential impacts on the local and SRN and permanent effects on PRowW</b>	<p>Construction traffic at sensitive highway receptors. Impact of construction traffic and proposed infrastructure on PRowWs. Location of HAGIs that would have permanent effects on PRowW.</p> <p>Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and mitigation to be identified. To be confirmed through assessment.</p>	
<b>Provision of associated construction compounds to support the delivery of the development resulting in potential impacts on the local and SRN</b>	<p>Construction traffic at sensitive highway receptors. Impact of construction traffic and proposed compounds on PRowWs.</p> <p>Effect anticipated to not be significant based on magnitude of change, receptor sensitivity and mitigation to be identified. To be confirmed through assessment.</p>	

11.7.5 It is proposed that an assessment of traffic and transport effects will be undertaken for the construction phase only. The assessment will consider the sensitivity of the receptors and the magnitude of change as a result of the traffic generated by the Project. It is anticipated that the likely significance of effects will be not significant based on the evaluation matrix set out in **Table 11.13**, however, this will be confirmed through assessment.

## Effects scoped out of assessment

11.7.6 A number of potential effects have been scoped out from further assessment, as no significant effects are likely. These conclusions have been made based on professional judgment arising out of knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact and recent experience on underground pipeline/cable and other major infrastructure projects. It is therefore proposed to scope out the following effects from further detailed assessment:

- Effects on roads and users of these routes from traffic associated with the Project's operation and maintenance activities. The volume of vehicle movements during operation would be low taking into account:
  - ▶ Routine checks on a weekly basis by one vehicle;
  - ▶ Annual maintenance by one vehicle on one day per year;
  - ▶ Any major maintenance requiring three vehicles for approximately 1 week of a year; and
  - ▶ Pigging operations<sup>313</sup> every 5 to 15 years requiring five vehicles for approximately one week.
- It is therefore considered that the number of daily vehicle movements would be significantly less than the construction phase of the Project and would not trigger the need of any assessment according to the GEART criteria<sup>301</sup>. The magnitude of change and significance of effect would be negligible, and this effect has therefore been scoped out of the assessment.
- Effects on roads, PRoWs and users of these routes from traffic associated with the Project's decommissioning phase. Decommissioning of the Project would involve leaving the pipeline in-situ and making it safe. This would typically involve rail, road and watercourse crossings being filled with grout and the removal of all HAGIs. Land would then be restored to its former use. It is therefore considered that effects from decommissioning of the Project would be less than those during the construction phase, with significant effects unlikely. The decommissioning of the Project has therefore been scoped out of this assessment.
- Effects on roads, PRoWs and users of these routes from Hazardous loads at all phases of the Project. No Hazardous loads are anticipated and effects from these are therefore scoped out of the assessment.

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<sup>313</sup> The inspection and cleaning of the pipeline – see **Chapter 2: The Project** for further details.

## 11.8 Assessment methodology

### Introduction

11.8.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this Traffic and Transport chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the transport assessment in the ES.

### General approach

11.8.2 The guidance that is followed when assessing the potential significance of road traffic effects is GEART<sup>301</sup> which states that:

*"The detailed assessment of impacts is likely to concentrate on the period during which the absolute level of an impact is at its peak, as well as the hour at which the greatest level of change is likely to occur." (Paragraph 3.10, IEA, 1993).*

11.8.3 To assess the impact at its peak, the likely percentage increase in traffic is determined by comparing estimates of traffic generated by the Project with future predicted baseline traffic flows on the road links within the defined Study Areas.

11.8.4 GEART<sup>301</sup> sets out that the following transport effects need to be considered in any assessment:

- Severance: the separation of people from places and other people and places or impede pedestrian access to essential facilities;
- Driver delay: traffic delays to non-development traffic;
- Pedestrian amenity: the effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width/separation from traffic;
- Pedestrian delay: the ability of people to crossroads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions;
- Fear and intimidation: these may be experienced by people as a result of an increase in traffic volume and its proximity or the lack of protection caused by such factors as narrow pavement widths;
- Accidents and safety: the risk of accidents occurring where the Project is expected to produce a change in the character of traffic; and
- Hazardous loads.

11.8.5 Cumulative effects on traffic and transport resulting from the effects of the Project and other developments will be assessed in accordance with the guidance and methodologies set out in **Chapter 4: The EIA Process** and considering the other developments that will be screened in as part of the cumulative effects assessment (CEA) screening exercise.

- 11.8.6 The following impacts have the potential to act cumulatively with impacts from other developments to contribute to cumulative effects:
- Permitted/committed developments within and in the vicinity of the transport Study Areas that will result in additional traffic on the road network. As set out earlier in this chapter, it is considered that permitted/committed developments will be included within the agreed TEMPro traffic growth rate. However, the highway authorities may require that specific developments are included (usually developments outside of local plan allocations) as the development traffic from these will have localised impacts on specific parts of the road network. This will be identified with the highway authorities through further consultation; and
  - Committed transport schemes that will affect the transport network, such as junction improvements and new road links. These will be identified with the highway authorities through further consultation.

## Determination of significance

- 11.8.7 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are likely to be significantly affected by the Project.
- 11.8.8 The EIA Regulations do not define significance and it is necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the change. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the Project.
- 11.8.9 GEART<sup>301</sup> provides two rules that are used to establish whether an environmental assessment of traffic effects<sup>314</sup> should be carried out on receptors:
- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
  - Rule 2: Include sensitive areas where traffic flows are predicted to increase by 10% or more. These include locations with vulnerable road users, such as schools, nursing homes, and locations with high pedestrian activity.
- 11.8.10 It should be noted that, according to GEART<sup>301</sup>, predicted traffic flow increases below 10% are generally not considered to be significant as daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flows below this level are, therefore, assumed not to result in significant environmental effects.

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<sup>314</sup> Note that, as per GEART, the assessment considers traffic-related environmental effects and does not relate to road congestion or capacity issues



11.8.11 **Table 11.13** sets out how significance will be determined based on receptor sensitivity and the magnitude of change.

**Table 11.13 Significance evaluation matrix**

		Magnitude of change			
		High	Medium	Low	Negligible
Receptor sensitivity	High	Major (Significant)	Major (Significant)	Moderate (Significant)	Negligible (Not significant)
	Medium	Major (Significant)	Moderate (Significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Moderate (Significant)	Minor (Not significant)	Minor (Not significant)	Negligible (Not significant)
	Negligible	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

### Receptor sensitivity

11.8.12 The sensitivity of each highway link to be included in the assessment will be assigned a sensitivity in accordance with the advice provided in the GEART<sup>301</sup>, as summarised in **Table 11.14** and based on professional judgement.

**Table 11.14 Receptor sensitivity**

Sensitivity	Description/Reason	Receptor
<b>High</b>	Receptors of high sensitivity to change in traffic flows: schools, colleges, playgrounds, accident blackspots, retirement homes and urban/residential homes without footways that are used by pedestrians and cyclists.	Residents/workers travelling to and from work or home on foot and by bicycle, school children, leisure walkers and equestrians.
<b>Medium</b>	Receptors of medium sensitivity to change in traffic flows including congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycle ways, community centres, parks and recreation facilities.	Residents/workers travelling to and from work or home on foot and by bicycle, people visiting these land uses.
<b>Low</b>	Receptors with low sensitivity to change in traffic flows: places of worship, public open	Residents/workers travelling to and from work

Sensitivity	Description/Reason	Receptor
	space, nature conservation areas, listed buildings, tourist/visitor attractions and residential areas with adequate footway provision.	or home on foot or bicycle and people visiting these land uses.
<b>Negligible</b>	Receptors with negligible sensitivity to change in traffic flows including Motorways and Dual Carriageways and/or land uses sufficiently distant from affected routes and junctions.	Residents/workers travelling by foot or bicycle.

11.8.13 In accordance with GEART<sup>301</sup>, where the sensitivity of a road link is judged as high or medium, Rule 2 will be applied and where traffic flows are predicted to increase by 10% or more, an assessment of environmental effects will be undertaken. Where the sensitivity is judged as low or negligible results, Rule 1 will be applied and where traffic flows are predicted to increase by more than 30%, or where the number of HGVs is predicted to increase by more than 30%, an assessment of environmental effects will be undertaken of the road link.

**Magnitude of change**

11.8.14 GEART<sup>301</sup> recognises that professional judgement should be used as part of the assessment and states the following:

*“For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources.” (Paragraph 4.5, IEA, 1993)*

11.8.15 Based on the Rule 1 and Rule 2 and the sensitivity of the receptors, **Table 11.15** shows the magnitude of change will be applied to the environmental effects to help identify levels of significance. The indicators to assess the magnitude of change are based on advice included within GEART<sup>301</sup> and professional judgement.

**Table 11.15 Magnitude of change**

Transport Effect	High	Medium	Low	Negligible
<b>Severance</b>	Change in total traffic or HGV flows over 90%	Change in total traffic or HGV flows of 60%-90%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of less than 30%

<b>Driver Delay</b>	High increase in queuing at junctions and/or congestion on road links	Medium increase in queuing at junctions and/or congestion on roads links	Low increase in queuing at junctions and/or congestion on roads links	Low or no increase in queuing at junctions and/or congestion on roads links
<b>Pedestrian amenity</b>	Based on general level of pedestrian activity, visibility and physical conditions such as traffic flow, traffic composition, crossing points and pavement width/separation from traffic			
<b>Pedestrian delay</b>				
<b>Pedestrian fear and intimidation</b>				
<b>Accident and Safety</b>	Informed by a review of existing collision patterns and trends based upon the existing personal injury accident records and the forecast increase in traffic.			

## Desk-based assessment

- 11.8.16 An initial desk-based baseline assessment will be undertaken to gather information on highway infrastructure, construction routes and restrictions. Bing Maps, Google Maps UK and Google Street View will be used to provide an overview of the study area and the highway network and connections. This will then be supplemented with a site visit.
- 11.8.17 Traffic generation as a result of the Project will be identified as the project progresses and the transport related environmental effects will be assessed.
- 11.8.18 Baseline traffic and accident data will be sought from existing sources such as:
- DfT permanent count locations;
  - Data held by Local Planning Authorities; and
  - Accident Data – personal injury accident (PIA) data will be required to identify road safety issues that may be affected by the traffic generated by the Project. This data will be obtained from relevant authorities.

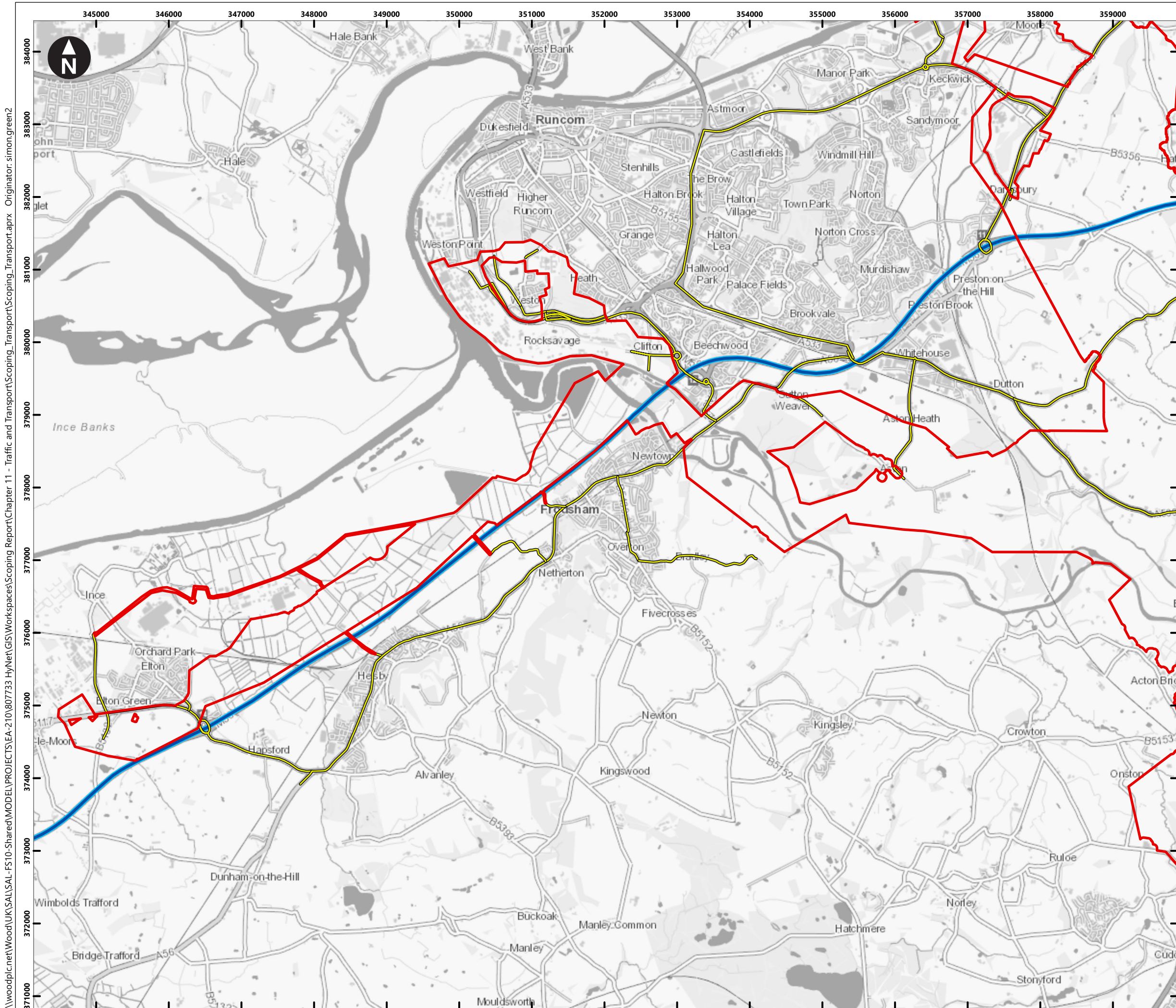
## Site based assessment

- 11.8.19 Two elements of site-based work will inform the baseline:
- Commissioned traffic counts - to supplement the existing traffic data from DfT and Local Planning Authorities; and
  - Site visit assessment - a site visit will be undertaken to inform the assessment and ground-truth the high-level desktop-based assessments. Detailed notes and a photographic record will be undertaken on the site visit and consideration will be given to the identification of receptor locations.

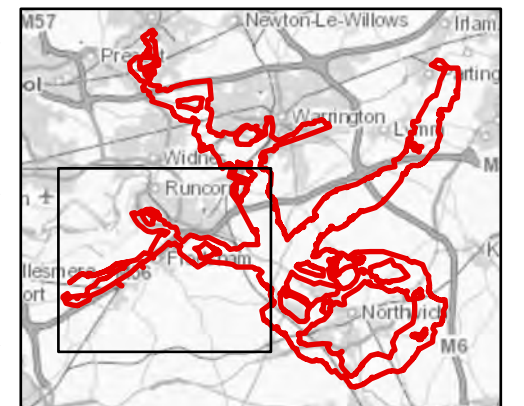
- 11.8.20 Any reinstatement of COVID-19 pandemic restrictions has potential implications on the Project, in particular with regard to normal consultation activities and conducting traffic surveys. Measures are being taken on the Project to collect as much baseline data as possible during the EIA programme, whilst planning to work fully within any new restrictions and being mindful of and managing any potential implications.
- 11.8.21 Changes in Spring 2021 with regards to the COVID-19 lockdown situation in the UK mean that site work currently being undertaken by the transport team and special health and safety arrangements will be made to ensure that this complies with the social distancing rules. Should the situation change, the approach will be amended accordingly to reflect the most up-to-date Government guidance.

### Undertaking further assessments

- 11.8.22 As outlined earlier in this chapter, further collection of baseline data will be carried out through a desk-based assessment supplemented with site-based information (for example traffic count data and site visit data).
- 11.8.23 A baseline assessment and analysis of findings will be refined in line with consultation feedback through to DCO submission.
- 11.8.24 Our approach to the traffic and transport assessment as set out in this section will be in accordance with the GEART<sup>301</sup>. The main transport effects will be associated with the construction phase and the traffic movements of the following to and from the transport study area:
- Construction staff vehicles, including cars and light vans;
  - HGVs –vehicles 3.5t gross weight (>3.5t) delivering materials and equipment; and
  - Abnormal Loads –vehicles longer than 17m and/or wider than 4m.
- 11.8.25 Additional transport related technical documents will be identified through the EIA process. This will include the need for a CTMP, an AIL Study and a Public Rights of Way Management Plan (PRoWMP). It is considered that a Transport Assessment will not be required as the peak hour traffic flows associated with the Project operational phase are anticipated to be very low and the impact of the operational phase has been scoped out.
- 11.8.26 Where significant transport effects are identified, mitigation or other environmental measures will also be presented in the ES, as appropriate.



- Key
- Scoping boundary
  - Strategic road network
  - Access routes



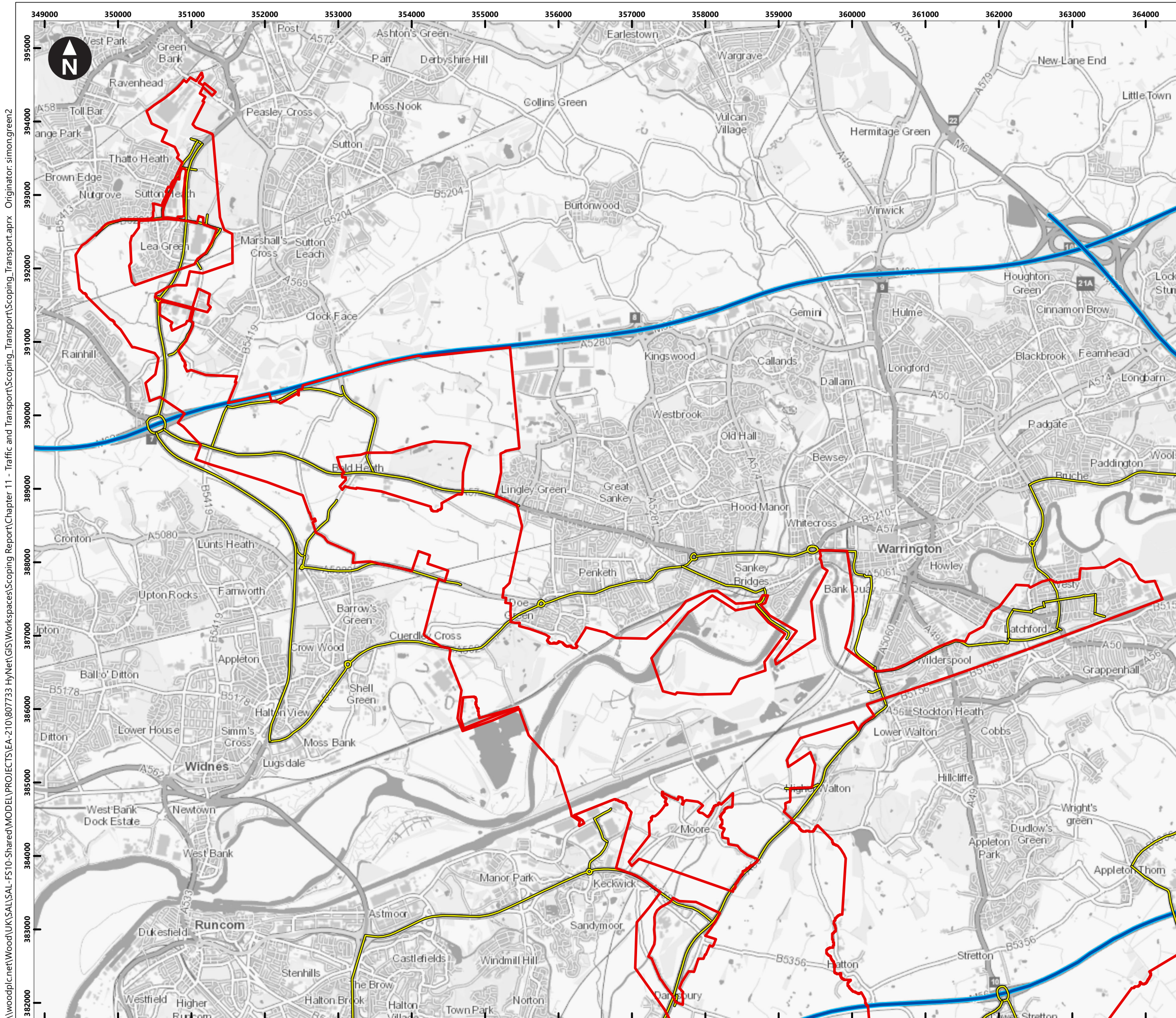
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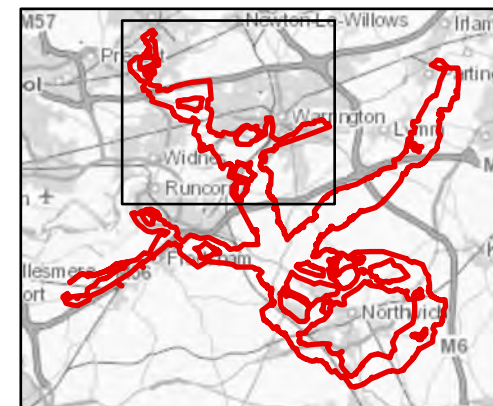
**Figure 11.1**  
**Transport study areas**  
**Sheet 1: West**

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Key

- Scoping boundary
- Strategic road network
- Access routes



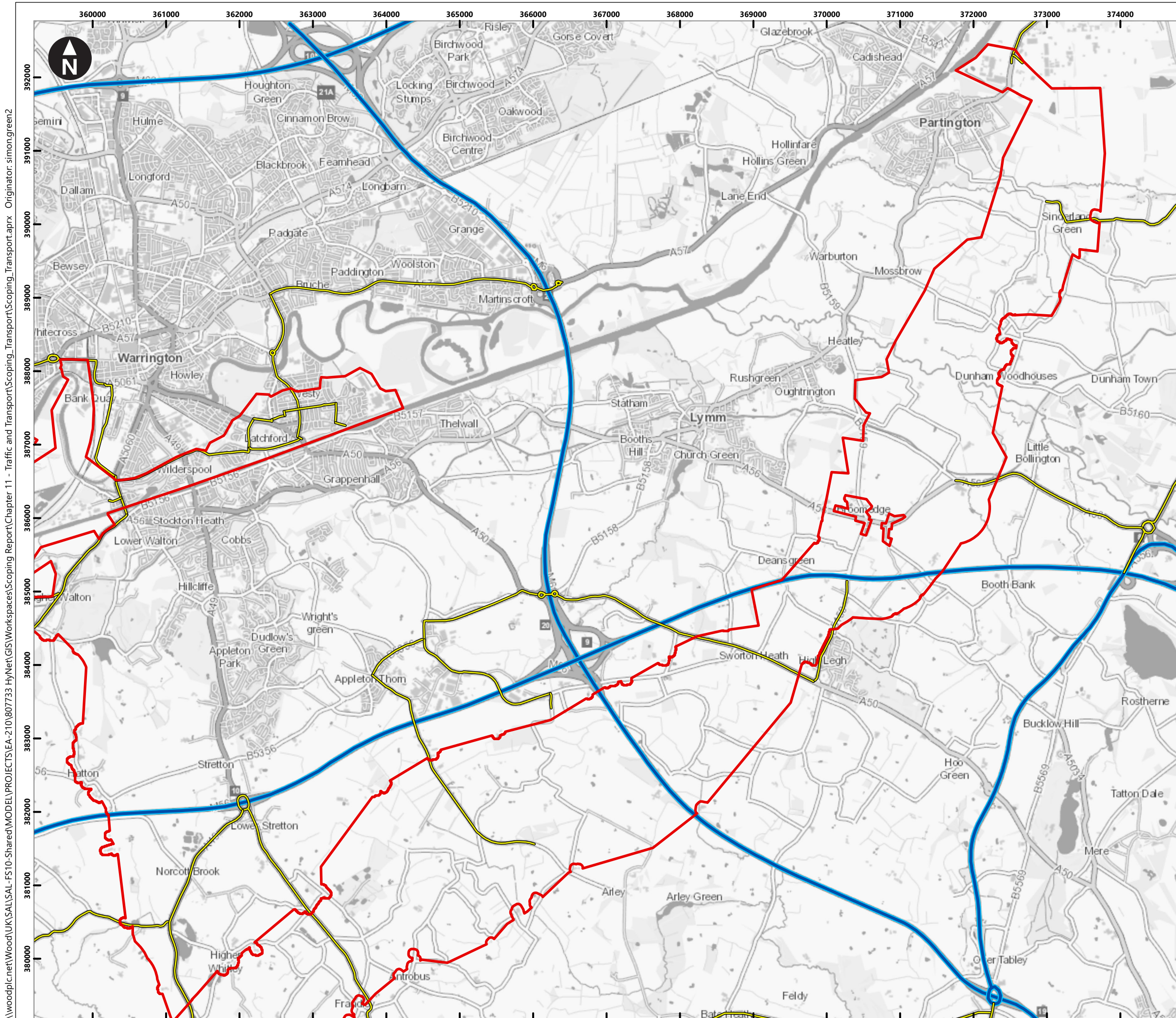
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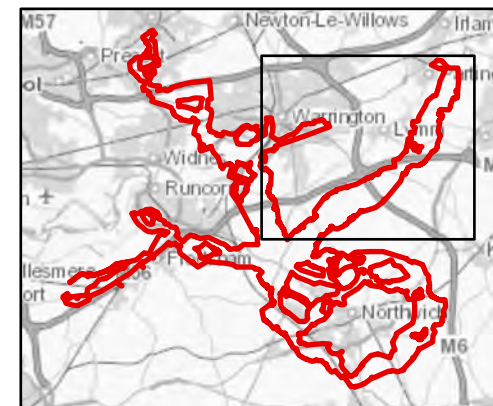
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**Figure 11.1**  
**Transport study areas**  
**Sheet 2: North**

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- Key
- Scoping boundary
  - Strategic road network
  - Access routes



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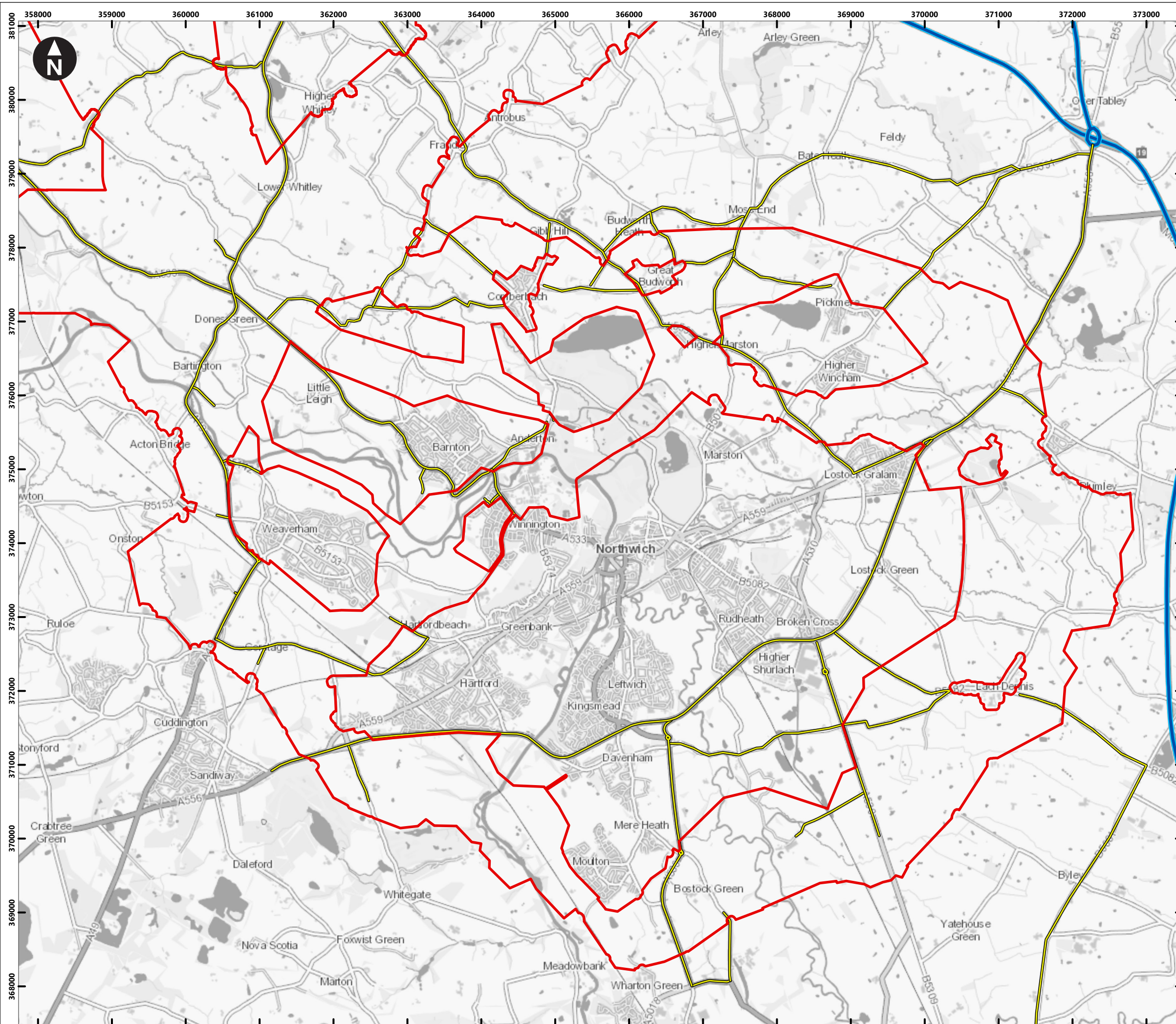
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**Figure 11.1**  
**Transport study areas**  
**Sheet 3: East**

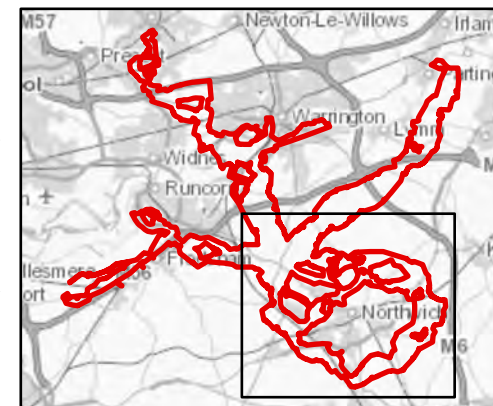
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Key

- Scoping boundary
- Strategic road network
- Access routes



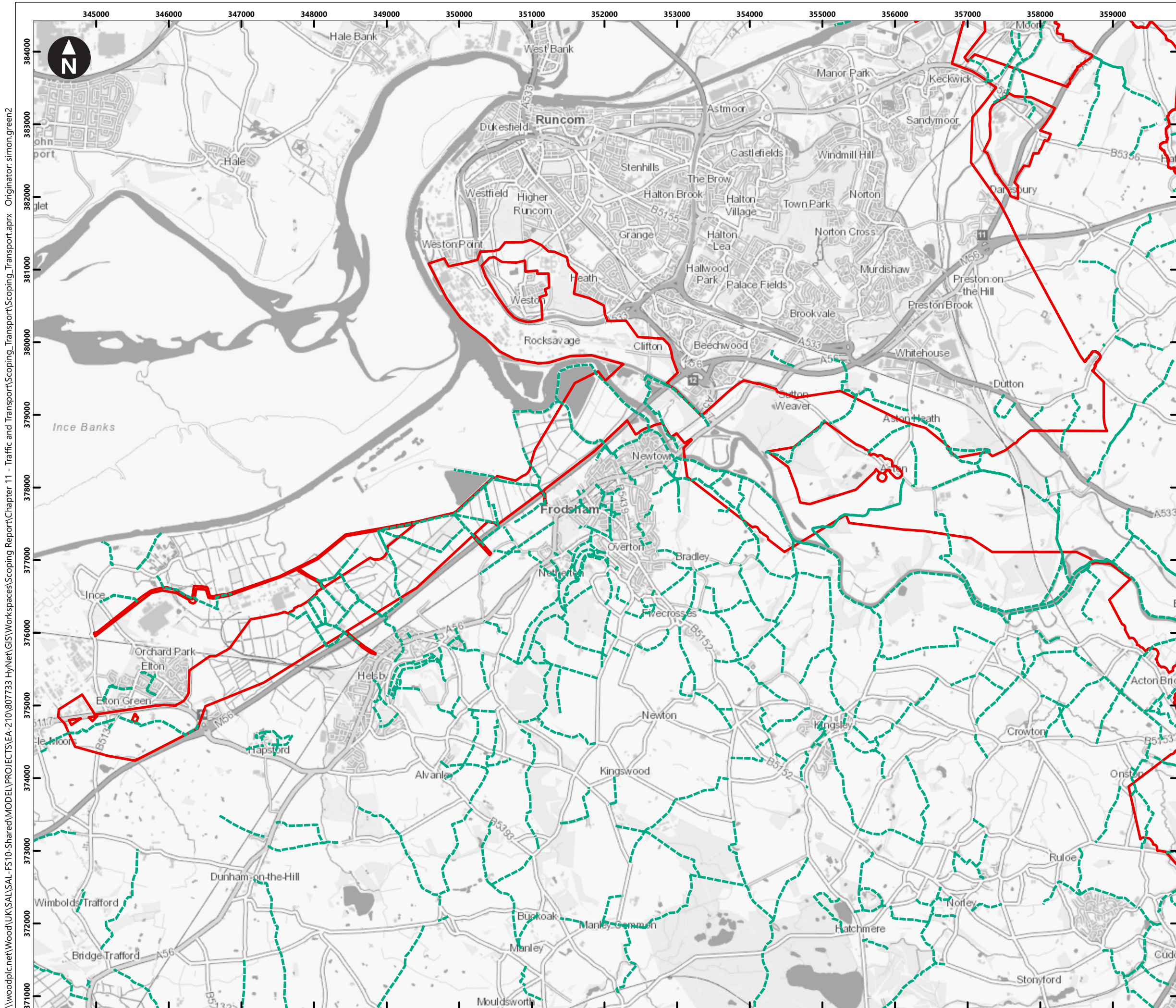
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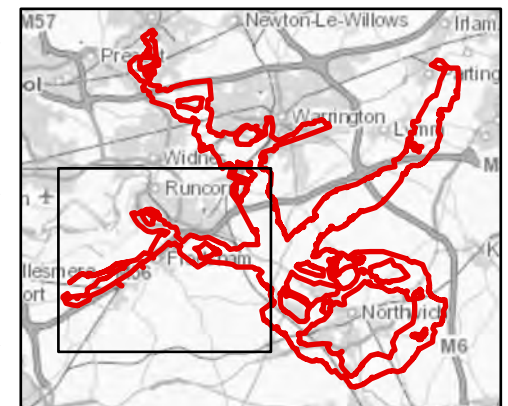
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**Figure 11.1**  
**Transport study areas**  
**Sheet 4: South**





- Key
- Scoping boundary
  - Public Rights of Way



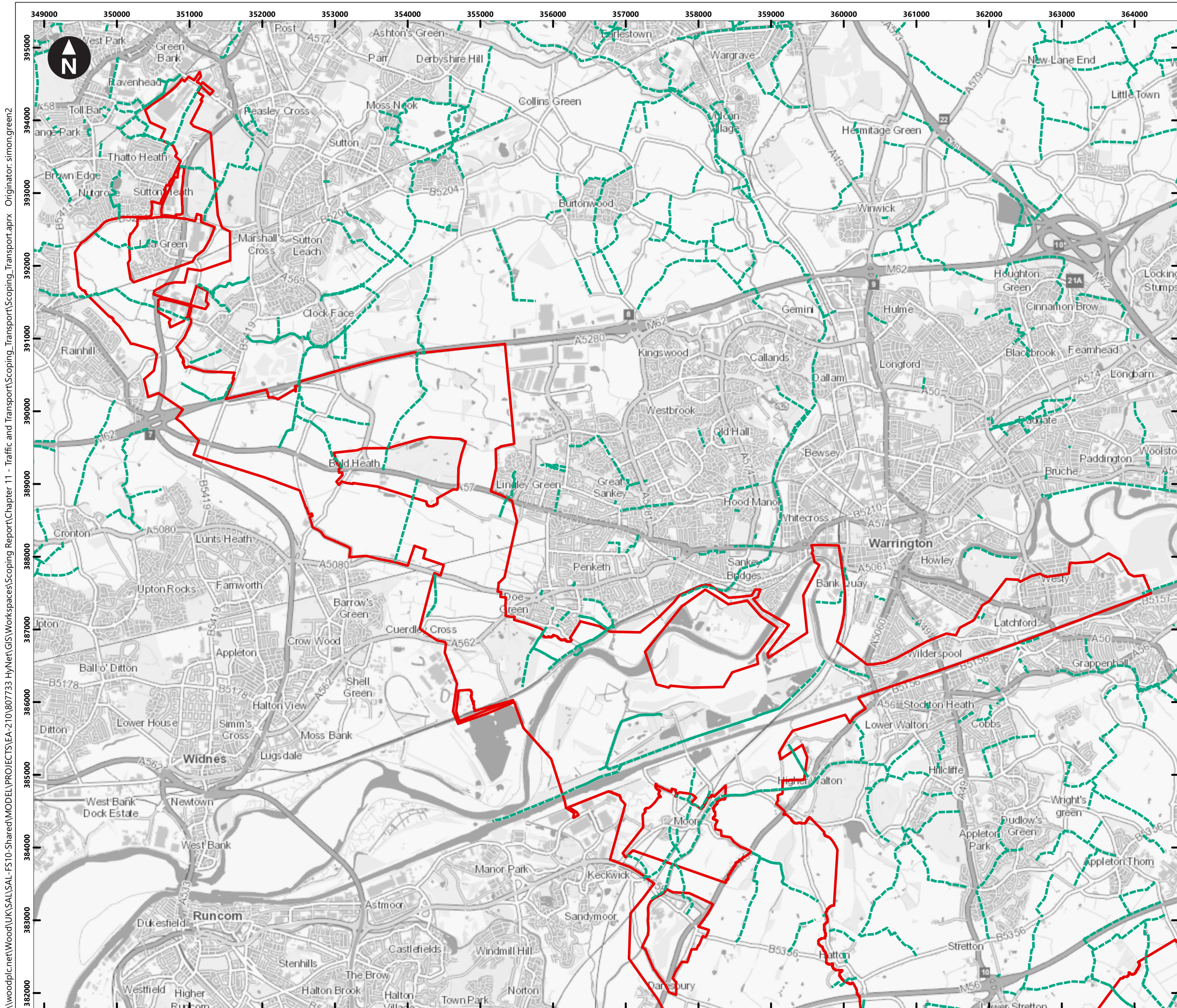
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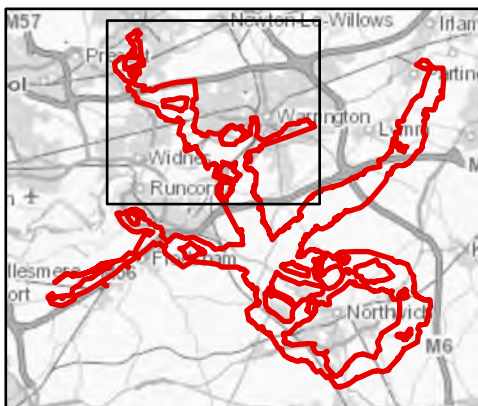
**Figure 11.2**  
**Public Rights of Way**  
**Sheet 1: West**

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Key

- Scoping boundary
- Public Rights of Way



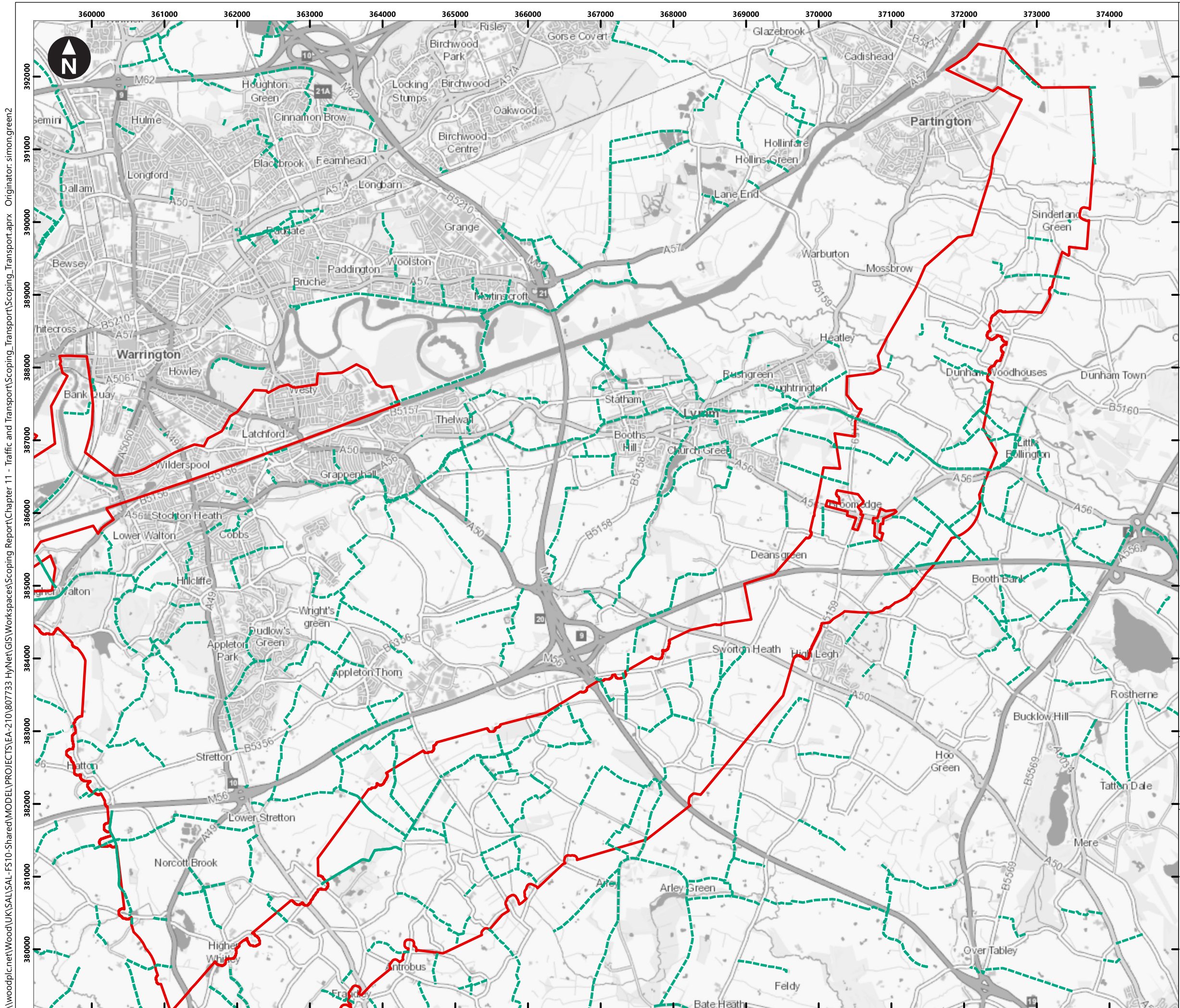
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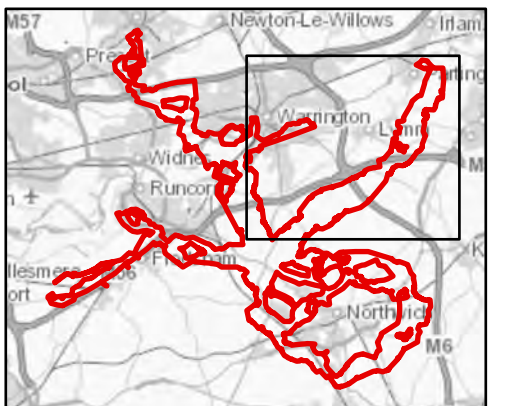
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**Figure 11.2**  
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**Sheet 2: North**

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- Key
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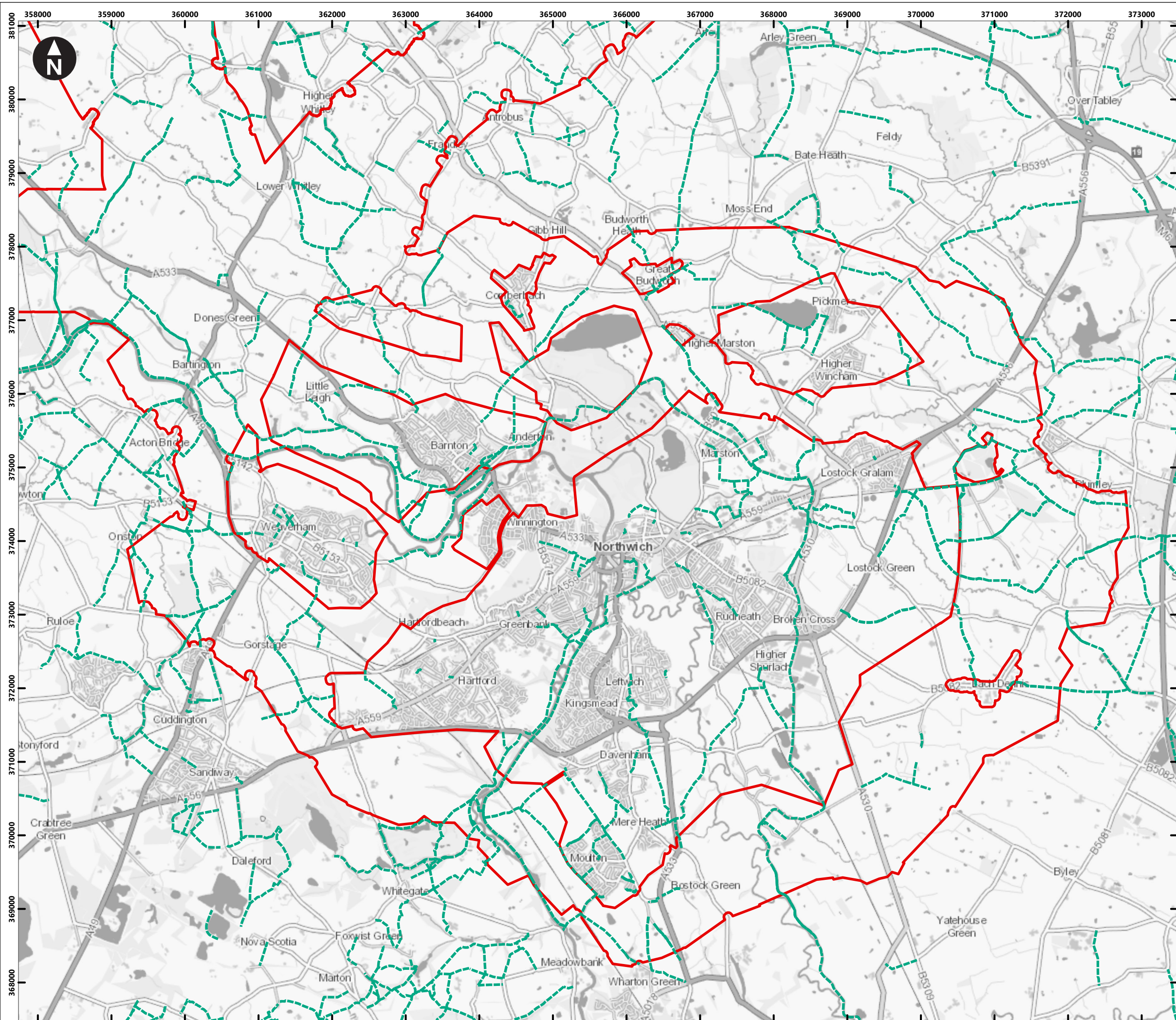
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**Sheet 3: East**

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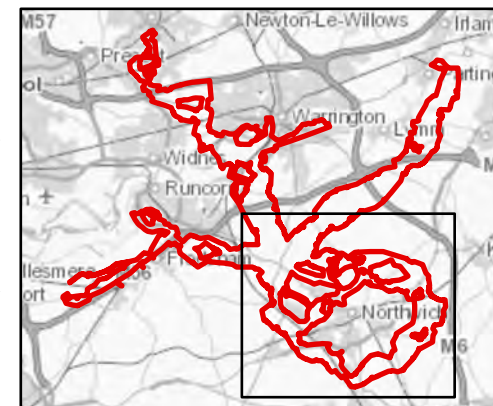
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Key

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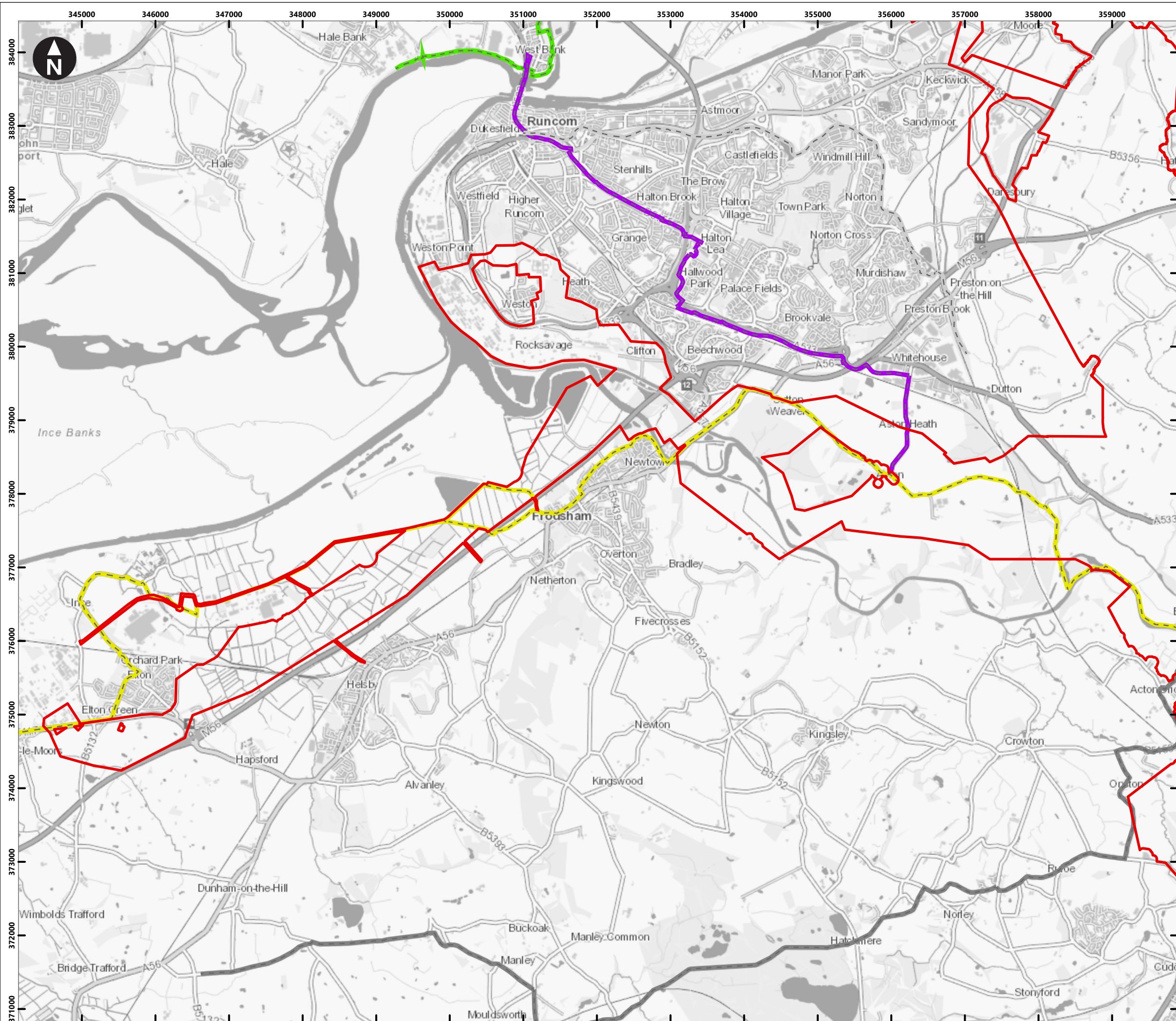
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Chapter 11 - Traffic and Transport

**Figure 11.2**  
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**Sheet 4: South**

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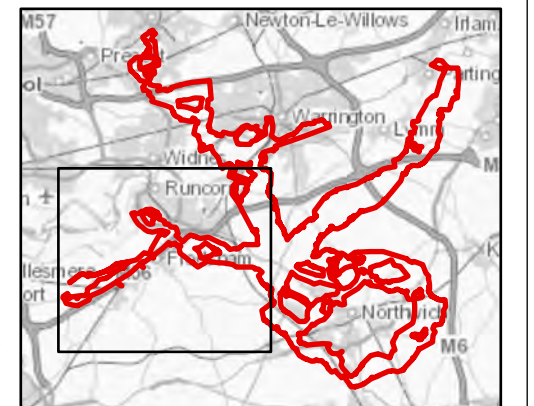


Key

- Scoping boundary

**National and Regional Cycle Routes**

- 5
- 562
- 62
- 70
- 82



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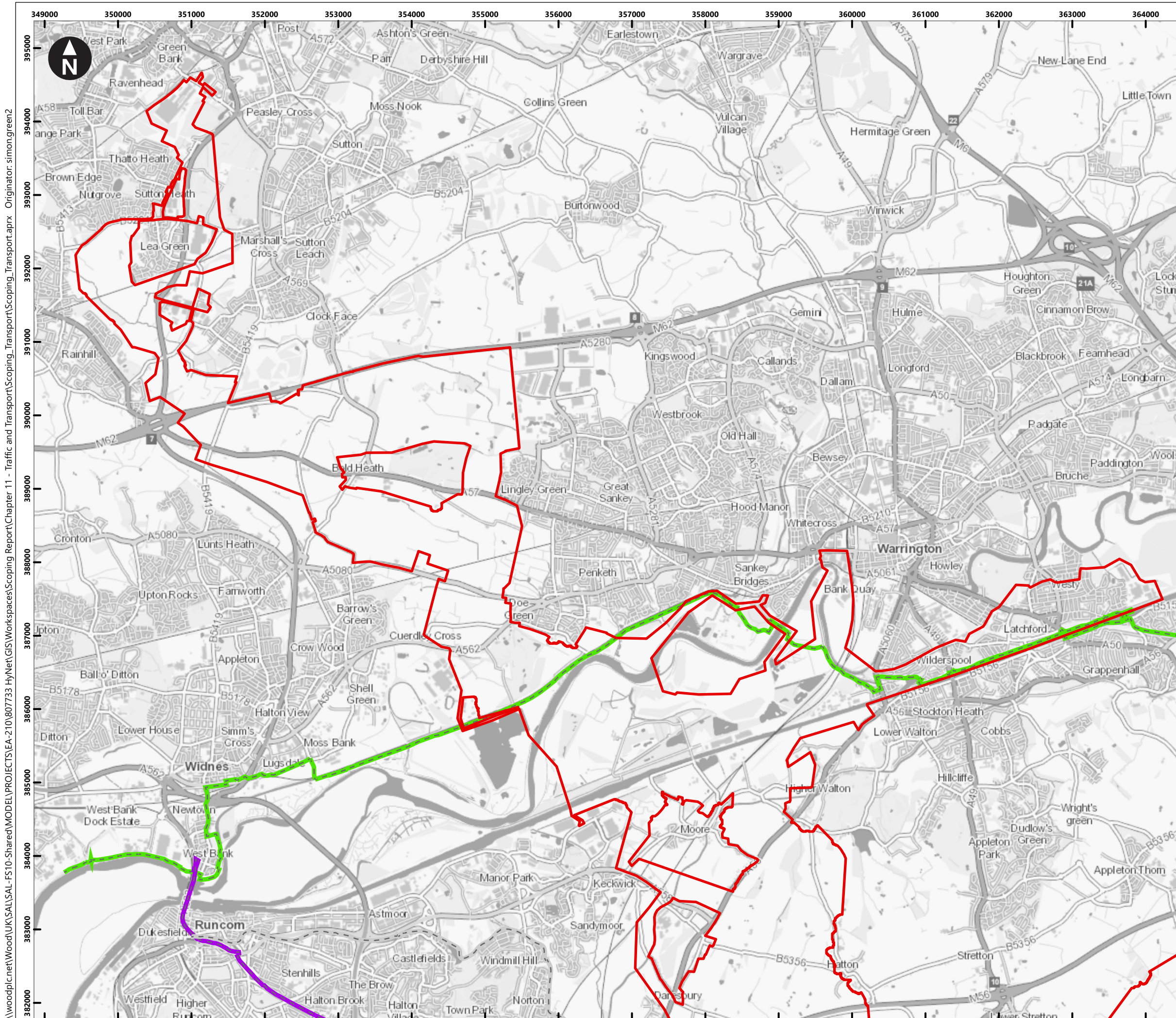
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**Figure 11.3**  
**National Cycle Network**  
**Sheet 1: West**

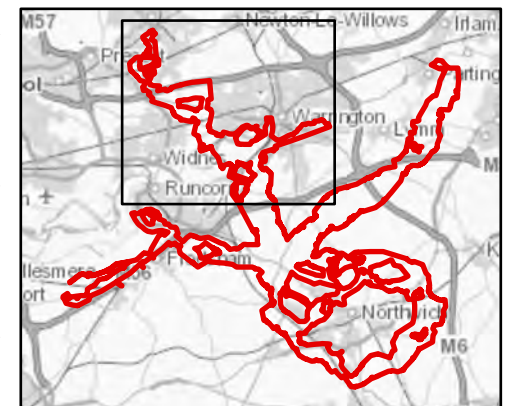


**Key**

- Scoping boundary

**National and Regional Cycle Routes**

- 562
- 62
- 82



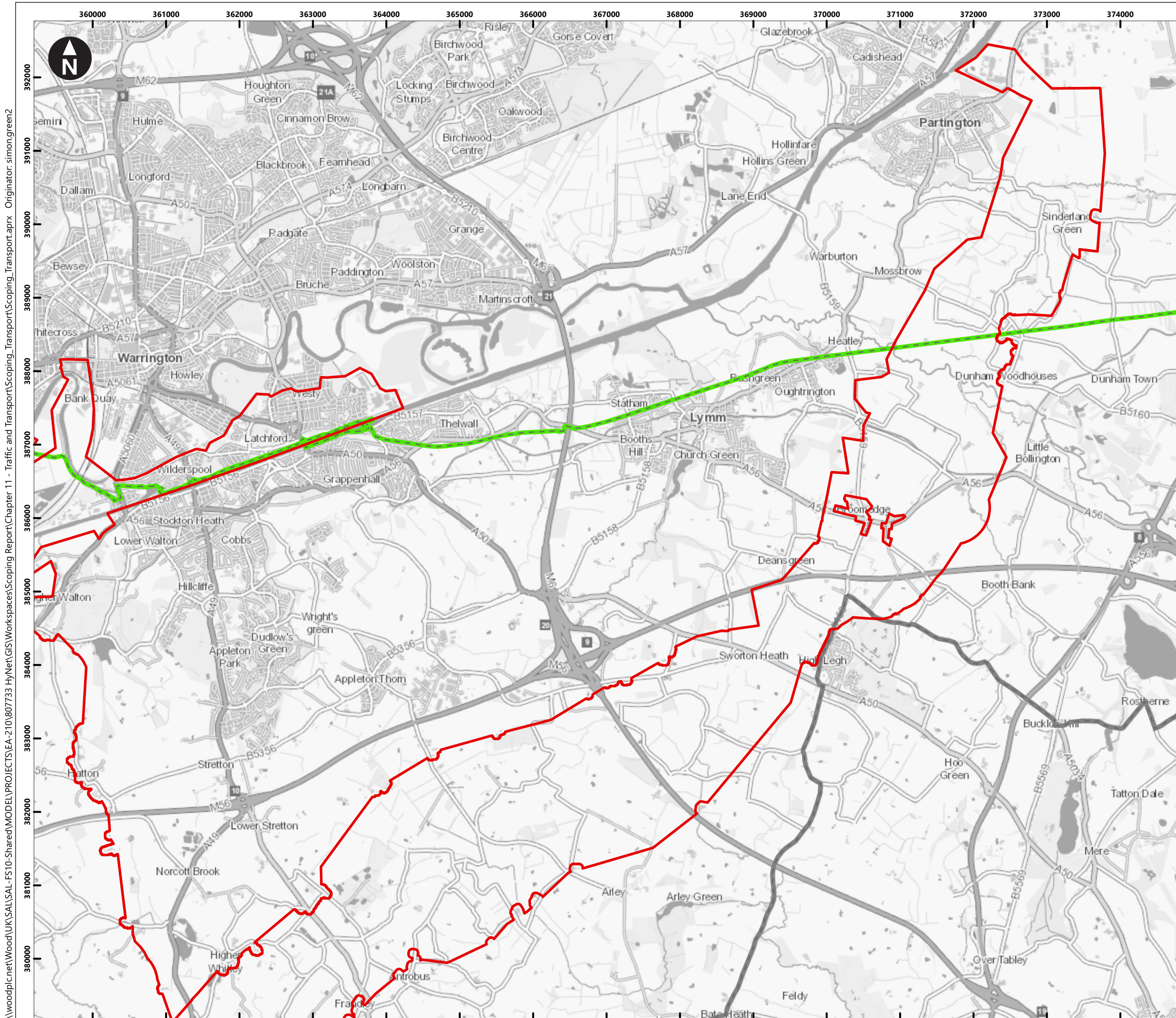
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**Figure 11.3**  
**National Cycle Network**  
**Sheet 2: North**

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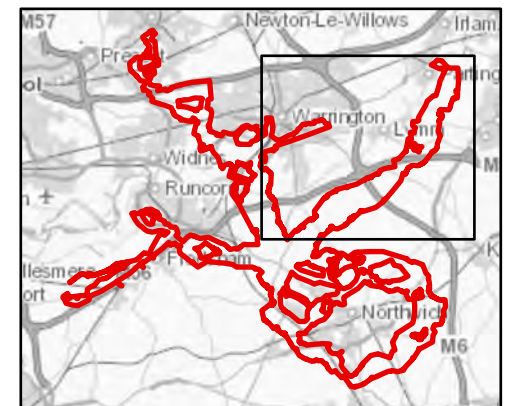


Key

- Scoping boundary

**National and Regional Cycle Routes**

- 62
- 70



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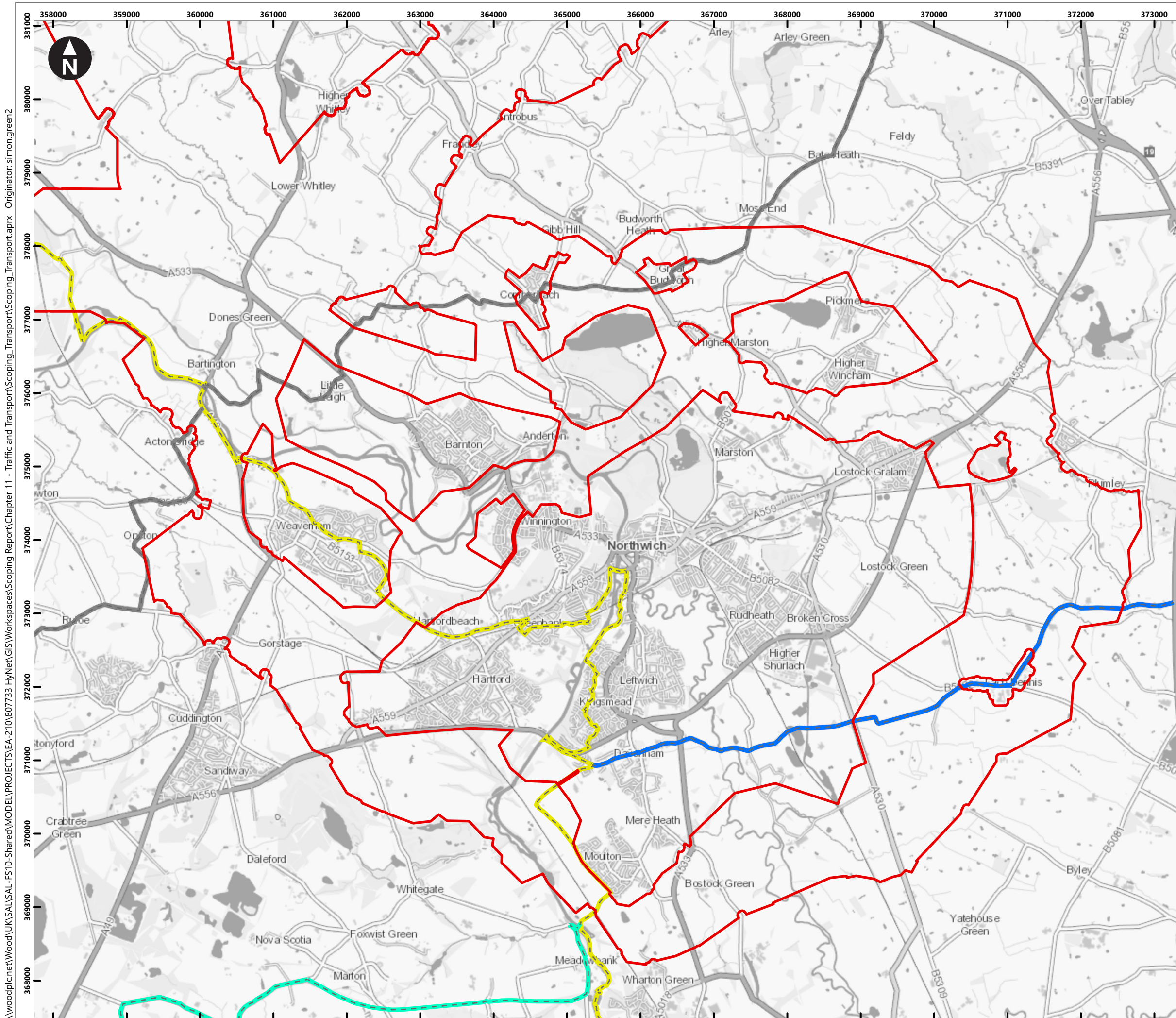
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Chapter 11 - Traffic and Transport

**Figure 11.3**  
**National Cycle Network**  
**Sheet 3: East**

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Key

- Scoping boundary

**National and Regional Cycle Routes**

- 5
- 573
- 70
- 71



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**Figure 11.3**  
**National Cycle Network**  
**Sheet 4: South**

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## 12. Ground Conditions

### 12.1 Introduction

- 12.1.1 The ground conditions assessment will consider the likely significant effects from land contamination and on geodiversity that may arise from the construction and operation of the Project. This chapter of the Scoping Report describes the methodology to be used for the Environmental Impact Assessment (EIA), the datasets to be used to inform the assessment, an overview of the baseline conditions, the likely significant effects to be considered, and how these likely significant effects will be assessed for the purpose of the EIA.
- 12.1.2 Assessment of ground conditions interfaces with other topics and therefore should be considered alongside these. Relevant chapters of this Scoping Report include:
- **Chapter 5: Ecology;**
  - **Chapter 7: Water Environment;** and
  - **Chapter 13: Agriculture and Soil Resources.**

### Assumptions and limitations

- 12.1.3 The current understanding of the baseline is based on a review of available open-source information on ground conditions within the Study Area (as defined in **Section 12.6: Scope of the assessment**). Following Scoping, the primary focus of the ground conditions aspect for the Preliminary Environmental Impact Report (PEIR) and Environmental Statement (ES) will be to collect and collate the data required to produce the Phase 1 Desk Study Report and establish the existing baseline conditions of the Study Area using the sources set out in **Section 12.4: Baseline conditions**.

### 12.2 Relevant legislation, planning policy and technical guidance

- 12.2.1 This section identifies the legislation and guidance that has informed the assessment of effects with respect to ground conditions. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each topic.

### Legislation

- 12.2.2 A summary of the relevant legislation is given in **Table 12.1**.

Table 12.1 Legislation relevant to ground conditions

Legislation	Legislative context	Section considered
<b>European Union Groundwater Directive (2006/118/EC) 2006<sup>315</sup></b>	The aim of the Directive is to protect groundwater against pollution caused by dangerous substances. The Directive continues to have effect in England following the end of the Brexit Transition Period.	<p>The potential for the Project to have an effect on groundwater bodies through the introduction of dangerous substances during the construction and operation phases requires assessment.</p> <p>Construction activities are considered in <b>Section 12.6: Scope of the assessment</b>. Embedded measures are discussed in <b>Section 12.5: Embedded environmental measures</b> of this chapter to enable the protection of groundwater.</p>
<b>Water Resources Act 1991<sup>316</sup> as amended by the Water Act 2003<sup>317</sup></b>	<p>The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters.</p> <p>The Act was revised by the Water Act 2003, which provides the definition of and regulatory controls for the protection of water resources, including the quality standards expected for controlled waters.</p>	<p>The Act (as amended) sets out the definition of controlled waters which have been used to define the scope of receptors in <b>Section 12.6: Scope of the assessment</b>.</p> <p>Embedded measures are discussed in <b>Section 12.5: Embedded environmental measures</b> of this chapter to enable the protection of controlled waters.</p>

<sup>315</sup> UK Government (2006). Groundwater Directive 2006, (online) Available at: <https://www.legislation.gov.uk/eudr/2006/118> (Accessed December 2021).

<sup>316</sup> UK Government (1991). Water Resources Act 1991, (online). Available at: <https://www.legislation.gov.uk/ukpga/1991/57/contents> (Accessed December 2021).

<sup>317</sup> UK Government (2003). Water Act 2003, (online). Available at: <https://www.legislation.gov.uk/ukpga/2003/37/contents> (Accessed December 2021).

Legislation	Legislative context	Section considered
<b>The Environmental Protection Act 1990</b> <sup>318</sup>	Part 2 of the Act makes provision for the improved control of pollution arising from certain industrial and other processes. Part 2A of the Act provides the regulatory basis for the identification, designation, and remediation of contaminated land.	<p>The potential for the Project to be built on land potentially affected by historical contamination requires assessment to ensure it is suitable for the proposed land-use and that, where necessary, remediation is carried out to ensure the land cannot be determined as Contaminated Land under the Act.</p> <p>The approach to incorporating the requirements of the Act is outlined in <b>Section 12.6: Scope of the a.</b></p>
<b>Environmental Damage (Prevention and Remediation) (England) Regulations 2015</b> <sup>319</sup>	Regulations implementing the European Union (EU) directive on environmental liability setting out the principles for prevention and remedy of environmental damage.	<p>Construction and operational activities for the Project have the potential to cause pollution and the regulations place emphasis on businesses to proactively implement pollution prevention measures so that damage to the environment does not arise.</p> <p>Construction activities are considered in <b>Section 12.6: Scope of the assessment.</b> Embedded measures are discussed in <b>Section 12.5: Embedded environmental measures</b> of this chapter to enable the prevention of pollution.</p>

<sup>318</sup> UK Government (1990). Environmental Protection Act 1990, (online). Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> (Accessed December 2021).

<sup>319</sup> UK Government (2015). Environmental Damage (Prevention and Remediation) (England) Regulations 2015, (online). Available at <https://www.legislation.gov.uk/uksi/2015/810/contents> (Accessed December 2021).

Legislation	Legislative context	Section considered
<b>Health and Safety at Work etc. Act 1974<sup>320</sup></b>	The Health and Safety at Work etc. Act and regulations made under the Act places responsibilities upon employers to carry out a risk assessment for every work activity and to document it. Besides carrying out a risk assessment, employers also need to: make arrangements for implementing the health and safety measures identified as necessary by the risk assessment; appoint competent people to help them implement the arrangements; set up emergency procedures; provide clear information and training to employees; and work together with other employers sharing the same workplace.	Land contamination poses a hazard to groundworkers and potentially others in proximity to the construction work. Appropriate risk assessments must be carried out and arrangements made to protect the health and safety of workers directly involved in groundworks for the Project and other human receptors who could be affected.  The consideration of how the requirements of the Act relate to ground conditions effects in relation to the construction activities is addressed in <b>Section 12.6: Scope of the assessment.</b>
<b>The Construction (Design and Management) Regulations 2015<sup>321</sup></b>	The Construction (Design and Management) Regulations (CDM) place specific duties on clients, designers, and contractors, so that health and safety is considered throughout the life of a construction project from its inception to its subsequent final demolition and removal.  They include the requirement to appoint a Principal Designer and Principal Contractor to co-	Construction of the Project will fall under the requirements of the Regulations requiring consideration of health and safety to be incorporated into the design of the Project and at construction stage.  The consideration of how the requirements of the Act relate to ground conditions effects in relation to the construction activities is

<sup>320</sup> UK Government (1990). Health and Safety at Work etc. Act 1974 (online), Available at <https://www.legislation.gov.uk/ukpga/1974/37/contents> (Accessed December 2021)

<sup>321</sup> UK Government (2015). The Construction (Design and Management) Regulations 2015, (online), Available at <https://www.legislation.gov.uk/uksi/2015/51/contents/made> (Accessed December 2021)

Legislation	Legislative context	Section considered
	<p>ordinate health and safety aspects during construction.</p> <p>Under the CDM regulations, designers must avoid foreseeable risks so far as reasonably practicable by: eliminating hazards from the construction, cleaning, maintenance, and proposed use and demolition of a structure; reducing risks from any remaining hazard; and giving collective safety measures priority over individual measures.</p>	addressed in <b>Section 12.6: Scope of the assessment.</b>

## Technical Guidance

12.2.3 A summary of other information and guidance relevant to the assessment for ground conditions is provided here:

- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance<sup>322</sup>: sets out how local authorities should implement the Part 2A regime, including how they should go about deciding whether land is contaminated land in the legal sense of the term. It also elaborates on the remediation provisions of Part 2A, such as the goals of remediation, and how regulators should ensure that remediation requirements are reasonable.
- The Environment Agency (2020) Land Contamination Risk Management (LCRM)<sup>323</sup>: provides the technical framework for applying a risk management process when dealing with land affected by contamination.
- Guidance for the Safe Development of Housing on Land Affected by Contamination Annex 4 (NHBC et al.) (2008)<sup>324</sup>: provides guidance on defining

<sup>322</sup> Defra (2012) Environmental Protection Act 1990 Part 2A – Contaminated Land Statutory Guidance (online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/223705/pb13735cont-land-guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/223705/pb13735cont-land-guidance.pdf) (Accessed December 2021).

<sup>323</sup> Environment Agency, (2020). Land contamination risk management (LCRM). (online) Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> (Accessed December 2021).

<sup>324</sup> NHBC et al. (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination Annex 4. Available at <https://www.nhbc.co.uk/binaries/content/assets/nhbc/products-and-services/tech-advice-and-guidance/guidance-for-the-safe-development-of-housing-on-land-affected-by-contamination.pdf> (Accessed December 2021).

the likelihood definitions used in the ground conditions assessment methodology described in **Section 12.7**.

- The Contaminated Land: Applications in Real Environments (CL:AIRE) (2010) Framework for Assessing the Sustainability of Soil and Groundwater Remediation<sup>325</sup>: provides a framework for assessing the sustainability of remediation and informing the decision-making process where remediation measures are required.
- The CL:AIRE (2016) CAR-SOIL: Control of Asbestos Regulations 2012 - Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials<sup>326</sup>: provides interpretation and guidance to all involved in the management of asbestos in both soils and construction and demolition arisings in accordance with the Control of Asbestos Regulations 2012.

## 12.3 Consultation

- 12.3.1 It is intended that this Scoping Report shall form the basis for consultation with the Environment Agency and all the Local Planning Authorities that fall within the Study Area described in **Section 12.6**.
- 12.3.2 At this early stage, agreement will be sought on the extent of the Study Area, the baseline sources of information and the approach to the Ground Conditions methodology that is to be adopted.
- 12.3.3 As the project details progress further, it is intended to agree, where possible, the details of the baseline, including the Phase 1 Desk Study described in **Section 12.4** with the Environment Agency and environmental health officers within the Local Planning Authorities.
- 12.3.4 Following receipt of the Scoping Opinion, consultation will also be held as necessary to ensure that consultee comments are fully addressed and incorporated for the ES.

## 12.4 Baseline conditions

### Data gathering methodology

- 12.4.1 Baseline data will be collected for the ground conditions Study Area, the extent of which is described in **Section 12.6**, and presented as a Phase 1 Desk Study

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<sup>325</sup> CL:AIRE, (2010) Framework for Assessing the Sustainability of Soil and Groundwater Remediation. Available at:

<https://www.claire.co.uk/component/phocadownload/category/16-surf-uk-bulletins?download=61:surf-uk-framework-final-march-2010> (Accessed December 2021).

<sup>326</sup> CL:AIRE (2016) Control of Asbestos Regulations 2012 - Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials. Available at: <https://www.claire.co.uk/component/phocadownload/category/36-asbestos-in-soil?download=545:jiwg-car-soil-guidance> (Accessed December 2021).

accompanying the ES. **Table 12.2** outlines the key data sources that will be used to prepare the Phase 1 Desk Study.

12.4.2 The Phase 1 Desk Study will present a Conceptual Site Model (CSM) from which the ground conditions assessment can be undertaken. The CSM will identify the sources, receptors, and potentially active pathways within the Study Area.

**Table 12.2 Data sources to be used to inform the ground conditions baseline**

Source	Summary of data to be obtained
<b>Groundsure</b>	Environmental and GIS data 1:10,000 and 1:50,000 historical mapping
<b>Gov.uk open data</b>	Rivers shapefile Source Protection Zones (SPZs) Historical and Authorised landfills shapefiles Environmental Pollution incidents (database) Consented discharge data
<b>MAGIC.gov.uk website</b>	Designated sites Aquifer designations and groundwater vulnerability Geological SSSIs information
<b>Ordnance Survey (OS)</b>	1:50,000 and 1:25,000 mapping
<b>British Geological Survey (BGS)</b>	On-line Geindex 1:50,000 digital geology Borehole Record Viewer (offers access to the National Geoscience Data Centre collection of onshore scanned boreholes, shafts and well records)
<b>Coal Authority</b>	Coal mining datasets
<b>Cheshire RIGS Group</b>	Information on geological Special Sites of Scientific Interest (SSSIs), Regionally Important Geological and Geomorphological Sites (RIGS) and Locally Important Geological Sites (LIGS)
<b>Natural England</b>	Geological SSSI citations
<b>Local Authorities</b>	Environmental site register data Contaminated land register data Landfills data Information on geological SSSIs, RIGS and LIGS

## Current baseline

12.4.3 A preliminary overview of the baseline to inform this Scoping Report has been determined from the available open-source data identified in **Table 12.2** and is summarised in the following paragraphs.

- 12.4.4 Superficial deposits are present across the Study Area, predominantly associated with the River Mersey which runs from the north (near Warrington) and northeast (near Partington) towards the southwest (at Runcorn). In the locality of the river channel, the superficial deposits comprise alluvium (clays, silts and sand) and river terrace deposits (sands and gravels) with these deposits giving way to Till (diamicton) further from the river in the north and south of the Study Area. A detailed description of the soil overlying the superficial deposits is included in **Chapter 13: Agriculture and Soil Resources**.
- 12.4.5 The bedrock geology beneath the superficial deposits is heavily faulted. In the northern part of the Study Area, the Wilmslow Sandstone Formation and Chester Formation (sandstone) are present whilst in the southern part of the Study Area, mudstones, siltstones and sandstones of the Helsby Sandstone Formation, Tarporley Siltstone Formation and Bollin Mudstone member are present.
- 12.4.6 The superficial and bedrock geology of the Study Area are shown on **Figure 12.2** and **Figure 12.3** respectively.
- 12.4.7 The northern part of the Study Area (north of Warrington and Partington) is located within a Coal Mine Reporting area, however, it is outside of the areas indicated to be a Development High Risk Area for coal mining.
- 12.4.8 The Environment Agency classifies the superficial deposits in the Study Area as Secondary A and Secondary (Undifferentiated) Aquifers. The bedrock sandstone is classified as a Principal Aquifer in the northern part of the Study Area and as a Secondary B Aquifer in the southern part of the Study Area.
- 12.4.9 There are several drinking water abstractions indicated to be present in the Study Area the locations of which are surrounded by associated groundwater Source Protection Zones (SPZs). The SPZs in the Study Area are shown on **Figure 12.4**.
- 12.4.10 Numerous historical and authorised landfills are present within the Study Area, particularly in the North Corridor and West Corridor, along the River Mersey. Further information on their status and the nature of the wastes accepted will be obtained as part of the Phase 1 Desk Study to inform an assessment of the risks posed from the landfills. Historical and authorised landfills in the Study Area are shown on **Figure 12.5**.

## Future baseline

- 12.4.11 In the absence of the Project, there is unlikely to be a change to the baseline conditions with respect to ground conditions over the lifetime of the Project. This is because the geology and ground conditions are unlikely to be altered over time without a significant change of land use.
- 12.4.12 With respect to land contamination management, the relevant requirements are identified under Part 2A of the Environmental Protection Act<sup>327</sup> and, for other future developments, the Town and Country Planning Act 1990<sup>328</sup>. Part 2A requires local

<sup>327</sup> UK Government (1990). Environmental Protection Act 1990. (online) Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> (Accessed December 2021).

<sup>328</sup> UK Government (1990). Town and Country Planning Act 1990. (online). Available at <https://www.legislation.gov.uk/ukpga/1990/8/contents> (Accessed December 2021).



authorities to identify potentially contaminated land in their area and ensure potential risks from historical contamination are assessed and mitigated accordingly. For future developments which take place within the Study Area, the Town and Country Planning Act requires the consideration of the potential for contamination to be present. Where necessary a developer would be required to carry out remediation of contamination to ensure the development site is suitable for the proposed end use. Therefore, it is reasonable to conclude that in the absence of the Project there would not be a detrimental change in ground conditions over time within the Study Area.

## 12.5 Embedded environmental measures

- 12.5.1 As part of the project design process, several embedded measures are proposed to reduce the potential for impacts on or from ground conditions, as provided in **Table 12.3**. These measures will evolve over the design development process and as the EIA progresses and where appropriate in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice within the construction industry and include actions that would be undertaken to meet existing legislation requirements.
- 12.5.2 As there is a commitment to implement these environmental measures, and to meet various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

**Table 12.3 Relevant ground conditions embedded environmental measures**

<b>Environmental measure</b>	<b>How the environmental measures will be secured</b>
<b>Where practical, sensitive sites will be avoided by the temporary and permanent project footprint including SSSIs, LIGS, RIGS, areas of historic landfill and other known areas of potential contamination.</b>	Development Consent Order (DCO) works plans and order limits
<b>Potential risks to human health from any unexpected ground contamination will be avoided using Personal Protective Equipment (PPE) and by adopting appropriate working practices.</b>	Code of Construction Practice (CoCP) and DCO requirement
<b>Contamination, if found, will be subject to appropriate risk assessment and if necessary, either removed, treated and/or mitigated as part of the Project.</b>	CoCP and DCO requirement
<b>All aspects of the construction work will be in accordance with the Construction (Design and Management) Regulations 2015.</b>	CoCP and DCO and UK legislative requirement

Environmental measure	How the environmental measures will be secured
<p>A CoCP would be produced prior to commencement of construction which would detail measures to be implemented (via a Construction Environmental Management Plan (CEMP) to avoid or reduce impacts during the construction phase. The CEMP will minimise temporary disturbance to residential properties, recreational users and existing land users and provide details of measures to protect environmental receptors.</p>	CoCP and DCO requirement
<p>Construction strategies will be implemented that will seek to maximise the reuse of excavated clean materials from the pipeline construction corridor where practicable and feasible. A Materials Management Plan (MMP) will be developed by the Principal Contractor that outlines where excavated non-waste materials will be reused in line with the CL:AIRE (2011) Definition of Waste Code of Practice (DoWCoP). The MMP will include a declaration by a Qualified Person that the MMP has been completed in accordance with the DoWCoP and that best practice is being followed.</p>	CoCP and DCO requirement
<p>The Applicant will ensure that the land used for the Project is suitable for the proposed use with respect to the potential for soil and groundwater contamination and, that where necessary, risk-based remediation is undertaken in line with Environment Agency (2020) guidance (Land Contamination: Risk Management). The precise design of any remediation strategy will be confirmed in the detailed design after consent has been granted.</p>	DCO and UK legislative requirement
<p>Prior to construction, an unexpected contamination protocol will be developed in accordance with Environment Agency (2020) guidance (LCRM) to minimise the potential risks to human health and controlled waters from any unexpected ground contamination. The protocol will take into account the requirements for risk assessment, the use of PPE and adoption of best practice methods during construction.</p>	CoCP and DCO requirement
<p>In accordance with good practice, Pollution Prevention Plans (PPPs) will be developed to detail how ground and surface waters will be protected in construction and operation. These will include information on the use and storage of any fuels, oils and other chemicals and pollution incidence response planning. These will also</p>	CoCP and DCO requirement

Environmental measure	How the environmental measures will be secured
include measures for the protection of licenced and private abstractions. This could include a monitoring regime associated with critical or very near receptors.	
If water being pumped from excavations is suspected to be contaminated, appropriate measures will be taken in accordance with Environment Agency guidance and the Environmental Permitting Regulations to prevent uncontrolled or unauthorised releases of this water to ground or to the water environment.	CoCP and DCO requirement
Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate/runoff drainage to prevent migration of contaminants from the stockpile. Materials will be segregated where possible to prevent cross-contamination occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the MMP.	CoCP and DCO requirement
In areas where there is a potential for hydrocarbon residues from run-off/isolated leakages surface water drainage measures will be provided to capture hydrocarbons prior to discharge, such as hydrocarbon interceptors.	CoCP and DCO requirement
Plant and machinery used during the construction and operation phases will be maintained to minimise the risks of oils leaks or similar. Maintenance and refuelling of machinery will be undertaken within designated areas where spillages can be easily contained. In these designated areas contingency plans will be implemented to ensure that the risk of spillages is minimised. Placing a drip tray beneath a plant and machinery during refuelling and the availability of spill kits will contain small spillages.	CoCP and DCO requirement
Any tanks and associated pipe work containing oils, fuels and chemicals will be double skinned and provided with leak detection equipment. There will be a bunded capacity of 100% of the maximum tank volume for non-hazardous fluids. For hazardous chemicals, fuels or oils bund capacity will be the larger of 110% of the largest tank volume for single tank bunds, (or, in the case of multi tank bunds, 110% of the largest tank	CoCP and DCO requirement

Environmental measure	How the environmental measures will be secured
<p>capacity or 25% of the combined tank capacity, whichever it is the largest). Fuel storage will be in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001 and Pollution Prevention Guidelines (PPGs). All stores of fuel will be located at least 20m from any watercourses and away from areas at risk of flooding.</p>	
<p>Drilling fluids used during Horizontal Directional Drilling (HDD) will not be classified as environmentally hazardous or contain hazardous substances.</p>	<p>CoCP and DCO requirement</p>

## 12.6 Scope of the assessment

### Spatial Scope and Study Area

- 12.6.1 The spatial scope of the ground conditions assessment will be based on applying the following principles to give the wider of either:
- the area within which the Project and associated infrastructure will be located, including the temporary and permanent construction and operational work areas;
  - a Zol 250m from the edge of the pipeline corridor; or
  - a Zol 500m around the boundary of the land required for the permanent infrastructure (such as Hydrogen Above Ground Installations (HAGIs)).
- 12.6.2 The rationale for the Zol used to define the Study Area is informed by considering:
- the spatial extent (taking into account contaminant degradation, dilution and dispersion in the environment) at which significant ground conditions effects have the potential to be realised through potentially active contaminant linkages; and
  - the spatial extent from which off-site sources of contamination have the potential to lead to significant effects on receptors within the Project.
- 12.6.3 The Study Area for ground conditions based on the Scoping red line boundary is shown on **Figure 12.1**.
- 12.6.4 The final ground conditions Study Area for the ES will be refined using these principles in response to further spatial definition of the location of the key components of the Project (notably the pipeline corridors and HAGIs) and where appropriate in response to stakeholder engagement.

## Potential receptors

12.6.5 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of the Project. The receptors that may experience likely significant effects with respect to ground conditions are identified in **Table 12.4**.

**Table 12.4 Receptors requiring assessment for ground conditions**

Receptor group	Receptors included within group
<b>Human Health</b>	Construction/operational workers. Residential. Commercial/industrial. Public open space. Land and property (including land used for allotments, agriculture (crops and livestock), existing and future structures, utilities and infrastructure).
<b>Controlled Waters</b>	Groundwater resources in superficial deposits. Groundwater resources in bedrock. Surface waters (for example, reservoirs, streams, rivers, lakes and ponds). Groundwater and surface water abstractions.
<b>Geodiversity</b>	SSSI RIGS LIGS

12.6.6 The refinement of receptors requiring assessment will be subject to review during the EIA process as more detailed information is obtained from baseline surveys for this topic and other relevant EIA topics and where appropriate in response to stakeholder engagement.

## Potential effects

12.6.7 Potential effects on ground conditions receptors that have been scoped in for assessment are summarised in **Table 12.5**.

Table 12.5 Potential effects on ground conditions receptors scoped in for further assessment

Activity and impact	Potential effect	Receptor	Linkage Reference <sup>329</sup>
<b>Construction</b>			
<b>Construction activities located on, or adjacent to landfills and other potentially contaminated sites such as industrial/waste management facilities and fuel storage/distribution facilities</b>	Mobilisation of contamination via pathways including groundwater, surface water, preferential pathway creation and leaching from soil which could result in contamination of controlled waters.	Controlled waters receptors (groundwater and surface waters)	GC-C-1
	Mobilisation of contamination via pathways including groundwater, surface water, leaching from soil, migration of vapours and windblown dusts resulting in health effects.	Human health receptors (residential, agricultural land, commercial/industrial and public open space)	GC-C-2
	Build-up of gases in confined spaces in existing or newly constructed infrastructure on and adjacent to the land required for the Project.	Human health receptors (residential, commercial/industrial land) and property (including existing and new infrastructure)	GC-C-3
	Damage to newly constructed infrastructure from land affected by contamination.	Human health receptors, land and property (including existing and new infrastructure)	GC-C-4

<sup>329</sup> Linkage references included to allow for cross referencing of activity-effect-receptor. GC = Ground Conditions, C = Construction, O = Operation.

Activity and impact	Potential effect	Receptor	Linkage Reference <sup>330</sup>
<b>Construction activities located near to sites of geological importance</b>	Damage to, or detrimental impact on sites of geological importance.	Sites of geological importance (SSSIs, RIGS or LIGS)	GC-C-5
<b>Construction vehicle and equipment maintenance and storage of fuels/oils for construction vehicles and equipment</b>	Accidental spillages and leaks resulting in ground contamination and resultant risks to controlled waters during construction. This includes the potential for leakage of bentonite during HDD works.	Controlled waters receptors (groundwater and surface waters)	GC-C-6
<b>Operation</b>			
<b>Presence of significant quantities of artificial ground, disturbed landfill material or excavated and re-used material beneath permanent infrastructure</b>	Potential mobilisation of landfill leachate, which, if not properly managed, could impact upon controlled waters.	Controlled waters receptors (groundwater and surface waters)	GC-O-1
	Damage to infrastructure from land affected by contamination.	Land and property (including existing and new infrastructure)	GC-O-2
	Build-up of ground gases in confined spaces in existing or newly constructed infrastructure on and adjacent to the Project red line boundary.	Human health receptors (occupants of residential, commercial/industrial premises) and land and property (including existing and new infrastructure)	GC-O-3

<sup>330</sup> Linkage references included to allow for cross referencing of activity-effect-receptor. GC = Ground Conditions, C = Construction, O = Operation.

Activity and impact	Potential effect	Receptor	Linkage Reference <sup>331</sup>
<b>Operational vehicle and equipment maintenance and storage of fuels/oils for operational vehicles and equipment</b>	Accidental spillages and leaks resulting in ground and/or controlled waters contamination.	Controlled waters receptors (groundwater and surface waters)	GC-O-4

<sup>331</sup> Linkage references included to allow for cross referencing of activity-effect-receptor. GC = Ground Conditions, C = Construction, O = Operation.



## Activities or impacts scoped out of the assessment

- 12.6.8 Several potential effects have been scoped out from further assessment as no likely significant effects are likely to occur given the understanding of the baseline environment, the scope (temporal and physical) of planned works required for the Project and the knowledge base with respect to the potential for impacts to arise from similar projects more widely. The conclusions follow (in a site-based context) existing best practice.
- 12.6.9 Construction work for the Project must comply with legal requirements. Construction workers will, therefore, be subject to the Construction Design Management (CDM) Regulations<sup>332</sup> and safe working practices as part of normal construction health and safety management procedures under the Health and Safety at Work etc. Act (1974)<sup>333</sup> and regulations made under the Act. These legal obligations include the requirement for risk assessments and method statements for all construction related activities and the use of appropriate working methods, training, and the use of personal protective equipment (PPE).
- 12.6.10 In addition to these legal obligations, **Section 12.5** outlines the embedded environmental measures that enable minimisation of ground condition effects and the prevention of pollution incidents that could result in harm to construction workers. These measures include current best practice for construction activities and actions that would be undertaken to meet existing legislative requirements under CDM and the Health and Safety at Work etc. Act.
- 12.6.11 Taking into account the need for compliance with legal requirements and the commitment to implementing the embedded and other environmental measures, there will be no significant adverse effects on construction workers as a result of the Project and therefore such effects have been scoped out of the activities/impacts requiring further assessment as detailed in **Table 12.6**.

**Table 12.6 Activities or impacts scoped out of the ground conditions assessment**

Activity and Impact	Effect	Receptor
<b>Construction</b>		
<b>Construction activities located on, or adjacent to landfills and other potentially contaminated sites such as industrial/waste management facilities and fuel storage/distribution facilities</b>	Exposure to contamination via direct contact, inhalation and/or ingestion of soils and dusts	Human health receptors (construction workers)

<sup>332</sup> UK Government (2015). The Construction (Design and Management) Regulations 2015 (online) Available at: [The Construction \(Design and Management\) Regulations 2015 \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukreg/2015/1222) (Accessed December 2021).

<sup>333</sup> UK Government (1974). Health and Safety at Work Act 1974 (online) Available at: [Health and Safety at Work etc. Act 1974 \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukpga/1974/37) (Accessed December 2021).

Activity and Impact	Effect	Receptor
<b>Construction vehicle and equipment maintenance and storage of fuels/oils for construction vehicles and equipment</b>	Accidental spillages and leaks resulting in ground contamination and risks to human health	Human health receptors (construction workers)
<b>Operation</b>		
<b>Operational vehicle and equipment maintenance and storage of fuels/oils for operational vehicles and equipment</b>	Accidental spillages and leaks resulting in ground contamination and risks to human health.	Human health receptors (construction/operational workers)

## 12.7 Assessment methodology

- 12.7.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**, and specifically in Section 4.3. However, whilst this has informed the approach that has been used in this ground conditions chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the ground conditions assessment in the ES.
- 12.7.2 The assessment and management of ground conditions is based on the risk presented by the presence of a hazard (for example, contamination) for a given circumstance, i.e. the probability and consequence of an event occurring. However, EIA seeks to identify the magnitude of a change in status from baseline (impact) caused by the Project and the consequences of those changes (effects).
- 12.7.3 Consequently, for the ground conditions assessment, the impact and its effect have been defined as a change in risk and the magnitude of the change in risk from baseline, through construction to operation.
- 12.7.4 The methodology that is proposed for assessing these risks is set out in the following section and will be supported by a desk study which sets out the baseline and post-development risks identified for the Project using this methodology.

### Risk Assessment

- 12.7.5 The process of managing land contamination, as set out in the Environment Agency guidance LCRM<sup>323</sup>, is based on risk assessment which is proportionate to the given circumstances. The assessment of risks from land contamination is based upon the identification and subsequent appraisal of contaminant linkages which are specifically relevant to the project under consideration. A contaminant linkage requires the presence of:
- a source of contamination;
  - a receptor capable of being adversely affected by the contamination; and

- an active pathway capable of exposing a receptor to the contaminant.

12.7.6 The risk assessment process for this Project will address the significance of each relevant contaminant linkage noting that the designation of risk is based upon the consideration of:

- the magnitude of the potential consequence (severity) - taking into account both the potential severity of the hazard and the sensitivity of the receptor; and
- the magnitude of probability (likelihood) - taking into account both the presence of the hazard and receptor and the integrity of the pathway.

12.7.7 The definitions for the qualitative risk assessment have been taken from Guidance for the Safe Development of Housing on Land Affected by Contamination Annex 4<sup>334</sup>.

12.7.8 The likelihood classifications for the contaminant linkages being realised is presented in **Table 12.7**.

**Table 12.7 Likelihood classification of contaminant linkage being realised**

Classification	Definition	Examples
<b>High Likelihood</b>	There is a contaminant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m of ground where direct contact is possible. b) Ground/groundwater contamination could be present from chemical works, containing a number of Underground Storage Tanks (USTs).
<b>Likely</b>	There is a contaminant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m where direct contact is possible, or the top 0.5m of ground where direct contact is not possible. b) Ground/groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage

<sup>334</sup> NHBC et al. (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination Annex 4. Available at <https://www.nhbc.co.uk/binaries/content/assets/nhbc/products-and-services/tech-advice-and-guidance/guidance-for-the-safe-development-of-housing-on-land-affected-by-contamination.pdf> (Accessed December 2021).

Classification	Definition	Examples
<b>Low Likelihood</b>	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	<p>although there are no records of integrity tests.</p> <p>a) Elevated concentrations of toxic contaminants are present in soils at depths &gt;1m where direct contact is possible, or 0.5-1.0m of ground where direct contact is not possible. b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.</p>
<b>Unlikely</b>	There is a contaminant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	<p>a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit &lt;10 years old containing a double skinned UST with annual integrity testing results available.</p>

12.7.9 The assessment of the magnitude of a potential consequence of a contaminant linkage will take into account the sensitivity of a given receptor to a particular source or contaminant of concern. The assessment will take into account the full exposure via the relevant linkage. The classification of consequence is presented in **Table 12.8**.

Table 12.8 Classification of consequence

Classification	Human Health	Controlled Water	Geodiversity	Property/ Structures/ Crops and animals	Examples
<b>Severe</b>	Highly elevated concentration is likely to result in “significant harm” to human health as defined by the Environmental Protection Act (EPA) 1990, Part 2A, if exposure occurs.	Equivalent to Environment Agency Category 1 pollution incident <sup>335</sup> including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.	Major damage to a geodiversity site, which is likely to result in a substantial adverse change in its functioning or harm to a site of special interest that endangers the long-term maintenance of the site.	Catastrophic damage to crops, buildings or property.	<p>Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (for example, cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions.</p> <p>Major fish kill in surface water from large spillage of contaminants from site.</p> <p>Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity).</p> <p>Explosion, causing building collapse (can also equate to</p>

<sup>335</sup> Environment Agency (2017). Available at <https://www.ofwat.gov.uk/wp-content/uploads/2017/12/20171129-Incidents-and-their-classification-the-Common-Incident-Classification-Scheme-CICS-23.09.16.pdf> (Accessed December 2021).

Classification	Human Health	Controlled Water	Geodiversity	Property/ Structures/ Crops and animals	Examples
					immediate human health risk if buildings are occupied).
<b>Medium</b>	Elevated concentrations which could result in “significant harm” to human health as defined by the EPA 1990, Part 2A if exposure occurs.	Equivalent to Environment Agency Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	Significant damage to a geodiversity site, which may result in a substantial adverse change in its functioning or harm to a site of special interest that may endanger the long-term maintenance of the site.	Significant damage to crops, buildings or property.	<p>Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (for example, cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions.</p> <p>Damage to building rendering it unsafe to occupy, for example, foundation damage resulting in instability.</p> <p>Ingress of contaminants through plastic potable water pipes.</p>
<b>Mild</b>	Exposure to human health unlikely to lead to “significant harm”.	Equivalent to Environment Agency Category 3 pollution incident including minimal or short-lived effect on water quality; marginal effect on	Minor or short-lived damage to a geodiversity site, which is unlikely to result in a substantial adverse change in its	Minor damage to crops, buildings or property.	<p>Exposure could lead to slight short-term effects (for example, mild skin rash).</p> <p>Surface spalling of concrete.</p>

Classification	Human Health	Controlled Water	Geodiversity	Property/ Structures/ Crops and animals	Examples
		amenity value, agriculture or commerce.	functioning or harm to a site of special interest that would endanger the long-term maintenance of the site.		
<b>Minor</b>	No measurable effects on humans.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Equivalent to insubstantial pollution incident with no observed effect on a geodiversity site or site of special interest.	Repairable effects of damage to buildings, structures.	The loss of plants in a landscaping scheme.  Discoloration of concrete.

12.7.10 The risk matrix which links the likelihood and consequence with respect to the EIA for the Project is shown in **Table 12.9**.

**Table 12.9 Risk matrix**

Potential Consequence \ Likelihood	Unlikely	Low	Likely	High
Severe	Moderate/Low Risk	Moderate Risk	High Risk	Very High Risk
Medium	Low Risk	Moderate/Low Risk	Moderate Risk	High Risk
Mild	Very Low Risk	Low Risk	Moderate/Low Risk	Moderate Risk
Minor	Very Low Risk	Very Low Risk	Low Risk	Low Risk

12.7.11 The relevant risk definitions are summarised in **Table 12.10**.

**Table 12.10 Risk definitions**

Risk	Definition
<b>Very High</b>	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action or there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
<b>High</b>	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
<b>Moderate</b>	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner or occupier. Some remediation works may be required in the longer term.



Risk	Definition
<b>Low</b>	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst that this harm if realised would normally be mild. It is unlikely that the site owner or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
<b>Very Low</b>	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

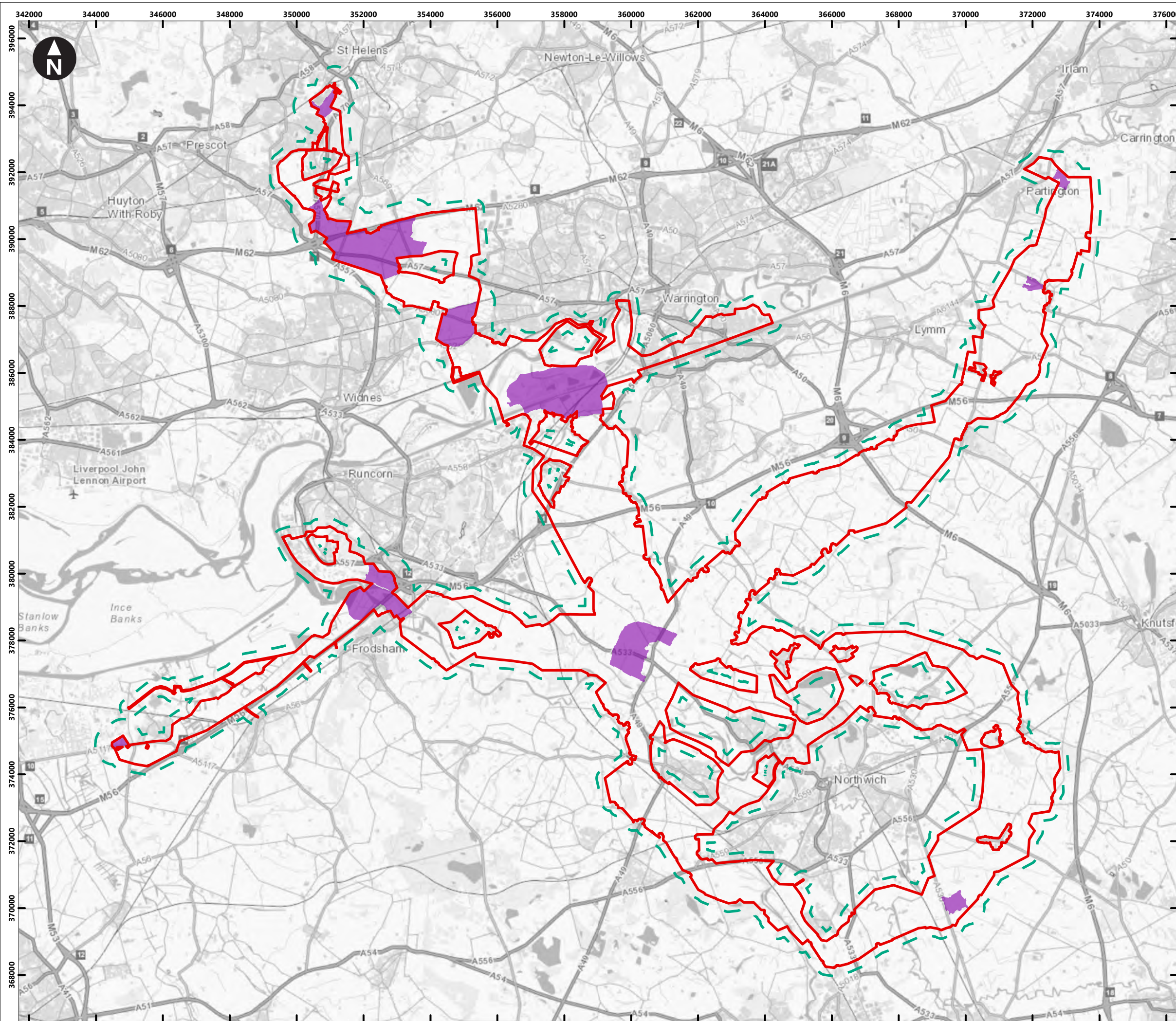
### Significance evaluation methodology

- 12.7.12 The evaluation of the significance of effects will be based on the change in risk from baseline conditions to those following construction and operation of the Project.
- 12.7.13 In order to define the baseline risk, the initial assessment and classification of risk will be carried out for the Study Area in its pre-development state. A separate assessment of risk will then be conducted for the site post-development (including environmental measures inherently embedded in the development) to enable an evaluation of the change in risk due to the Project.
- 12.7.14 **Table 12.11** uses the risk classification pre- and post-development as the basis for the significance evaluation matrix that will be used in the EIA.

Table 12.11 Ground conditions significance evaluation matrix

		Risk Post-development (including embedded environmental measures)						
		Very Low	Low	Moderate / Low	Moderate	High	Very High	
<b>Risk Pre-development</b>	<b>Existing Receptors</b>	<b>Very High</b>	Major Positive (Significant)	Major Positive (Significant)	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)
		<b>High</b>	Major Positive (Significant)	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)
		<b>Moderate</b>	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)
		<b>Moderate / Low</b>	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)
		<b>Low</b>	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)
		<b>Very Low</b>	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)
	<b>No Receptor Present Pre-development</b>	<b>N/A</b>	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)	Major Negative (Significant)
		Risks that remain at moderate, high or very high post-development are unlikely to be considered acceptable and further environmental measures will be required to enable the development to proceed.						

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Key

- Scoping boundary
- Hydrogen Above Ground Installation (HAGI) search areas
- Ground Conditions study area

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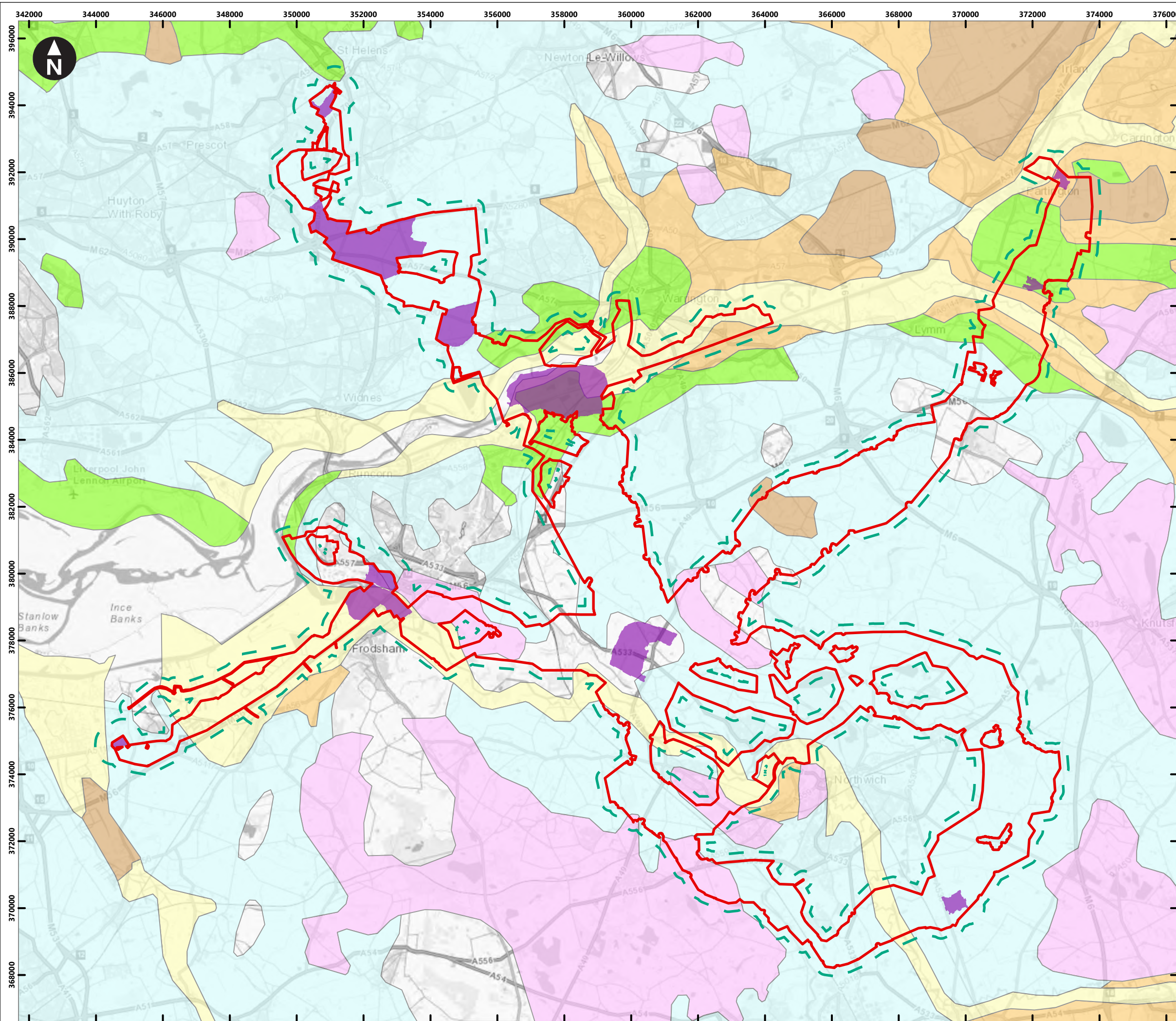
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**Figure 12.1**  
**Ground Conditions Study Area**

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**Key**

- Scoping boundary
- Hydrogen Above Ground Installation (HAGI) search areas
- Ground Conditions study area

**BGS 625K Superficial Geology**

- Alluvium - clay, silt and sand
- Blown sand - sand
- Glacial sand and gravel
- Peat
- River terrace deposits - sand and gravel
- Till - diamicton

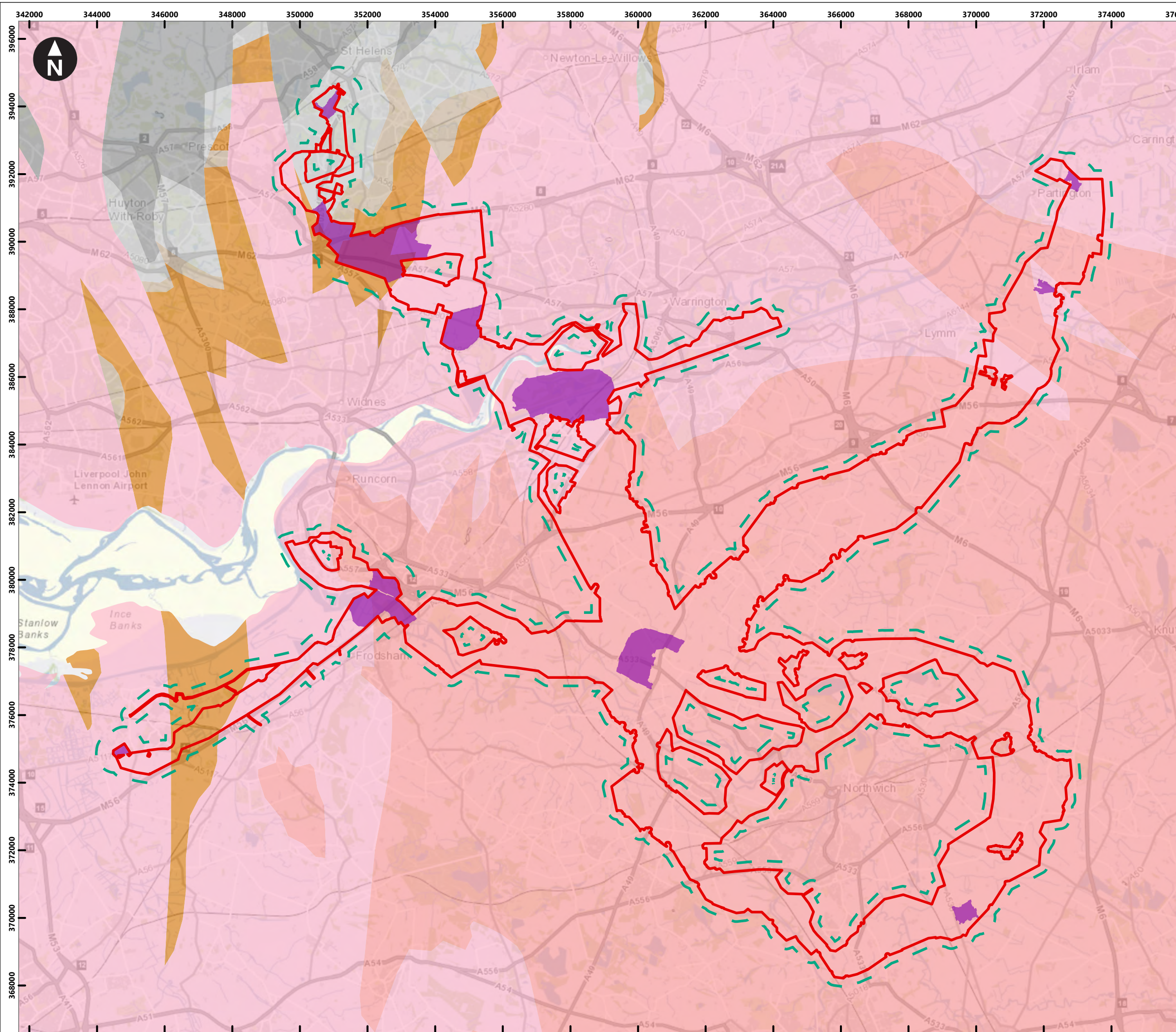
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**Figure 12.2**  
**Superficial geology**

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**Key**

- Scoping boundary
- Hydrogen Above Ground Installation (HAGI) search areas
- Ground Conditions study area

**BGS 625K Bedrock Geology**

- Triassic rocks (undifferentiated) - mudstone, siltstone and sandstone
- Triassic rocks (undifferentiated) - sandstone and conglomerate, interbedded
- Permian rock (undifferentiated) - sandstone and onglomerate, interbedded
- Pennine middle coal measures formation and south Wales middle coal measures formation (undifferentiated)
- Warickshire group - siltstone and sandstone with subordinate mudstone
- Pennine lower coal measures formation and south Wales lower coal measures formation (undifferentiated)

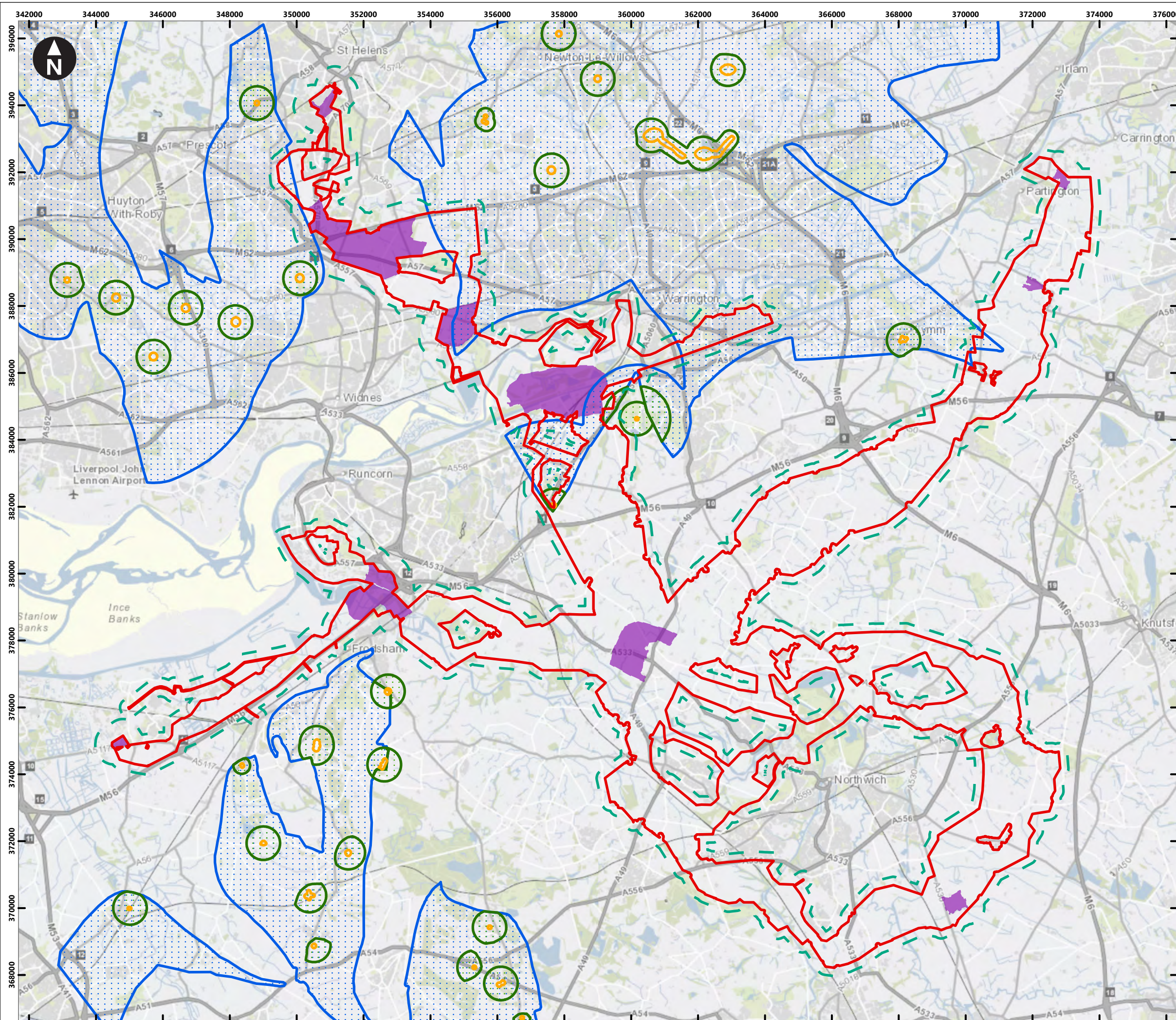
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**Figure 12.3**  
**Bedrock geology**

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**Key**

- Scoping boundary
- Hydrogen Above Ground Installation (HAGI) search areas

**EA Source Protection Zones (SPZ)**

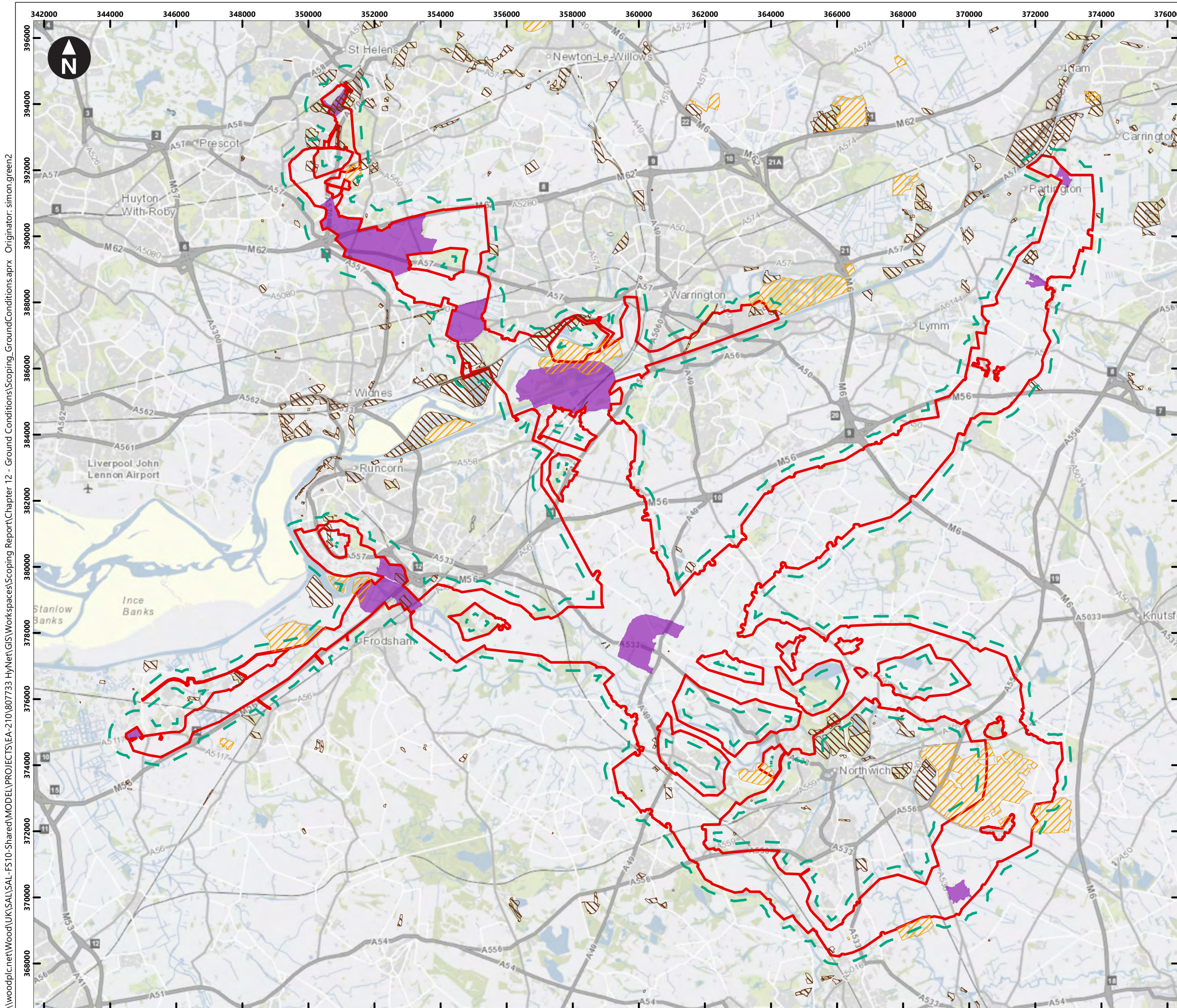
- Zone I - Inner Protection Zone
- Zone II - Outer Protection Zone
- Zone III - Total Catchment
- Zone of Special Interest

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**Figure 12.4**  
**Groundwater Source Protection Zones (SPZ)**



- Key
- Scoping boundary
  - Hydrogen Above Ground Installation (HAGI) search areas
  - Ground Conditions study area
  - Authorised landfill sites
  - Historic landfill sites

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 Scale at A3: 1:110,000  
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**Figure 12.5**  
**Historic and Authorised landfills**

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# 13. Agriculture and Soil Resources

## 13.1 Introduction

13.1.1 The agriculture and soil resources assessment will consider the likely significant effects on soil and the agricultural land resource that may arise from the construction and operation of the Project. This section of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

13.1.2 Agriculture and soil interface with several other aspects notably:

- **Chapter 5: Biodiversity;**
- **Chapter 7: Water Environment** – the water environment chapter considers the potentially significant effects on water resources, there is interaction between the water environment and soil and agricultural resources;
- **Chapter 12: Ground Conditions** – the ground conditions chapter considers the potential effects of the Project with respect to geodiversity and land contamination;
- **Chapter 15: People and Communities;**
- **Chapter 17: Climate Change.**

### Assumptions and limitations

13.1.3 The agriculture and soil resources scoping assessment is based on a number of key assumptions associated with project parameters. Please refer to **Chapter 2: The Project** for the parameters on which this Scoping Report is based.

## 13.2 Relevant legislation, planning policy and technical guidance

### Legislation

13.2.1 There is no national legislation specific to the assessment of effects on agriculture and soil resources. However, general environmental legislation of relevance to agriculture and soil resources is identified in **Table 13.1**. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each topic.



Table 13.1 Legislation relevant to agriculture and soil resources

Legislation	Legislative context	Section considered
The Environment Act 2021 <sup>336</sup>	<p>The Environment Act 2021 passed into law in November 2021, it is a framework law and associated targets, policies and regulations are yet to be developed. It provides the legal basis for the establishment of the Office for Environmental Protection (OEP).</p> <p>The Environment Act 2021 requires organisations to pay regard to environmental principles including:</p> <ul style="list-style-type: none"> <li>• The prevention principle, which means that government policy should aim to prevent, reduce or mitigate harm</li> <li>• The rectification at source principle, which means that if damage to the environment cannot be prevented it should be tackled at its origin</li> <li>• The polluter pays principle, which is the principle that those who cause pollution or damage to the environment should be responsible for mitigation or compensation</li> <li>• The precautionary principle, which states that where there are threats of serious or irreversible environmental damage, a lack of scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation</li> </ul> <p>The Environment Act 2021 also strengthens woodland protection enforcement measures and biodiversity protection and includes a biodiversity net gain requirement for development to deliver at least 10% increase in biodiversity.</p>	<p>The approach to incorporating the requirements of the Act is provided in <b>Section 13.6: Scope of the assessment.</b></p> <p>Embedded measures to prevent, reduce or mitigate harm are discussed in <b>Section 13.4: Embedded environmental measures.</b></p>

<sup>336</sup> UK Government (2021). Environment Act 2021. (Online). Available at: <https://bills.parliament.uk/bills/2593> (Accessed November 2021).

Legislation	Legislative context	Section considered
<b>Water Resources Act 1991<sup>337</sup> as amended by the Water Act 2003<sup>338</sup></b>	<p>The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters.</p> <p>The Act was revised by the Water Act 2003, which provides the definition of and regulatory controls for the protection of water resources, including the quality standards expected for controlled waters.</p>	Embedded measures are discussed in <b>Section 13.5: Embedded environmental measures</b> of this chapter to enable the protection of controlled waters e.g. from silt pollution of surface water due to construction activities.

## Technical Guidance

13.2.2 There is no technical guidance on the assessment of effects on agricultural land or soil. A summary of other relevant information and guidance relevant to the assessment undertaken for agriculture and soil resources is provided below.

- The Government's Guide to Assessing Development Proposals on Agricultural Land<sup>339</sup> states that Natural England must be consulted for development proposals that are both: likely to cause the loss (or likely cumulative loss) of 20ha or more of best and most versatile (BMV) land; and, not in accordance with an approved development plan.
- Natural England's Technical Information Note TIN049<sup>340</sup> states that the Agricultural Land Classification of England and Wales (ALC) agricultural land grading system, which takes into account climate, site and soil characteristics, is used by Natural England to give advice to planning authorities when development is proposed on agricultural land or other greenfield sites that could potentially grow crops.

<sup>337</sup> UK Government (1991). Water Resources Act 1991. (online). Available at: <https://www.legislation.gov.uk/ukpga/1991/57/contents> (Accessed December 2021).

<sup>338</sup> UK Government (2003). Water Act 2003, (online). Available at: <https://www.legislation.gov.uk/ukpga/2003/37/contents> (Accessed December 2021).

<sup>339</sup> Natural England (2021). Guide to assessing development proposals on agricultural land. (Online) Available at: <https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land> (Accessed December 2021).

<sup>340</sup> Natural England (2012). Technical Information Note TIN049, Agricultural Land Classification: protecting the best and most versatile agricultural land. (Online). Available at: <http://publications.naturalengland.org.uk/publication/35012> (Accessed December 2021).

- Highways England's Design Manual for Roads and Bridges LA109<sup>341</sup> (DMRB) sets out the requirements for assessing and reporting the effects of highway projects on geology and soils. Although designed for highways projects, this document provides a published approach to the assessment of the effects of development on agricultural land and soil in EIAs which can be adopted or adapted for other types of project.
- The Government's Safeguarding our Soils strategy<sup>342</sup> aims to help developers and others manage soil sustainably and protect soil functions and is supported by the Defra construction code of practice on the sustainable use of soils on construction sites<sup>343</sup>, this can inform development design, construction and after-care phases.
- The Government's Planning Practice Guidance<sup>344</sup> advises that soil is an essential natural capital resource that provides important ecosystem services, for example as a growing medium for food, timber and other crops; as a store for carbon and water; as a reservoir of biodiversity; and as a buffer against pollution (paragraph 8-002-20190721).
- Advice on Soil Management<sup>345</sup> states that once the decision has been taken to develop an area of land, it is important to retain as many healthy soil functions as practicable by careful management of the soils during construction.

### 13.3 Consultation

13.3.1 No consultation has been completed to date in relation to agriculture and soil resources. However, in respect of agriculture, focussed engagement (through both informal and formal consultation) will be undertaken and recorded throughout the pre-application stages of the Project. This will involve consultation with Natural England with respect to the spatial extent of the Study Area, the sources of

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<sup>341</sup> Highways England (2019). Design Manual for Roads and Bridges. Sustainability and Environment Appraisal LA109: Geology and Soils. (Online) Available at:

<https://www.standardsforhighways.co.uk/dmrb/search/adca4c7d-4037-4907-b633-76eaed30b9c0> (Accessed December 2021).

<sup>342</sup> Defra (2009). Safeguarding our Soils. A Strategy for England. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69261/pb13297-soil-strategy-090910.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69261/pb13297-soil-strategy-090910.pdf) (Accessed December 2021).

<sup>343</sup> Defra (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/716510/pb13298-code-of-practice-090910.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf) (Accessed December 2021).

<sup>344</sup> Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2019). Planning Practice Guidance: Natural Environment. (Online) Available at: <https://www.gov.uk/guidance/natural-environment> (Accessed December 2021).

<sup>345</sup> Natural Capital Committee (2019). Advice on Soil Management. (Online) Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/909069/ncc-advice-soil-management.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/909069/ncc-advice-soil-management.pdf) (Accessed December 2021).

baseline information to be used to inform the EIA and the assessment methods to be applied.

## 13.4 Baseline conditions

### Data gathering methodology

- 13.4.1 A desk-based review of existing datasets has been undertaken to gain an overview of likely conditions and how this may vary geographically across the Scoping red line boundary and to help inform the scoping of agriculture and soil resources assessment. The sources of data are provided in **Table 13.2**.
- 13.4.2 The Study Area referred to in **Table 13.2** is defined in paragraph 13.6.1 and comprises the Scoping red line boundary.

**Table 13.2 Key sources of soils and agricultural data**

Source	Date	Summary	Coverage of study area
<b>MAGIC website</b> <sup>346</sup>	2021	1:250,000 Soilscape (England) map	Full coverage of the Study Area
<b>Cranfield University Soils Guide</b> <sup>347</sup>	2021	Guide to Soilscape mapping	Full coverage of the Study Area
<b>Gov.uk open data</b> <sup>348</sup>		1:250,000 Ministry of Agriculture, Fisheries and Food (MAFF) provisional Agricultural Land Classification (ALC) Map of England and Wales and post-1988 ALC data	Full coverage of the Study Area (provisional ALC mapping)  Partial coverage of the Study Area (post 1988 ALC mapping)
<b>Ordnance Survey (OS)</b> <sup>349</sup>		1:50,000 and 1:25,000 mapping	Full coverage of the Study Area

<sup>346</sup> Defra (2021). Magic Maps. (Online) Available at: <https://magic.defra.gov.uk/> (Accessed December 2021).

<sup>347</sup> Cranford University (2021). Soils Guide. (Online) Available at: <https://www.cranfield.ac.uk/themes/environment-and-agrifood/landis/soils-guide> (Accessed December 2021).

<sup>348</sup> UK Government (2021). Find Open Data. (Online) Available at: <https://data.gov.uk/> (Accessed December 2021).

<sup>349</sup> Ordnance Survey (2021). OS Maps. (Online) Available at: <https://osmaps.ordnancesurvey.co.uk/> (Accessed December 2021).

Source	Date	Summary	Coverage of study area
Open access Google Earth imagery <sup>350</sup>		Aerial images to inform land use considerations	Full coverage of the Study Area

## Current baseline

### Soils

- 13.4.3 An initial desk-based review of the soil types within the Scoping red line boundary has been completed using the Soilscape map and accompanying soils guide in addition to a review of OS mapping.
- 13.4.4 The Soilscape map shows soils across most of the scoping red line boundary area are loamy and clayey in texture, comprising slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with moderate fertility (type 18). These are mainly used as grassland and for arable farming with some woodland and can support seasonally wet pasture and woodland habitats. Soil structure is such that these soils are susceptible to damage if worked during wet ground conditions. Topsoil carbon storage in these soils is low.
- 13.4.5 Given the large area covered by the scoping red line boundary, a wide range of other soil types are also present locally, supporting a variety of habitats, as outlined below. Carbon storage potential in soils within the scoping red line boundary varies from low to high (potential peat).
- 13.4.6 The Scoping red line boundary avoids larger expanses of peatland present regionally, such as Cadishead Moss north-west of Partington, however, there is potential for peat to be present in several areas.
- 13.4.7 From Stanlow Refinery the Scoping red line boundary passes south of Elton, then heads north-east to the Weaver Navigation at Frodsham, through land on the south bank of the Mersey Estuary that is mainly in agricultural use and characterised by soils with a peaty texture. The loamy and sandy soils have naturally high groundwater and a peaty surface (type 23), and support mainly arable agricultural land and wet meadow habitats. Topsoil carbon storage in these soils is medium/high. This soil type is also present north-east of Moore on the south bank of the River Mersey, where the corridor heads north-west towards St Helens.
- 13.4.8 At the northern extent of the Scoping red line boundary, where it reaches Partington, there is one area of raised bog peat soils (type 26). These naturally wet peaty soils have very low natural fertility, their main land cover is bog, grassland and some arable farming, and these soils can support bog communities forming lowland mires and mosses. Topsoil carbon storage in peat is high.
- 13.4.9 Fen peat soils are present in two areas between Higher Whitley and Sworton Heath on the Scoping red line boundary section heading north-east towards

<sup>350</sup> Google (2021). Google Earth. (Online) Available at: <https://earth.google.com/web/> (Accessed December 2021).

Partington. There is also a small area shown at Plumley at Holford Moss, immediately south-east of Plumley Nature Reserve/Plumley Lime Beds Site of Special Scientific Interest (SSSI) (which is outside the Scoping red line boundary). These are naturally wet peaty soils (type 27) with mixed natural fertility, ranging from lime-rich to very low. These areas are mainly used for arable farming and horticultural and can support wet fen/carr woodland habitats. Topsoil carbon storage in these soils is medium/high.

- 13.4.10 The Scoping red line boundary crosses several watercourses including the River Mersey, the River Weaver, and the River Dane, in addition to the Manchester Ship Canal plus the Trent and Mersey Canal. Floodplain soils are present in these areas as described below.
- 13.4.11 From Frodsham, heading east to the proposed Hydrogen Hub between Lower Whitley and Acton Bridge, the Scoping red line boundary initially follows the route of the River Weaver, continuing through agricultural land. Soils along the River's floodplain comprise loamy and clayey floodplain soils with naturally high groundwater (type 20). They are capable of supporting wet flood meadows and pasture with wet carr woodlands in old river meanders, and are predominantly covered by grassland, which needs to be drained to be productive, with some arable farming (cereal production where flood risk is low). Topsoil carbon storage in these soils is medium. Other areas where this soil type is present include land north of Higher Walton on the south bank of the River Mersey, where the Scoping red line boundary heads north-west towards St Helens, and along the route of the River Bollin, where the Scoping red line boundary heads north-east towards Partington.
- 13.4.12 At Bostock Green the Scoping red line boundary passes through an area of loamy textured freely draining floodplain soils (type 12) by the River Dane. These have naturally moderate to high fertility and are predominantly used a grassland with some arable farming. Habitats supported by these soils include valley and floodplain grassland and wet carr woodland. Topsoil carbon storage in these soils is low.
- 13.4.13 At the River Mersey north of Higher Walton, loamy and clayey soils of coastal flats (type 21) are present, these have naturally high groundwater and are naturally wet, with lime-rich to moderate fertility. These soils are typically in arable farming use with some grassland and can support wet brackish coastal flood meadows and grazing marsh habitats.
- 13.4.14 There are localised areas with very acid sandy soils east of Lostock Green, north-east of Higher Whitley and northeast of Moore and these soils are present to a greater extent on the Scoping red line boundary in proximity to Partington. These naturally wet very acid sandy and loamy soils (type 15) have very low natural fertility. The land is typically used for arable farming, horticulture and wet lowland heath and these soils can support mixed dry and wet lowland heath communities.
- 13.4.15 At Sutton Weaver, Aston, and north of Acton Bridge, where the land slopes up steeply from the river valley, localised areas with sandy soils are present, comprising freely draining slightly acid sandy soils (type 10), with low fertility. These support acid dry pasture, acid deciduous and coniferous woodland and can potentially support lowland heath habitat, and arable farming for a wide range of

crops. Topsoil carbon storage in these soils is low. This soil type is also present on higher ground southeast of Cuddington, at Moulton and Bostock Green, south-east of Moore, at Moulton, southwest of Higher Whitley, on land between Moore and Hatton/Daresbury and a small area within the corridor to the east of Prescott.

13.4.16 Within the Scoping red line boundary on the route to Partington, there is one area at Warburton with freely draining very acid sandy and loamy soils (type 14). These freely draining soils have very low natural fertility and are generally covered by heath and forestry, supporting mainly lowland dry heath communities with mixed and coniferous woodland. Topsoil carbon storage in these soils is medium.

13.4.17 The information on soils above should be regarded as preliminary at this stage and will be informed by further desk and site-based analysis to comprise an appropriately-scoped soil resources survey which will include assessing the ALC grade of agricultural land.

### *Agricultural land quality*

13.4.18 The provisional ALC mapping shows most of the land within the Scoping red line boundary as Grade 3 and to a lesser extent Grade 2. Without site specific data obtained through survey, and to provide a conservative assessment, the ALC grade of land provisionally assessed as Grade 3 will be assumed to be subgrade 3a which is the lowest grade of land meeting the definition of BMV agricultural land.

13.4.19 There is extremely limited coverage by post 1988 ALC mapping of the Scoping red line boundary. There is an area of Grade 1 and 2 (BMV) land west of Moore, and some Grade 2 land is shown to the south of Great Sankey. However, in most areas where post 1988 classification is available, for example at Elton, Frodsham, southeast of Rudheath, east of Lostock Gralam, north of High Legh, west of Daresbury, west of Great Sankey and southeast of Rainhill Stoops, the land is classed as subgrade 3a (BMV) or 3b (not BMV).

13.4.20 The ALC classification data is presented as **Figure 13.1**.

### *Future baseline*

13.4.21 The land use across the Scoping red line boundary is anticipated to remain generally consistent with its present use, with no significant effects on agriculture or soils expected.

13.4.22 Agricultural and soil resources are geographically discrete, and without development, these resources will still be subject to land management effects e.g., farming activities, which could improve or degrade the resources. However, it is not possible to predict these effects sufficiently to quantify them. It is noted that Defra intends to publish a Soil Health Action Plan, which will take a natural capital approach and will be intended to restore the health of soils in England and ensure that soil is managed sustainably by 2030. However, this has not yet been

published. The sustainable farming incentive<sup>351</sup> will be a key focus of the action plan<sup>352</sup>. The action plan will include the development of a healthy soil indicator, soil structure monitoring methodology and a soil health monitoring scheme to help land managers and farmers track the health of our soil over time and the impact of their management practices. At present, no baseline soil health data is available for the Study Area to enable a comparison to be made post development and no measurable soil health targets have been set for 2030.

## 13.5 Embedded environmental measures

- 13.5.1 As part of the design process, several embedded measures are proposed to reduce the potential for impacts on agriculture and soil. These will evolve over the development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process. These measures typically include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements. The embedded environmental measures for agriculture and soil resources are detailed in Table 13.3.
- 13.5.2 As there is a commitment to implementing these environmental measures, and to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and have, therefore, been considered in the scoping assessment.

**Table 13.3 Agriculture and soil embedded environmental measures**

Environmental measure	How the environmental measures will be secured
<b>The hydrogen pipeline will be completely buried other than where it comes above ground at Hydrogen Above Ground Installations (HAGIs).</b>	DCO works plans, description of development and requirements
<b>Main rivers and canals, and road and rail crossings (and other sensitive environmental constraints, to be confirmed) will be constructed using trenchless techniques.</b>	DCO works plans and order limits
<b>Grade 1 and 2 agricultural land will be avoided where it is feasible and practicable to do so</b>	DCO works plans and order limits

<sup>351</sup> Currently at pilot trial stage. Defra and Rural Payments Agency (2021). Sustainable Farming Incentive pilot. (Online) Available at: <https://www.gov.uk/guidance/sustainable-farming-incentive-pilot> (Accessed December 2021).

<sup>352</sup> UK Parliament (2021). Soil Health Action Plan for England. (Online) Available at: <https://hansard.parliament.uk/commons/2021-10-19/debates/21101972000015/SoilHealthActionPlanForEngland> (Accessed December 2021).



Environmental measure	How the environmental measures will be secured
<b>The Project avoids soils on sensitive ecological sites including ancient woodland, SSSIs, national nature reserves and local wildlife site. It also avoids sites with designations for the conservation of archaeological features.</b>	DCO works plans and order limits
<b>Each section of the hydrogen pipelines will have a working width specific to the given leg diameter, to minimise environmental impacts.</b>	Project Code of Construction Practice (CoCP) and DCO requirement
<b>The footprint of the HAGIs will be minimised to that required for the safe operation and maintenance of the equipment.</b>	CoCP and DCO requirement
<b>Soils will be managed in accordance with Defra 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (CCOP)<sup>343</sup>. This will include carrying out sufficient field soil survey/peat survey to produce a soil resources plan and then the development of a Soil Management Plan (SMP) for use during construction to protect the identified soil resources.</b>	CoCP and DCO requirement
<b>An SMP will be developed to enable construction works to be completed in accordance with the Defra CCOP to protect soil resources from damage during the construction phase.</b>	CoCP and DCO requirement
<b>Soils displaced from their original location during construction that cannot be reinstated at the same location due to the Project (i.e., soil removed from HAGIs and Block Valve Installations (BVI) compounds will be conserved and reused within the Project boundary wherever possible. This will apply to topsoil and subsoil.</b>	CoCP and DCO requirement
<b>Peat soils of 0.3m or greater thickness will be avoided.</b>	CoCP and DCO requirement
<b>During construction, topsoil and subsoil will be stored within the temporary working corridor. The topsoil and subsoil will be stored in separate stockpiles in line with Defra CCOP. Any suspected or confirmed contaminated soils will be separated, contained and tested before being removed.</b>	CoCP and DCO requirement
<b>During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction</b>	CoCP and DCO requirement

Environmental measure	How the environmental measures will be secured
<p>where the soil conditions indicate that compaction is possible. Storage time will be kept to the practicable minimum to prevent the soil deteriorating in quality. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips.</p>	
<p>In areas (or during periods of adverse weather) there may be the requirement to import aggregates to create a stable surface for construction traffic movements. Options such as bogmatting and geotextiles will be considered by the principal contractor for sensitive areas to reduce impact.</p>	CoCP and DCO requirement
<p>Consideration will be given to the timing of construction to lower the risk of adverse weather during earthworks causing damage to soils.</p>	CoCP and DCO requirement
<p>The hydrogen pipeline will be constructed in discrete sections, allowing phased excavation, pipeline laying and reinstatement, to allow reinstatement to take place in as short a timeframe as possible from the point of excavation.</p>	CoCP and DCO requirement
<p>Stockpiles will be present for the shortest practicable timeframe, with stockpiles being reinstated as the construction work progresses. Stockpiles which remain present for three months or longer will be seeded to encourage stabilisation.</p>	CoCP and DCO requirement
<p>Care will be taken to ensure that the existing land drainage regime is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. Temporary cut-off drains will be installed parallel to the trench-line, before the start of construction, to intercept soil and groundwater before it reaches the trench. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.</p>	CoCP and DCO requirement
<p>The use of tried and tested invasive species control and biosecurity measures to avoid the spread of infested materials will be applied.</p>	CoCP and DCO requirement
<p>Where potential flood risk receptors could be impacted by a loss of floodplain storage and/or impacts on floodplain conveyance, soil stockpiles</p>	CoCP and DCO requirement

Environmental measure	How the environmental measures will be secured
(associated with both the pipeline construction and temporary haul roads) will be located outside of the fluvial floodplain wherever possible. Where not possible, further assessment will be undertaken in the Flood Risk Assessment (FRA) and further measures will be proposed to address this where necessary.	
Within the fluvial floodplain and at surface water flow pathways, the permanent pipelines will be completely buried, with the land above reinstated to pre-construction ground levels (some mounding may be appropriate to allow for settlement).	CoCP and DCO requirement
The SMP will interact with other materials management planning e.g., in relation to contaminated or potentially contaminated soil/materials.	CoCP and DCO requirement

## 13.6 Scope of the assessment

### Study area

- 13.6.1 The Study Area for the agriculture and soil resources assessment is defined as the Scoping red line boundary. There is no external zone of influence (ZoI) for soils and agriculture beyond this. The rationale for the Study Area is that soils and agricultural land are geographically discrete and not substantially influenced by changes to the surroundings. Therefore, soil and agricultural land will only be significantly affected by changes or activities (temporary or permanent) taking place on the resource itself and, therefore, no additional spatial buffer around the Scoping red line boundary is required.

### Potential receptors

- 13.6.2 The spatial and temporal scope of the Project enables the identification of receptors that may experience a change a result of the Project. The receptors identified that may experience a change because of the Project are outlined in **Table 13.4**.

Table 13.4 Receptors requiring assessment for soils and agriculture

Receptor group	Receptors included within the group
<b>Construction</b>	
<b>Agricultural land</b>	<p>Agricultural land quality and best and most versatile land (Grades 1, 2 and subgrade 3a). Definitions of these ALC grades are provided below:</p> <p><b>Grade 1</b> – excellent quality agricultural land: land with no or very minor limitations. A very wide range of agricultural and horticultural crops can be grown and commonly includes: top fruit, for example tree fruit such as apples and pears, soft fruit, such as raspberries and blackberries, salad crops, and winter harvested vegetables. Yields are high and less variable than on land of lower quality.</p> <p><b>Grade 2</b> – very good quality agricultural land: Land with minor limitations that affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown. On some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops, such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.</p> <p><b>Subgrade 3a</b> – good quality agricultural land: Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of crops including: cereals, grass, oilseed rape, potatoes, sugar beet, less demanding horticultural crops.</p> <p><b>Subgrade 3b</b> – moderate quality land capable of producing moderate yields of a narrow range of crops, principally: cereals and grass, or lower yields of a wider range of crops, or high yields of grass which can be grazed or harvested over most of the year</p> <p><b>Grade 4</b> – poor quality agricultural land, with severe limitations which significantly restrict the range of crops or level of yields. It is mainly suited to grass with occasional arable crops (for example cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties using the land. The grade also includes arable land that is very dry because of drought.</p> <p><b>Grade 5</b> – this is very poor quality agricultural land, with very severe limitations that restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.</p>
<b>Soils</b>	Soil resources including peat.

## Likely significant effects

13.6.3 The likely significant agriculture effects that will be taken forward for assessment in the ES are summarised in **Table 13.5**.

**Table 13.5 Likely significant agriculture effects**

Activity	Effect	Receptor
<b>Construction</b>		
<b>Use of machinery for soil handling and storage</b>	Potential for changes to soil structure (e.g., due to compaction of soil) resulting in loss of soil functions. Due to the embedded environmental measures, no significant effect anticipated. To be determined through further assessment.	Agricultural land and soil
<b>Vegetation stripping, soil storage, construction activities</b>	Potential for soil erosion to occur. Due to the embedded environmental measures, no significant effect anticipated. To be determined through further assessment.	Agricultural land and soil
<b>Temporary loss of topsoil due to removal during construction</b>	Potential for damage to topsoil or permanent loss of topsoil. Due to the embedded environmental measures, no significant effect anticipated. To be determined through further assessment.	Agricultural land and soil
<b>Permanent loss of agricultural land and topsoil due to construction of HAGIs and IBVs (land take)</b>	Potential for significant effect, however, with the relatively small area occupied by HAGIs and IBVs, no significant effect anticipated. To be determined through further assessment.	Agricultural land and soil
<b>Damage to land drainage systems due to construction activities</b>	Potential for significant effect. To be determined through further assessment.	Agricultural land and soil

Activity	Effect	Receptor
Temporary loss of productive agricultural land due to construction activities	Potential for socio-economic effects due to loss of agricultural land for production or other business activities. To be determined through further assessment.	Agricultural land

13.6.4 The effects scoped out from further assessment are:

- Temporary loss of topsoil and agricultural land and potential damage to topsoil and agricultural land during hydrogen pipeline maintenance activity during operation is scoped out on the basis that the pipeline can be inspected internally using intelligent in-line inspection (ILI) pigging technology, meaning that any intrusive maintenance work can be precisely targeted and is likely to be infrequent and limited in extent. Maintenance activities are described in more detail in **Chapter 2: The Project**.

## 13.7 Assessment methodology

13.7.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**, and specifically in Section 4.3. However, whilst this has informed the approach that has been used in this chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the agriculture and soil resources assessment in the ES.

13.7.2 The assessment of the likely significant effects for agriculture and soil resources will be based on the extent of agricultural land and soils that may be affected and whether the effects are temporary or permanent. The assessment will be informed by:

- Information about the construction, operation and decommissioning activities associated with the Project;
- Relevant national policy, strategy, legislation and guidance documents; and
- Stakeholder engagement feedback.

13.7.3 The assessment will take into consideration the sensitivity of the affected receptor or resource, and the magnitude of change from the baseline conditions resulting from the Project. This results in an evaluation of significance and an indication of likely significant effects.

13.7.4 Definitions of receptor sensitivity that will be used in the assessment are provided in **Table 13.6**. The receptor sensitivity assessment approach is designed to take account of key soil functions and ecosystem services, including as a growing medium for crops, as a store of organic matter including carbon, providing habitat and supporting biodiversity, and soil's role in the hydrological cycle. There are interactions between soil and receptors covered in other chapters, including those

provided in **Chapter 5: Biodiversity, Chapter 7: Water Environment, Chapter 12: Ground Conditions, Chapter 15: People and Communities and Chapter 17: Climate Change.**

**Table 13.6 Sensitivity of receptor/resource**

<b>Sensitivity</b>	<b>Criteria/description</b>
<b>Very high</b>	<p>Grade 1 and 2 ALC agricultural land</p> <p>Soils directly supporting an EU designated site (e.g. SAC, SPA, Ramsar).</p> <p>Peatlands – blanket bog, raised bog, fen peat soils* (mapped peatland and peatland with any statutory designation including SSSI).</p> <p>Grade 1: Excellent quality agricultural land with no or very minor limitations to agricultural use. Grade 2: Very good quality agricultural land with minor limitations which affect crop yield, cultivation or harvesting.</p>
<b>High</b>	<p>Grade 3a ALC agricultural land.</p> <p>Soils (other than peat) directly supporting a UK designated site (e.g. SSSI, Local Nature Reserves (LNR)).</p> <p>Peatland not previously mapped and with no designation**.</p> <p>Subgrade 3a: Good quality agricultural land capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops.</p>
<b>Moderate</b>	<p>Potential for damage to topsoil or permanent loss of topsoil. Due to the embedded environmental measures, no significant effect anticipated. To be determined through further assessment.</p>
<b>Low</b>	<p>Potential for significant effect, however, with the relatively small area occupied by HAGIs, no significant effect anticipated. To be determined through further assessment.</p>
<b>Very low</b>	<p>Potential for significant effect. To be determined through further assessment.</p>

13.7.5 Planning guidance and the NPPF<sup>353</sup> refer to the need to protect BMV (Grade 3a) agricultural land (ALC grades 1,2 and 3a). Hence other agricultural land is regarded as of lower sensitivity. Subgrade 3a land is a more common resource

<sup>353</sup> Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework. (Online) Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> (Accessed December 2021).

than Grades 1 and 2 (the best available both locally and nationally) in north-west England and is, therefore, regarded as of lower sensitivity.

- 13.7.6 In accordance with the NPPF, which states that undeveloped land can perform many functions, including for wildlife, flood risk mitigation, carbon storage or food production, **Table 13.6** assigns highest sensitivity to soils performing key agricultural functions, organic matter (including carbon) storage/cycling functions, flood risk mitigation and biodiversity/wildlife supporting functions at a national level.
- 13.7.7 Disturbance of soil cannot be avoided by the Project, and it is acknowledged that soil is vulnerable to damage during handling and storage, even if the effect is only temporary, and that some soil types are less resilient to handling than others. For the purposes of the assessment, soil sensitivity will be assessed on a soil function basis. However, it is also acknowledged that during construction, the soil type (e.g., topsoil or subsoil, and specific types of each) and its structural qualities can influence its sensitivity to handling, storage and placement.
- 13.7.8 Different soil types have different resilience to structural damage during soil handling (including soil stripping, storage in stockpiles and restoration), and the interaction between soil texture and soil moisture is key. The sensitivity of the soil to handling is likely to vary within the scoping red line boundary as several different soil types will be encountered, predominantly fine loamy slowly permeable soils, but also sandy soils and possibly peat.

## Magnitude of change

- 13.7.9 The assessment of the magnitude of change from baseline conditions includes a consideration of the duration and reversibility of the change in the context of relevant legislation, policy standards and guidance. As the soils within the Scoping red line boundary are located on agricultural land and are likely to constitute BMV land, the approach to the assessment of magnitude of change has been guided by current planning guidance and Natural England guidance (Natural England, 2012<sup>354</sup>) for developments on agricultural land. It is recognised that there may be changes to other soil functions in addition to crop/biomass production because of the Project. However, in general, adverse effects on soil biomass function will correspond to adverse effects on other key soil functions, and vice versa. For example, a healthy soil capable of performing its biomass function to a high standard should also be capable of other key functions, such as storing flood water and supporting biodiversity, however, compaction of this soil would lead to a reduction in all of these functions. **Table 13.7** provides examples of how the magnitude of change is determined with respect to soils and agriculture features.
- 13.7.10 Magnitude of change may be either beneficial or adverse. The criteria and examples in **Table 13.7** focus on adverse changes, however, beneficial changes may also occur and will be considered on a case-by-case basis as required.

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<sup>354</sup> Natural England (2012). Technical Information Note TIN049, Agricultural Land Classification: protecting the best and most versatile agricultural land. (Online). Available at: <http://publications.naturalengland.org.uk/publication/35012> (Accessed December 2021).



**Table 13.7 Magnitude of change for agricultural land and soils**

<b>Magnitude of change</b>	<b>Description example</b>
<b>Very high</b>	Permanent or long-term temporary (>5 years) loss or significant degradation* of over 80ha of agricultural land or soil.
<b>High</b>	Permanent or long-term temporary (>5 years) loss or significant degradation of between 50ha to 80ha of agricultural land or soil.
<b>Medium</b>	Permanent or long-term temporary (>5 years) loss or significant degradation of between 20ha to 50ha of agricultural land or soil.
<b>Low</b>	Permanent or long-term temporary (>5 years) loss or degradation of up to 20ha of agricultural land or soil or temporary damage over 20ha which will rectify without mitigation.
<b>Very Low</b>	Temporary damage to areas up to 20ha which will rectify without mitigation.

\*Significant degradation in this context means that a key soil function is significantly reduced, an example could be that agricultural land classification is reduced due to changes in the soil's structure (e.g., due to compaction).

- 13.7.11 The magnitude of change on BMV land will depend on the amount to be affected by the Project. The Town and Country Planning (Development Management Procedure) (England) Order 2015<sup>355</sup> only requires Natural England to be consulted on development that involves the loss of greater than 20ha of Grades 1, 2 or 3a agricultural land. Consequently, losses smaller than this threshold are considered to have a small magnitude effect on the national stock of BMV land. Losses of over 80ha of BMV land are equivalent to the size of a medium to large farm and consequently the magnitude of impact is considered to be very high. At a national policy level, total farm holdings below 20ha in size are generally considered collectively as small farms.
- 13.7.12 The construction phase is expected to last for three years. When handled and stored appropriately, soil in temporary storage can be maintained for a period of years and should be reusable shortly after reinstatement. In practice, soil will be reinstated as early as possible, and within one year where possible, such as at pipeline trenches and trenchless crossing construction compounds, and the working area reduced accordingly to protect the reinstated soils. This will be addressed in the SMP.

<sup>355</sup> UK Government (2015). The Town and Country Planning (Development Management Procedure) (England) Order 2015. (Online) Available at: <https://www.legislation.gov.uk/ukxi/2015/595/contents/made> (Accessed December 2021).

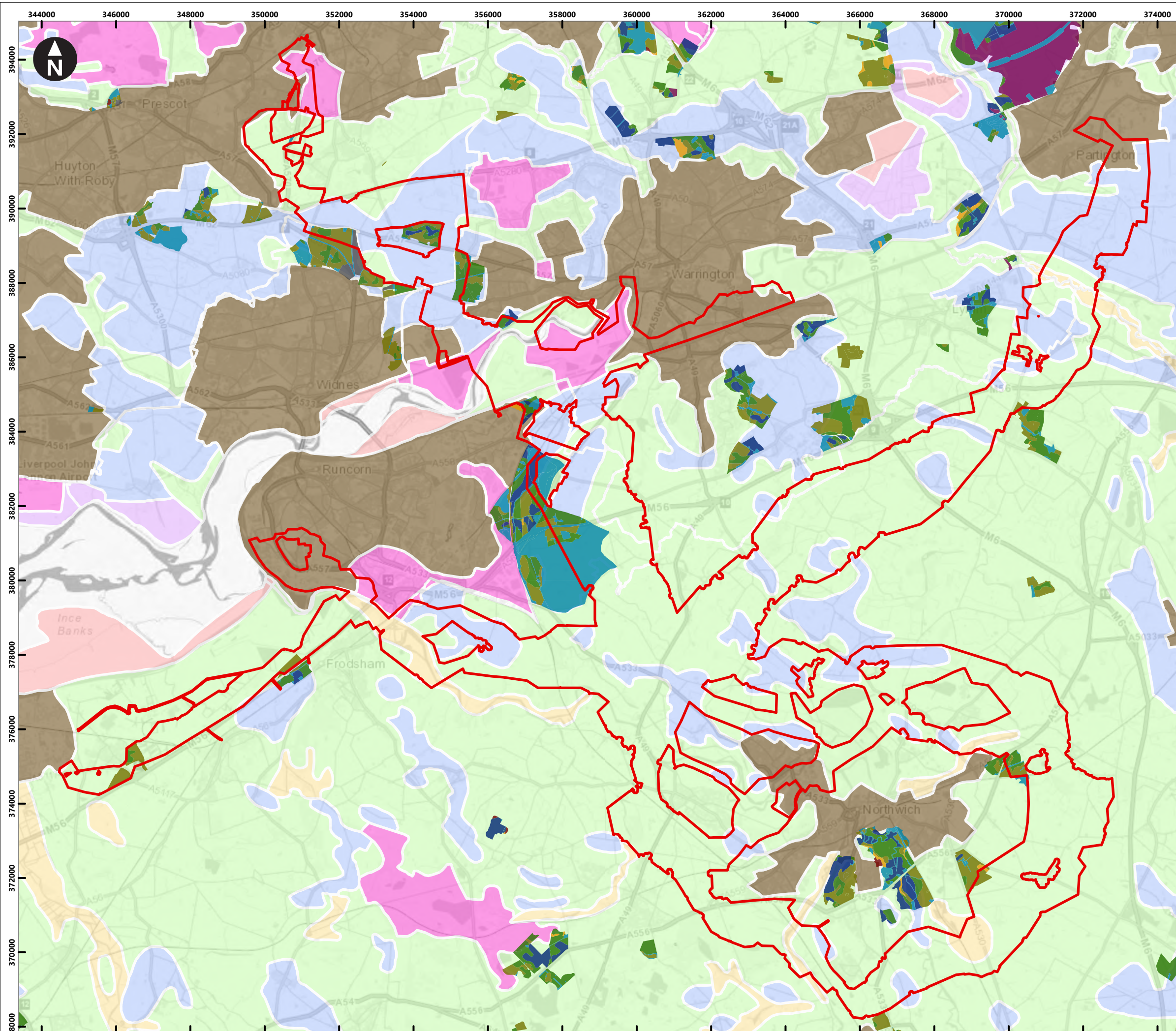
## Evaluation of significance

- 13.7.13 During the assessment of effects for each identified receptor the sensitivity value in **Table 13.6** will be combined with the magnitude of change from **Table 13.7** to produce an overall significance rating based on the evaluation matrix shown in **Table 13.8**. A ‘significant’ effect is assessed as a Moderate or Major rating at this stage of the EIA process. The latter will be subject to further investigation as part of the ES following refinement of design information. This approach will be based on professional judgement and carried out on a precautionary basis.
- 13.7.14 The evaluation of significance for soils will be undertaken using professional judgement, drawing upon information about the nature and extent of the soil resources present, their environmental setting and the type of construction activity proposed.
- 13.7.15 The evaluation of significance for agricultural land quality will be undertaken using professional judgement, in particular this will draw upon information about the area of BMV agricultural land (defined as Grade 1, 2 and 3a of the ALC) which might be lost or damaged together with contextual data about BMV land within the Study Area.

**Table 13.8 Significance evaluation matrix**

		Magnitude of change				
		Very high	High	Medium	Low	Very low
Sensitivity, importance or value	Very high	Major (Significant)	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Potentially significant)
	High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very low	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

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Key

Scoping boundary

**Agricultural Land Classification (post 1988)**

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Not Surveyed
- Other

**Agricultural Land Classification (provisional)**

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Non Agricultural
- Urban

0 1 2 3 4 5 Kilometers

Scale at A3: 1:100,000

OS Open Greyscale: Contains OS data © Crown Copyright and database right 2020

Client

**wood. Cadent**

HyNet North West Hydrogen Pipeline Project  
Scoping Report  
Chapter 13 - Agriculture and Soils

**Figure 13.1**  
**Agricultural Land Classification**

# 14. Land Use

## 14.1 Introduction

14.1.1 The Land Use assessment will consider the likely significant effects on natural resources, tourism and recreational uses that may arise from the construction and operation of the Project. This section of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline, the likely significant effects to be considered within the EIA and how these likely significant effects will be assessed for the purpose of an EIA.

14.1.2 The Land Use assessment interfaces with many other aspects, using the conclusions from these chapters within its assessments, and as such should be considered alongside:

- **Chapter 8: Landscape and Visual;**
- **Chapter 9: Air Quality;**
- **Chapter 10: Noise and Vibration;** and
- **Chapter 15: People and Communities.**

## 14.2 Assumptions and limitations

14.2.1 The Land Use assessment will have some direct links with the other chapters identified above and to avoid repetition between Chapters it is proposed that the Land Use chapter will:

- Utilise the assessments from **Chapter 8: Landscape and Visual, Chapter 9: Air Quality** and **Chapter 10: Noise and Vibration** to consider the indirect effect on amenity of nearby tourism or recreational receptors.
- **Chapter 11: Traffic and Transport** will consider the direct effect on recreational routes (rights of way, cycle routes etc) and this chapter will consider how these effects may impact on users.
- **Chapter 15: People and Communities** to consider the economic implications of any effects on local businesses (including farming businesses).

## 14.3 Relevant legislation and technical guidance

14.3.1 This section identifies the relevant legislation and guidance relevant to the scope of potential effects on businesses, tourism and recreational land uses which are detailed below. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview. Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

## Legislation and Guidance

- 14.3.2 There is no dedicated UK legislation or guidance that specifies the detailed scope of a land use assessment or that provides appropriate standards and thresholds for determining significance of effects.

## 14.4 Consultation

- 14.4.1 There has been no specific consultation carried out to date in relation to Land Use. It is anticipated that feedback in relation to this topic will be gained following consultation on this Scoping Report, most likely from the host authorities, both for the Land Use chapter and those related chapters identified in **Section 14.1**.

- 14.4.2 The methodology adopted for the Land Use assessment will take into account feedback following scoping and subsequent stakeholder engagement with the host local authorities, as part of the Development Consent Order (DCO) process.

## 14.5 Baseline conditions

### Data gathering methodology

- 14.5.1 Baseline data will be collected from a desk-based review of available data and presented within future environmental reporting. The key data sources that have been used to date are:
- 1:50,000 and 1:25,000 scale Ordnance Survey (OS) mapping<sup>356</sup> (from):
    - ▶ Google Earth Pro<sup>357</sup>;
  - The following local development plan documents:
    - ▶ Cheshire West and Chester Adopted Development Plan<sup>358</sup>;
    - ▶ Cheshire East Local Plan Strategy<sup>359</sup>;
    - ▶ Trafford Local Plan Core Strategy<sup>360</sup>;

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<sup>356</sup> Defra (2021). Magic Maps. (Online) Available at: [www.magic.defra.gov.uk](http://www.magic.defra.gov.uk) (Accessed December 2021).

<sup>357</sup> Google (2021). Google Earth Pro. Version 7.3. (Computer program). Google; California, USA.

<sup>358</sup> Cheshire West and Chester Council (2015). Adopted Development Plan. (Online) Available at: [https://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/adopted\\_cwac\\_lp/](https://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/) (Accessed December 2021).

<sup>359</sup> Cheshire East Council (2017). Local Plan Strategy 2010-2030. (Online) Available at: <https://www.cheshireeast.gov.uk/pdf/planning/local-plan/local-plan-strategy-web-version-1.pdf> (Accessed December 2021).

<sup>360</sup> Trafford Council (2012). Trafford Local Plan: Core Strategy. (Online) Available at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/core-strategy-adopted-final.pdf> (Accessed December 2021).

- ▶ Greater Manchester Joint Minerals Plan<sup>361</sup> (as it relates to Trafford);
- ▶ Warrington Local Plan Core Strategy<sup>362</sup>;
- ▶ Warrington Proposed Submission Local Plan<sup>363</sup>;
- ▶ St Helens Core Strategy<sup>364</sup>;
- ▶ Halton Core Strategy<sup>365</sup>; and
- Where available, websites relating to the individual receptors identified.

## Current baseline

14.5.2 The current baseline looks at the land uses which may be affected - either directly or indirectly within the Study Area, defined as the Scoping red line boundary plus a 1km buffer around the Hydrogen Above Ground Infrastructure (HAGI) search areas (see **Section 14.8** for further details of the Study Area). In a land use context, the impact would be limited to temporary disruption during the construction phase whilst the pipeline is being laid and HAGIs constructed. Once the pipeline is operational, the land use effects should mostly return to the baseline condition unless a HAGI is located so that it would affect a Land Use receptor. In addition to the information below, the corridors of the Scoping red line boundary cross multiple public rights of way (PRoWs). Baseline receptors are shown on **Figure 14.1**.

### West Corridor

14.5.3 The West Corridor crosses National Cycling Routes 5 and 562 in a number of locations as well as the North Cheshire Way and Cheshire Ring regional walking trails.

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<sup>361</sup> Association of Greater Manchester Authorities (2013). Greater Manchester Joint Minerals Plan Development Plan Document. (Online) Available at: [https://secure.manchester.gov.uk/downloads/download/5550/greater\\_manchester\\_joint\\_minerals\\_development\\_plan\\_documents](https://secure.manchester.gov.uk/downloads/download/5550/greater_manchester_joint_minerals_development_plan_documents) (Accessed December 2021).

<sup>362</sup> Warrington Borough Council (2014). Local Plan Core Strategy. (Online) Available at: [https://www.warrington.gov.uk/sites/default/files/2019-08/local\\_plan\\_core\\_strategy\\_adopted\\_2014.pdf](https://www.warrington.gov.uk/sites/default/files/2019-08/local_plan_core_strategy_adopted_2014.pdf) (Accessed December 2021).

<sup>363</sup> Warrington Borough Council (2021). Warrington Updated Proposed Submission Version Local Plan 2021-2038. (Online) Available at: [https://www.warrington.gov.uk/sites/default/files/2021-09/warrington\\_updated\\_proposed\\_submission\\_version\\_local\\_plan\\_upsvlp\\_2021-2038\\_-\\_september\\_2021.pdf](https://www.warrington.gov.uk/sites/default/files/2021-09/warrington_updated_proposed_submission_version_local_plan_upsvlp_2021-2038_-_september_2021.pdf) (Accessed December 2021).

<sup>364</sup> St Helens Council (2012). St Helens Local Plan Core Strategy. (Online). Available at: <https://www.sthelens.gov.uk/planning-building-control/planning-policy/core-strategy/> (Accessed December 2021).

<sup>365</sup> Halton Borough Council (2013). Halton's Local Plan Core Strategy. (Online) Available at: <https://www3.halton.gov.uk/Documents/planning/planning%20policy/CoreStrategy.pdf> (Accessed December 2021).

- 14.5.4 The Study Area also passes across the River Weaver, Weaver Navigation and Trent and Mersey Canal and includes Runcorn Golf Club, Sutton Hall Golf Club and Gowy Meadows Nature Reserve.
- 14.5.5 Minerals safeguarding areas for sand and gravel resources exist within the West Corridor.

### *North Corridor*

- 14.5.6 The North Corridor includes Lapwing Lake/Moore Nature Reserve, the Big Hand Riding School and Moore Rugby Union Club and the National Trust site and woodlands commemorating the birthplace of Lewis Carroll. The corridor includes golf courses at Sherdley Park and Fiddlers Ferry (True Fit), the Fiddler's Ferry Sailing Club and crosses the River Mersey.
- 14.5.7 The North Corridor crosses National Cycle Route 62 and the Trans-Pennine walking trail along the north bank of the River Mersey, as well as the Bridgewater Canal and Cheshire Ring walking trail.
- 14.5.8 The Study Area also includes Ravenhead Nature Park/Thatto Heath Meadows Nature Reserve, Sutton Leisure Centre sports ground, Rainhill Cricket Club, KSTA Rainhill football, Daresbury Firs and Oxmoor Wood Nature Reserves, Pex Hill Nature Reserve and Observatory, Clock Face Colliery Country Park, Mersey Valley Golf Club and Whalton Hall Golf Club.
- 14.5.9 Minerals safeguarding areas for sand and gravel resources exist within the corridor.

### *East Corridor*

- 14.5.10 The East Corridor passes Antrobus and High Legh Golf Courses and Arley Hall and Garden is within the Study Area. The corridor crosses over the Trans Pennine and Cheshire Ring walking trails, National Cycle Routes 62 and 70 and the Bridgewater Canal.
- 14.5.11 Minerals safeguarding areas for sand and gravel resources exist within the East Corridor.

### *South Corridor*

- 14.5.12 Two options for the South Corridor are currently under consideration as part of the Project design, one which runs around the west and south of Northwich (Option A) and the other around the north and east of the town (Option B).
- 14.5.13 Option A crosses the Trent & Mersey and Weaver navigation canals, the rivers Dane and Weaver, the Dane Valley, Cheshire Ring and North Cheshire way walking trails and National Cycle Routes 5 and 70. It also includes two caravan parks (Watervale and Woodbine Cottage).
- 14.5.14 Option A is also partially in the parkland associated with Vale Royal Park, which includes Vale Royal Abbey Scheduled Monument and associated buildings, a Banqueting Hall and Vale Royal Golf Club, and several listed structures at Vale Royal Locks.

- 14.5.15 Option B crosses National Cycle Routes 70 and 573 and the North Cheshire Way walking route.
- 14.5.16 Minerals safeguarding areas for salt, and sand and gravel resources exist within both options in the South Corridor.

## 14.6 Future baseline

- 14.6.1 From the desk-based research to date, nothing has been found to indicate that existing baseline receptors would be subject to change in the future (i.e. no new development proposals linked to any of the receptors have been found). It is possible that the public rights of way network may be extended in the future, or that recreational routes will be introduced to the area, however no specific plans of relevance have been identified to date. As such, it is not considered that the future baseline of the study area for Land Use will be materially different from that identified within the current baseline at **Section 14.5**.

## 14.7 Embedded environmental measures

- 14.7.1 Embedded environmental measures have been incorporated into the design to date relating to the proposed infrastructure, avoiding potential Land Use receptors wherever possible. Further details are provided in **Chapter 2: The Project**, on how the design has been developed to date. These are detailed in **Table 14.1**.

**Table 14.1 Land Use embedded environmental measures**

Environmental measure	How the environmental measures will be secured
The hydrogen pipeline will be completely buried other than where it comes above ground at HAGIs.	DCO works plans, description of development and requirements
Crossing of main rivers and canals will be constructed using trenchless techniques.	DCO works plans and DCO requirements
The corridors have been designed to avoid all World Heritage Sites, National Nature Reserves, registered Parks and Gardens, Countryside and Rights of Way Act land (Open Access Land).	DCO requirements
The corridors have been designed to either avoid, or minimise conflict with local nature reserves and National Trust land.	DCO works plans, description of development and requirements
Project infrastructure will avoid tourist attractions and recreational facilities as far as is practicable.	DCO requirements



14.7.2 The detailed design, including the selection of the preferred route, and the precise siting of the infrastructure will also seek to avoid and minimise effects on potential receptors as far as is practicable. This could be by directional drilling under waterways to avoid impacts on their users, detailed routeing to avoid receptors within the corridors where possible, managing access for users of walking routes or PRowWs to avoid conflict with construction activities or diverting routes away from the construction works.

14.7.3 Further detail on measures to be taken forward will be provided in future environmental reporting.

## 14.8 Scope of the assessment

### Study Area

14.8.1 The Study Area includes the Scoping red line boundary, with any land uses within this which could be affected by the construction of the pipeline or by the land take associated with the HAGIs. In addition, a buffer of 1km around the HAGI search areas is also to be used. This represents the maximum extent that indirect amenity effects (as shown by the Study Areas in **Chapter 8: Landscape and Visual**, **Chapter 9: Air Quality and Chapter 10: Noise and Vibration**) could impact on Land Use users. The Study Area is shown on **Figure 14.2**.

14.8.2 The temporal scope of the Study Area would consist of the construction phase (expected to be around three years) and then the operational phase.

### Potential receptors

14.8.3 Potential Land Use receptors include:

- Tourism:
  - ▶ Tourist attractions such as museums, National Trust properties/land, and parks/gardens.
- Recreation:
  - ▶ designated cycle or walking routes (regional or national trails);
  - ▶ outdoor sports (golf courses, sports grounds);
  - ▶ country parks or nature reserves;
  - ▶ navigational rivers or canals; and
  - ▶ PRowW.
- Businesses:
  - ▶ caravan and camping parks; and
  - ▶ wedding venues.
- Minerals resources.

## Likely significant effects

14.8.4 The likely significant Land Use effects that will be taken forward for assessment in are summarised in **Table 14.2**.

**Table 14.2 Likely significant Land Use effects**

Activity	Effect	Receptor
<b>Construction</b>		
<b>Direct effects from land use required during construction activities.</b>	Receptors may lose land to the construction activities leading to a reduced tourism/recreational or commercial offer during this phase.	Tourist attractions, outdoor sports, country parks, nature reserves.
	Linear recreational routes (cycling/walking/waterways) could be severed leading to users not being able to follow the route.	Cycling and walking routes, public rights of way, navigational waterways.
<b>Indirect effects on amenity of users</b>	The effects from noise emissions, or on air quality or views, may impact on receptors away from the construction work area itself.	Tourism and recreational receptors.
<b>Operation</b>		
<b>Direct effects from land take</b>	Land take to accommodate HAGIs leading to a reduced tourism/recreational or commercial offer during this phase.	Tourist attractions, outdoor sports, country parks, nature reserves.
	Sterilisation of minerals resources where the pipeline runs through, or HAGIs are located in minerals safeguarding areas.	Minerals resources
<b>Indirect effects from HAGIs</b>	The effects from noise emissions, or on air quality or views, may impact on receptors away from the operational area itself.	Tourism and recreational receptors.

14.8.5 The effects scoped out from further assessment are:

- The direct effects on linear features such as national trails, cycle route of PRowWs during the operational phase are scoped out as all land from the pipeline route would be reinstated to its original condition on completion of the construction works. In addition, any permanent land take required for a HAGI which was to impact on a linear route would see a diversion of that route around the HAGI. Due to the proposed size of the HAGIs (assumed to be 1ha maximum) then it is considered that any diversion would not be substantial enough to create a significant effect.
- The effects on salt minerals resources are scoped out as the pipeline would not be laid at a depth, which would impact on these resources (salt is extracted at 120-250m depth).
- Effects arising during the decommissioning phase, as stated in **Chapter 2: The Project**, have been scoped out from detailed assessment.

## 14.9 Assessment methodology

14.9.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this land use chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the land use assessment in the ES.

14.9.2 The assessment will focus on the land use effects of the Project and will build on the information collected to date through further desk survey as necessary. This is to provide a full appreciation of any likely significant land use impacts of the Project.

14.9.3 The methodology adopted for the land use assessment will take into account feedback following scoping, and where relevant ongoing consultation and stakeholder engagement.

14.9.4 No quantitative impact assessment on tourism will be undertaken, with the assessment utilising available tourism data and published studies and applying professional judgement to reach conclusions. The assessment will provide a qualitative assessment of the effects on tourism, focussing on tourism related businesses that could be affected by the Project along with amenity impacts to tourism and recreation resources.

### Significance assessment methodology: direct and isolation effects

14.9.5 This methodology is relevant for direct effects (where the Project would directly encroach on a resource) and isolation effects (where the Project would prevent access to a resource such that its activity level is impacted). There is no definitive guidance on significance criteria for land use effects; as such the significance criteria identified has been proposed based on experience gained from other projects.

- 14.9.6 The significance of a land use effect will be determined by assessing the magnitude of the impact and the sensitivity of the receptor.
- 14.9.7 The magnitude of an impact represents its severity. Key factors when assessing magnitude include the extent (number of groups and/or people affected) and how the impact affects the receptor's ability to fulfil its original function. **Table 14.3** details the proposed criteria for assessing the impact magnitude.

**Table 14.3 Magnitude of effects**

Magnitude of Effects	Criteria
<b>High</b>	An impact that will be very adverse/beneficial and very likely to affect a large number of people or prevent the receptor from fulfilling its function.
<b>Medium</b>	An impact that will be adverse/beneficial and that is likely to affect a moderate number of people or partially prevent the receptor from fulfilling its function.
<b>Low</b>	An impact that will be adverse/beneficial and that it is likely to affect a small number of businesses and/or people or which have a limited effect on how the receptor fulfils its function.
<b>Negligible</b>	An impact that is anticipated to have a slight or no effect on the receptor.

- 14.9.8 The sensitivity of a receptor relates to its importance to tourists, recreational users or minerals supply, or to how much they will be affected by the land take or amenity effects to be generated by the Project. For example a local business that has a reliance on its outdoor setting (a petting zoo or a wedding venue) would be more sensitive than a local business that largely runs in an indoor venue (manufacturing companies or shops). **Table 14.4** details the proposed criteria for assessing receptor sensitivity.

**Table 14.4 Receptor sensitivity**

Receptor Sensitivity	Criteria
<b>High</b>	Businesses, individuals or groups who are at risk and that have little or no capacity to experience the impact without incurring a material loss (or gain).
	A recreational receptor which is considered nationally significant (e.g. National Trail).
	Existing or allocated minerals sites.

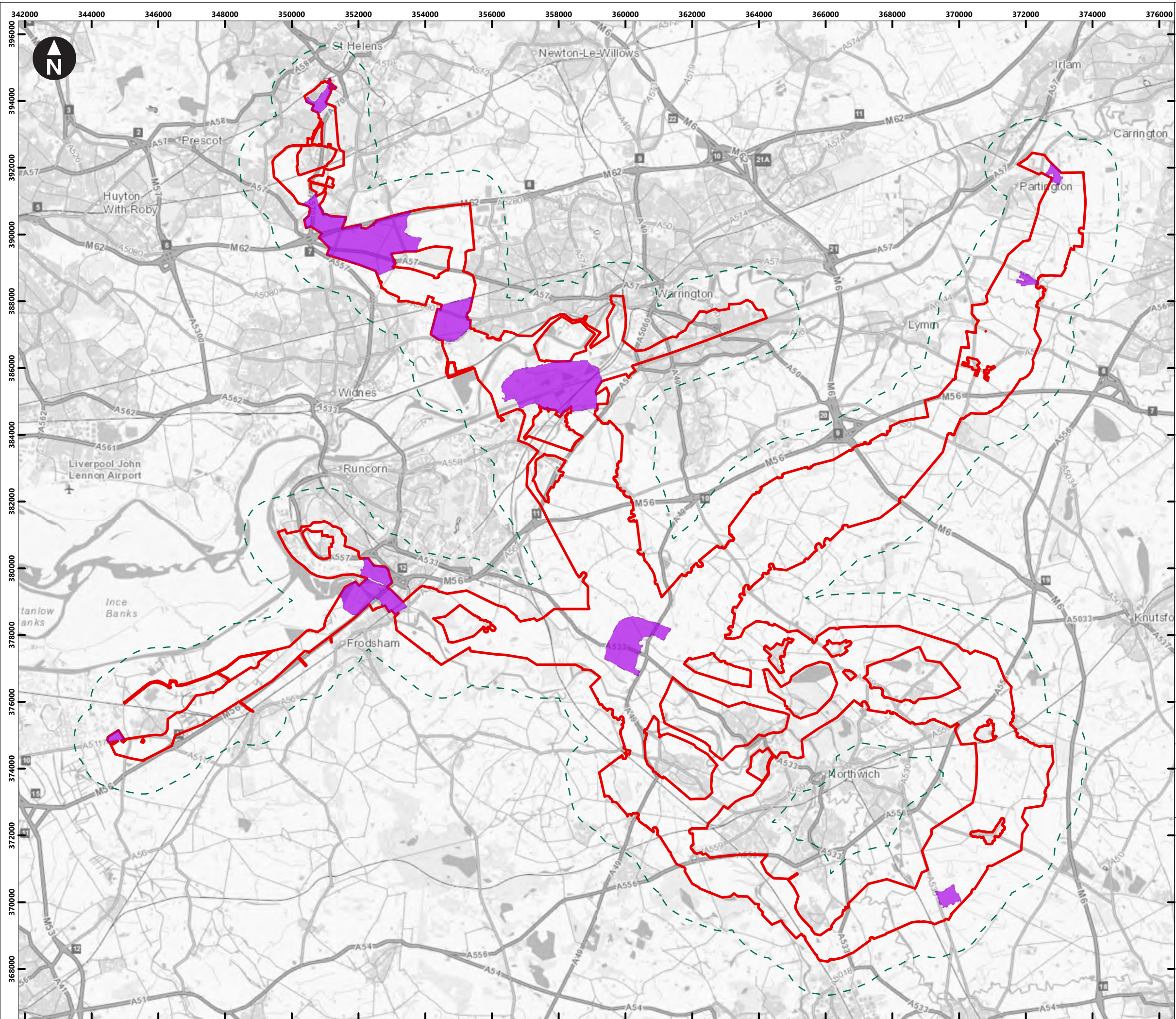
Receptor Sensitivity	Criteria
<b>Medium</b>	<p>Businesses, individuals or groups who are at risk and that have some capacity to experience the impact without incurring a material loss (or gain).</p> <p>A recreational receptor which is considered regionally significant (e.g. Regional Trail).</p> <p>Minerals safeguarding or consultation areas.</p>
<b>Low</b>	<p>Businesses, individuals or groups who are at risk and that generally have capacity to experience the impact without incurring a material loss (or gain).</p> <p>No minerals resources identified.</p> <p>A recreational receptor which is considered to be of local significant (e.g. public footpath or community centre).</p>

14.9.9 The significance of a Land Use effect is determined by combining both the magnitude of the impact and the sensitivity of the receptor. The proposed approach to determining significance is summarised in **Table 14.5**.




**Table 14.5 Determining significance**

Receptor Sensitivity	Impact Magnitude			
	High Impact	Medium Impact	Low Impact	Negligible Impact
<b>High</b>	Major adverse – significant	Major adverse – significant	Moderate adverse – potentially significant	Minor adverse – not significant
<b>Medium</b>	Major adverse – significant	Moderate adverse – potentially significant	Minor adverse – not significant	Negligible – not significant
<b>Low</b>	Moderate adverse – potentially significant	Minor adverse – not significant	Negligible – not significant	Negligible – not significant

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Key

-  Scoping boundary
-  HAGI search areas
-  Land Use study area

0 1 2 3 4 5 Kilometers

Scale at A3: 1:110,000

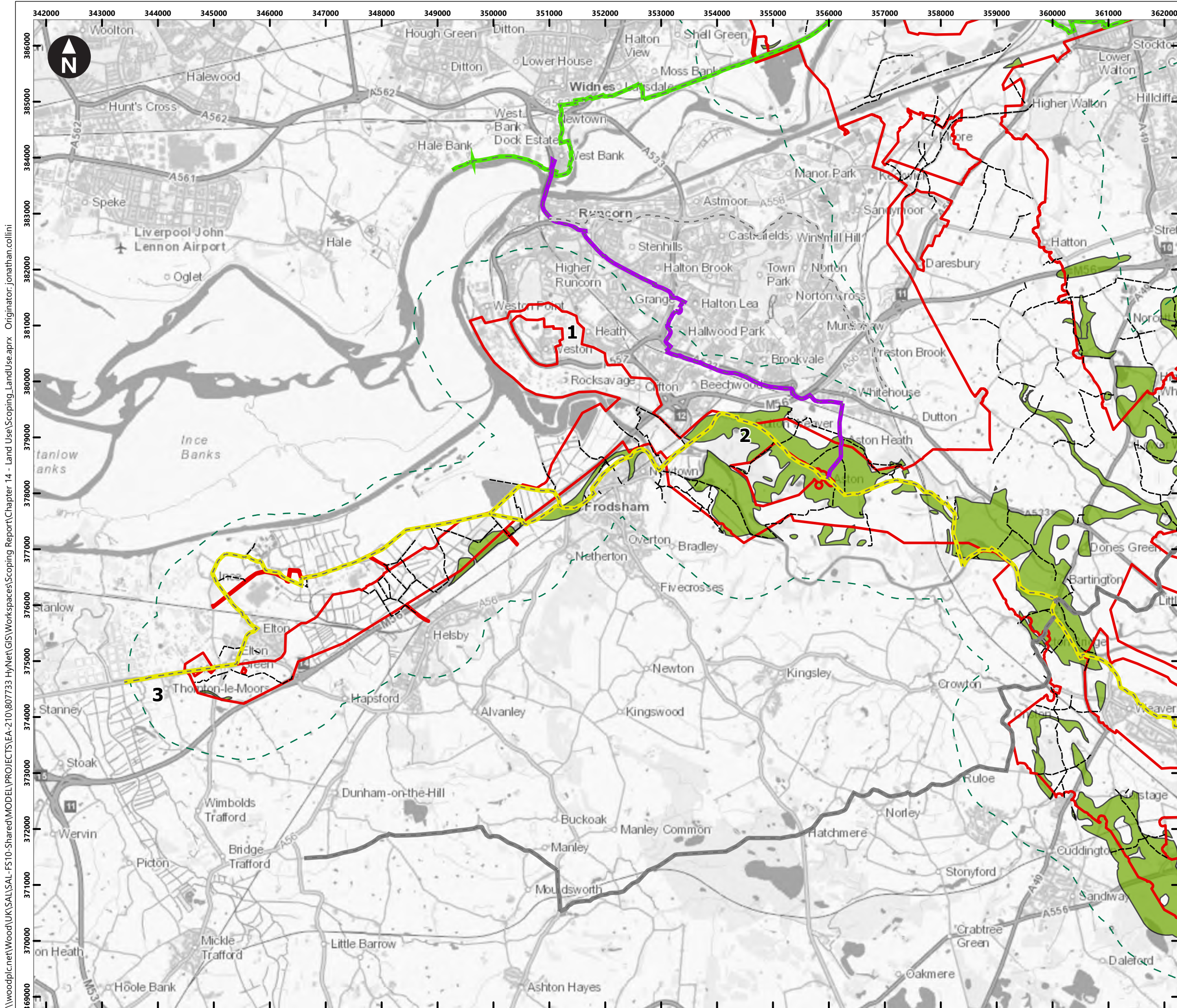
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**Figure 14.1**  
**Land Use Study Area**



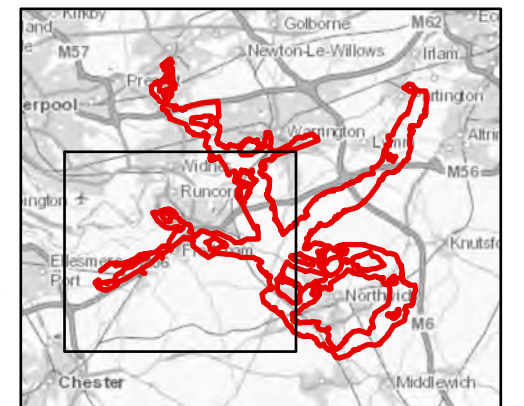
Key

- Scoping boundary
- Land Use study area
- Mineral safeguarding areas
- Public rights of way

**National and Regional Cycle Routes**

- 5
- 562
- 62
- 70
- 82

1 Runcorn Golf Club  
 2 Sutton Hall Golf Club  
 3 Gowy Meadows Nature Reserve



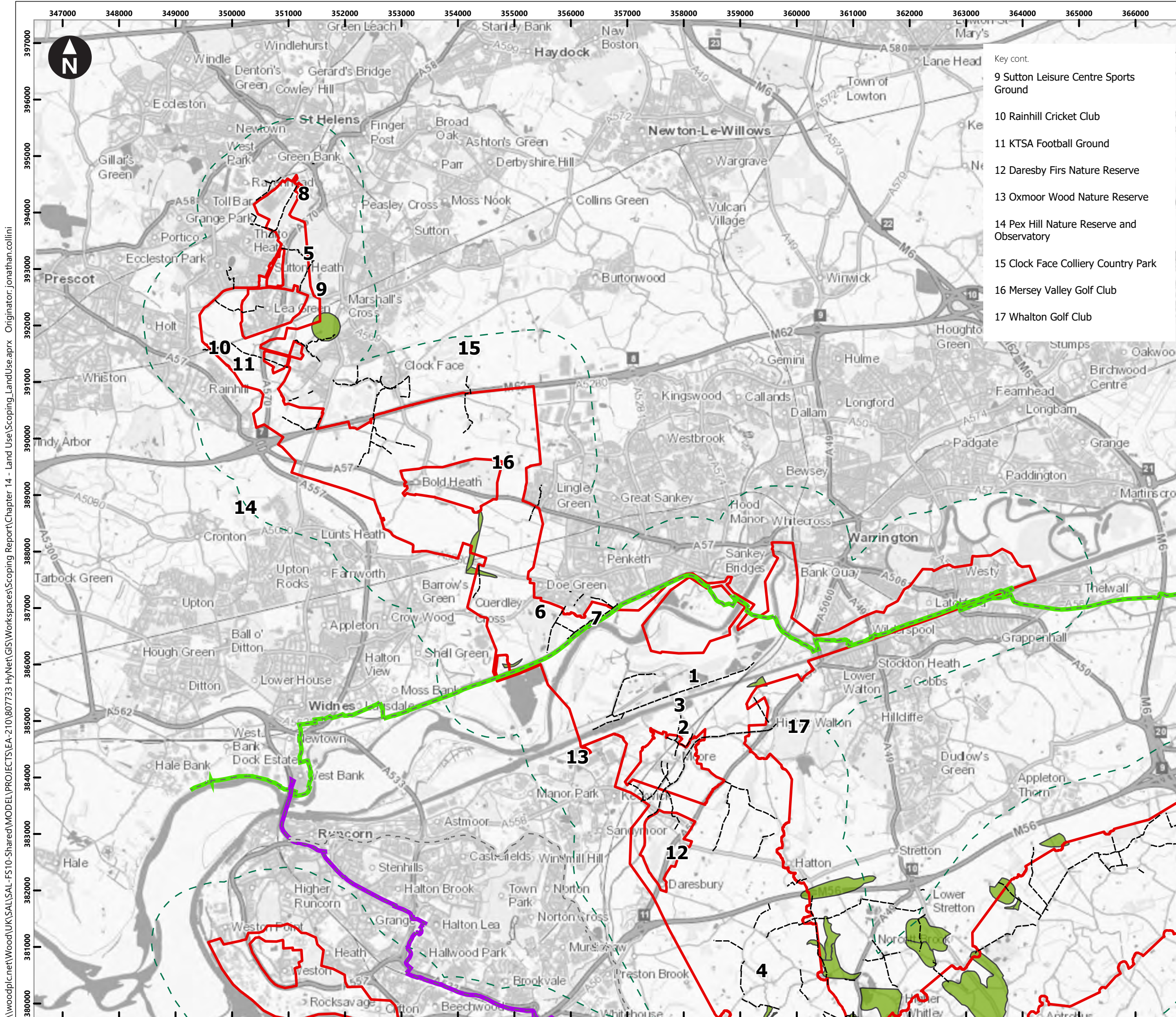
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**Figure 14.2**  
**Land Use baseline receptors**  
**Sheet 1: West**

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**Key**

- Scoping boundary
- Land Use study area
- Mineral safeguarding areas
- Public rights of way

**National and Regional Cycle Routes**

- 562
- 62
- 82

**Key cont.**

- 9 Sutton Leisure Centre Sports Ground
- 10 Rainhill Cricket Club
- 11 KTSA Football Ground
- 12 Daresby Firs Nature Reserve
- 13 Oxmoor Wood Nature Reserve
- 14 Pex Hill Nature Reserve and Observatory
- 15 Clock Face Colliery Country Park
- 16 Mersey Valley Golf Club
- 17 Walton Golf Club

1 Lapwing Lake / Moore Nature Reserve  
 2 Moore Rugby Union Club  
 3 Big Hands Riding School  
 4 Lewis Carol Birthplace Woodland  
 5 Sherdley Park Golf Club  
 6 True Fit Golf Club  
 7 Fidler's Ferry Sailing Club  
 8 Ravenhead / Thatto Heath Nature Reserve

0 1 2 3 Kilometers  
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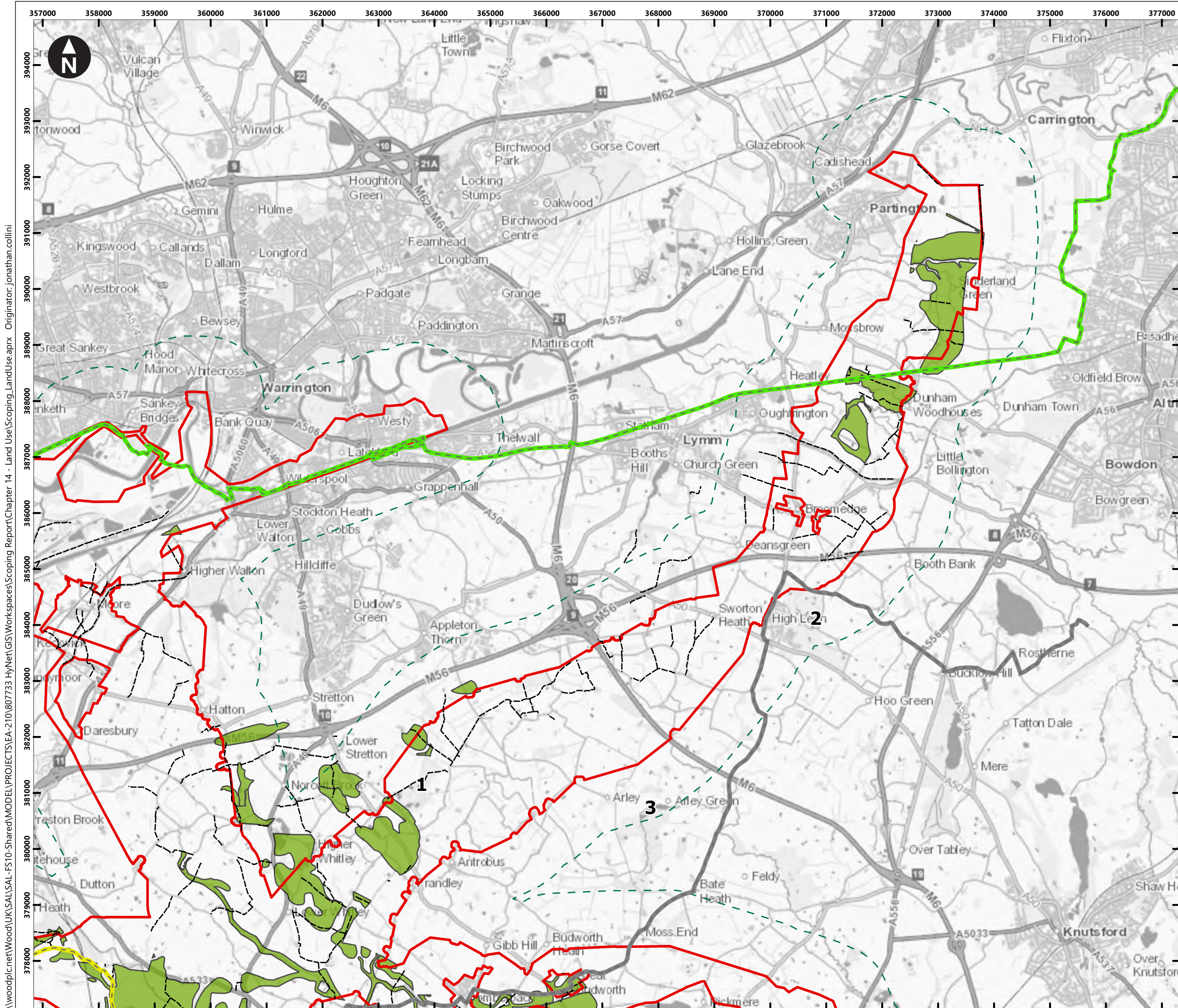
HyNet North West Hydrogen Pipeline Project  
 Scoping Report  
 Chapter 14 - Land Use

**Figure 14.2**  
**Land Use baseline receptors**  
**Sheet 2: North**

January 2022

**wood.**





Key

- Scoping boundary
- Land Use study area
- Mineral safeguarding areas
- Public rights of way

**National and Regional Cycle Routes**

- 5
- 62
- 70
- 82

1 Antrobus Golf  
 2 High Legh Golf Club  
 3 Arly Hall and Garden

0 1 2 3 Kilometers  
 Scale at A3: 1:65,000  
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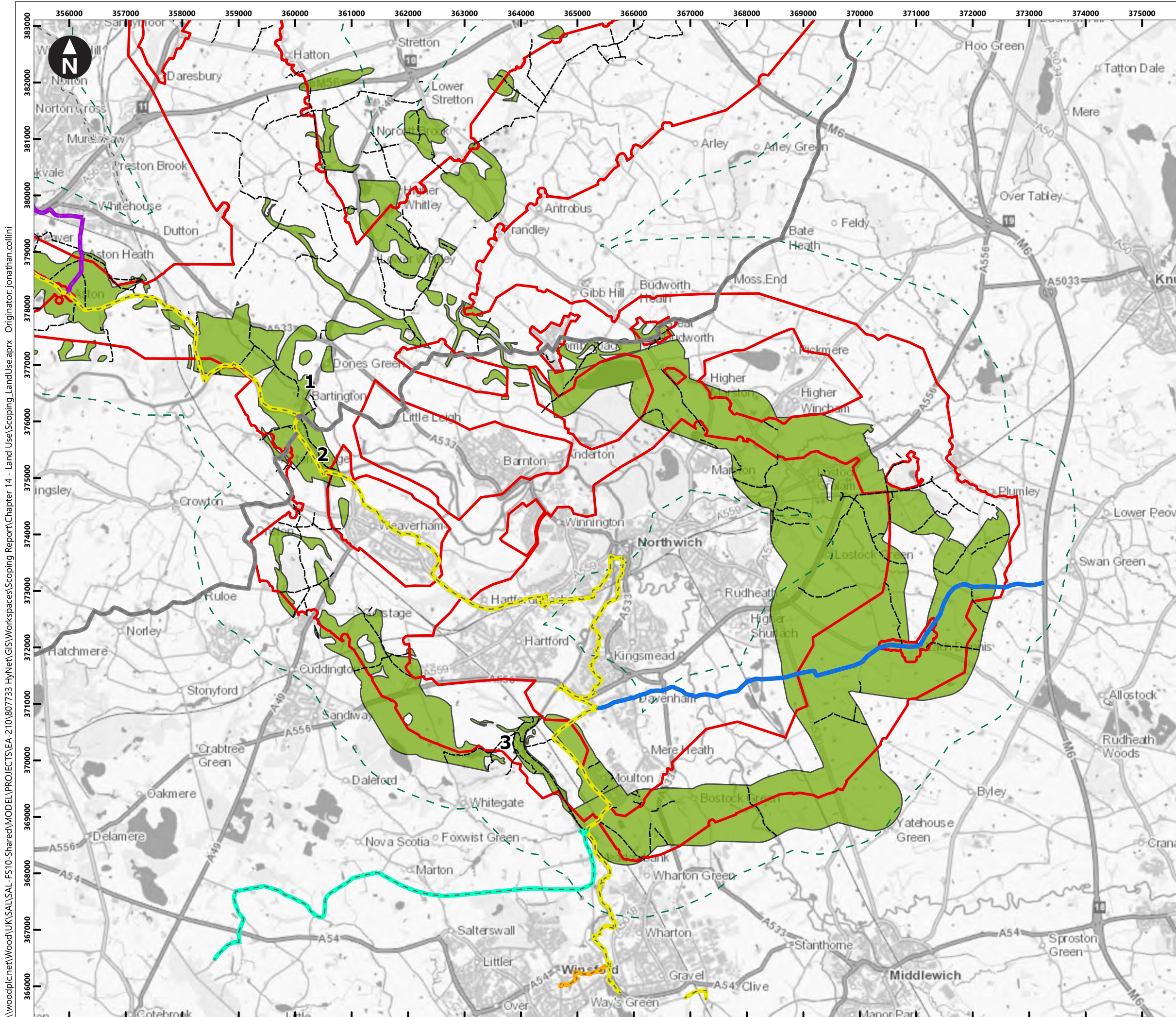
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 Scoping Report  
 Chapter 14 - Land Use

**Figure 14.2**  
**Land Use baseline receptors**  
**Sheet 3: East**

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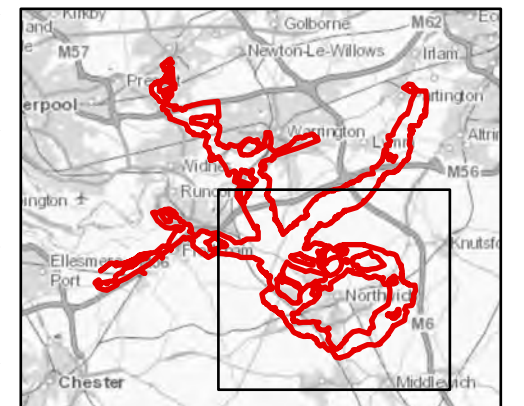
Key

- Scoping boundary
- Land Use study area
- Mineral safeguarding areas
- Public rights of way

**National and Regional Cycle Routes**

- 5
- 551
- 562
- 573
- 70
- 71
- 82

1 Watervale Caravan Park  
 2 Woodbine Caravan Park  
 3 Vale Royal Park and Golf Club



0 1 2 3 Kilometers  
 Scale at A3: 1:65,000  
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**Figure 14.2**  
**Land Use baseline receptors**  
**Sheet 4: South**

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# 15. People and Communities

## 15.1 Introduction

- 15.1.1 The People and Communities assessment will consider the likely significant effects on the social, economic and health aspects of individuals, communities and wider society that may arise from the construction and operation of the Project. This section of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the types of datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed.
- 15.1.2 The People and Communities topic interfaces with several other aspects and therefore, should be considered together with:
- **Chapter 7: Water Environment;**
  - **Chapter 8: Landscape and Visual;**
  - **Chapter 9: Air Quality;**
  - **Chapter 10: Noise and Vibration;**
  - **Chapter 11: Traffic and Transport;**
  - **Chapter 13: Agriculture and Soil Resources;**
  - **Chapter 14: Land Use;**
  - **Chapter 16: Major Accidents and Disasters; and**
  - **Chapter 17: Climate Change.**
- 15.1.3 The People and Communities topic covers a range of different types of effect. These more detailed effects are referred to in this chapter using the term “sub-topic”. The term “six local councils” is used to refer to the six councils which cover the Project area.

## Assumptions and limitations

- 15.1.4 Please refer to **Chapter 2: The Project** for the parameters on which this Scoping Report is based.
- 15.1.5 The details of the final design and the planned construction activities have the potential to be material in the determination of significant effects on people and communities and may also be material to the use of specific mitigating measures. The proposed assessment methodology is specified using a generic perspective which can accommodate a degree of expected change in line with ‘Rochdale Envelope’ perspectives and will be implemented as appropriate to the final preferred design, as set out in future environmental assessments.

- 15.1.6 The Project is part of an overarching project ('HyNet North West') which has an aggregate level of investment significantly greater than that of the Project alone. As a result, there is the potential for cumulative effects between parts of the overarching project with, for example, the needs for similar specialist skills relating to gas networks and the use of hydrogen leading to increased overall demand as well as increased industry expertise locally. Depending on the degree of potential cumulative effects (including those from other unrelated projects) the assessment of the impacts to people and communities from the Project may need specific focus on aspects such as labour markets, training needs, and use of transport and supply chains and, if so, this will be included in future environmental assessments.
- 15.1.7 The changes brought by the COVID-19 pandemic have both short and long term impacts and future potential impacts on the Project. The methodology will primarily work from datasets not influenced by current pandemic (such as those reported in or before 2020) and use them as a guide to the future, as though the pandemic had not occurred. Where datasets are used to compare regions, an assumption that COVID-19 affects them equally allows recent data to be used for both pre and post-COVID-19 assessment. An additional step to assess the effects of COVID-19 will be performed for sub-topics where these effects are considered to make a potentially significant difference.

## 15.2 Relevant legislation and technical guidance

- 15.2.1 Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

### Legislation

- 15.2.2 There are no specific guidelines or requirements for socio-economic assessments set out in any statutory or advisory guidance regarding the preparation of Environmental Impact Assessments (EIA). However, such assessments have an established practice of including a description of the direct socio-economic consequences of the effects on the environment as experienced by communities locally and, where appropriate, more widely. The method adopted is therefore one of determining the existing and future circumstances for these communities (the baseline) followed by the assessment of relevant topics and effects on individual receptors. The approach uses desk-based analysis, drawing on statistical information and professional judgment/opinion as well as relevant government and other guidance.

### Technical Guidance

- 15.2.3 A summary of the relevant technical guidance is provided in **Table 15.1**.

Table 15.1 Technical guidance relevant to people and communities

Technical Guidance Document	Context	Section considered
<b>The Green Book (and supplementary guidance) published by UK government<sup>366</sup></b>	Published by UK government's HM Treasury ministry, the set of advice in The Green Book provides a broad framework for how policies, programmes and projects in the UK should be appraised and evaluated to inform decision making. It sets out guidelines for how the economic and social effects of policy should be assessed. It contains advice on the scoping of costs and benefits to be included in assessment, the time period for assessment and the use of discount rates. It contains various supplementary guidance on specific assessment of environmental effects, for example of health, crime and air quality.	All sections reflect the general assessment principles in this guidance
<b>The Additionality Guide, published by UK government<sup>367</sup></b>	Provides more specific guidance on how to assess impact of a policy intervention (or a private sector investment) on the local, regional and national economy. Additionality is the " <i>extent to which something happens as a result of an intervention that would have not occurred in the absence of intervention.</i> "	All sections reflect the general assessment principles in this guidance
<b>The DCLG Appraisal Guide, published by UK government<sup>368</sup></b>	This is a guidance document provided by the Ministry of Levelling Up, Housing and Local Government (previously Department of, Communities and Local Government (DCLG) and Department of Housing, Communities and Local	All sections reflect the general assessment principles in this guidance

<sup>366</sup> HM Treasury (2018). The Green Book Central Government Guidance on Appraisal and Evaluation. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/938046/The\\_Green\\_Book\\_2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938046/The_Green_Book_2020.pdf) (Accessed December 2021).

<sup>367</sup> Homes & Communities Agency (2014). Additionality Guide Fourth Edition. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/378177/additionality\\_guide\\_2014\\_full.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf) (Accessed December 2021).

<sup>368</sup> Department of Communities and Local Government (2016). The DCLG Appraisal Guide. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/576427/161129\\_Appraisal\\_Guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576427/161129_Appraisal_Guidance.pdf) (Accessed December 2021).

Technical Guidance Document	Context	Section considered
	Government (DHCLG)) directed at Government economists in their assessment of economic appraisal of development proposals, including housing and other commercial development. Whilst not aimed at socio-economic assessment in EIA which does not involve cost benefit analysis calculations or assessing value for money, it contains relevant technical guidance for socio-economic impact assessment and links to data sources.	
<b>Guidance produced by the United Kingdom Public Health England: Health and Environmental Impact Assessment: A Briefing for Public Health Teams in England<sup>369</sup> (2017)</b>	This guidance is targeted towards national and regional public authorities in the assessment of future policies and plans, although it does still contain useful guidance that can be applied to a development project.	All sections reflect the general assessment principles in this guidance
<b>Glasson, J, Socio-economic impacts 1: economic impacts<sup>370</sup> (2009)</b>	This source of socio-economic guidance is from the practitioners' established general reference for Environmental Impact Assessment.	All sections reflect the general assessment principles in this guidance
<b>International Association for Impact Assessment: Social Impact Assessment: Guidance for Assessing and</b>	The guidance provides a thorough source of detailed methodologies for conducting activities supporting social assessment particularly those for identifying and representing community issues and assessing methods of resolution.	All sections reflect the general assessment principles in this guidance.

<sup>369</sup> Public Health England (2017). Health and Environmental Impact Assessment: A Briefing for Public Health Teams in England. (Online) Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/629207/Health\\_and\\_environmental\\_impact\\_assessment.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/629207/Health_and_environmental_impact_assessment.pdf) (Accessed December 2021).

<sup>370</sup> Glasson, J (2009). Methods of Environmental and Social Impact Assessment 4<sup>th</sup> Edition pp.475-514: Socio-economic impacts 1: Overview and economic impacts. Routledge; Oxfordshire, UK.

Technical Guidance Document	Context	Section considered
<b>Managing the Social Impacts of Projects</b> <sup>371</sup>		
<b>The World Health Organization Health Impact Assessment guidance, tools and methods</b> <sup>372</sup>	The guidance, tools and methods are recognised as the leading international authority on the completion of human health impact assessments. The guidance covers a number of topic areas that are linked to health impacts from projects, including transport, housing, water and sanitation.	All sections reflect the general assessment principles in this guidance related to health.
<b>International Union for the Conservation of Nature: Social Impact Assessment in Environmental &amp; Social Management System</b> <sup>373</sup>	The guidance provides a succinct summary of the key elements in assessment as well as supplementary guidance focusing on the context and use of natural resources.	All sections reflect the general assessment principles in this guidance
<b>United Nations Environment Programme: EIA Training Resource Manual</b> <sup>374</sup>	A well-established and extensive resource with a range of guidance on many elements of EIA implementation.	All sections reflect the general assessment principles in this guidance
<b>Design Manual for Roads and Bridges, Population and Human</b>	The methodology specified in this guidance is generally applicable to a range of aspects of linear infrastructure including pipeline networks.	All sections reflect the general assessment principles in this

<sup>371</sup> International Association for Impact Assessment (2015). Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects. (Online) Available at: [https://www.iaia.org/uploads/pdf/SIA\\_Guidance\\_Document\\_IAIA.pdf](https://www.iaia.org/uploads/pdf/SIA_Guidance_Document_IAIA.pdf) (Accessed December 2021).

<sup>372</sup> World Health Organisation (2021). Health impact assessment (HIA) tools and methods. (Online) Available at: <https://www.who.int/teams/environment-climate-change-and-health/air-quality-and-health/hia-tools-and-methods> (Accessed December 2021).

<sup>373</sup> International Union for the Conservation of Nature (2016). Environmental & Social Management System: Social Impact Assessment (SIA). (Online) Available at: [https://www.iucn.org/sites/dev/files/iucn\\_esms\\_sia\\_guidance\\_note.pdf](https://www.iucn.org/sites/dev/files/iucn_esms_sia_guidance_note.pdf) (December 2021).

<sup>374</sup> United Nations Environment Programme (2002). Environmental Impact Assessment Training Resource Manual. 2<sup>nd</sup> Edition. (Online) Available at: [https://wedocs.unep.org/bitstream/handle/20.500.11822/26503/EIA\\_Training\\_Resource\\_Manual.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/26503/EIA_Training_Resource_Manual.pdf?sequence=1&isAllowed=y) (Accessed December 2021).

Technical Guidance Document	Context	Section considered
Health (LA112), Highways England <sup>375</sup>		guidance related to disruption on land types affected directly by the Project.

## 15.3 Consultation

15.3.1 No consultation regarding People and Communities has been carried out to date, however engagement (through both informal and statutory consultation) focussing on effects on People and Communities will be undertaken and recorded throughout the pre-application stages of the Project with the relevant consultees.

## 15.4 Baseline Conditions

15.4.1 The basis for identification of the Study Area is defined in **Section 15.6: Scope of the assessment**. The Study Area for each type of effect is defined by their individual characteristics. The Project extent occurs across a wide geographic area and in order to provide a general context applicable to many effects at both a wide and detailed level, the baseline conditions have been assessed with reference to the six local councils it affects:

- Cheshire West and Chester Council;
- Cheshire East Council;
- Halton Borough Council;
- Warrington Borough Council;
- Trafford Council; and
- St. Helens Council.

### Data gathering methodology

15.4.2 The data used in the scoping assessment was obtained from the UK Government Office of National Statistics (ONS) and the dataset names are referenced below the tables. Where the latest data is used, it is assumed to reflect present circumstances.

15.4.3 High level-information was used to characterise the Project, primarily the general extent of the potential network, the types of land and infrastructure that may be

<sup>375</sup> Highways England (2020). LA 112 Population and human health. Revision 1. (Online) Available at: <https://www.standardsforhighways.co.uk/prod/attachments/1e13d6ac-755e-4d60-9735-f976bf64580a?inline=true> (Accessed December 2021).



affected by Project activities, and knowledge of the proposed construction methods. The methodology was developed in order to identify the likely significant effects allowing for alternative possible routes.

## Further information sources

- 15.4.4 Further information on baseline conditions to supplement those in this chapter shall be derived from a combination of:
- Publicly available documents and information which shall be accurately referenced;
  - Where applicable, relevant information from other topic chapters, including survey material, mapping information and physical monitoring data;
  - Information about the Project including routes, construction methods, workforce requirements and purchasing plans; and
  - Information supporting the estimation of effects including evidence from relevant similar developments.

## Current baseline

### Demography

- 15.4.5 The population across the six local councils was almost 1.5m people in 2020, amounting to 2.7% of the population of England. The largest of the six was Cheshire East (25.9%), with Cheshire West and Chester only slightly smaller (23.1%) The other four councils made up the remaining half of the population with Halton the smallest (8.8%) having approximately 130,000 residents. See **Table 15.2**.

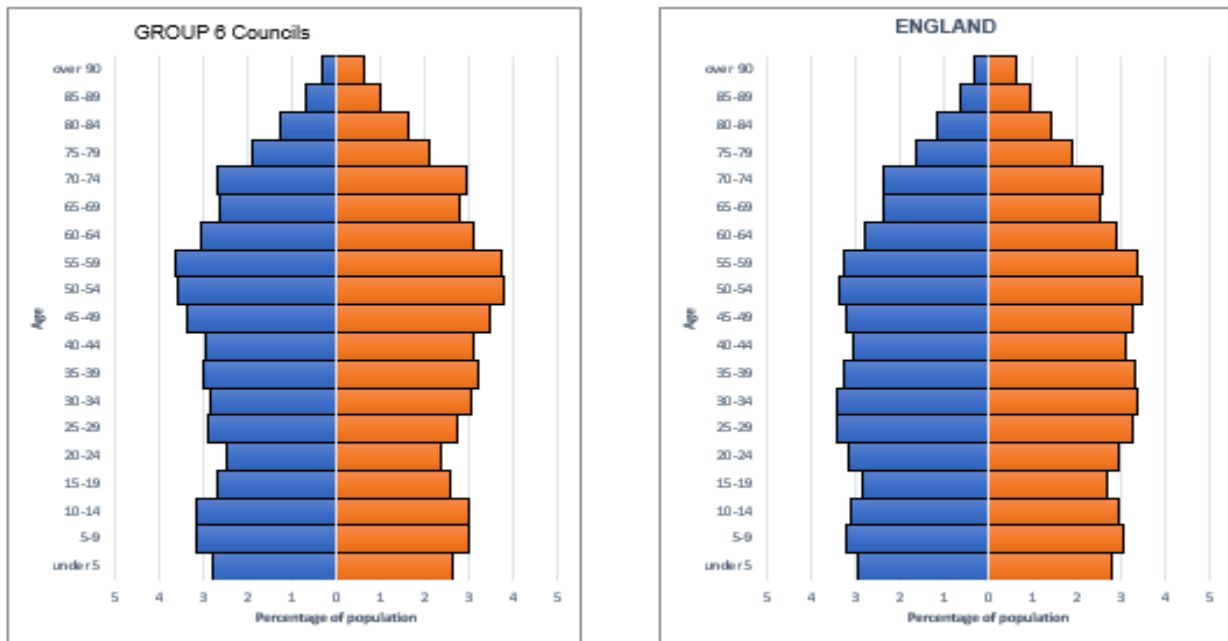
**Table 15.2 Population of six local councils in 2020 (total)**

Council	Population	Share
Cheshire West and Chester	343,823	23.1%
Cheshire East	386,667	25.9%
Halton	129,759	8.8%
Warrington	209,397	14.1%
Trafford	237,579	15.8%
St. Helens	181,095	12.3%
<b>Total</b>	<b>1,488,320</b>	<b>100.0%</b>

Source: ONS: Population estimates for UK, England and Wales, Scotland and Northern Ireland<sup>376</sup>

15.4.6 The age distribution of the population in the six local councils differs from that in England in showing a slightly older population on average. In the six local councils 59% of the population are under 50 compared with 62% in England. See **Figure 15.1** for further details.

**Figure 15.1 Population distribution in six local councils (total) and England in 2020 - % of total population**

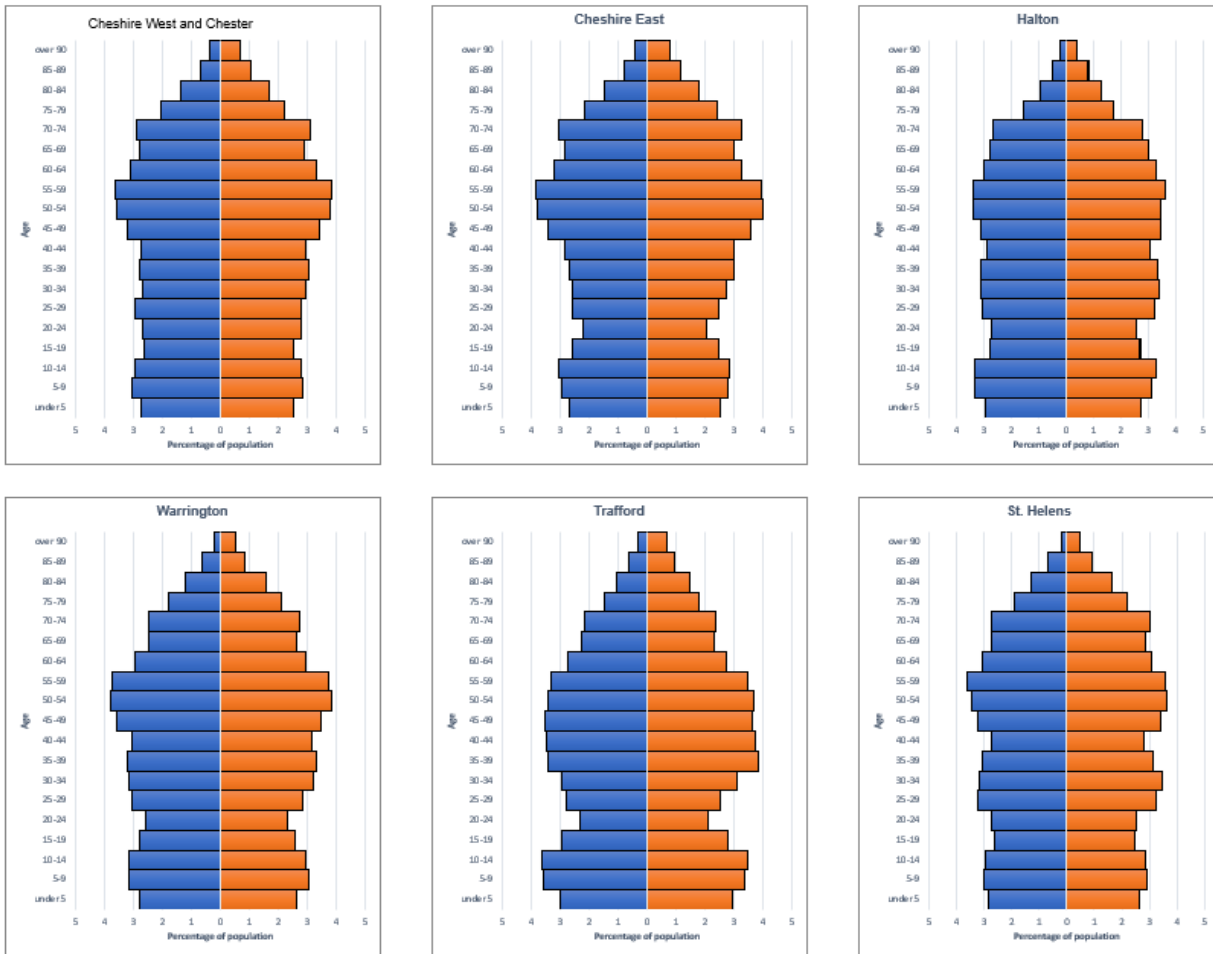


Source: ONS: Population estimates for UK, England and Wales, Scotland and Northern Ireland<sup>376</sup>

15.4.7 The age distribution for the six local councils individually shows more marked differences. The majority of the older population are in the two Cheshire councils where the population under 50 is 57.1% and 55.0% in the west and east respectively. In Trafford the proportion under 50 (63.2%) exceeds the value for England and the next highest proportion is in Halton (61.3%) with Warrington at 59.9% and St Helens at 59.0% (See **Figure 15.2**).

<sup>376</sup> Office for National Statistics (2021). Population estimates for the UK, England and Wales, Scotland and Northern Ireland: mid-2020. (Online) Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2020> (Accessed December 2021).

**Figure 15.2 Population distribution in individual six local councils - % of total population**



Source: ONS: Population estimates for UK, England and Wales, Scotland and Northern Ireland<sup>376</sup>

**Employment**

15.4.8 The population of working age is lowest in the two Cheshire councils, as expected from the population data. However, in none of the councils does the proportion of 16-64 year olds reach that of England though the values are in general close to the levels in England and also close to those for the North West<sup>377</sup>. Warrington and Halton show the highest proportion amongst the six local councils (See **Table 15.3**).

<sup>377</sup> North West England (ONS code E12000002) is one of nine official regions of England and consists of the administrative counties of Cheshire, Cumbria, Greater Manchester, Lancashire and Merseyside.

Table 15.3 Population of working age (16-64) in 2020 - % of total population

	Cheshire (W)	Cheshire (E)	Halton	Warrington	Trafford	St. Helens	North West	England
<b>All</b>	60.2	59	61.4	62	61.2	61.1	62.1	62.3
<b>Male</b>	60.2	59.3	61.3	62.9	61.6	61.7	62.6	63
<b>Female</b>	60.2	58.6	61.5	61.2	60.8	60.5	61.5	61.6

Notes: *Cheshire West and Chester* and *Cheshire East* are titled Cheshire (W) and Cheshire (E) respectively.

Source: ONS - Population estimates - local authority based by five-year age band<sup>376</sup>.

15.4.9

Despite the smaller working age population in Cheshire West and Chester, the area shows the highest percentage (83.6%) who are economically active, above the national level (78.8%) and with the lowest across the six local councils being in Halton (75.3%) (See **Table 15.4**). The proportion of people in employment across the six local councils is equally spread with three councils above the national average and three below. The proportion in the North West (73.1%) as a whole is slightly lower than for England (74.7%). Cheshire (81.1%) and Warrington (78.3%) show the highest values and Halton (72.5%) and St Helens (72.1%) the lowest. For the self-employed Halton is unique in showing a much lower proportion (3.6%) compared the other six local councils (lowest is 7.0%) and compared to the national average of 9.6%. Unemployment is below both the national average and the average for the North West and the lowest is in Cheshire West and Chester (3.4%).

Table 15.4 Employment status for working age population (16-64) (2020-2021) (%)

	Cheshire (W)	Cheshire (E)	Halton	Warrington	Trafford	St. Helens	North West	England
<b>Economically Active</b>	83.6	76.3	75.3	81.2	81.2	75.9	77	78.8
<b>In Employment</b>	81.1	72.5	72.5	78.3	76.2	72.1	73.1	74.7
<b>Employees</b>	71	62.6	68.7	70	65.5	65.1	64.6	64.9
<b>Self Employed</b>	9.4	9.7	3.6	8.3	10.4	7	8.3	9.6
<b>Unemployed *</b>	3.4	4.1	4.4	3.8	4.4	4.2	4.9	5.1

Notes: \* values are proportion of those economically active and over 16; *Cheshire West and Chester* and *Cheshire East* are titled Cheshire (W) and Cheshire (E) respectively.

Source: ONS - annual population survey<sup>378</sup>

<sup>378</sup> Office for National Statistics, Social Survey Division. (2021). Annual Population Survey, January - December, 2020.(data collection). 4th Edition. (Online) Available at: <https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=8789> (Accessed December 2021).

15.4.10

As a whole the balance of occupations in the North West is close to the national average with the difference between them in any of the nine occupational categories varying by less than 1.5% (See **Table 15.5**). Differences at the level of individual councils are nuanced with a slight bias towards skilled trades and technical workers in Halton, east Cheshire, and St Helens and towards managerial and professional grades in west Cheshire and Trafford - though the mixed picture is shown by east Cheshire having the highest proportion of Managers (16.4%) compared to the national level of 11.2%. Elementary occupations are also highest in Halton, east Cheshire and St Helens, all above 11% compared to the national average of 9%. Warrington is very close to the average for the North West with the differences exceeding 2% in only two occupational categories.

Table 15.5 Employment by occupation (2020-2021) (%)

Occupation	Cheshire (W)	Cheshire (E)	Halton	Warrington	Trafford	St. Helens	North West	England
<b>1 Managers, Directors And Senior Officials</b>	13.8	16.4	8.7	10.6	13.5	10.5	10.2	11.2
<b>2 Professional Occupations</b>	25.1	21.5	18.2	22.7	32.6	21.4	22.2	23.4
<b>3 Associate Professional &amp; Technical</b>	12	12.4	11.9	16.7	15.4	13.2	14.7	15.6
<b>4 Administrative &amp; Secretarial</b>	9.9	12.3	13.8	10.5	8.7	8.8	10.6	10.3
<b>5 Skilled Trades Occupations</b>	10.3	7.5	8.4	6	4	11.2	8.8	8.9
<b>6 Caring, Leisure And Other Service Occupations</b>	8.1	7.4	9.2	9.2	6.3	8.4	8.7	8.9
<b>7 Sales And Customer Service Occs</b>	7.7	7	9.5	7.3	9.5	7.3	8	7
<b>8 Process Plant &amp; Machine Operatives</b>	6.8	4.2	8.1	6.3	*	7.2	6.3	5.5
<b>9 Elementary Occupations</b>	6.1	11.3	11.7	10.6	8.2	11.4	10.2	9
<b>Total</b>	<b>99.8</b>	<b>100</b>	<b>99.5</b>	<b>99.9</b>	<b>98.2</b>	<b>99.4</b>	<b>99.7</b>	<b>99.8</b>

Notes: \* Sample size too small for reliable estimate; *Cheshire West and Chester* and *Cheshire East* are titled Cheshire (W) and Cheshire (E) respectively; Totals are quoted as provided in the source and reflect the underlying statistical approaches applied by ONS.

Source: ONS - annual population survey<sup>378</sup>



## Education

15.4.11 The general picture is of a population with educational qualifications close to or above the national average at a level of NVQ1 and above, but a reduction compared to the national average at higher levels (see **Table 15.6**). At a level of NVQ2 and above, all councils have a proportion of the population that exceed the national average proportion except Halton. At NVQ3 level, three councils (west and east Cheshire and Trafford) exceed the national average proportion and at NVQ4, just west Cheshire and Trafford exceed the national average. In three councils (east Cheshire, Trafford and Warrington) the proportion of the population with no qualifications is lower than the national average.

Table 15.6 Educational qualifications (2020) (% of resident population aged 16-64)

Qualification	Cheshire (W)	Cheshire (E)	Halton	Warrington	Trafford	St. Helens	North West	England
<b>NVQ4 And Above</b>	45.4	41.2	31.1	42	51.3	36.1	38.6	42.8
<b>NVQ3 And Above</b>	65.9	65.4	50.9	58.9	66.5	56.8	57.9	61.2
<b>NVQ2 And Above</b>	82.7	84.6	73.4	79.5	82.6	78.6	76.6	78
<b>NVQ1 And Above</b>	91.8	93.2	86.1	89.6	91.6	87.8	87.2	87.9
<b>Other Qualifications</b>	*	*	5.3	5.7	4.1	4.5	5.1	5.9
<b>No Qualifications</b>	6.5	4.5	8.6	4.7	4.3	7.7	7.6	6.2

Note: \* Sample size too small for reliable estimate

Source: ONS - annual population survey<sup>378</sup>

## Earnings

15.4.12 Levels of pay in the North West are consistently about 10% lower than in England for jobs paid annually, weekly or hourly (see **Table 15.7**). The same table indicates that the earnings structure is otherwise very similar in the North West, in England and in the UK. Jobs paid annually show the widest difference between male and female salaries, being 118% and 83% respectively of the average in the North West. The discrepancy reduces slightly (117% and 83%) for jobs paid weekly and is more even for jobs paid hourly (106% and 93%).

Table 15.7 Employee Earnings in the UK 2019

	North West	England	UK	North West	England	UK
<b>Annual pay - Gross [£/year]</b>				<i>As % of England</i>		
<b>All</b>	28,605	32,054	31,447	89%	100%	98%
<b>Male</b>	33,759	38,676	37,817	87%	100%	98%
<b>Female</b>	23,608	25,278	25,066	93%	100%	99%
<b>Hourly pay - Gross [£/hour]</b>				<i>As % of England</i>		
<b>All</b>	16.64	18.24	17.97	91%	100%	99%
<b>Male</b>	17.64	19.62	19.26	90%	100%	98%
<b>Female</b>	15.44	16.51	16.39	94%	100%	99%
<b>Weekly pay - Gross [£/week]</b>				<i>As % of England</i>		
<b>All</b>	551	606	596	91%	100%	98%
<b>Male</b>	644	717	704	90%	100%	98%
<b>Female</b>	460	492	488	93%	100%	99%

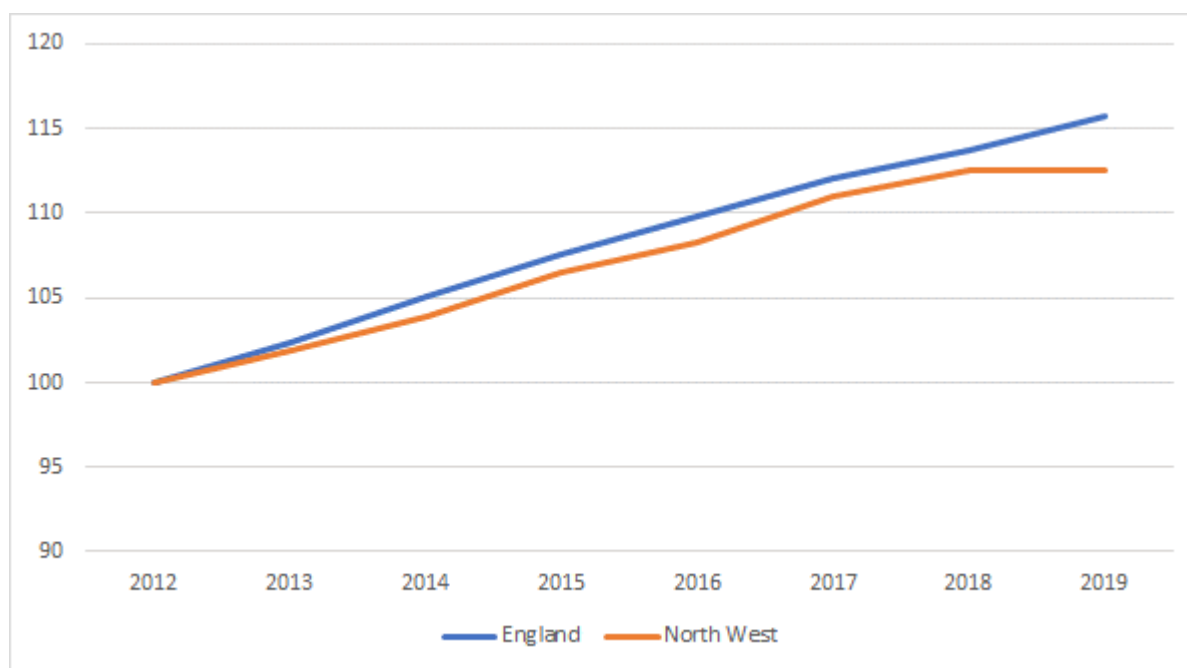
Source: ONS - Earnings and hours worked, place of work and residence by local authority: ASHE Tables 7 and 8<sup>379</sup>

<sup>379</sup> Office for National Statistics (2021). Earnings and hours worked, place of work and residence by local authority: ASHE Tables 7 and 8. (Online) Available at: <https://www.ons.gov.uk/datasets/ashe-tables-7-and-8> (Accessed December 2021).

## Economy & Business

15.4.13 The economies in the North West and England have recently grown at similar rate but over the period 2013-2019 are slightly lower on average in the North West (1.7%) than in England (2.1%) (see **Figure 15.3**). Each area has seen appreciable variation in yearly growth with a peak of 2.5% in the North West and 2.7% in England. The lowest growth rate in England is 1.5%, but in 2019 was slightly negative in the North West (-0.03%). Over the total period, the growth is 3% greater in England.

**Figure 15.3 GDP in England and the North West indexed to 2013**

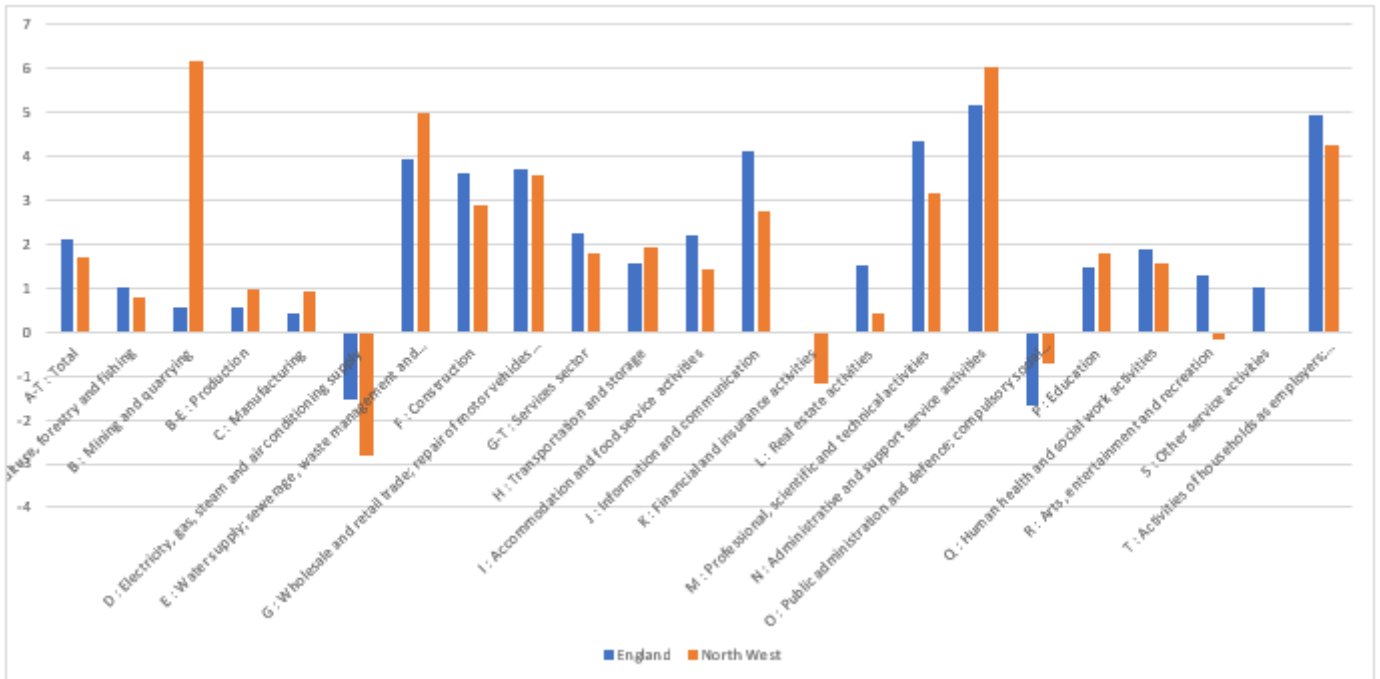


Source: ONS - Annual GDP for England, Wales and the English regions<sup>380</sup>

15.4.14 The differences in growth rate between the North West and England are only appreciable for some industry sectors (See **Figure 15.4**). The North West sees higher growth in: production and manufacturing (Sectors B-E), particularly mining and quarrying (Sector B); water and waste supply (E); and administration (N). The sectors with noticeably lower growth are: accommodation and food services (I); information and communication (J); finance and insurance (K); real estate (L); and arts, entertainment and recreation (R).

<sup>380</sup> Office for National Statistics (2021). Annual GDP for England, Wales and the English regions. (Online) Available at: <https://www.ons.gov.uk/datasets/regional-gdp-by-year/editions/time-series/versions/4> (Accessed December 2021).

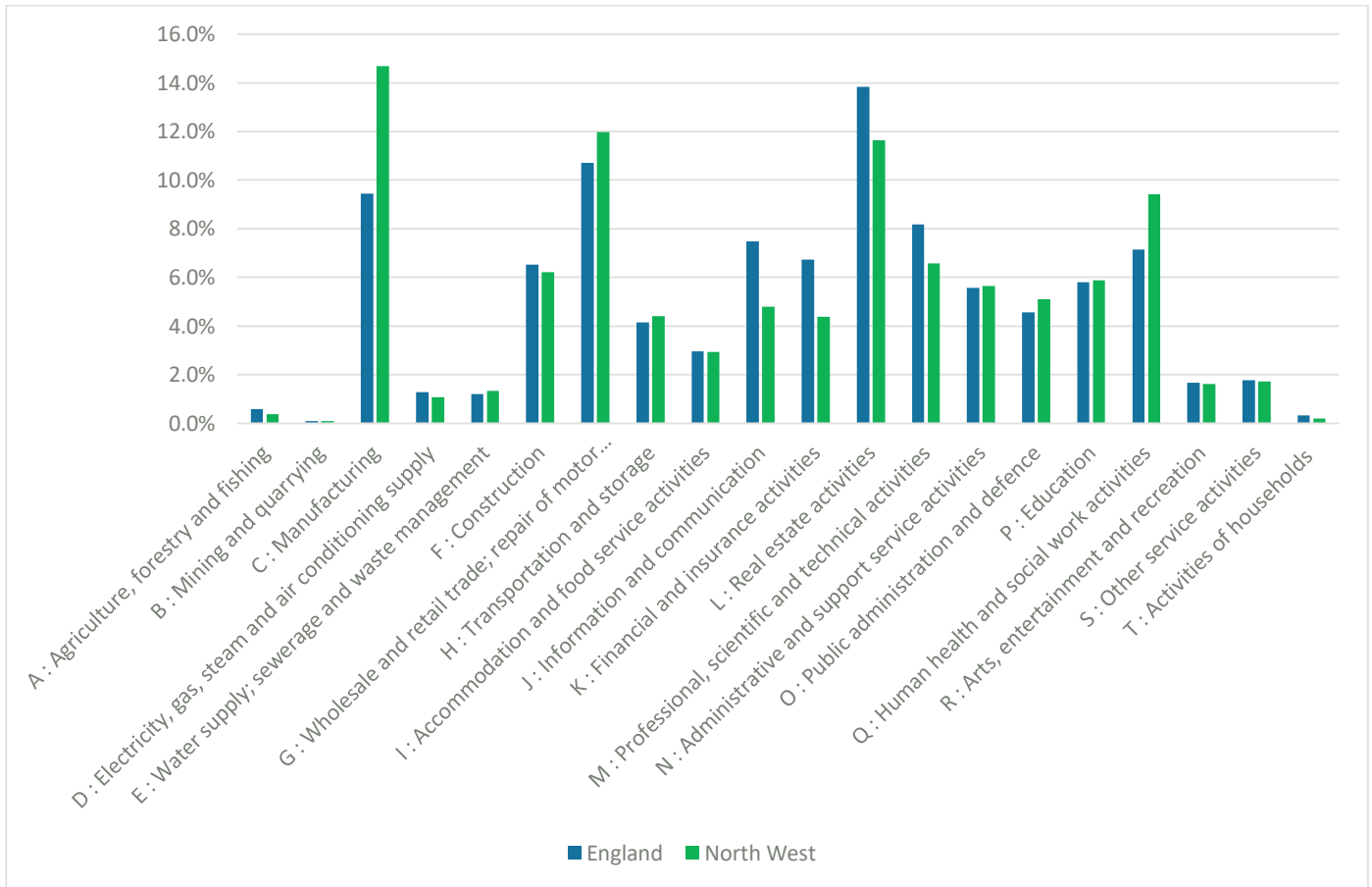
**Figure 15.4 Average annual growth by economic sector in the North West and England (2013-2019)**



Note: Industrial sectors are classified by Standard Industrial Classification.  
Source: ONS - Annual GDP for England, Wales and the English regions<sup>380</sup>

15.4.15 The North West accounts for some 11% of the Gross Value Added (GVA) in England and the structure of the economy as shown by the relative size of economic sectors is broadly similar in both (See **Figure 15.5**). The North West has an appreciably greater share of manufacturing (Sector C), 14.7% compared to 9.4% for England, and also exceeds the level in England in trade (G) and the health sector (Q) (although by a smaller margin). Sectors where the North West has noticeably lower GVA than in England are Information and communication (J), finance and insurance (K) and real estate (L).

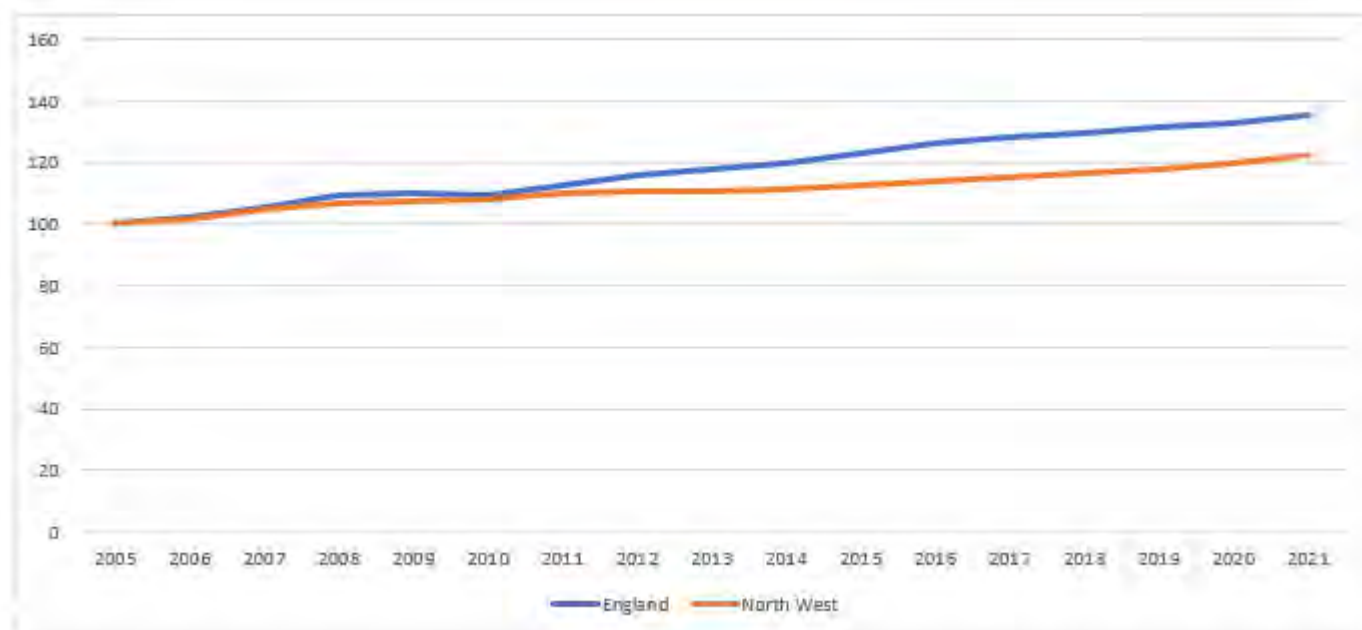
**Figure 15.5 Gross Value Added by economic sector in the North West and England as a proportion of totals (2019)**



Source: ONS - Regional gross value added (balanced) by industry<sup>381</sup>

15.4.16 The level of economic activity as reflected in private housing rental prices over the period from 2005 shows a level of change which broadly reflects the recent trend in GDP. The overall increase in rental prices in the North West over the period is approximately two thirds the increase in England.

<sup>381</sup> Office for National Statistics (2021). Regional gross value added (balanced) by industry: all ITL regions. (Online) Available at: <https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregionalgrossvalueaddedbalancedbyindustry> (Accessed December 2021).

**Figure 15.6 Private housing rental prices in England and the North West indexed to 2005**

Note: ONS refer to the dataset as “An experimental price index tracking the prices paid for renting property from private landlords in the United Kingdom”

Source: ONS - Index of Private Housing Rental Prices<sup>382</sup>

### Life Expectancy

15.4.17 Life expectancy provides a measure of general health. **Table 15.8** shows life expectancy in six local councils as a percentage of the value for England. For the group as a whole, life expectancy is lower than in England and reduces more for older age groups. For males, life expectancy is greater than in England in west and east Cheshire and Trafford for all age groups, but is lower in Halton, Warrington and St Helens. There is a similar pattern for females though west Cheshire falls below the average for England in age groups over 40.

<sup>382</sup> Office for National Statistics (2021). Index of Private Housing Rental Prices, UK Statistical bulletins. (Online) Available at: <https://www.ons.gov.uk/economy/inflationandpriceindices/bulletins/indexofprivatehousingrentalprices/previousReleases> (Accessed December 2021).



Table 15.8 Life Expectancy for six local councils by age group

Age Group (years)	% of Life Expectancy in England							England	Life Expectancy (years)
	Cheshire West and Chester	Cheshire East	Halton	Warrington	Trafford	St. Helens	All six local councils		
<b>Male</b>									
0-19	100%	101%	97%	99%	101%	97%	98%	100%	73.88
20-39	100%	102%	95%	99%	101%	96%	97%	100%	50.85
40-59	101%	102%	95%	98%	101%	95%	97%	100%	32.56
60-79	102%	103%	93%	95%	101%	94%	96%	100%	17.59
80+	104%	103%	89%	90%	105%	89%	96%	100%	7.83
<b>Female</b>									
0-19	100%	101%	98%	99%	101%	97%	98%	100%	77.47
20-39	100%	101%	97%	99%	101%	96%	98%	100%	54.07
40-59	99%	101%	96%	98%	101%	95%	97%	100%	35.42
60-79	99%	101%	95%	96%	102%	93%	96%	100%	19.30
80+	98%	100%	95%	92%	103%	91%	96%	100%	8.72

Note: Aggregation to age bands based on weighting by size of population

Source: ONS - Life Expectancy by Local Authority (data to 2019)<sup>383</sup>

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<sup>383</sup> Office for National Statistics (2020). Life Expectancy by Local Authority. (Online) Available at: <https://www.ons.gov.uk/datasets/life-expectancy-by-local-authority/editions/time-series/versions/1> (Accessed December 2021).

## Future baseline

15.4.18 The future baseline is expected to reflect current trends in socio-economic and health variables across the Study Area (as defined in **Section 15.6** below). In addition, local plans for individual borough councils may result in more significant but more localised changes which will be represented within the assessment to the extent that they affect sub-topics. For this scoping assessment, recent trends in the statistical sources disaggregated at the level of the six borough councils indicate that the current baseline can be assumed representative of the future baseline, subject to the potential effects of COVID-19 which may be addressed separately.

## 15.5 Embedded Environmental Measures

15.5.1 The Project will follow industry best practice approaches regarding all issues affecting People and Communities including promoting well-being for the workforce and suppliers. In addition, the Project will establish partnerships with local community organisations potentially in coordination with the wider HyNet North West project. Ongoing work by the Applicant is considering employment and training opportunities.

## 15.6 Scope of the assessment

### Study area

15.6.1 The Project requires construction and operational activities along wide corridors with a clearly defined Project boundary. These activities lead to direct and indirect socio-economic and health effects on people and communities within and outside the Project boundary.

15.6.2 An Area of Influence for a type of effect generated from the Project (including subcontracted activities) includes the geographic area where likely significant effects of bio-physical or social changes (such as air quality, or distances to accessible labour markets) may occur. This may make reference to the Project boundary and to other geographic areas relevant to project implementation, such as areas supporting temporary ancillary uses, nearby areas with infrastructure serving the project, commuting areas for the workforce and areas affected by transport of materials and equipment.

15.6.3 Each impact or topic area may have a different Area of Influence because they differ in:

- the times and locations of effects;
- the structure of indirect effects such as when changes to biodiversity or to ecosystem services causes subsequent effects on communities' dependent health and quality of life; and
- the structure of effects cumulative with those caused by other developments.

- 15.6.4 A practical approach reflecting the similarity of some types of impact will be used to limit the number of Areas of Influence used across the overall assessment and many will make reference to the four generic levels of increasing spatial extent around the Project specified below:
- The red line boundary of the Project.
  - A boundary 500m outside the red line boundary.
  - A wider extent covering effects which are local but sub-national, such as within the North West.
  - National extent.
- 15.6.5 The assessment will also reflect the geographic basis on which information is available. Lower Super Output Area (LSOA) level or wards are the most disaggregated levels at which publicly accessible government data is available.
- 15.6.6 A mismatch between Area of Influence and areas for which information is available is a source of uncertainty which will be assessed in circumstances where it may affect determination of significant effects and any such uncertainties will be made clear in future environmental assessments.
- 15.6.7 Where statistical information is required to be represented on another spatial basis, such as for reporting for defined areas, scaling methods will be used based on weightings such as by geographic area, by population density, and by travel times.
- 15.6.8 The 500m boundary reflects the guidance for linear transport infrastructure (LA112)<sup>375</sup> which provides a useful default reference in Great Britain. Roads are common linear developments with a range of precedents and use of associated guidance is likely to provide a conservative assessment as a pipeline would be expected to be less disruptive. LA112 indicates the generic types of effects to be assessed and provides indicative thresholds with a 500m boundary as a recommendation for an initial default
- 15.6.9 The wider and national scales of spatial extent are appropriate for effects which involve more dispersed people and communities. These include labour markets and supply chains at regional level as well as national decarbonisation objectives and international trade.

## Temporal scope

- 15.6.10 Socio-economic and health effects largely occur contemporaneous with the Project construction and operation phases and will be generally assumed not to demonstrate time-lags or anticipation (such as a prior increase in supply chain capacity or delayed health effects). Project construction proceeds in stages along the planned route. At each stage there will be effects of a similar type but on different groups of people and communities. The staged approach leads to significant mitigation of the potential effects as individual localities are not all affected at the same time.
- 15.6.11 The temporal scope used for assessing the construction phase will reflect the overall Project construction schedule and the stages of construction activity within

it. Each construction stage will be analysed in turn, referenced to their common context, using consistent characterisation of effects and assessment criteria. Construction stages on different corridors may be scheduled in parallel and if so will be assessed in combination, using approaches consistent with the cumulative effects assessment.

- 15.6.12 During the operational phase, all socio-economic and health effects will be related to the operation of the overall network and will occur at the same time. The temporal scope of the assessment will cover the overall expected period of operation and include anticipated changes to the baseline.

## Potential receptors

- 15.6.13 Receptors cover human populations broadly defined and may be characterised as individuals, groups, communities, business sectors, recreational groups or in a variety of ways depending on the type of impact. Receptors are identified reflecting their sensitivity and the magnitude of change to which they are exposed as a result of the Project. Receptors assessed as likely to experience significant effects are identified in **Table 15.9** and have been identified using considerations described in the **Section 15.7: Assessment Methodology** below.

## Likely significant effects

- 15.6.14 The likely significant effects on People and Communities that will be taken forward for assessment in the future environmental reporting are summarised in **Table 15.9**. Description of the methodologies relevant to their assessment is provided in **Section 15.7: Assessment Methodology**.

**Table 15.9 Likely significant people and communities effects**

Activity	Effect	Receptor
<b>Construction</b>		
<b>Use of land for construction sites, exclusion zones, laydown areas and access routes for construction works.</b>	Lack of or reduced access to land, services and amenities (such as agricultural land, public services and rights of way, recreational and health facilities).	Users of publicly and privately accessible land, services and amenities.
<b>Transport movements of plant, equipment, materials and workforce to construction sites.</b>	Disruption, including increased travel times and reduced access.	Users of transport infrastructure (e.g. roads).
<b>Air and water quality, noise effects from construction works and transport movements.</b>	Potential health impacts, inconvenience and nuisance.	Individuals and communities within the surrounding areas.

Activity	Effect	Receptor
<b>Employment of project workforce.</b>	Increased demand for directly-employed labour.	Local and wider labour markets.
<b>Investment expenditure</b>	Increased direct, indirect and induced expenditure in the economy, with associated increases in jobs and GVA.	Local, regional and national economy and employment markets.
<b>Purchase of specialist materials, equipment and services.</b>	Increased demand for output from industry and service sectors.	Suppliers of materials, equipment and services.
<b>Operation</b>		
<b>Decarbonisation</b>	The pipeline is a key part of the local system to deliver national decarbonisation targets.	Society; public and private sector organisations responsible for delivering decarbonisation. Environment Global community (See <b>Chapter 17: Climate Change</b> ).
<b>Cost-effective access to and use of hydrogen infrastructure.</b>	Users who demand or supply hydrogen will have a financial incentive to locate near the Project to reduce connection costs.	Landowners in the vicinity of the pipeline; users and producers of hydrogen.
<b>Change in land use</b>	Potential permanent loss of land for development of HAGIs together with restrictions or other influence on potential future land uses.	Existing and future landowners and developers; local authorities with statutory responsibility for planning.
<b>Increased regional and national capability in large scale hydrogen pipeline operations.</b>	Advanced technical and commercial knowledge of hydrogen pipeline development gained from training and project experience.	Commercial markets for hydrogen infrastructure development nationally and internationally.
<b>Perceptions of hydrogen safety</b>	Public concern leading to changes in public behaviour with possible effects on use and value of amenities and/or market prices.	General public

- 15.6.15 The effects scoped out from further assessment in future environmental reporting are discussed below.

### *In the operation phase*

- 15.6.16 *Employment effects under normal operation of the pipeline.* The workforce that must be physically in attendance locally is small compared to the size of local employment markets. Where remote working is in operation, effects will be small compared to wider regional or national employment markets and are also likely to be geographically distributed. This leads to effects which are expected to be of low magnitude and affect receptors (employment markets) with low sensitivity.

### *In construction and operation phases*

- 15.6.17 *Effects on mental health arising specifically from the use of hydrogen gas in the pipeline network.* The underlying basis for fear is limited and, while concern over safety is inherently rational, safety is an overriding priority for the Project and use of hydrogen is highly regulated (in a similar way to similar industries using hazardous technologies controlled to protect against potential harm). General public concern is scoped-in under 'Concern over hydrogen safety' (see above) and effects related to people and communities in the near vicinity of the Project will be identified and addressed through targeted communications and mitigation programmes (e.g. with landowners). For the wider public, general communication programmes in relation to the Project will provide a source of clear and objective information to increase knowledge and awareness. Additional levels of concern are considered likely to be rare and, while in practice the Project will work with health professionals as required on a case-by-case basis, the assessment of People and Communities will scope-out further mental health effects from general consideration.
- 15.6.18 *Effects on tourism.* The relatively large population in the area of the six councils has access to a range of recreational/ cultural amenities and facilities. The tourism offer in the region is based on use of the same recreational amenities and facilities, rather than on flagship destinations, and so will not lead to additional types of effects. As the area is not a primary tourist destination, magnitudes of effects additional to existing recreational effects are likely to be small. Furthermore baseline recreational information such as that based on surveys of all users will already include the use by tourists.
- 15.6.19 *Effects on individual economic sectors which do not directly supply the materials, equipment and services required by the Project.* While these sectors may see increased demand from indirect purchases, the effects will be assessed as part of the overall effects on the regional economy, and not broken down by individual sectors.
- 15.6.20 *Transboundary effects* are effects on socio-economic and health receptors which extend beyond national borders. A possible transboundary effect is increased demand for skilled labour from Ireland, but the size of the local labour market is likely to dwarf such effects. No transboundary effects are proposed to be included.

15.6.21 *Effects on social cohesion.* The workforce is not expected, as a whole, to be of a sufficiently different nature so as to lead to issues of social cohesion.

## 15.7 Assessment methodology

15.7.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4**, and specifically in Section 4.3. However, whilst this has informed the approach that has been used in this People and Communities chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the People and Communities assessment in the ES.

15.7.2 The socio-economic and health impact assessment of People and Communities is the systematic analysis of the effects of the Project on society resulting from changes to the circumstances in the environment of affected populations. The assessment has the objective of structuring both the analysis and the underlying information for decision-making within an overall aim of identifying the consequences from all types of effects on all participants in society. Both beneficial and adverse effects are assessed together with measures providing associated embedded or additional enhancement or mitigation, including those described in **Section 15.5: Embedded Environmental Measures**.

15.7.3 The basis of good practice in socio-economic assessment is commonly understood to be the implementation of a structured approach to answering the types of questions that arise from an overarching and general concern with people and communities in society. Questions are potentially wide-ranging and include those that individuals from any background might themselves raise due to direct effects on themselves or on people of concern to them.

15.7.4 Examples of the types of questions that an assessment aims to answer are:

- Will the Project result in material changes to the local, regional, or national demography, economy, economic sectors, employment opportunities or community characteristics, amenities and facilities?
- Will a small number of people be affected in a significant way (changes to freedom of movement, employment prospects, amenity) or will significant numbers of people be affected?
- Will people be affected over a long timescale?
- Will there be involuntary displacement of people and businesses?
- Will the Project result in a change similar to or larger than that experienced in the area over a similar time period in the past?
- Does the nature of effects caused by the Project or characteristics of people affected mean they would be particularly vulnerable or particularly advantaged?
- Ultimately, should the issue have a bearing on the decision whether to grant approval of the Project or not?



- 15.7.5 Impacts are defined in terms of their consequences on “receptors”. The objective in assessment is to cover all potential effects on all affected receptors, and to establish those likely to be significant. Each impact will have one or more receptors.
- 15.7.6 The simplest specification of socio-economic receptors is ‘people’, but more specific characterisations may also be used such as groups or organisations they belong to (for example, ‘workforce’ or according to religious belief). An individual may appear under more than one receptor heading (for example, as a member of the workforce and as a local resident).

## Identification of effects

- 15.7.7 The identification of possible effects follows the principles underpinning EIA, particularly the principle of scoping. The impacts result from the activities related to the Project are identified and described according to knowledge of how activities related to it will occur. Such knowledge is continuously evolving as the design and understanding of the Project advances. Socio-economic effects may also arise from specific changes to the environment and be assessed using evidence provided in support of assessment of other EIA topics.
- 15.7.8 The activities which lead to potential significant effects are presented in **Table 15.9** of this document and comprise those that are currently understood to require assessment. The list is based on review of current documentation of the Project, review of previous impact assessments for similar developments, and consideration of the range of potential socio-economic and health impacts that may occur.

## Assessment of Significance

- 15.7.9 The assessment of the significance of the effects is the primary concern and main output of the analysis. Significance will be assessed including embedded environmental measures. Where the potential for a significant environmental effect remains, ‘additional measures’ will be considered to avoid, reduce or compensate this effect. The assessment will report on the anticipated effects of the Project following the implementation of all mitigation to determine the ‘residual effects’.
- 15.7.10 Criteria for significance will be developed alongside the estimates of effects to meet the requirements for assessment of the specific types of effects according to the characteristics of receptors, as well as meeting good practice for criteria (such as being easy-to-use). Outcomes for assessments of significance will use the categories defined in the generic project-wide approach of ‘Major’, ‘Moderate’, ‘Minor’ or ‘Negligible’. Effects can be either beneficial or adverse.
- 15.7.11 The significance of effects will be assessed through the evaluation of the combination of the magnitude of effects and sensitivity of receptors using the matrix defined in the generic project-wide approach. Determination of magnitudes of change and of receptor sensitivity will similarly use the generic categories of ‘High’, ‘medium’, ‘low’, and ‘very low’.
- 15.7.12 The magnitude of change is a summary term used to describe the features of an effect which can be represented as varying over a range. Straightforward effects

may be represented with quantitative indicators, such as employment relative to a national average, but other effects may need a semi-quantitative or qualitative approach to account for variation that covers features such as:

- a more general concept of scale or extent (for example, number of groups and/or people, households or businesses affected; spatial area affected);
- the duration and frequency of effects and whether they are permanent or time-limited (short, medium, long);
- the direction of change and its reversibility; and
- the probability of occurrence.

15.7.13 The assessment of the magnitude of change is based on a comparison with baseline conditions which show outcomes without the Project, and with comparators from similar developments or modelled scenarios.

15.7.14 The sensitivity of a receptor is a summary term that describes the ability of the receptor to withstand or absorb change within the period of time the impact is expected to occur and without a fundamental change to its character or attributes. Sensitivity to socio-economic and health effects has no single interpretation and can be seen as capturing the concept of a value that is potentially threatened or enhanced.

15.7.15 Sensitivity of receptors may depend on their current and future characteristics as well as the nature of the impact, reflecting aspects such as:

- capacity and availability of community resources;
- previous experience of socio-economic change;
- vulnerability from pre-existing social circumstances or health conditions;
- cultural values, including public interest, perceptions towards a risk or potential change, and acceptability;
- environmental vulnerability of habitats important to the socio-economic and health context (such as open space and public parks); and
- the direction, duration and reversibility of the specific impacts;

15.7.16 The evaluation of significance will be based on a set of customised criteria which:

- are easy-to-use, explain, and are widely agreed, such as legal and physical thresholds including health and environmental standards;
- can be consistently and rationally applied and documented;
- meet public concerns (particularly over health and safety);
- reflect procedure and guidance; and
- reflect precedent experience.

15.7.17 Quantitative thresholds for criteria related to specific effects will be used where available. Where this is not possible, professional judgement will be used to apply criteria in a manner that aims to reflect whether the general population would

judge the impact to be of concern or not. In this context the detailed significance criteria defined in LA 112<sup>375</sup> will be used to guide considerations of the magnitude of effects, sensitivity of receptors and significance, particularly in relation to land use. For wider effects, a limited number of precedent studies include quantitative criteria with generic, non-project specific, benchmarks for demography, employment, economic effects, accommodation pressure social conditions and services, such as for Hinckley Point C<sup>384</sup>. These sources will be supplemented by criteria from other relevant assessments, where available.

15.7.18 While specific reference to available criteria will be made, an indication of their application can be seen by noting that an effect would be considered significant if, in the professional judgement of the expert undertaking the assessment, it would meet at least one of the following more general criteria:

- it leads to an exceedance of a defined standard or guideline used in determining what is considered an acceptable change in environmental conditions regarding socio-economic or health outcomes;
- it is likely that the Examining Authority would reasonably consider applying a DCO requirement or obligation within a legal agreement to the consent to require specific mitigation to reduce or overcome the effect; or
- it threatens or enhances the socio-economic conditions, health or quality of life by leading to beneficial or negative socio-economic, health or quality of life effects that are quantifiable and/or noticeable to the affected population (and that where data is available, is statistically significant).

15.7.19 The summary of significance will be presented in a table showing each effect identifying whether it is beneficial or adverse together with additional summary information (See **Table 15.10**). Rows will divide by both categories of receptor and type of effect. Where there are several types of effect (e.g. for a particular community), each may be further subdivided.

**Table 15.10 Template for table of summary presentation of effects and their significance**

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor	Magnitude of change	Significance	Summary rationale
<i>{Name of the outcome and a summary of the predicted effects }</i>	<i>{Determined as described in the assessment methodology}</i>	<i>{Determined as described in the assessment methodology}</i>	<i>{Determined as described in the assessment methodology}</i>	<i>{Brief reasons justifying assessment}</i>

<sup>384</sup> EDF Energy (2021). Hinkley Point C Environmental Appraisal Volume 2, Pre-application consultation - Stage 2, Chapter 8 Socio-economics. (Online) Available at: <https://www.edfenergy.com/sites/default/files/V2%20C08%20SOCIO%20ECONOMICS.pdf> (Accessed December 2021).

## Methodologies for sub-topics

15.7.20 Summary description of the methodologies for assessing the likely significant effects resulting from Project activities as identified in **Table 15.10** are provided in the following paragraphs.

### *In the construction phase*

- 15.7.21 *Use of land for construction sites, exclusion zones, laydown areas, and access routes for construction works* - The consideration of land use and accessibility will refer to the guidance in LA112<sup>375</sup>, which identifies the following elements: “*Private property and housing; Community Land and Assets; Development Land and Businesses; Agricultural Land holdings; and Walkers, Cyclists and Horse-Riders*”.
- 15.7.22 The effects on access will be considered for each type of land and the associated users affected by the Project. These include commuters, people using public and private services and amenities (including health and community services and amenities) Walkers, Cyclists and Horse-Riders are receptors with particular requirements that relate in particular to Public Rights of Way (PRoW). The consideration of land types, including PRoW will be coordinated with mapping definitions established at Project level.
- 15.7.23 Locations where the magnitude of Project impacts may be greater and/or receptor sensitivity higher will be specifically considered (such as hospitals and public parks). Where specific effects are assessed as potentially significant the receptor categories may be revised to provide further detail. The effects related to land will be considered first within the spatial scope of land defined using the 500m boundary, including users associated with all contiguous land parcels (in single ownership) that have a part that lies within the 500m boundary. Where effects of the Project are anticipated to extend beyond the 500m boundary, the locational area used for assessment will also be extended taking into account the magnitude of the effects and sensitivity of the affected users.
- 15.7.24 *Transport movements of materials and workforce to construction sites* - The effects from transport movements will be assessed in the Traffic and Transport chapter in terms of the effects of changes in access and level of transport infrastructure use on routes and travel times for transport users. The effects on travel times for affected users will be further assessed in terms of the impacts on the different groups of people and communities (receptors) and their socio-economic and health characteristics (sensitivity).
- 15.7.25 *Air and water quality and noise effects from construction works and transport movements* - The air/water quality and noise effects from construction works and transport movements will be assessed in the relevant corresponding chapters, in terms of the effects of changes on a person who might be in the vicinity of effects, including potential transport of effects via air or water pathways. These effects will be further assessed in terms of the impacts on the different groups of people and communities (receptors) and their socio-economic and health characteristics (sensitivity).

- 15.7.26 *Employment of Project workforce* - The Project requirement for directly-employed labour will be assessed in comparison to the relevant employment markets taking into account skills requirements and availability locally and the wider region. Relevant employment markets will be specified dependent on the occupations and working patterns demanded by the Project. The potential impact will be judged in terms of the magnitude of the workforce requirement compared to the capacity (sensitivity) of the relevant market (receptor).
- 15.7.27 *Investment expenditure* - The investment expenditure by the Project would add to overall economic activity through direct, indirect and induced effects on employment and on the level of gross value added (GVA). The effects will be assessed based on the levels of expenditure anticipated for the major categories of purchase, the levels of directly employed labour, and economic multipliers chosen to be relevant to the structure of the affected supply chains. Effects may be related to new construction and to deconstruction/demolition. Unless assessed as occurring as a result of specific Project effects (e.g. for a particular material) the additional demand from the Project will be assumed in general not to lead to changes in market prices.
- 15.7.28 *Purchase of specialist materials, equipment and services* - The Project would require appreciable quantities of materials, equipment and services. Where supply chains are limited in capacity locally or in wider markets, demand from the Project has the potential to be unmet and/or affect overall market supply to other purchasers. The assessment will be based on comparison of the levels of demand for major purchases, market size and the significance judged according to the characteristics (sensitivity) of the relevant market, in particular its size and ability to increase production.

### *In the operational phase*

- 15.7.29 *Decarbonisation* - The Project is a key part of energy infrastructure enabling decarbonisation. The magnitude of the potential effect on decarbonisation will be assessed based on comparison of the pipeline capacity with policy targets for substitution away from carbon-based energy sources at national and sub-national level. The sensitivity of the society and government organisations benefitting from and implementing decarbonisation (receptors) will be assessed using as a reference the potential contribution of the Project to decarbonisation objectives.
- 15.7.30 *Cost-effective access to and use of hydrogen infrastructure* - The Project would attract businesses seeking a low cost hydrogen connection. There is potential for a premium to be established for development land with easier access to the pipeline infrastructure, such as near to existing HAGIs or other connection points. Where there is potential for financial gains relating to access, estimates of increases will be compared with land values and with the representative value of a typical hydrogen investment to indicate sensitivity and resulting significance.
- 15.7.31 *Change in Land use* – Some components of the infrastructure related to the Project would permanently reduce the land available for other purposes and may restrict some potential uses of neighbouring land. The assessment will compare the levels of land use in existing local plans (using a measure of sensitivity) with the magnitude of land take required for the Project. The judgement over significance will also take account of the possible effect of the Project on the

opportunities for future development according to the land as categorised in current Local Authority plans.

- 15.7.32 *Increased regional and national capability in large scale hydrogen pipeline operations* - The Project would provide experience relevant to future hydrogen infrastructure development. The magnitude will be assessed through comparison of the potential future need with the level and type of capability gained from the Project. Potential effects include a faster decarbonisation pathway for the UK and new earnings in an international market with increasing requirements for hydrogen pipeline expertise. Capability is likely to include a significant element related to the training, skills and experience of the workforce in the North West that was used for the Project. The sensitivity will be assessed in the terms of the potential capacity of alternative sources of the same capability supplying national and international demand.
- 15.7.33 *Perceptions of hydrogen safety* - Public concern over hydrogen is potentially affected by a known legacy of hazards related to its combustion and abandonment of its use for lighter-than-air travel. The risks will be assessed under the topic considering Major accidents and disasters (discussed further in **Chapter 16**). The level and nature of public concern will be assessed as part of the People and Communities assessment, using relevant literature sources (such as *People's Attitude to Energy from Hydrogen*<sup>385</sup>) and the potential effects characterised in terms of magnitude and sensitivity according to the published methodologies.

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<sup>385</sup> Ingaldi, M and Klimecka-Tatar, D (2020). People's Attitude to Energy from Hydrogen— From the Point of View of Modern Energy Technologies and Social Responsibility. (Online) Available at: <https://www.mdpi.com/1996-1073/13/24/6495> (Accessed December 2021).

# Major Accidents and Disasters

## 16.1 Introduction

16.1.1 The Major Accidents and Disasters (MADs) assessment will consider the likely significant effects on both human and non-human (environmental) receptors that may arise from the construction and operation of the Project. This chapter of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA.

16.1.2 The MADs aspect interfaces with other technical topics and therefore this chapter should be considered alongside the following:

- **Chapter 5: Ecology** for ecological receptors;
- **Chapter 6: Historic Environment** for historic environment receptors;
- **Chapter 7: Water Environment** for water-based receptors and disaster scenarios that are relevant to the Project;
- **Chapter 11: Traffic and Transport** for transport related accidents;
- **Chapter 12: Ground Conditions** for land-based receptors and specific accident/disaster scenarios; and
- **Chapter 15: People and Communities** for human receptors.

## Assumptions and Limitations

16.1.3 The identification of receptors at this stage has been limited to the Scoping red line boundary and only the most sensitive categories of receptor. During the EIA process, once routes have been further refined, the Study Areas described in **Section 16.6** will be applied to those routes. Therefore, at this stage, only a high-level identification of receptors has been undertaken.

16.1.4 No embedded mitigation beyond that which is embedded into the design and location of the Project and that which addresses regulatory requirements has been identified to date, but this will be subject to review during the EIA process.

## 16.2 Relevant legislation and technical guidance

16.2.1 This section identifies the relevant legislation and guidance which has informed the scope of the assessment relevant to Major Accidents and Disasters. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and Policy Overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

## Legislation

16.2.2 A summary of the relevant legislation is given in **Table 0.1**.

**Table 0.1 Legislation relevant to Major Accidents and Disasters**

Legislation	Legislative context	Section considered
<p><b>The Health and Safety at Work etc. Act 1974<sup>386</sup> (HSWA) and associated regulations made thereunder including:</b></p> <ul style="list-style-type: none"> <li>• <b>Construction (Design and Management) Regulations 2015<sup>387</sup> (CDM);</b></li> <li>• <b>Management of Health and Safety at Work Regulations 1999<sup>388</sup>;</b></li> <li>• <b>Dangerous Substances and Explosive Atmospheres Regulations 2002<sup>389</sup> (DSEAR);</b></li> <li>• <b>Pipeline Safety Regulations 1996<sup>390</sup>;</b> and</li> <li>• <b>Gas Safety (Management) Regulations 1996<sup>391</sup> (GSMR).</b></li> </ul>	<p>HSWA sets out the legal requirements and regulatory framework within which the Project must be designed, constructed and operated. It incorporates in UK law, the requirement to undertake a suitable and sufficient risk assessment, apply the hierarchy of controls to favour elimination over mitigation, and to reduce any residual risks to As Low As Reasonably Practicable, generally known as ‘the ALARP principle’.</p> <p>The regulations made under the HSWA, incorporate these principles and make specific requirements for their implementation in defined contexts. For example,</p>	<p>The Regulations will need to be incorporated into the processes and design of the Project. The processes to comply with the relevant regulations will form part of the embedded measures for the Project. The approach to mitigation described in <b>Section 16.5</b> is based upon these legal requirements complemented by industry good practice.</p> <p>The assessment of potential Major Accidents and Disasters is documented in <b>Appendix 16A</b> and summarised in <b>Section 16.6</b> assumes that these regulations are effective in their intent of reducing the risk.</p>

<sup>386</sup> UK Government (1974). Health and Safety at Work etc. Act 1974. (Online) Available at: <https://www.legislation.gov.uk/ukpga/1974/37/contents> (Accessed December 2021).

<sup>387</sup> UK Government (2015). The Construction (Design and Management) Regulations 2015. (Online) Available at: <https://www.legislation.gov.uk/uksi/2015/51/contents/made> (Accessed December 2021).

<sup>388</sup> UK Government (1999). The Management of Health and Safety at Work Regulations 1999. (Online) Available at: <https://www.legislation.gov.uk/uksi/1999/3242/contents/made> (Accessed December 2021).

<sup>389</sup> UK Government (2002). The Dangerous Substances and Explosive Atmospheres Regulations 2002. (Online) Available at: <https://www.legislation.gov.uk/uksi/2002/2776/contents/made> (Accessed December 2021).

<sup>390</sup> UK Government (1996). The Pipelines Safety Regulations 1996. (Online) Available at: <https://www.legislation.gov.uk/uksi/1996/825/contents/made> (Accessed December 2021).

<sup>391</sup> UK Government (1996). Gas Safety (Management) Regulations 1996. (Online) Available at: <https://www.legislation.gov.uk/uksi/1996/551/contents/made> (Accessed December 2021).



Legislation	Legislative context	Section considered
	CDM makes requirements for the design and construction of significant facilities by requiring the nomination of a Principal Designer and Principal Contractor who are ultimately responsible for managing the design and construction respectively.	

## Technical Guidance

16.2.3 A summary of the technical guidance which has informed the approach to the assessment and scope is given in **Table 0.2**.

**Table 0.2 Technical guidance relevant to Major Accidents and Disasters**

Technical Guidance Document	Context	Section considered
<b>Reducing Risks Protecting People (R2P2), Health and Safety Executive, 2001<sup>392</sup></b>	R2P2 describes the HSE's decision making process and presents the protocols and procedures followed in decision making in relation to the protection of human life in the UK. The tolerability criteria for risk to people, including the aversion for large numbers of casualties resulting from single incidents, has been referenced in setting the criteria for assessing the significance of effects on people.	<b>Section 16.7: Assessment Methodology</b>  <b>Appendix 16B</b>
<b>Environmental Impact Assessment of Projects, Guidance on Scoping, European Commission, 2017<sup>393</sup></b>	Guidance on how to undertake a scoping assessment under the requirements of the EIA Directive to ensure that sufficient information is included. The guidance provided by the European Commission highlights that a risk-based approach may	<b>Section 16.7: Assessment Methodology</b>

<sup>392</sup> Health and Safety Executive (2001). Reducing Risks Protecting People. HSE's Decision Making Process. (Online) Available at: <https://www.hse.gov.uk/risk/theory/r2p2.pdf> (Accessed December 2021).

<sup>393</sup> European Commission (2017). Environmental Impact Assessment of Projects. Guidance on Scoping. (Online) Available at: [https://ec.europa.eu/environment/eia/pdf/EIA\\_guidance\\_Scoping\\_final.pdf](https://ec.europa.eu/environment/eia/pdf/EIA_guidance_Scoping_final.pdf) (Accessed December 2021).

Technical Guidance Document	Context	Section considered
	be adopted in lieu of the typical sensitivity/extent criteria, where appropriate.	
<b>Environmental Impact Assessment of Projects, Guidance on the Preparation of the Environmental Impact Assessment Report, European Commission, 2017<sup>394</sup></b>	Guidance on how to develop good quality environmental impact assessment reports to ensure appropriate information is available for decision making purposes. The guidance provided by the European Commission highlights that the context for inclusion of Major Accidents and Disasters is to ensure that adequate focus is given to the provisions for events leading to significant risk, with an objective of building resilience in a development against such effects.	<b>Section 16.7: Assessment Methodology</b>
<b>Guidance on the Interpretation of Major Accidents to the environment for the purposes of Control of Major Accident Hazards (COMAH) Regulations, DETR, 1999<sup>395</sup></b>	Guidance on what would constitute a major accident to the environment (from the perspective of COMAH regulations).	<b>Section 16.7: Assessment Methodology</b>  <b>Appendix 16B</b>
<b>Guideline – Environmental risk tolerability for COMAH establishments, CDOIF, 2016<sup>396</sup></b>	Guidelines on the assessment and tolerability of Major Accidents to The Environment (established in relation to COMAH establishments) produced by a joint industry and regulator forum in the UK.	<b>Section 16.7: Assessment Methodology</b>  <b>Appendix 16B</b>

<sup>394</sup> European Commission (2017). Environmental Impact Assessment of Projects, Guidance on the Preparation of the Environmental Impact Assessment Report. (Online) Available at: [https://ec.europa.eu/environment/eia/pdf/EIA\\_guidance\\_EIA\\_report\\_final.pdf](https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf) (Accessed December 2021).

<sup>395</sup> Department of the Environment, Transport and the Region (1999). Guidance on the Interpretation of Major Accidents to the environment for the purposes of COMAH Regulations. (Online) Available at: <https://www.sepa.org.uk/media/219153/detr-guidance-1999.pdf> (Accessed December 2021).

<sup>396</sup> Chemical and Downstream Oil Industries Forum (2016). Guideline – Environmental risk tolerability for COMAH establishments. (Online) Available at: [https://www.sepa.org.uk/media/219154/cdoif\\_guideline\\_environmental\\_risk\\_assessment\\_v2.pdf](https://www.sepa.org.uk/media/219154/cdoif_guideline_environmental_risk_assessment_v2.pdf) (Accessed December 2021).

## 16.3 Consultation

- 16.3.1 At this early stage of the Project, no specific consultation has been undertaken in relation to the assessment of MADs but such consultation and engagement will be progressed as part of the Scoping and EIA process.
- 16.3.2 The HSE will be a statutory consultee for both the EIA Scoping Report and Section 42 consultation. It is anticipated that the HSE will provide a response that will identify any COMAH establishments, Explosives Regulations or sites holding Hazardous Substance Consent which may affect the Project. Further consultation may then be required to identify the potential impacts from any of these external sites and required mitigations.
- 16.3.3 The HSE will also need to be consulted in their role as the regulator for the Pipeline Safety Regulations 1996.
- 16.3.4 Local authorities in their role as Hazardous Substance Authority may need to be consulted in relation to sites holding Hazardous Substance Consent, where such sites may present a hazard to the Project, or the Project will pass in close vicinity to them.
- 16.3.5 Appropriate stakeholders such as the Department for Business, Energy and Industrial Strategy may need to be consulted in relation to operational and security requirements.

## 16.4 Baseline Conditions

### Data gathering methodology

- 16.4.1 The principal data sources used to inform the assessment and the identification of the potential for likely significant effects comprise the following identified in **Table 0.3**.

**Table 0.3 Data sources to be used to inform the major accidents and disasters assessment**

Source	Summary of data to be obtained
MAGIC mapping website <sup>397</sup>	Locations of vulnerable receptors
Natural England	Access to Evidence database <sup>398</sup> for details on Designated Land and Water Sites and for Scarce Habitats and Species

<sup>397</sup> Defra (2021). Magic Maps. (Online) Available at: <https://magic.defra.gov.uk/> (Accessed December 2021).

<sup>398</sup> Natural England (2021). Access to Evidence. (Online) Available at: <http://publications.naturalengland.org.uk/> (Accessed November 2021)

Source	Summary of data to be obtained
Historic England	Listed Buildings and Scheduled Monuments <sup>399</sup>
Environment Agency	River Catchment Planning database for waterbodies <sup>400</sup>
British Geological Survey (BGS)	Seismic Hazard Map <sup>401</sup>
COMAH Information Portal <sup>402</sup>	Locations of any COMAH establishments and their inventories
HSE Planning Advice Web App <sup>403</sup>	Locations of Major Hazard sites and/or pipelines within consultation distance from the Scoping red line boundary
National Risk Register of Civil Emergencies <sup>404</sup>	Baseline information related to potential Major Accidents and Disasters.
Google Earth <sup>405</sup> and Google Maps <sup>406</sup>	Location of buildings close to the Scoping red line boundary, including schools and hospitals.

16.4.2 Further data sources used are referenced in the baseline description below.

<sup>399</sup> Historic England (2021). Search the list. (Online) Available at:

<https://historicengland.org.uk/listing/the-list/> (Accessed November 2021)

<sup>400</sup> Environment Agency (2021). Catchment Data Explorer. (Online) Available at:

<https://environment.data.gov.uk/catchment-planning/> (Accessed November 2021)

<sup>401</sup> British Geological Survey (2020). Seismic Hazard Map. (Online)

[http://www.earthquakes.bgs.ac.uk/hazard/Seismic\\_maps/0p2sa\\_2475.pdf](http://www.earthquakes.bgs.ac.uk/hazard/Seismic_maps/0p2sa_2475.pdf) (Accessed November 2021)

<sup>402</sup> HSE (2021). COMAH 2015 Public Information. (Online) Available at:

<https://notifications.hse.gov.uk/COMAH2015/Search.aspx> (Accessed November 2021)

<sup>403</sup> HSE (2021). Planning Advice WebApp. (Online) Available at: <https://pa.hsl.gov.uk/> (Accessed November 2021)

<sup>404</sup> Cabinet Office (2020). National Risk Register of Civil Emergencies. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/952959/6.6920\\_CO\\_CCS\\_s\\_National\\_Risk\\_Register\\_2020\\_11-1-21-FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952959/6.6920_CO_CCS_s_National_Risk_Register_2020_11-1-21-FINAL.pdf) (Accessed November 2021)

<sup>405</sup> Google (2021) Google Earth. (Online) Available at: <https://earth.google.com/web/> (Accessed November 2021)

<sup>406</sup> Google (2021), Google Maps. (Online) Available at: <https://www.google.com/maps> (Accessed November 2021)

## Current baseline

- 16.4.3 A preliminary Study Area has been defined as the Scoping red line boundary, with wider areas applied for COMAH and Nuclear Licensed Sites as described in **Section 16.6: Scope of the Assessment**, paragraphs 16.4.5 and 16.4.8. The Study Area will be refined as the Project design and implementation requirements develop.
- 16.4.4 However, in general for future environmental reporting, it is intended to identify effects that are relevant to the proposed routes with the search areas given in paragraphs 16.6.4 to 16.6.6.

## Sources of Potential Major Accidents

- 16.4.5 An initial search to identify COMAH Establishments within approximately 5km of the Study Area has been undertaken using information from the HSE COMAH Information Portal<sup>402</sup>. The list of identified COMAH Establishments is given in **Table 0.4**.
- 16.4.6 The spatial extent which has been used in this section to identify the baseline sources is preliminary and will be further refined with a more detailed Study Area in future environmental reporting, during which specific pipeline routes will be defined.

**Table 0.4 COMAH Establishments within 5km of Study Area**

Establishment Name	Operator Name	Postcode	Upper/Lower Tier
<b>Chester</b>	Encirc Limited	CH2 4LF	Lower Tier
<b>Ince Marshes</b>	CF Fertilisers UK Limited	CH2 4LB	Upper Tier
<b>INOVYN</b>	INOVYN ChlorVinyls Limited	WA7 4HZ	Upper Tier
<b>Runcorn</b>	Packed Chlorine Limited	WA7 4HZ	Upper Tier
<b>Runcorn</b>	Mexichem UK Limited	WA7 4LN	Upper Tier
<b>Runcorn MCP</b>	Runcorn MCP Limited	WA7 4HZ	Upper Tier
<b>Sulphuric Acid Plant - Runcorn</b>	INEOS Enterprises Group Limited	WA7 4LT	Upper Tier
<b>Vynova</b>	Vynova Runcorn Limited	WA7 4HZ	Upper Tier

Establishment Name	Operator Name	Postcode	Upper/Lower Tier
Ellesmere Port	Argent Energy Holdings Limited	CH65 4EQ	Upper Tier
Ellesmere Port	Veolia ES (UK) Limited	CH65 4EQ	Upper Tier
Ellesmere Port	Innospec Limited	CH65 4EY	Upper Tier
Ellesmere Port	Avanti Gas Limited	CH2 4RA	Upper Tier
Stanlow	Essar Oil (UK) Limited	CH65 4HB	Upper Tier
Stanlow - Tanker Loading Depot	Stanlow Terminals Limited	CH65 4BD	Lower Tier
Hale Road Industrial Estate - Widnes	Univar Solutions UK Limited	WA8 8XW	Upper Tier
Runcorn	Syntor Fine Chemicals Limited	WA7 1SR	Lower Tier
Northwich	Nalco Manufacturing Limited	CW8 3AA	Upper Tier
Stublach Gas Storage Site	Storengy UK Limited	CW9 7SE	Upper Tier
Winsford	Warehouse One Distribution Limited	CW7 3BE	Upper Tier
Byley - Middlewich	H W Coates Limited	CW10 9NT	Upper Tier
Holford Brine Field	Holford Gas Storage Limited	CW10 9NE	Upper Tier
Holford H165 Gas Storage Cavity	Cadent Gas Limited	CW9 7ST	Upper Tier
Plumley	Oil and Pipelines Agency	WA16 9SJ	Upper Tier
Plumley PSD	Oil and Pipelines Agency	WA16 9SN	Upper Tier
Wincham	Thor Specialities (UK) Limited	CW9 6GB	Upper Tier

Establishment Name	Operator Name	Postcode	Upper/Lower Tier
Cadishead	Univar Solutions UK Limited	M44 5AL	Upper Tier
Carrington	Air Products (BR) Limited	M31 4TG	Lower Tier
Carrington - Manchester	Basell Polyolefins UK Limited	M31 4AJ	Upper Tier
Irlam	Libra Speciality Chemicals Limited	M44 5LF	Upper Tier
Irlam	Multisol Limited	M44 5EG	Lower Tier
Irlam	Air Liquide UK Limited	M44 5BA	Lower Tier
Baronet Works	Solvay Interox Limited	WA4 6HA	Upper Tier
Warrington	Unilever UK Limited	WA5 1AQ	Lower Tier
Widnes	Emerald Kalama Chemical Limited	WA8 0RF	Upper Tier
Widnes	ICoNiChem Widnes Limited	WA8 0RU	Upper Tier
St Helens	Sutton & Son (St. Helens) Limited	WA9 5BW	Upper Tier

16.4.7 In addition to the COMAH establishments identified in **Table 0.4**, there may be other non-COMAH establishments which operate under a Hazardous Substances Consent (HSC). These sites may present hazards which could be a source of major accidents, and the location and nature of these sites will be considered following consultation with the HSE.

16.4.8 Following an inspection of the list of sites and facilities regulated by the Office for Nuclear Regulation (ONR)<sup>407</sup>, details of the closest sites to the Project are presented in **Table 0.5**. The spatial footprint of the Project as currently defined is entirely outside of the Detailed Emergency Planning Zone and Outline Planning Zone for the URENCO facility and therefore cannot credibly be affected by a Major Accident at that facility.

<sup>407</sup> Office for Nuclear Regulation (2021). Sites/Facilities that we regulate. (Online) Available at: <https://www.onr.org.uk/regulated-sites.htm>, (Accessed November 2021)

**Table 0.5 Closest Sites Regulated by ONR**

Establishment Name	Operator Name	Postcode	Distance from Corridor
Capenhurst Works	URENCO UK Ltd	CH1 6ER	7.5km

16.4.9 The risk of encountering Unexploded Ordnance (UXO) in the Project is considered to be low. The Zetica UXO maps<sup>408</sup> indicate that the majority of the Study Area is considered to be low risk, with three areas of moderate risk relating to the St Helens, Manchester and Runcorn-Warrington urban areas. There are well developed industry working practices and published good practice guidance for dealing with UXO hazard in construction such as CIRIA C681<sup>409</sup>, which will enable safe construction.

### Sources of Disasters

16.4.10 Extreme weather such as intense precipitation, extreme temperatures (high and low) and high winds are possible throughout the duration of the Project but most importantly during the construction phase. Monitoring of extreme weather will be undertaken using predictive information provided by the Met Office, which typically includes the provision of advanced warnings of hazardous weather.

16.4.11 Flooding is a potential disaster, which may affect areas of the route corridor. This will be assessed elsewhere in a flood risk assessment, the scope for which is detailed in **Chapter 7: Water Environment**.

16.4.12 Lightning is a sudden electrostatic discharge that originates from electrically charged regions of a cloud and can strike the ground. Lightning strikes can cause damage to structures, often leading to fires or can kill or seriously injure people if struck.

16.4.13 Seismic activity in the UK is generally low with no significant earthquakes occurring frequently. According to data provided by the BGS database<sup>410</sup>, there have been a total of four earthquakes in the UK mainland surpassing 4.0 magnitude local within the last 10 years (data from 2011 to 2021). Furthermore, none of these earthquake events were characterised as strong (>6.0 magnitude local). Therefore, a disaster due to seismic activity is considered a highly unlikely scenario.

<sup>408</sup> Zetica (2021). UXO Risk Maps. (Online) Available at: <https://zeticauxo.com/downloads-and-resources/risk-maps/> (Accessed November 2021)

<sup>409</sup> CIRIA (2009). Unexploded ordnance (UXO). A guide for the construction industry (C681). CIRIA; London UK.

<sup>410</sup> British Geological Society (2021). Geological Data. (Online) Available at: <https://www.bgs.ac.uk/geological-data/>, (Accessed November 2021)



- 16.4.14 Volcanic activity has not been prevalent in the UK for several centuries, with no active volcanoes located in the UK<sup>411</sup> and therefore is not anticipated to present any risk to the Project.
- 16.4.15 Tsunamis, while extremely rare, could affect the UK, albeit with a maximum predicted wave height of 1-2m<sup>412</sup>. Storm surges of this magnitude are far more common and are capable of being controlled by sea defences and therefore tsunami hazard is not anticipated to present a credible risk of disaster to the Project.

### *Population and human health*

- 16.4.16 There are 17 low density residential areas partially or entirely encompassed within the Study Area. Summary inspection of the existing land-use within the Scoping red line boundary suggests that the area is generally sparsely populated and consists mostly of agricultural land, with some small urban areas.
- 16.4.17 Six sensitive (public) receptors have been identified within Study Area which include both education centres (e.g. colleges, schools) and medical and care facilities (e.g. hospitals, care homes). A refined list of receptors which could be vulnerable to a Major Accident will be provided in future environmental reporting.
- 16.4.18 Further details on the current baseline with respect to human population characteristics are given in **Chapter 15: People and Communities**, and include data for populations within the MADs Study Area.

### *Biodiversity*

- 16.4.19 There are eight internationally designated land/water sites present in the north-west region, including four Special Areas of Conservation (SAC), three Ramsar sites and one Special Protection Area (SPA). However, due to the route corridor selection process, none of these designated sites are within the Study Area.
- 16.4.20 It is expected that there will be a number of biodiversity sites which are designated as of national importance in the vicinity of the Project. Due to the extent of the area within the Scoping red line boundary, those designated land/water sites which are relevant to the forthcoming EIA process will be identified subject to further definition of pipeline routing.
- 16.4.21 Further details on the current baseline for biodiversity are given in **Chapter 5: Ecology**.

### *Land, soil, and water*

- 16.4.22 High-level identification of receptors has been undertaken at this stage, and due to the potential number of land, soil, and water receptors within the Scoping red line boundary, these have not been specifically identified. Land, soil, and water

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<sup>411</sup> British Geological Survey (2007). Volcanoes. (Online) Available at: <http://geopark.org.uk/pub/wp-content/uploads/2020/06/Volcanoes.pdf>. (Accessed November 2021)

<sup>412</sup> Defra Flood Management (2006). The threat posed by tsunami to the UK. (Online) <https://www.onr.org.uk/fukushima/submissions/207061.pdf> (Accessed November 2021)

receptors will be identified in future environmental reporting when the pipeline routes will be established with greater spatial accuracy, thus allowing a more precise Study Area to be defined.

- 16.4.23 Details on the land, soil, and water receptors in the surrounding area are given in **Chapter 7: Water Environment**, **Chapter 12: Ground Conditions**, and **Chapter 13: Agriculture and Soil Resources**.

### *Material assets, cultural heritage, and the landscape*

- 16.4.24 Review of the Scoping red line boundary, cross referenced against Historic England's database for Grade I Listed Buildings and Scheduled Monuments has identified a total of five Grade I Listed Buildings and eight Scheduled Monuments. Further information on the historic environment baseline context is given in **Chapter 6: Historic Environment**.

### *Future baseline*

- 16.4.25 This section describes a number of factors which may influence the baseline conditions over the time the Project is due to be constructed and then operated. This includes changes which are anticipated as a result of climate change, natural changes and those driven by human populations.

### *Climate change*

- 16.4.26 Climate change is predicted to lead to an increase in peak rainfall intensities and potential flood flows over time. The latest guidance on climate change allowances to be applied in England was last updated in October 2021<sup>413</sup> and provides guidance on the potential enhanced rainfall intensity, with wetter winters and drier summers. Climate change is expected to alter the prevalence of extreme weather conditions which could, if unmitigated, lead to a disaster. Any impact of climate change will be dealt with through **Chapter 17: Climate Change**.

### *Technological development*

- 16.4.27 It is anticipated that there may be technological improvement over the lifetime of the Project; this could include improved control systems and use of remote maintenance or inspection tools. These are likely to reduce the risk posed to the environment (human and non-human receptors); however, they may also introduce new hazards that would need to be managed at the appropriate time. There are unlikely to be significant changes in the operations of the Pipeline and HAGIs, which would change the nature of the accidents that could occur.

### *Land use change*

- 16.4.28 Changing land use may mean that the surrounding environment could become more agricultural, industrial, residential or recreational in use. Changing ecological

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<sup>413</sup> Environmental Agency (2021). Flood Risk Assessment - Climate Change Allowances. (Online) Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> (Accessed 3 November 2021)

baselines resulting from the land use and climate change factors may also impact the local ecology and associated environmental designations of the land. As the surrounding environment changes, so do the receptors which could be affected. If land adjacent to the Project were to receive a higher level of ecological protection such as a designation, or a larger or more sensitive human population, then the sensitivity of receptors could increase. It is not expected that this will drastically change due to the application of local planning policy and the use of agricultural land.

- 16.4.29 The pipeline will be notified as a Major Accident Hazard pipeline, which is likely to have a consultation distance and appropriate Land Use Planning restrictions applied by the Health and Safety Executive, and which would prevent inappropriate future development in the vicinity of the pipeline.

## 16.5 Embedded environmental measures

- 16.5.1 Embedded measures which mitigate the potential for effects arising from Major Accidents and Disasters related to the Project are described in **Table 0.6**. At this early stage of the Project, the embedded measures are focussed on compliance with regulatory requirements and industry good practice, but they will be developed to focus on the effects described in **Section 16.6** for future environmental reporting.
- 16.5.2 National Planning Policy is based upon the assumption that the regulations outlined in **Table 0.6** are effective in achieving their intent, that the risk arising from workplace activities is reduced to ALARP. Planning decisions instead focus on whether the Project represents ‘an acceptable use of land’ in line with Paragraph 188 of the National Planning Policy Framework<sup>414</sup> (NPPF).

**Table 0.6 Embedded environmental measures relevant to Major Accidents and Disasters**

Embedded environmental measure proposed	How the environmental measure will be secured
Any effects arising from disasters during the construction process will be identified and dealt with through appropriate risk assessment and mitigation (applying the hierarchy of controls) as required to comply with UK health and safety legislation and environmental legislation. A Code of Construction Practice (CoCP) would be produced prior to commencement of construction which would detail measures to be implemented (via a Construction Environmental Management Plan (CEMP)) to avoid or	CoCP and DCO requirement.

<sup>414</sup> Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1005759/NPPF\\_July\\_2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf) (Accessed December 2021).

Embedded environmental measure proposed	How the environmental measure will be secured
<p>reduce impacts during the construction phase The CEMP will require risk assessment of construction activities (including any necessary earthworks or demolition activities) and this assessment will cover and mitigate where necessary the potential impact of all major accidents or disasters including those affecting non-human receptors.</p>	
<p>HSWA combined with the Management of Health and Safety at Work Regulations 1999<sup>388</sup> (MHSWR) enshrine various principles as fundamental components of UK law. These include the requirement to undertake a written risk assessment of any activities and to ensure that the residual risk arising from those activities is reduced to ALARP, which is known as the ALARP principle. Finally, they codify the 'hierarchy of controls' which requires more effective risk controls which would eliminate the risk entirely to be used in preference to mitigation measures, such as Personal Protective Equipment (PPE).</p>	<p>CoCP and DCO requirement.</p> <p>The Applicant/Contractor will adhere to regulatory requirements.</p>
<p>There are various regulations governing the use of work equipment such as the Lifting Operation and Lifting Equipment Regulations 1998<sup>415</sup> (LOLER) and Provision and Use of Work Equipment Regulations 1998<sup>416</sup> (PUWER). For example, for this Project, all lifting operations involving lifting equipment will be properly planned by a competent person, appropriately supervised and carried out in a safe manner in accordance with LOLER.</p>	<p>CoCP and DCO requirement.</p> <p>The Applicant/Contractor will adhere to regulatory requirements.</p>
<p>In order to comply with the requirements of the Dangerous Substances and Explosive Atmospheres Regulations 2002<sup>389</sup> (DSEAR), the Applicant will carry out an assessment of locations where flammable materials could be present, either by design or in event of a deviation from normal operation and ensure that sufficient mitigation is in place. Mitigation could include: minimising quantities of flammable materials, optimisation of operating conditions (e.g. flow</p>	<p>CoCP and DCO requirement.</p> <p>The Applicant/Contractor will adhere to regulatory requirements.</p>

<sup>415</sup> UK Government (1998). The Lifting Operations and Lifting Equipment Regulations 1998. (Online) Available at: <https://www.legislation.gov.uk/uksi/1998/2307/contents/made> (Accessed December 2021).

<sup>416</sup> UK Government (1998). The Provision and Use of Work Equipment Regulations 1998. (Online) Available at: <https://www.legislation.gov.uk/uksi/1998/2306/contents/made> (Accessed December 2021).

Embedded environmental measure proposed	How the environmental measure will be secured
<p>rate/pressures), containment, inert gas blanketing, and controls over ignition sources including the use of ATEX rated equipment where necessary.</p>	<p>CoCP and DCO requirement.</p> <p>The Applicant/Contractor will adhere to regulatory requirements.</p>
<p>The Pipeline Safety Regulations 1996<sup>390</sup> and the Gas Safety (Management) Regulations 1996<sup>391</sup> cover the design, construction and operation of pipeline and gas distribution systems in the UK. It is anticipated that the regulations will apply to this Project and it is anticipated that the relevant provisions, which apply will be confirmed during the forthcoming EIA process and reported upon in the ES.</p>	<p>CoCP and DCO requirement.</p> <p>The Applicant/Contractor will adhere to regulatory requirements.</p>
<p>The potential major accidents arising from construction activity include a spill from temporary fuel storage tanks, collapse of excavations, fire during construction or the collapse of a crane/piling rig. All of the construction works will be managed in accordance with a Construction Environment Management Plan (CEMP) and relevant regulations such as CDM. Under the CDM Regulations, all structures must be designed so that they can be built and maintained safely, the designer must also ‘design out’ hazards where possible by applying the hierarchy of controls and produce a designers risk assessment to inform the construction contractors. The construction process must be managed to take account of the risks to people affected by the work, including the public. These include measures to manage fire risk, electrical hazards and structural integrity (including excavations) throughout the construction process. This must be documented in a CDM Designers Risk Register. This ensures that the risk of such effects occurring is extremely low and will be reduced to ALARP. This process will be managed by the contractor under the supervision of the Project.</p>	<p>CEMP (via CoCP) and DCO requirement.</p> <p>The Applicant/Contractor will adhere to regulatory requirements.</p>
<p>Gas transmission infrastructure is a mature technology with some changes required to ensure suitability for hydrogen, the design requirements are generally well understood by industry. Good practice design standards such as those issued by the British Standards Institute (BSI) or the Institution of Gas Engineers and Managers (IGEM) will be applied to the design of the pipelines and HAGI infrastructure, as appropriate.</p>	<p>The Applicant/Contractor will apply good practice in design.</p>

Embedded environmental measure proposed	How the environmental measure will be secured
<p>The specific systems will go through an iterative design process, from the current concept phase through to a fully developed detailed design which will be used for construction. At each phase of the design process, there will be a consideration of the inherent hazards and how these could be reduced. These hazards will be designed out where possible in accordance with good practice, applying the hierarchy of controls principle, which prioritises inherently safe design over control and mitigation measures. However, some of these hazards are an intrinsic part of a gas transmission process and therefore, as part of the design process, safety and environmental major accident hazards will be identified and assessed to ensure that adequate technical and administrative measures are in place to reduce the risk to ALARP. Specific design mitigation measures will be incorporated as the design progresses.</p>	<p>The Applicant/Contractor will apply good practice in design.</p>
<p>Good construction practices will be adopted and included as requirements in the CEMP, which will describe how the construction practices will comply with the CDM regulations and incorporate Good Industry Practice standards, such as those published by the Construction Industry Research and Information Association (CIRIA).</p>	<p>CEMP (via CoCP) and DCO requirement.  The Applicant/Contractor will apply good practice in design and construction.</p>
<p>The route of the pipelines will be consulted upon with relevant stakeholders including National Highways, Network Rail, the HSE and appropriate local authorities to ensure that any transport networks, hazardous pipelines or other hazardous sites along the route, such as those identified in Table 0.4 are avoided entirely or crossed safely in accordance with industry standards.</p>	<p>The Applicant/Contractor will apply good practice in design and construction.</p>

## 16.6 Scope of the Assessment

### Study Area

- 16.6.1 The temporal scope of the assessment of Major Accidents and Disasters is consistent with the period over which the Project would be carried out and therefore covers the construction and operational periods.
- 16.6.2 The Study Areas which will be used for the Major Accidents and Disasters assessment will be based upon applying buffer distances relative to the Scoping red line boundary, which may be revised as the Project design process

progresses. These distances have been developed using professional judgement, as there is no specific regulatory guidance or standardised methodology.

16.6.3 Different Study Areas will be applied depending on the nature of the factor which is under consideration. Each factor has been grouped into either an external source of major accidents or disasters (where the Project is a receptor), or where the Project is a source of Major Accident to receptors.

16.6.4 External major accident Study Areas:

- Airports – 10km (based on HSE research)<sup>417</sup>;
- COMAH Establishments – 3km (based upon professional judgement and typical HSE Land Use Planning restrictions);
- Major Accident Hazard Pipelines – 1km (based upon HSE research<sup>418</sup>);
- Fuel storage or retail facilities (where not COMAH establishments) – 1km (based on professional judgement; and
- Other utilities (pipelines, electrical, communications etc.) – where a pipeline crossing is required or within the HAGI Search Areas.

16.6.5 Disaster Study Areas:

- Natural features which may lead to a risk e.g. flooding, wildfire or subsidence – 1km (based on professional judgement); and
- Widespread features of the natural environment which may impact the Project e.g. seismic hazards – potential impacts within red line boundary (based on professional judgement).

16.6.6 Receptor Study Areas:

- Receptors during construction – 500m (based upon typical construction hazards); and
- Receptors during operation (including commissioning) – 1km (based upon a worst-case estimate of potential effects of hydrogen gas releases).

## Potential receptors

16.6.7 This section details the approach to identifying receptors that could be vulnerable to a major accident or disaster and where the Project may materially alter the risk, e.g. through introducing a new source of accidents or a new receptor.

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<sup>417</sup> HSE (2019). Update of aircraft crash rates used by HSE in assessing hazards from chemical, process and other major hazard installations. Research Report 1140. (online) Available at: <https://www.hse.gov.uk/research/rrpdf/rr1140.pdf> (Accessed 6 January 2022).

<sup>418</sup> HSE (1994). Risks from Hazardous Pipelines in the United Kingdom. Contract Research Report 82. (online) Available at: [https://www.hse.gov.uk/research/crr\\_pdf/1994/crr94082.pdf](https://www.hse.gov.uk/research/crr_pdf/1994/crr94082.pdf) (Accessed 6 January 2022).

- 16.6.8 The general principle is that receptors that have the potential to be significantly affected will be identified on the basis of their value/sensitivity and the magnitude of the impact to which they may be exposed as a result of the Project.
- 16.6.9 In order to categorise the severity of potential major accidents and disasters effects on receptor populations, sites and features, they are grouped based upon their type, sensitivity and vulnerability to harm. These receptor types are aligned to the Major Accident risk assessment methodologies promoted by the HSE and Environment Agency.
- 16.6.10 The identification of receptors at this stage has been limited to the preliminary Study Area, and only the most sensitive categories for the Scoping stage. During the EIA process, once routes have been identified, the Study Areas will be applied to those routes. Therefore, at this stage, only a high-level identification of receptors has been undertaken, as provided in **Table 0.7**.

**Table 0.7 Preliminary list of receptors within the Major Accidents and Disasters Study Area**

Receptor Type	Receptor Details
<b>Human populations (public)</b>	<p>All human populations which are not associated with the Project are considered in this receptor type; this includes residential, commercial and industrial locations as well as public spaces.</p> <p>Summary inspection of the existing land-use within the proposed corridors suggests that the area is sparsely populated and consists mostly of agricultural land. There are 17 low density residential areas partially or entirely encompassed within the Scoping red line boundary.</p> <p>There are likely to be a number of more vulnerable receptors such as education centres (e.g. colleges, schools), medical and care facilities (e.g. hospitals, care homes). Six have been identified within the Scoping red line boundary but this will be updated as the Project evolves.</p>
<b>Human populations (workers)</b>	<p>All populations associated with the Project are considered in this receptor type. A description of the likely workforce associated with the Project is given in <b>Chapter 2: The Project</b>.</p> <p>During construction, the total construction workforce is anticipated to vary between 200 and 500 personnel across multiple locations. The construction workforce in any one location may be up to ~30 personnel. These personnel will typically work Monday to Friday, from 08:00 until 18:00. Although 24 hour working and Saturday working patterns may be required in some locations</p> <p>During operations, populations from 1 to 10 may need to be present at the HAGI sites, however, they are unoccupied for the vast majority of the time. The Operations and Maintenance tasks will vary</p>



Receptor Type	Receptor Details
	<p>on an annual basis but will be approximately equivalent to 1-2 Full Time Equivalent workers across the 14 sites.</p>
<p><b>Designated land/water sites (internationally important)</b></p>	<p>Sites of international importance are ecological receptors which are designated under international agreements.</p> <p>There are no designated land/water sites of international importance (SAC, SPA and Ramsar) within the Scoping red line boundary. Following further definition of the pipeline route, receptors of this type which may be vulnerable to MADs will be identified within the applicable red line boundary and buffer zones and considered in future environmental reporting.</p>
<p><b>Designated land/water sites (nationally important)</b></p>	<p>There may be a number of land/water sites of national importance in the vicinity of the Scoping red line boundary. However, there are none of these sites within the Scoping red line boundary. These could include Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), and Marine Conservation Zones (MCZ). Following further definition of the pipeline route, receptors of this type which may be vulnerable to MADs will be identified within the applicable red line boundary and buffer zones and considered in future environmental reporting.</p>
<p><b>Other designated land</b></p>	<p>This category includes receptors such as Environmentally Sensitive Areas (ESA), Areas of Natural Beauty (AONB), National Parks and Local Nature Reserves (LNR).</p> <p>There are no AONBs, LNRs or National Parks within the Scoping red line boundary. Following further definition of the pipeline route, receptors of this type which may be vulnerable to MADs will be identified within the applicable red line boundary and buffer zones and considered in future environmental reporting.</p>
<p><b>Scarce Habitat</b></p>	<p>Scarce habitats include Habitats of Principal Importance and other locally designated rural land-based schemes. These have been identified in <b>Chapter 5: Ecology</b>.</p>
<p><b>Particular species (these criteria apply nationally)</b></p>	<p>Specific populations of species will be identified in the assessment undertaken in <b>Chapter 5: Ecology</b>. Those receptor populations which are specifically vulnerable to MADs will be identified in future environmental reporting.</p>
<p><b>Widespread habitat – non-designated land</b></p>	<p>These categories include land/water which is used for agriculture, forestry, fishing, or aquaculture. At the next stage of assessment, when more precise pipeline routes have been plotted, land use in the surrounding area will be determined using OS mapping.</p>
<p><b>Widespread Habitat - Non-</b></p>	<p>Those receptors which are vulnerable to MADs will be identified in future environmental reporting.</p>

Receptor Type	Receptor Details
Designated Water	
Soil or sediment	Those receptors which are vulnerable to MADs will be identified in future environmental reporting.
Groundwater - Source of Drinking Water	The presence of ground water in the Scoping red line boundary will be identified in <b>Chapter 12: Ground Conditions</b> . Those ground water receptors which are vulnerable to MADs will be identified in future environmental reporting.
Groundwater - non drinking water source	
Historic environment	This category is limited to Grade I listed buildings, scheduled monuments, and conservation areas. In total, there are a total of 5 Grade I Listed Buildings and 8 Scheduled Monuments within the Scoping red line boundary. Those receptors which are vulnerable to MADs will be identified in future environmental reporting.
Fresh and estuarine water habitats	There are several surface water bodies in the vicinity of the Scoping red line boundary. Those receptors which are vulnerable to MADs will be identified in future environmental reporting.
Marine	

## Likely significant effects

- 16.6.11 The EIA Regulations recognise that developments will affect different environmental aspects to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are *“likely to be significantly affected by the development”*. Guidance provided by the European Commission<sup>393</sup> highlights that the context for inclusion of MADs in EIA is to ensure that adequate focus is given to the provisions for events leading to significant risk with an objective of building resilience into a development against such effects.
- 16.6.12 An initial assessment of the potential MADs scenarios associated with the Project is included in **Appendix 16A**. The likely significant MADs effects that will be taken forward for assessment are summarised in **Table 0.8**.

**Table 0.8 Likely significant Major Accidents and Disasters effects**

<b>Activity</b>	<b>Effect</b>	<b>Receptor</b>
<b>Construction Phase</b>		
<b>Intrusive works such as excavation or piling</b>	Construction works causing damage to existing utilities such as power, water, or natural gas with the potential for serious harm to the project workforce and temporary loss of supply to the public.	Project workforce
<b>Construction compounds</b>	Fire in the construction compounds with the potential to cause serious harm to the Project workforce and spread to surrounding areas.	Project workforce Human or environmental receptors
<b>Construction of the pipeline</b>	Impacts on mines or storage caverns which may lead to loss of containment or loss of structural integrity to existing underground structures, which could cause serious harm to the project workforce and any human populations associated with the mines or storage caverns.	Project workforce  Other human receptors e.g. those associated with the storage caverns
<b>Accidents during commissioning</b>	Accidents during commissioning such as a failure during pressure testing, which leads to serious harm to the Project workforce.	Project workforce
<b>Construction works affected by land movement</b>	A significant land movement, which could lead to serious harm to human populations in the vicinity of the Project.	Project workforce Human or environmental receptors
<b>External Major Accident Hazard sites</b>	A major accident occurring on an external site or third-party pipeline involving hazardous substances	Project workforce

Activity	Effect	Receptor
	causing serious harm to the Project workforce.	
<b>Operation</b>		
<b>Release of hydrogen from pipelines or HAGIs</b>	Potential fires and/or explosions which could lead to serious harm to receptors in the vicinity.	Human populations (onsite and offsite) Ecological receptors Historic Environment receptors
<b>Building fires at HAGIs during operation</b>	Fire at a HAGI site which could cause damage to the pipework and equipment which may cause a leak of hydrogen. Potential for escalation of fires and/or explosions which could lead to serious harm to receptors in the vicinity.	Human populations (onsite and offsite) Ecological receptors Historic Environment receptors
<b>Pipeline or HAGIs affected by a significant land movement</b>	Damage to the pipeline causing a significant release of hydrogen. Potential fires and/or explosions which could lead to serious harm to receptors in the vicinity.	Human populations (onsite and offsite) Ecological receptors Historic Environment receptors

16.6.13 At this stage, no receptors have been scoped out of further assessment, however, only those receptors which could be credibly affected by those potential MADs described in **Table 0.8** will be considered in the ES.

16.6.14 An assessment of the potential MADs is included in **Appendix 16A**. The effects scoped out from further assessment are:

### *Internal Major Accidents*

- Accidents during maintenance would be managed through good design of the assets and procedural controls in place under the Management of Health and Safety at Work Regulations, which will reduce risk to ALARP.
- Physical accidents during construction including dropped objects, excavation hazards and use of plant machinery. All construction activities would be managed in compliance with the CDM Regulations and through the COCP, which will require risk assessment of all activities to be undertaken and reduced to ALARP.

- Construction works encountering UXO during intrusive construction works is proposed to be scoped out. The UXO hazard across the Study Area is mostly low with some areas of moderate hazard based upon historical bombing. There are well developed construction industry practices that will be applied and which have allowed the safe construction of numerous recent projects in low and moderate hazard areas.
- Construction phase traffic accidents will be assessed in **Chapter 11: Traffic and Transport**.
- Impacts of the Project on aviation would be minimal due to the physical separation of the Project from any airports (>5km at the nearest point) and further mitigated through compliance with good practice such as the Airport Operators Association guidance notes.
- Impact on/from transport networks will be managed through the proper design and construction of network crossings. Construction works would be undertaken in compliance with the CDM Regulations and in accordance with methodologies, which will be agreed with the relevant stakeholder (highways authority/rail network).
- Impact on/from waterways would be managed through the proper design and construction of waterway crossings. Construction works would be undertaken in compliance with the CDM Regulations and in accordance with methodologies, which will be agreed with the relevant stakeholder (notably the Environment Agency).
- Leaks and spills would be managed through compliance with construction good practice as described in the embedded measures included in **Chapter 12: Ground Conditions**.
- Structural collapse will be prevented through the proper design of the assets and construction practices in compliance with CDM and the Building Regulations.

### *External Major Accidents - Industrial*

- Aircraft crash is scoped out from further EIA due to the distance of the Project from an airport and the relatively small size of the Project in each location will therefore have a minimal impact on the risk of any such event.
- External major accidents at nuclear facilities are scoped out as the spatial extent of the Project elements do not overlap with the Emergency Planning Zones of any Nuclear Licensed Sites.
- Loss of utility supply to the Project is scoped out as it is not considered that loss of supply would have consequences that would be considered to be a major accident<sup>419</sup>.

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<sup>419</sup> Note that the need for an assessment of potential effects from loss of supply to users, and the approach to such an assessment, is being considered by the Applicant.

### External Major Accidents – Malicious Actions

- Cyber attack is scoped out, as it is not considered that a successful cyber attack would have consequences that would be considered to be a major accident. Further details are provided in **Appendix 16A, Table 16A.1**.
- Terrorism is scoped out as the Project represents a low risk target with relatively small receptor populations, and therefore has a negligible impact on the wider risk of terrorism. Further details are provided in **Appendix 16A, Table 16A.1**.
- Widespread public disorder is scoped out as the Project would have a negligible impact on the risk of widespread public disorder. Further details are provided in **Appendix 16A, Table 16A.1**.

### Disasters

- Biological threats are scoped out as the Project will not significantly alter the risk of biological threats such as epidemic diseases or animal diseases.
- Dam breach/reservoir failure will be assessed as required in any Flood Risk Assessment which is scoped in **Chapter 7: Water Environment**.
- Extreme weather would be managed through good design of the Project to accommodate all foreseeable design loads which will account for the effects of climate change. The potential effects of climate change are described in **Chapter 17: Climate Change**.
- Flood risk will be assessed in **Chapter 7: Water Environment**.
- Lightning hazards are scoped out as they are considered to be effectively mitigated through compliance with a good design standard such as BS EN 62305 which will reduce the risk to ALARP. Suitable protection would be provided to construction phase structures and equipment through the CEMP.
- Seismic hazards are scoped out as the potential harm arising from seismic hazards are not considered to be significant enough to meet the threshold of a disaster.
- Space weather is scoped out as the potential harm arising from severe space weather is not considered to be significant enough to meet the threshold of a disaster.

## 16.7 Assessment methodology

16.7.1

The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**, specifically in Section 4.3. However, whilst this has informed the approach that has been used in this chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the MADs assessment in the ES.

## General methodology approach

- 16.7.2 There is no established guidance on the assessment of MADs within the context of EIA in the UK. Two clear principles have emerged from existing EIA guidance<sup>393,394</sup>. These have been adopted in the methodology described below; firstly, the principle of proportionality and secondly, the established principle that only those effects likely to be significant need to be assessed within the EIA.
- 16.7.3 The approach described herein is aligned to the European guidance made available by the EC<sup>393</sup>. The context of the guidance for MADs is that the scope covers those MADs which could impede the Project's activities and objectives and may have adverse effects upon receptors. The focus of the assessment will therefore recognise significant risk arising from MADs and which may lead to potential significant environmental effects, thereby building resilience into the scheme and reducing the vulnerability of the Project.
- 16.7.4 MADs are by their nature, high consequence events (if they occur) and are 'unplanned' with the effects not part of the intended design, construction or operational intent. The assessment of significant effects for MADs focuses on the risk, which is the combination of the severity of harm, sensitivity of the receptor and likelihood of occurrence.
- 16.7.5 Risk tolerability for MADs in the UK is built on the principle of eliminating intolerable risks, and to ensure, particularly at engineering design stages, that any residual risks are further minimised where 'reasonably practicable'. This principle has been applied in the assessment here, with 'intolerable risk' interpreted as equivalent to 'significant adverse effects'.
- 16.7.6 A significant adverse effect for MADs is one which would result in the following consequences, with a likelihood that the effect is considered intolerable to general society, based on commonly accepted benchmarks for what is intolerable:
- Serious damage to human populations – This includes harm which would be considered substantial i.e. death(s), multiple serious injuries or a substantial number requiring medical attention.
  - Serious damage to the environment – Loss or significant detriment to populations of species or organisms, designated sites, cultural heritage sites, contamination of drinking water supplies, ground or groundwater, or harm to environmental receptors in line with other UK major accident regulations.
- 16.7.7 A significant effect could include both immediate and delayed effects. An immediate effect would be one that is self-evident at the time of the event (e.g. fire damage, injury). A delayed effect is one which becomes evident only after time (e.g. loss of feeding resources for a particular species leading to a change in ecosystem dynamics).
- 16.7.8 The proposed methodology is qualitative as the design is at the planning stage. After consent is granted and the design advances through detailed engineering design stages, additional risk assessments (qualitative and where necessary quantitative) will be undertaken as part of the normal pre-construction design process, to account for all relevant emerging and requirements.
- 16.7.9 The assessment approach will:

- Identify potential receptors;
- Identify potential MADs arising from or affecting the Project;
- Assess whether any credible pathways exist (i.e. the link between an event and a receptor);
- Qualitatively assess the harm/damage which could be caused to the receptor to:
  - ▶ Eliminate those effects which do not meet the minimum threshold of serious damage from a major accident/disaster; and, if the threshold is met;
  - ▶ Estimate the magnitude of accidents and disasters (if they were realised), at the receptor.
- Qualitatively assess the likelihood of the effect, considering the range of impacts which may be associated with the source/initiator of an accident/disaster and taking into account the measures embedded in the Project which would reduce their occurrence and/or severity; and
- Establish whether there are any significant (i.e. intolerable) effects from MADs.

## Assessment of effects

- 16.7.10 As noted above, a significant effect for MADs focuses on risk. This differs from the way in which many other topics in the EIA context are addressed. Typically, other topics examine effects that are considered likely to occur and therefore such effects are unlikely to meet the thresholds required to be considered a major accident or a disaster.
- 16.7.11 This chapter considers the potential for MADs which are reasonably foreseeable but unplanned events with the effects not part of the intended design, construction or operational intent. These are typically by their nature very infrequent but are important considerations so that resilience against them can be built into a project at planning stage, and to provide sufficient information for informed decisions to be made for planning purposes. Resilience is built by ensuring that high consequence events are eliminated or, where elimination is not possible, reduced to such an extent the chance of them occurring is so small that they can be deemed not to be significant.
- 16.7.12 Risk tolerability for people is well established in the UK. The primary reference for this is HSE's R2P2<sup>392</sup>. The CDOIF<sup>396</sup> and R2P2 criteria will be used for this assessment to provide a consistent basis for the study against common benchmarks for MADs applied across the UK.
- 16.7.13 The following factors are important in defining the criteria:
- Magnitude of change – the consequence thresholds of MADs are established from the following dimensions and intrinsically account for receptor sensitivity;
    - ▶ Severity of harm (a combination of extent and damage potential); and
    - ▶ Duration of harm (the recovery period) for non-human receptors or the numbers of people affected for human receptors.



- Likelihood of the event occurring.

16.7.14 These combine to provide a measure of risk (i.e. the combination of the serious damage arising from a potential event and its likelihood of occurrence). The fact that the Project is currently in the planning stage means that the estimates are necessarily qualitative and based on by expert judgement informed by comparison against experience in similar industries and for similar developments, where possible and practical.

**Magnitude of change**

16.7.15 In order to distinguish between potential major accidents of differing severities, all potential MADs are categorised into one of four magnitude of change categories: Low, Medium, High and Very High. Any scenario which does not meet the criteria of a Major Accident or Disaster, then it is simply listed as ‘Not MA&D’. Magnitude of change within the context of MADs is assessed from both the severity of the harm, and either the duration over which the receptor experiences that harm or the number of people affected.

16.7.16 The criteria for severity of harm developed for a range of non-human receptor types were extracted directly from the CDOIF guidance and further receptor types for human populations were established to align to HSE’s R2P2. The severity of harm criteria are given in **Appendix 16B**.

- 16.7.17 Four categories of harm severity are considered:
- **Not Significant:** This level of harm is below the minimum threshold determined for a major accident or disaster in the CDOIF guidance and in R2P2; and
  - **Severe, Major, Catastrophic:** These represent increasing levels of damage or harm to populations or environmental receptors.

16.7.18 For non-human receptor types, four categories of duration are considered: Short, Medium, Long and Very Long Term.

16.7.19 The combination of harm severity and harm duration for non-human receptors to determine magnitude of change is given in **Table 0.9**.

**Table 0.9 Magnitude of change matrix – non-human receptors**

<b>Severity of Harm</b>	<b>Very Large</b>		High	Very High	Very High
	<b>Large</b>		Medium	High	Very High
	<b>Severe</b>		Low	Medium	High
	<b>Not Significant</b>	Not MA&D			
		<b>Short</b>	<b>Medium</b>	<b>Long</b>	<b>Very Long</b>
		<b>Duration of harm</b>			

16.7.20 For human receptors, the number of people affected is accounted for in assigning the magnitude of change, this ensures appropriate alignment to HSE R2P2 concepts. The combination of harm severity and people affected for human receptors to determine magnitude of change is given in **Table 0.10**.

**Table 0.10 Magnitude of change matrix – Human receptors**

<b>Severity of Harm</b>	<b>Very Large</b>	Very High	<b>Very high</b>	<b>Number of people affected</b>
		High	<b>Low to high</b>	
	<b>Large</b>	Medium		
	<b>Severe</b>	Low		
	<b>Not Significant</b>	Not MA&D		

16.7.21 Potential MADs that have been assigned a magnitude of change are further assessed for significance, unless they are eliminated under any of the following cases:

- Although a source, pathway and receptor are present it is unrealistic to consider that major accident or disaster consequences could occur, even if theoretically credible;
- The magnitude of damage, when assessed without taking into account mitigation, does not meet the threshold for major accident or disaster;
- If the ‘source’ does not directly cause a major accident but influences the sequence of events leading to a major accident / disaster being realised, the influence of the source is integrated into the event scenario assessment but is not assessed further as a standalone scenario. This includes:
  - ▶ Conditions such as snow and rain that make driving more dangerous, but do not directly cause accidents – these are considered as causal factors; and
  - ▶ Impairment of an embedded environmental measure such as damage to a secondary containment designed to contain hazardous spillages – this does not cause release, but if a spillage occurs while it is damaged the consequences are more likely to be major accident – these are considered in the assessment of likelihood.

### Determination of significance

16.7.22 Guidance provided by the EC<sup>393</sup> highlights that the context for inclusion of MADs in EIA is to ensure that adequate focus is given to the provisions for events leading to significant risk with an objective of building resilience into a development against such effects. The threshold for what may be considered significant (i.e. what can be considered to be intolerable) therefore includes much less frequent effects than are addressed in many other topic chapters. Lesser magnitude events are generally tolerated much more readily than those of higher magnitude.

- 16.7.23 **Table 0.11** presents the magnitude of change and a qualitative likelihood scale to determine whether the risk is significant. In the assessment, a significant effect would represent a level of risk that would generally be considered intolerable.
- 16.7.24 The assessment will apply expert judgement to evaluate the likelihood of each potential major accident or disaster occurring, once the mitigation is applied. The likelihood and risk reported is that above the baseline (i.e. the incremental likelihood and risk). This is the risk that can be attributed to the development directly or indirectly.
- 16.7.25 While qualitatively stated, the definition and classifications used for likelihood are designed to be compliant with HSE’s R2P2<sup>392</sup> for societal risk, and CDOIF<sup>396</sup> for environmental tolerability, if considered on a per effect basis rather than in terms of aggregated risk (i.e. the risk from all contributors to a receptor). Expert judgement has been used to establish the appropriate qualitative parameters for likelihood categorisation, with levels used ranging from ‘Remote chance of occurring’ through to ‘Reasonable chance of occurring’. These then provide an allocation of likelihood against magnitude to determine risk significance, which in turn is an approach that is consistent with major accident tolerability perceptions commonly applied elsewhere in the UK.

**Table 0.11 Significance matrix – Major Accidents and Disasters**

Magnitude of change	Likelihood (per receptor per effect)				
	Remote chance of occurring	Very small chance of occurring	Small chance of occurring	Chance of occurring	Reasonable chance of occurring
<b>Very high</b>	Not significant	Significant	Significant	Significant	Significant
<b>High</b>	Not significant	Not significant	Significant	Significant	Significant
<b>Medium</b>	Not significant	Not significant	Not significant	Significant	Significant
<b>Low</b>	Not significant	Not significant	Not significant	Not significant	Significant

# Climate Change

## 17.1 Introduction

- 17.1.1 The Climate Change assessment will consider the likely significant effects in relation to both emissions of Greenhouse Gases (GHGs) from the construction and operation of the Project and the resilience of the Project to climate change.
- 17.1.2 This section of the Scoping Report describes the methodology to be used within the Environmental Impact Assessment (EIA), the datasets to be used to inform the EIA, an overview of the baseline conditions, the likely significant effects to be considered within the EIA, and how these likely significant effects will be assessed for the purpose of an EIA. In accordance with Schedule 4, paragraph 5(f) of the EIA Regulations<sup>420</sup>, this chapter considers climate change in two ways:
- the Greenhouse Gas (GHG) assessment: The impact of the Project on the climate; and
  - the Climate Change Resilience (CCR) assessment: The vulnerability of the Project to climate change.
- 17.1.3 The wider HyNet North West project is expected to provide an overall benefit to the climate in relation to GHG emissions, however this benefit is not included in the scope of the GHG assessment for the Project. The wider benefits of the HyNet North West project are described in **Chapter 1: Introduction**, paragraph 1.1.2. The GHG assessment described in this chapter will be undertaken by considering the total GHG emissions associated with the construction, operation and maintenance of the Project considered for this Development Consent Order (DCO) application.
- 17.1.4 Climate Change interfaces with many other aspects and as such, should be considered alongside these topics:
- **Chapter 5: Biodiversity;**
  - **Chapter 7: Water Environment;** and
  - **Chapter 9: Air Quality.**

## 17.2 Assumptions and limitations

- 17.2.1 Please refer to **Chapter 2: The Project** for the parameters on which this scoping report is based.

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<sup>420</sup> UK Government (2107). The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 Schedule 4 (Online). Available at: <https://www.legislation.gov.uk/ukxi/2017/571/schedule/4/made> (Accessed 24 November 2021).

17.2.2 The GHG assessment will have the following limitations, which will be managed by making appropriate assumptions:

- Limitations in design information. Specific design information, which will be required, but is currently not available, includes the types and amounts of materials to be used for construction. This data will be gathered as part of future environmental reporting, and where it is not available, suitable assumptions will be made in agreement with the design team and will be made clear in the Preliminary Environmental Information Report (PEIR) and Environmental Statement (ES) respectively.

17.2.3 The CCR assessment is associated with a range of assumptions and limitations including:

- Uncertainties with climatic trends and how they are presented at the regional scale. For the CCR assessment, a range of projections would be used from UK Climate Projections 2018 (UKCP18). The full details and references of data used from UKCP18 are contained in **Section 17.5**.
- Limited design information is available at this stage. Design information will be gathered to be used in the CCR assessment in future environmental reporting.

## 17.3 Relevant legislation and technical guidance

17.3.1 This section identifies the relevant legislation and guidance, which has informed the scope of the assessment relevant to climate change. Information on policies relevant to the EIA are set out in **Chapter 3: Legislation and policy overview**. **Appendix 3A** provides a table of national and local policy of relevance to each technical topic.

### Legislation

17.3.2 A summary of the relevant planning policies related to the GHG assessment and the CCR assessment is given in **Table 0.1** and **Table 0.3** respectively.

**Table 0.1 Legislation relevant to the GHG assessment**

Legislation	Legislative context	Section considered
<b>Climate Change Act 2008<sup>421</sup> (including The Climate Change Act 2008 (2050 Target)</b>	This Act, as amended in 2019, commits the UK to reduce its net GHG emissions by at least 100% below 1990 levels by 2050 (the 'UK carbon target', often referred to as 'net zero') and requires the Government to establish 5-year carbon budgets. The Act also established an independent expert body, the Committee on Climate Change, to advise the Government on the level of those emissions	All sections, especially <b>Section 17.8: Assessment Methodology</b>

<sup>421</sup> UK Government (2008). Climate Change Act 2008 (online). Available at: <https://www.legislation.gov.uk/ukpga/2008/27/contents> (Accessed December 2021).

Legislation	Legislative context	Section considered
<b>Amendment) Order 2019<sup>422)</sup></b>	targets and report on progress made to reduce emissions.	
<b>The Carbon Budgets Order 2009<sup>423</sup></b>	This legislation implements the carbon budgets set out in the Climate Change Act 2008. The budgets require the UK to continually reduce emissions in line with the carbon reduction commitments established under that Act.	All sections, especially <b>Section 17.8: Assessment Methodology</b>
<b>Energy Act 2016<sup>424</sup></b>	The Energy Act 2016 is a UK Act of Parliament relating to UK enterprise law and energy in the UK. It covers three main areas, establishes the new Oil and Gas Authority, sets out the formal powers of the OGA and sets out the closure of Renewables Obligation for onshore wind in England, Wales and Scotland.	All sections
<b>Environment Act 2021<sup>425</sup></b>	The Environment Act received Royal Assent in 2021. This Act replaces EU environmental frameworks and has been produced as a result of the UK leaving the EU.  The Environment Act 2021 makes provisions about targets, plans and polices for improving the natural environment.	All sections

17.3.3 All carbon budgets that have been legislated will be considered in the GHG assessment. The timescale of these budgets covers the construction period and the operational period of the Project. The total UK budgets, expressed in the form of million tonnes of carbon dioxide (CO<sub>2</sub>) equivalent (million tCO<sub>2e</sub>), are detailed in **Table 0.2**.

<sup>422</sup> UK Government (2019). The Climate Change Act 2008 (2050 Target Amendment) Order 2019 (online). Available at: <https://www.legislation.gov.uk/ukxi/2019/1056/contents/made> (Accessed December 2021).

<sup>423</sup> UK Government (2009). The Carbon Budgets Order 2009 (online). Available at: <https://www.legislation.gov.uk/ukxi/2009/1259/contents/made> (Accessed December 2021).

<sup>424</sup> UK Government (2016). Energy Act 2016. (Online) Available at: <https://www.legislation.gov.uk/ukpga/2016/20/contents> (Accessed December 2021).

<sup>425</sup> UK Government (2021). Environment Act 2021. (Online) Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted> (Accessed December 2021).

Table 0.2 UK Carbon Budgets

Budget	Carbon budget level (million tCO <sub>2e</sub> )	Reduction below 1990 levels	Legal status
3 <sup>rd</sup> Carbon Budget (2018 to 2022)	2,544	37% by 2020	Statute
4 <sup>th</sup> Carbon Budget (2023 to 2027)	1,950	51% by 2025	Statute
5 <sup>th</sup> Carbon Budget (2028 to 2032)	1,725	57% by 2030	Statute
6 <sup>th</sup> Carbon Budget (2033 -2037)	965	78% by 2035	Statute
Net Zero Target	0	100% by 2050	Statute

Table 0.3 Legislation relevant to the CCR assessment

Legislation	Legislative context	Section considered
<b>UK Climate Change Act 2008 (as amended)</b>	<p>The Climate Change Act 2008 requires the Government, on a regular basis, to assess the risks to the UK from the impact of climate change and report the findings back to Parliament.</p> <p>The Act contains the Adaptation Reporting Power, which allows Government to ask certain organisations to produce reports on both their climate change risks and their adaptation plans. The current third round of reporting includes gas providers such as the Applicant.</p> <p>The Act also requires the Government to lay before Parliament five-yearly climate change risk assessments (CCRA) detailing current and predicted impacts of climate change. The Third CCRA was published in 2021<sup>426</sup>.</p>	All sections

<sup>426</sup> Betts, R.A. and Brown, K, (2021). Introduction. In: The Third UK Climate Change Risk Assessment Technical Report (Betts, R.A., Haward, A.B. and Pearson, K.V.(eds.)). Prepared for the Climate Change Committee, London

## Technical Guidance

17.3.4 A summary of the relevant technical guidance is given in **Table 0.12** and **Table 0.13**.

**Table 0.4** Technical guidance relevant to the GHG assessment

Technical Guidance Document	Context	Section considered
<b>Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance</b> <sup>427</sup>	<p>Provides guidance on assessment and mitigation of GHG emissions within an EIA context and is the primary source of guidance for assessing GHG emissions. It includes a focus on proportionate and robust assessment. The Institute of Environmental Management and Assessment (IEMA) guidance is based on the five IEMA Principles on Climate Change Mitigation and EIA:</p> <ol style="list-style-type: none"> <li>1. <i>“The GHG emissions from all projects will contribute to climate change; the largest inter-related cumulative environmental effect.</i></li> <li>2. <i>The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive – e.g. population, fauna, soil etc.</i></li> <li>3. <i>The UK has legally binding GHG reduction targets – EIA must therefore give due consideration to how a project will contribute to the achievement of these targets.</i></li> <li>4. <i>GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant.</i></li> <li>5. <i>The EIA process should, at an early stage, influence the location and design of projects to optimise GHG performance and limit likely contribution to GHG emissions.”</i></li> </ol> <p>The GHG assessment will assess the impact of the Project by contextualising against local and national carbon targets.</p>	<b>Section 17.8: Assessment Methodology</b>

<sup>427</sup> IEMA (2017). Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance. (online). Available at: [https://www.iaia.org/pdf/wab/EIA%20Guide\\_GHG%20Assessment%20and%20Significance\\_IEMA\\_16May17.pdf](https://www.iaia.org/pdf/wab/EIA%20Guide_GHG%20Assessment%20and%20Significance_IEMA_16May17.pdf) (Accessed December 2021).



Technical Guidance Document	Context	Section considered
<b>Publicly Available Standard (PAS) 2080: 2016 – Carbon management in infrastructure</b> <sup>428</sup>	PAS 2080:2016 provides an approach to reducing GHG emissions from infrastructure projects including working with stakeholders throughout the project lifecycle.	<b>Section 17.4: Consultation and Section 17.8: Assessment methodology</b>
<b>The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (GHG Protocol)</b> <sup>429</sup>	GHG Protocol provides standards and guidance for preparing a GHG emissions inventory.	<b>Section 17.8: Assessment methodology</b>

**Table 0.5** Technical guidance relevant to the CCR assessment

Technical Guidance Document	Context	Sections considered
<b>UK Climate Projections 2018 (UKCP18)</b> <sup>430</sup>	UKCP18 has been produced by the Met Office and provides the latest set of climate change projections for the UK. It includes projections of how key climate parameters could change in the coming decades, through absolute values or anomalies from the baseline. UKCP18 projections will be used in the climate hazard assessment (see section 16.14). Should a new version of UK Climate Projections be produced during the	<b>Section 17.5: Future Baseline</b>

<sup>428</sup> The Green Construction Board, Construction Leadership Council (2016). PAS 2080:2016 Carbon Management in Infrastructure. BSI; Lincoln, UK

<sup>429</sup> World Resources Institute and World Business Council for Sustainable Development (2004). The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (online). Available at: <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf> (Accessed December 2021).

<sup>430</sup> Met Office (2021). UKCP18 UK Climate Projections Data (Online). Available at: <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/download-data> (Accessed December 2021).

Technical Guidance Document	Context	Sections considered
	assessment period, they will be used instead of UKCP18.	
<b>UKCP18 technical notes including<sup>430</sup>:</b> <ol style="list-style-type: none"> <li><b>Science Overview Report</b></li> <li><b>UKCP18 Land projections: Science Report</b></li> <li><b>UKCP18 Factsheets</b></li> </ol>	The UKCP18 technical notes provide qualitative information on projections for future time periods. These technical notes will be used in the climate hazard assessment when relevant projections are not available.	<b>Section 17.5: Future Baseline</b>
<b>ISO14091:2021 Adaptation to climate change – Guidelines on vulnerability, impacts and risk assessment<sup>431</sup></b>	This international standard provides guidelines on approaches to assessing climate change-related risks. It states that <i>“risk assessments improve planning of adaptation to climate change and inform the implementation and monitoring of climate change adaptation activities”</i> .	<b>Section 17.8: Assessment methodology</b>
<b>EIA Guide to: Climate Change Resilience and Adaptation 2020<sup>432</sup></b>	This IEMA guidance provides a framework for the effective consideration of climate change resilience and adaptation in the EIA process. The methodology for the Vulnerability to Climate Change assessment will align closely with this guidance.	<b>Section 17.7: Scope of Assessment and Section 17.8: Assessment methodology</b>
<b>UK Climate Change Risk Assessment 2017<sup>433</sup></b>	The CCRA 2017 fulfils the requirement under the Climate Change Act 2008 for the Government to produce a five-yearly assessment of the risks for the UK of the current and predicted impacts of climate	<b>Section 17.8: Assessment methodology</b>

<sup>431</sup> International Organization for Standardization (2021). ISO14091:2021 Adaptation to climate change — Guidelines on vulnerability, impacts and risk assessment. ISO; Geneva, Switzerland.

<sup>432</sup> IEMA (2020). EIA Guide to: Climate Change Resilience and Adaptation (Online). Available at: <https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020> (Accessed December 2021).

<sup>433</sup> Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017 Synthesis Report: priorities for the next five years. (Online). Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Synthesis-Report-Committee-on-Climate-Change.pdf> (Accessed December 2021).

Technical Guidance Document	Context	Sections considered
	change. The assessment methodology presented in this Chapter aligns closely with the CCRA.	
<b>Climate Change Adaptation Manual (NE751)</b> <sup>434</sup>	The Climate Change Adaptation Manual (NE751) has been updated in 2020. It is designed to support practical and pragmatic decision-making on considering climate change adaptation for impacts on habitats, green infrastructure, geology and geomorphology, access and recreation.	<b>Section 17.7: Scope of Assessment and Section 17.8: Assessment methodology</b>

## 17.4 Consultation

- 17.4.1 Consultation will be held with relevant statutory and non-statutory organisations as necessary and as part of the wider stakeholder engagement programme. This will be through both informal and statutory consultation throughout the pre-application stages of the Project. The outcome of the consultation will be recorded within the PEIR and ES respectively.
- 17.4.2 For the CCR assessment, consultation will be undertaken with the host Local Authorities, the Environment Agency and Natural England as part of the statutory consultation. Support will be given where consultation intersects with and is led by other topics, for example Water Environment.

## 17.5 Baseline conditions

- 17.5.1 This section sets out the current baseline for the Project in relation to the Climate Change topic and a summary of the future baseline which the assessments will be based on.

## Greenhouse Gases

### *Data gathering methodology*

- 17.5.2 No data sources have been accessed to inform the baseline for the GHG assessment at this stage. Data sources which will be used in future environmental reporting are included in **Table 0.8** and are discussed in paragraphs 17.8.6 and 17.8.7.

<sup>434</sup> Natural England and RSPB (2019). Climate Change Adaptation Manual - Evidence to support nature conservation in a changing climate, 2nd Edition. (Online). Available at: <http://publications.naturalengland.org.uk/publication/5679197848862720> (Accessed December 2021).

### Current baseline

17.5.3 The 3<sup>rd</sup> carbon budget reported in **Table 0.2** can be considered as the current baseline.

### Future baseline

17.5.4 As indicated by the carbon budgets in **Table 0.2**, GHG emissions are expected and required to reduce in the future. The future baseline considers a number of the carbon budgets in **Table 0.2**, as future Project activities coincide with a number of carbon budgets.

## Climate Change Resilience

### Data gathering methodology

17.5.5 The following desk-based data sources were utilised to gather the information:

- Met Office North West England & Isle of Man: Climate<sup>435</sup>. This document describes the main features of the climate over a 30-year average period of 1981 – 2010.
- UKCP18 probabilistic climate change regional projections Key results<sup>436</sup>.
- UKCP18 User Interface<sup>437</sup> used to download additional data to inform future climate.
- UK CCRA 2017: Chapter 4 Infrastructure<sup>438</sup>.
- Evidence for the third UK Climate Change Risk Assessment (CCRA3) Summary for England<sup>439</sup>.

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<sup>435</sup> Met Office (2016). North West England & Isle of Man: Climate (Online). Available at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/regional-climates/north-west-england--isle-of-man-climate---met-office.pdf> (Accessed December 2021).

<sup>436</sup> Met Office (2018). UKCP18 Key Results: Probabilistic and sea level projections (Online). Available at: <https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Key-results.xlsx>

<sup>437</sup> Met Office (2018). UK Climate Projections User Interface. (Online). Available at: <https://ukclimateprojections-ui.metoffice.gov.uk/> (Accessed December 2021).

<sup>438</sup> Dawson, R. J. et al (2016) UK Climate Change Risk Assessment Evidence Report: Chapter 4 Infrastructure (online). Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Chapter-4-Infrastructure.pdf> (Accessed January 2022)

<sup>439</sup> UK Climate Risk (2021). Evidence for the third UK Climate Change Risk Assessment (CCRA3) Summary for England (Online). Available at: <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA-Evidence-Report-England-Summary-Final.pdf> (Accessed December 2021).

- Evidence for the third UK Climate Change Risk Assessment (CCRA3) Energy Sector Briefing<sup>440</sup>.

### Current baseline

- 17.5.6 The baseline for the climate change resilience assessment is the current climatic conditions representative of the Scoping red line boundary. They are used to provide context of the climate change impacts throughout the construction and operation of the Project. Due to the size and scale of the Scoping red line boundary, the climate data is considered at the regional scale, encompassing the north-west of England, where the Project is located.
- 17.5.7 The north-west has a wide range of climate variability, due to its topography and altitude. This region contains both the coldest place and wettest place in England. Temperatures in this region are generally affected by altitude and proximity to the coast. The exposure of the region to westerly maritime air masses, in addition to the areas of high altitude, resulted in the region containing some of the wettest places in the UK.
- 17.5.8 Key features of the climate that have defined the area over the last 30-year period (1981-2010)<sup>441</sup> include:
- Temperatures in the coldest month of January have typically ranged from 0°C to 2 - 2.5°C along the coasts and in Merseyside. The warmest month is typically July with mean daily maximum temperatures of around 21°C in Cheshire. This varies for the upland areas which is typically around 17°C. Extreme temperatures have been experience in the region in this period, which include a temperature of 34.5°C recorded in Knutsford, Cheshire in 1990 and a heat wave in July 2006 where 34.3°C was experienced in Crosby, Merseyside.<sup>435</sup>
  - Rainfall has been generally well-distributed throughout the year with a seasonal pattern. The total number of days with rainfall of 1mm or more ('wet days') can reach 50 – 60 days within winter, decreasing to 40 - 45 days in summer. Cheshire and Merseyside are typically drier with 35 - 40 days in winter and about 30 days in summer.
  - The region is prone to widespread flooding, especially in winter and early spring. There have been a number of severe flooding events over this period.
  - The occurrence of thunderstorms correlates with the heaviest falls of rain, often associated with summer thunderstorms. On the mainland, it is typical that there will be 8 - 12 thunderstorm days per year.
  - The north-west region is also amongst the most exposed parts of the UK due to the coastal areas of the Atlantic and the large upland areas. Mean wind speeds and gusts are the strongest between December to February. Wind

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<sup>440</sup> UK Climate Risk (2021). Evidence for the third UK Climate Change Risk Assessment (CCRA3) Energy Sector Briefing (Online). Available at: <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA3-Briefing-Energy.pdf> (Accessed December 2021).

<sup>441</sup> The Met Office utilise 30-year climate periods of which this is the period of most recent observable data available.

exposure can also be measured in the number of days gale force is reached; if wind reaches a mean speed of 34 knots or more over any ten consecutive minutes, this is classed as a gale day. On the mainland within the region, gales occur along the coast for around 5 – 10 days and less than 5 days in inland areas.

17.5.9 Key data from the 1981 – 2010 period is contained within Table 0.6.

**Table 0.6 Baseline climate data 1981 - 2010**

1981 - 2010	Nearest weather station – Woodford, England	Regional: Northwest of England and North Wales	England
Monthly average rainfall (mm)	72.25	109.87	71.11
Days of rainfall > 1mm (days)	151.72	166.7	133.01
Minimum Annual Temperature (°C)	5.52	5.53	5.85
Maximum Annual Temperatures (°C)	13.23	12.34	13.47
Mean wind speed at 10m (knots)	7.52	9.46	8.35
Air frost (days)	44.8	51.72	49.7

### Future baseline

17.5.10 The UK Climate Projections 2018 (UKCP18)<sup>430</sup> provide probabilistic data on projected climate variables for the UK for administrative regions. The data provides projections until the end of the 21<sup>st</sup> century for different emissions scenarios, known as Representative Concentration Pathways (RCP).

17.5.11 RCP8.5 is considered a high emissions pathway and represents a potential future which is slow to transfer to low-carbon energy provision. With progress toward achieving National Determined Contributions, RCP8.5 is considered a possible, but conservative, emission scenario suitable for evaluating the climate resilience of long-lifetime projects.

17.5.12 The future baseline is used to set out general climatic conditions that would be experienced over the project lifetime based on the following:

- The construction period is anticipated to be over three years from 2025 to approximately 2028, with minimal expected climate change from the baseline.

- The anticipated asset design life of the Project is 40 years, with an anticipated end of design life in 2068. This is considered within the 2070s climate period (2060 – 2079). More significant climate changes are anticipated by the end of the project design life and beyond. The 2090s data was excluded from this assessment as this time period is beyond the asset design life.

**Table 0.7 Future climate projections for the north-west of England from UKCP18**

Climate variable		Time period and projected change <sup>442</sup>		
		2030s (2020 – 2039)	2050s (2040 – 2059)	2070s (2060 – 2079)
Mean temperature change (Summer) (°C)	10%	0.2	0.6	1.2
	50%	1	1.8	3
	90%	1.8	3.2	4.9
Mean temperature change (Winter) (°C)	10%	0.1	0.5	0.8
	50%	0.9	1.6	2.4
	90%	1.8	2.8	4.1
Maximum temperature anomaly (Summer) (°C)	10%	0.1	0.7	1.2
	50%	1.2	2.2	3.2
	90%	2.3	3.8	5.5
Minimum temperature anomaly (Winter) (°C)	10%	-0.01	0.3	0.6
	50%	0.8	1.5	2.3
	90%	1.8	2.9	4.3
Mean precipitation change (Winter) (%)	10%	-6	-5	-3
	50%	4	7	13
	90%	13	21	33
	10%	-19	-32	-44
	50%	-6	-15	-23

<sup>442</sup> UKCP18 science reports, key messages, maps and graphs uses a 20-year baseline period of 1981 – 2000 to present the projected change in climate variables associated with climate change.

Climate variable	Time period and projected change <sup>442</sup>			
Mean precipitation change (Summer) (%)	90%	8	0	-3
1-day total winter precipitation (mm)	10%	40.7	42	43.3
	50%	49	51	53.4
	90%	60.2	63.1	67.3
1-day total summer precipitation (mm)	10%	49.8	49.5	48.4
	50%	64.2	65.3	66.6
	90%	85.1	88.5	94
5-day total winter precipitation (mm)	10%	84.2	85.6	86.6
	50%	95.3	98.2	101.8
	90%	110.4	115.9	123.9
5-day total summer precipitation (mm)	10%	88.9	86.8	83.1
	50%	100.4	100.9	102.1
	90%	114	119.1	126.4
Sea Level Rise Anomaly (m)	10%	0.05	0.13	0.23
	50%	0.08	0.18	0.31
	90%	0.1	0.23	0.42

17.5.13 **Table 0.7** shows the projected changes in future climate variables across the chosen time periods. Mean temperatures are increasing across all seasons but especially in the summer. The extremes are greater than the mean values, with extreme maximum temperatures increasing throughout the time periods. This could lead to frequent and prolonged hot spells. Hot spells are defined as maximum temperatures exceeding 30°C for two or more consecutive days. By the 2070s the frequency of hot spells is expected to increase.<sup>443</sup>

17.5.14 Precipitation (rainfall) is anticipated to increase in the winter months, with a clear shift to drier summers across all time periods. Summer rainfall events are still

<sup>443</sup> Met Office (2018). UKCP18 Headline Findings (online). Available from: [https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18\\_headline\\_findings\\_v3.pdf](https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_headline_findings_v3.pdf) (Accessed December 2021).



expected and the likelihood of individual wet summers reduces only slightly<sup>444</sup>. Despite an overall trend towards drier summers, new data from UKCP18 Local suggests future increases in the intensity of heavy summer rainfall events<sup>443</sup>. This is reflected within the data for the 1-day and 5-day total summer precipitation within **Table 0.7** as it shows an increasing trend for the 50% percentile of rainfall over 5-day events.

- 17.5.15 Sea level rise over the considered time periods is expected to affect tidal characteristics substantially, however there is no evidence for significant changes in future storm surges, although confidence in this is low. Extreme sea levels will increase as a result of the rise in mean sea level.<sup>445</sup>
- 17.5.16 Additionally, UKCP18 has found an increase in surface wind speeds over the UK for the second half of the 21<sup>st</sup> century during the winter season, where more significant impacts of wind are experience. The frequency of winter storms would increase, however the increase in wind speeds is modest.<sup>446</sup>
- 17.5.17 The UKCP18 projects by the 2070s show a decrease in lying winter snow of around 80-100% for the north-west of England in both local (2.2km) and regional (12km) projections. Snowfall will also substantially decrease.<sup>447</sup>

## 17.6 Embedded environmental measures

- 17.6.1 A Code of Construction Practice will be produced prior to commencement of construction which will detail measures to be implemented to avoid or reduce climate impacts during the construction phase (via a Construction Environmental Management Plan (CEMP)). This could detail the use of certain construction materials thought to have a lower embodied carbon density (and therefore lower carbon impact) than others.
- 17.6.2 The design of the Project is in its infancy and therefore embedded mitigation to mitigate the vulnerability of the Project to climate change will be explored within future environmental reporting.

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<sup>444</sup> Met Office (2018). UKCP18 Factsheet: Precipitation (online). Available from: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-factsheet-precipitation.pdf> (Accessed December 2021).

<sup>445</sup> Met Office (2018). UKCP18 Factsheet: Sea level rise and storm surge (online). Available from:

<https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-sea-level-rise-and-storm-surge.pdf> (Accessed December 2021).

<sup>446</sup> Met Office (2018). UKCP18 Factsheet: Wind (online). Available from:

[https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-wind\\_march21.pdf](https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-wind_march21.pdf) (Accessed December 2021).

<sup>447</sup> Met Office (2108). UKCP18 Factsheet: Snow (online). Available from:

[https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18\\_factsheet\\_snow\\_jul-2021.pdf](https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_factsheet_snow_jul-2021.pdf) (Accessed December 2021).

## 17.7 Scope of the assessment

- 17.7.1 The overall scope of the GHG assessment is considered to include:
- The GHG emissions associated with the construction, operation and maintenance phases as described in **Chapter 2: The Project**; and
  - The GHG emissions associated with the material processing and transportation of materials which may occur outside of the Scoping red line boundary described in **Chapter 2: The Project**.

### Study area

- 17.7.2 The spatial extent of the Project is currently based upon the Scoping red line boundary and is defined within **Chapter 2: The Project**. The spatial extent of the Project will be updated with further refinement of the design and is likely to reduce from that currently identified.
- 17.7.3 The Study Area of the CCR assessment will be informed by the spatial extent of the Project. The interdependency of climate change resilience of infrastructure external to the spatial scope of the Project is also considered. The spatial scope for the GHG assessment will also be informed by the spatial extent of the Project, with specific influence from the construction routes taken for the transportation of materials.
- 17.7.4 The temporal scope of the GHG assessment will be consistent with the period over which the Project would be constructed and in operation – anticipated to be 40 years - and would include any maintenance activities during this period.
- 17.7.5 The temporal scope of the CCR assessment will inform the analysis of the climate variables of the future climate. The asset design life is anticipated to be 40 years, with any decommissioning works scoped out from detailed assessment, as detailed in paragraph 17.7.11. Therefore, the future climate variables will be analysed for the following time periods: the ‘2030s’ (2020 – 2039), the ‘2050s’ (2040 – 2059), and the ‘2070s’ (2060 – 2079). Using 20-year periods allows the effects of climate variability on annual to decadal time scales to be accounted for.

### Potential receptors

- 17.7.6 GHG emissions have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The global climate is therefore the only receptor for the GHG assessment.
- 17.7.7 The CCR assessment will assess the impact a climate trend could have on sensitive receptors. In this case, sensitive receptors would be those assets vulnerable to climate change and the anticipated impacts over the lifetime of the Project. This could include construction impacts to assets such as workers, temporary works and plant and equipment and the operation of the Project.

## Likely significant effects

### Greenhouse Gases

- 17.7.8 The likely significant greenhouse gas effects that will be taken forward for assessment are summarised in **Table 0.8**. This is based on phases as defined within the PAS 2080: Carbon Management in Infrastructure<sup>428</sup>. Some phases and associated GHG emissions may be scoped out from detailed assessment once more design information becomes available.
- 17.7.9 Some phases as described within the PAS are not applicable to the activities expected to be associated with the Project. For such phases, it has been stated within **Table 0.8** that this is not applicable. A description of the emission source has been provided, and commentary provided to further explain that GHG emissions associated with such aspects are not expected from the Project.

**Table 0.8 Stages of the Project considered as sources of GHG emissions and likely significant effects**

Project phase	Main stages of Project life cycle	Sources of GHG emissions and effects
<b>Pre-Construction</b>	A0 – Pre-Construction	<p>Scoped in - This stage of the Project comprises preliminary studies and works, for example strategy and brief development, design development, survey work to support EIA and engineering design, and cost planning. Most, if not all, of these functions will be largely office-based functions contributions from across the value chain.</p> <p>Pre-construction works for the Project could include pre-site surveys, ground investigations and construction compounds. This would involve GHG emissions associated with the vehicles used to make these pre-site surveys.</p>
<b>Construction</b>	A1-A2-A3 – Raw materials supply, transport and manufacture	<p>Scoped in - GHG emissions associated with the materials used to construct the pipelines and any associated Project facilities. These comprise embodied GHG emissions associated with the raw material assets required to construct the Project.</p>
<b>Construction</b>	A4 – Construction transport	<p>Scoped in - Transport of construction materials resources and equipment from point of purchase to the works site. Commuting of workforce during construction.</p>

Project phase	Main stages of Project life cycle	Sources of GHG emissions and effects
Construction	A5 - Construction process stage	<p>Scoped in - Emissions associated with construction and installation processes (including fuel and electricity consumption) of the temporary works, ground works, landscaping and permanent works. Emissions associated with site water demand.</p> <p>Waste management activities (transport, processing, final disposal) associated with waste arising from the Project.</p>
Construction	A5 - Construction process stage	Not Applicable – GHG emissions associated with land use change.
Operation	B1 - Boundary of use stage – installed products and materials	<p>Scoped out - Called 'Use', this represents the carbon emitted directly from the fabric of products and materials once they have been installed as part of infrastructure and it is in normal use.</p> <p>It is not anticipated that any of the materials used in the construction of the Project will be capable of emitting carbon directly.</p>
Operation	B2 – B5 – Maintenance, repair, replacement and refurbishment	<p>Not Applicable - Represents the works activities and new materials for the maintenance, repair, replacement and refurbishment of the infrastructure during the use stage/operation of infrastructure.</p> <p>As per the maintenance scheduled detailed in <b>Chapter 2: The Project</b>, maintenance activities mostly include less than 10 personnel, and any major maintenance requiring more will only occur periodically every 5 to 15 years. It is therefore anticipated that GHG emissions associated with the vehicles used for travel will be insignificant in comparison to construction traffic GHG emissions.</p>

<b>Project phase</b>	<b>Main stages of Project life cycle</b>	<b>Sources of GHG emissions and effects</b>
<b>Operation</b>	B6 – Operational energy	<p>Not Applicable - Emissions resulting from the energy used by the Project to enable it to deliver its service during operation. For example, the GHG emissions associated with the generation of power.</p> <p>The GHG emissions arising from the Project once operational are considered to be minimal, as minimal energy would be required to distribute hydrogen via the proposed pipeline network.</p>
<b>Operation</b>	B7 – Operational water	<p>Not Applicable - Emissions resulting from the consumption of water required by the Project to operate and deliver its service.</p> <p>It is not anticipated that the construction, operation and maintenance of the hydrogen pipelines and associated facilities of the Project would include any consumption of water.</p>
<b>Operation</b>	B8 – Other operational processes	<p>Not Applicable - Represents other process GHG emissions arising from the Project to enable it to operate and deliver its service.</p> <p>No GHG emissions associated with this aspect are considered likely to arise.</p>
<b>Operation</b>	B9 – User’s utilisation	<p>Not Applicable - Represents the activities associated with user’s utilisation of the Project during the use stage. This is defined by the principle of control and influence whereby the GHG emissions are B9 (user’s utilisation) when they arise from an activity that the user has control over.</p> <p>No GHG emissions associated with this aspect are considered likely to arise.</p>
<b>General</b>	D – Benefits and loads beyond the infrastructure life cycle	<p>Scoped in - Includes avoided carbon emissions associated with the Project including potential for re-use, recovery and recycling of materials and/or energy and associated GHG emissions beyond the system boundary. GHG benefits from</p>

Project phase	Main stages of Project life cycle	Sources of GHG emissions and effects
		avoided fossil fuel power generation have been recorded.

**Climate Change Resilience**

17.7.10 The likely significant climate change resilience effects that will be taken forward for assessment in the ES are summarised in **Table 0.9**. Scoping has been based on the assessed vulnerability of the receptors identified at this stage and has assessed the climate impact on the receptors assuming no mitigation across the lifetime of the Project. Therefore, the vulnerability assessed for the 2070s (2060 – 2079) is used to scope in any impacts.

**Table 0.9 Assessment of the likely significant effects to be scoped into the EIA**

Activity	Climate impact	Receptor
<b>Construction</b>	Extreme temperatures leading to heatwaves and an increase in maximum daily temperatures in summer	Human health (safety of construction personnel)  Third party dependencies
	Extreme precipitation events leading to an increase in fluvial and pluvial flood risk	The natural environment (contamination risk to watercourses)
		Human health (safety of construction personnel)  Third party dependencies
	Storm events leading to high winds and precipitation	Human health (safety of construction personnel)  Project assets  Third party dependencies
<b>Operation and Maintenance</b>	Increased temperatures leading to extreme heatwaves	Project assets (overheating of

Activity	Climate impact	Receptor
	and an increase in daily maximum temperatures	equipment, deterioration of infrastructure, damage to access roads)  Human health (safety of operational personnel)
	Increased temperatures and decreases in rainfall in the summer leading to drought conditions	Project assets and the natural environment (landscaping and biodiversity planting failure)
	Increased temperatures and decrease in rainfall in the summer, coupled with increases in winter rainfall leading to subsidence and shrink swell processes	Project assets (damage to pipelines and other infrastructure)  Natural environment (instability of soils, groundworks and earthworks causing environmental damage)
	High temperatures leading to changes in vegetation and the spread of invasive species and disease	Project assets and the natural environment (landscaping and biodiversity planting failure)
	Increase in frequency and severity of flood events from all sources	Project assets (damage to pipeline and other infrastructure, flooding of M&E equipment, flooding of access routes)  Natural environment (instability of landscape bunds causing

Activity	Climate impact	Receptor
		environmental damage)
		Third party dependencies
	Increased frequency of storm events	Project assets (damage)

17.7.11 The CCR effects scoped out from future assessment are those associated with the decommissioning phase of the Project. Decommissioning will likely involve leaving the pipeline in situ and the removal of all HAGIs, with land being restored to its former use. Although the exposure of the receptors during the decommissioning phase will be greater due to the anticipated climate change trends, the vulnerability of the receptor remains the same, and any outline additional mitigation measures will be detailed within the Outline Decommissioning Strategy. The measures would be similar to those procedures detailed during the construction phase.

## 17.8 Assessment methodology

17.8.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 4: The EIA Process**. However, whilst this has informed the approach that has been used in this Climate Change chapter, it is necessary to set out how this methodology will be applied, and adapted as appropriate, to address the specific needs of the GHG assessment and the CCR assessment in future environmental reporting.

### Greenhouse Gases

17.8.2 Consideration of a 'With Development' and 'Without Development' case ensures that the methodology is in line with the IEMA guidance<sup>427</sup>. The only assessment case to consider for the GHG assessment of the Project is the 'With Development' case, as future GHG emissions will be nil in the context of the 'Without Development' case.

17.8.3 The approach to the GHG assessment is to quantify and contextualise the GHG emissions of a Project. As discussed in **Section 17.7**, the GHG assessment of the Project will consider the GHG emissions associated with the construction, operation and maintenance of the Project.

### Quantification of GHG emissions

17.8.4 The approach to quantifying the GHG emissions associated with the Project will consider the whole infrastructure life cycle of the Project. The infrastructure life cycle phases as described within the PAS 2080: Carbon Management in Infrastructure<sup>428</sup> and in **Table 0.8** will be used. These phases will allow for the identification of the GHG emission sources associated with the Project. This



methodology is in line with the IEMA guidance<sup>427,448</sup>. The Project infrastructure phases as described within the PAS 2080: Carbon Management Infrastructure<sup>428</sup> and associated GHG emission sources are described in **Table 0.8**.

17.8.5 GHG emissions associated with the emission sources described in **Table 0.8** will be calculated by gathering associated activity data and combining this data with associated emission factors.

17.8.6 For transport GHG emissions, emission factors will be gathered from the BEIS greenhouse gas reporting: conversion factors 2020<sup>449</sup>. These will be combined with total traffic movements and a figure for the average distance travelled will be derived.

17.8.7 For GHG emissions associated with construction materials, embodied carbon figures reported by the Inventory of Carbon and Energy database<sup>450</sup> will be used. These will be combined with material weights which will be gathered through data requests to the Project engineers and through use of published literature.

### *Contextualisation of GHG emissions*

17.8.8 The GHG emissions impact assessment considers the significance of the Project's contribution to UK GHG emissions and the Government's ability to achieve its carbon reduction targets to meet the relevant carbon budgets set by the Climate Change Act 2008 (as amended). The total UK budgets, expressed in the form of million tonnes of carbon dioxide equivalent (million tCO<sub>2</sub>e), are detailed in **Table 0.2**.

17.8.9 The GHG emissions quantified for the GHG assessment will be reported in the form of tCO<sub>2</sub>e, which will allow the emissions of the seven key GHGs from the Kyoto Protocol Reference Manual to be accounted for: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>).

17.8.10 The contribution of the Project's GHG emissions to the UK GHG emissions, and therefore to the total UK carbon budgets will be calculated, with the significance of these contributions determined.

### *Determination of significance*

17.8.11 The current IEMA principles and guidance<sup>427,448</sup> state that due to the combined environmental effect that GHG emissions have, any GHG emissions (either positive or negative) from a project might be considered to be significant.

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<sup>448</sup>IEMA (2010). Climate Change Mitigation & EIA. (online). Available at: <https://www.iema.net/document-download/33006> (Accessed December 2021).

<sup>449</sup> Department for Business, Energy & Industrial Strategy (2020). Greenhouse gas reporting: conversion factors 2020. (Online). Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020> (Accessed December 2021).

<sup>450</sup> Circular Ecology (2019). The Inventory of Carbon and Energy (ICE) database. (Online). Available at: [Embodied Carbon Footprint Database - Circular Ecology](#) (Accessed December 2021).

Therefore, the assessment methodology will aim to determine the relative scale of the impact of the Project on global climate change by considering the sensitivity (or value) of the receptor, its impacts and the magnitude of that impact on relevant UK carbon budgets and targets at a national and local level.

### Sensitivity

17.8.12 The only receptor for the climate assessment is the global climate and this receptor is considered highly sensitive.

### Magnitude

17.8.13 The magnitude of the GHG impacts arising from the Project will be evaluated based on the following statements:

- Net increase in GHG emissions associated with the Project represents an adverse effect.
- Net reduction in GHG emissions associated with the Project represents a beneficial effect.
- The significance of the effect is dependent on the extent to which the increase/decrease in GHG emissions materially affects the ability of the UK Government to achieve its UK carbon budgets.

17.8.14 The magnitude of the GHG emissions calculated will be determined once the GHG emissions are contextualised against the UK's carbon budgets. This is described further in **Table 0.10**. Any impact which is concluded to have either a low or high impact will be considered significant. This methodology follows current IEMA guidance<sup>427,448</sup> where it is understood any net GHG emissions (either positive or negative) from a Project might be considered to be significant.

**Table 0.10 Significance criteria**

Significance	Significance criteria
<b>High (adverse)</b>	Net increases in GHG emissions associated with the Project are considered to materially affect the ability of the UK Government to meet its carbon budgets/targets. Net increases in GHG emissions which are calculated to contribute a major amount to the UK Carbon budgets will constitute as high in magnitude.
<b>Low (adverse)</b>	Net increases in GHG emissions associated with the Project are considered to not materially affect the ability of the UK Government to meet its carbon budgets/targets. Net increases in GHG emissions which are calculated to contribute only a minor amount to the UK Carbon budgets will constitute as low in magnitude.
<b>Negligible</b>	Overall, GHG emissions associated with the Project are zero, and thus there is no implication for carbon budgets/targets.

Significance	Significance criteria
<b>Low (beneficial)</b>	Net decreases in GHG emissions associated with the Project are considered to not materially affect the ability of the UK Government to meet its carbon budgets/targets. Net decreases in GHG emissions which are calculated to contribute only a minor amount to remaining within the UK Carbon budgets will constitute as low in magnitude.
<b>High (beneficial)</b>	Net decreases in GHG emissions associated with the Project are considered to materially affect the ability of the UK Government to meet its carbon budgets/targets. Net decreases in GHG emissions which are calculated to contribute a major amount to remaining within the UK Carbon budgets will constitute as high in magnitude.

## Climate Change Resilience

- 17.8.15 The assessment methodology for the Climate Change Resilience assessment is set out below. This includes undertaking vulnerability assessment based on the projected future climate variables and evaluating the vulnerability of the identified receptors across its lifetime. This will depend on the sensitivity and exposure of the receptors to the climate hazard. This will highlight climate impacts taken forward within the PEIR and ES to be assessed in a risk assessment and any further resilience measures and mitigation to embed into the design.
- 17.8.16 Climate change can have in-combination effects with other environmental effects, where climate change could exacerbate or ameliorate potential effects, or affect the efficacy of the proposed environmental mitigation in the future. This will be addressed in the cumulative effects chapter of the ES.
- 17.8.17 The CCR assessment will be undertaken by climate change topic specialists in collaboration with relevant design teams and topic specialists, e.g. flood risk engineers, ecologists, pipeline engineers.

### Compile inventory of assets and receptors

- 17.8.18 Receptors for consideration within the CCR assessment can be grouped into the following:
- Building and infrastructure receptors i.e. the Project assets, both temporary and permanent, throughout the lifecycle of the Project.
  - Human health receptors i.e. construction workers, maintenance staff.
  - Environmental receptors i.e. habitats and species associated with any landscaping and biodiversity planting.
- 17.8.19 As discussed in **Section 17.7**, the potential receptors under consideration for the CCR assessment will include temporary and permanent assets associated with the spatial scope of the Project and will be collated based on the Project design details. The asset design life for each asset will also be ascertained.

### Climate vulnerability assessment

- 17.8.20 Based on the information contained in **Section 17.7**, the future baseline will be analysed to provide an understanding of the climate hazards that have the potential to affect the Project. The climate variables would be assessed for the following future periods: the '2030s' (2020 – 2039), the '2050s' (2040 – 2059), and the '2070s' (2060 – 2079). Using 20-year periods allows the effects of climate variability on annual to decadal time scales to be accounted for. The assessment for the construction phase will focus on the 2030s (2020 – 2039).
- 17.8.21 In accordance with National Policy Statement EN-1<sup>451</sup>, the 10%, 50% and 90% probability levels will be considered in the CCR assessment as a minimum. Probabilistic climate projections, such as UKCP18, assign a probability to climate change outcomes based on a probability distribution function (PDF). For example, the 50% probability level is known as the 50<sup>th</sup> percentile where the outcome is just as likely to happen as not. The 10<sup>th</sup> percentile means that 10% of the possible outcomes fall below this level, and the 90<sup>th</sup> percentile means that 10% of the outcomes fall above this level. The RCP8.5 (high) will be used due to some safety critical elements of the Project.
- 17.8.22 As a minimum, the following climate variable would be assessed, identified as those that are most likely to influence the Project:
- Increase in mean summer temperatures.
  - Increase in mean winter temperatures.
  - Increased frequency and intensity of hot spells.
  - Decreased frequency of cold weather events (e.g. snow and ice).
  - Decrease in mean summer rainfall.
  - Increase in mean winter rainfall.
  - Increased frequency of heavy rainfall events across all seasons.
  - Increase in sea levels.
  - Increased frequency of storm events.
  - Changes in relative humidity.

### Sensitivity of the receptor to the climate impact

- 17.8.23 The sensitivity of a receptor can be defined as the “*degree to which a system or species is affected, either adversely or beneficially, by climate variability or change*”. The sensitivity analysis of the receptor is irrespective of its location. The

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<sup>451</sup> Department of Energy and Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). (Online) Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf) (Accessed December 2021).

definitions of the levels of sensitivity experienced by a receptor to the climate impact are contained within **Table 0.11**.

**Table 0.11 Definitions of levels of sensitivity of the receptor to the climate impact**

Level of Sensitivity	Definition
<b>Low</b>	The receptor has the ability to withstand/not be altered much by the projected climate impacts. It can retain much of its original function and form.
<b>Moderate</b>	The receptor has some limited ability to withstand/not be altered by the projected climate impacts. It can retain elements of its original function and form.
<b>High</b>	The receptor has no ability to withstand/not be substantially altered by the projected climate impacts. It will lose much of its original function and form.

### *Exposure of the receptor to the climate impact*

- 17.8.24 The exposure assessment will assess the degree to which the receptor would be affected by the climate impact. The definition of exposure used within ISO14091 is the “*presence of people, livelihoods, species or ecosystems, environmental functions, services, resources, infrastructure, or economic, social or cultural assets in places and settings that could be affected*”.<sup>431</sup>
- 17.8.25 The construction phase would be assessed as exposure of the construction assets to climate trends of the ‘2030s’ (2020 – 2039), and the operational phase will use analysis from all climate time periods considered in **Table 0.7**. The level of exposure will likely increase over time. Definitions of increasing levels of exposure are contained within **Table 0.12**.

**Table 0.12 Definitions of levels of exposure of the receptor to the climate impact**

Level of Exposure	Definition
<b>Low</b>	The receptor is influenced very little by the climate impact.
<b>Medium</b>	The receptor is able to tolerate a range of climate conditions but is affected by the climatic impact.
<b>High</b>	The receptor is highly affected by the climate impact and is only able to tolerate a very limited variation in climate conditions.

### *Vulnerability of the receptor*

- 17.8.26 The vulnerability of a receptor to climate impacts is defined as the “*propensity or predisposition to be adversely affected*”<sup>431</sup>. The exposure and sensitivity of the receptor to climate impacts will be assigned a level of vulnerability, as shown in

**Table 0.13.** Where the vulnerability of the receptor to a climate impact is assessed to be ‘medium’ or ‘high’, this would be considered as a significant effect and would require mitigation to improve the resilience of the receptor where possible.

**Table 0.13 Matrix showing vulnerability of receptors to climate impacts**

Sensitivity	Exposure		
	Low	Medium	High
Low	Low vulnerability	Low vulnerability	Low vulnerability
Moderate	Low vulnerability	Medium vulnerability	Medium vulnerability
High	Low vulnerability	Medium vulnerability	High vulnerability

*List of potential climate impacts*

17.8.27 The next stage is to assess the resulting effect in terms of vulnerability to the climate impact. A climate effect is the resulting change of climate variables. Potential impacts are contained within **Table 0.14** and **Table 0.15**, along with a vulnerability assessment. This is non-exhaustive and will continue to be developed following consultation with internal project teams and where relevant external consultees.

**Table 0.14 Potential climate impacts on receptors during construction and assessment of vulnerability of the receptor**

Climate Impact	Sensitivity	Exposure	Vulnerability
Extreme temperatures leading to heatwaves and an increase in maximum daily temperatures in summer	M	M	M
Extreme precipitation events leading to an increase in fluvial and pluvial flood risk	M	M	M
Storm events leading to high winds and precipitation	M	M	M

**Table 0.15 Potential climate impacts on receptors during operation and assessment of vulnerability of the receptor**

Climate Impact	Time period	Sensitivity	Exposure	Vulnerability
Increased temperature leading to extreme heatwaves and increase in daily maximum temperatures	2030s	L	M	L
	2050s	M	M	M
	2070s	M	H	M
Increased temperatures and decrease in rainfall in the summer months leading to drought conditions	2030s	L	L	L
	2050s	M	M	M
	2070s	H	M	M
Changes in soil moisture content resulting in ground subsidence or shrink swell processes resulting from changes in temperature and rainfall	2030s	L	L	L
	2050s	M	M	M
	2070s	H	H	H
Higher temperatures leading to changes in vegetation such as the spread of invasive species and disease	2030s	L	L	L
	2050s	L	L	L
	2070s	M	M	M
Increase in winter rainfall, heavy rainfall events and sea level rise leading to an increase in the frequency and severity of flood events (from all sources)	2030s	M	M	M
	2050s	M	H	M
	2070s	H	H	H
Storm events leading to driving rain, wind, and excessive precipitation	2030s	M	L	M
	2050s	M	M	M
	2070s	M	H	H

17.8.28 A thorough literature review will be undertaken to ensure climate impacts which may give rise to significant effects are assessed. The interdependencies of climate vulnerability will also be addressed, resulting in impacts through cascading

failures. The CCRA3 Briefing Report for the Energy Sector<sup>440</sup> states that the “*vulnerability of interconnected systems may be significantly underestimated*”.

17.8.29 Those impacts which are considered of ‘medium’ or ‘high’ vulnerability by the 2070s are scoped into the assessment and are denoted as bold in the table.

### *Improving resilience*

17.8.30 Within the PEIR and ES, the climate impacts which have been scoped into the assessment will undergo a risk assessment which takes into account the likelihood and magnitude of consequences of the impact occurring. The assessment will conclude on the significance of any risk of future climatic conditions.

17.8.31 Those receptors within this Scoping Report deemed as having ‘medium’ or ‘high’ vulnerability to a climate impact are likely to require mitigation measures to ameliorate any significant effects and reduce risk, which will be developed and included within the PEIR and ES. Once such embedded mitigation measures are put in place, the assessment will recalculate the risk to ascertain the increase in resilience and the significance of any residual risk.

17.8.32 Resilience is the receptor’s ability to respond to climatic changes. A receptor with high resilience is able to respond to climate impacts and retain much of its original function and form.

17.8.33 Mitigation and/or adaptation measures will be developed as required and will occur as early in the design process as possible to ensure resilience is built into the design of the Project. Examples of potential mitigation and/or adaptation measures to be discussed and implemented are:

- Discuss climate projections with relevant design engineers to ensure these design parameters are included in any material or equipment specifications e.g. materials which withstand high temperatures, specifying temperature ranges of Mechanical and Electrical equipment, cooling requirements.
- Development of an operation and maintenance manual, or similar, to detail maintenance requirements following climate events.
- River and coastal flooding and erosion to be monitored around assets and site-specific flood resilience measures considered (e.g. raising ground levels or installing flood gates at key locations as necessary).
- Integrate climate risk into organisational risk management processes.
- Using a common formalised standards of risk assessment and resilience, such as ISO 14090/2019<sup>452</sup>.
- Establish performance Key Performance Indicators and thresholds for further adaptation needs.
- Apply an adaptive planning approach to developing pathways for increasing resilience overtime as the climate changes.

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<sup>452</sup> International Organisation for Standardization (2019). Adaptation to climate change — Principles, requirements and guidelines. ISO; Geneva, Switzerland.



- Increase ground and weather monitoring to mitigate the risks of shrink-swell subsidence and impacts on subterranean and surface infrastructure.

## 18. Summary

18.1.1 The scope of the assessments described within the environmental topic chapters (Chapters 5 to 17) is summarised in **Table 18.1**.

**Table 18.1 Summary scope of the assessment**

Environmental topic	Scope of assessment
<b>Chapter 5: Ecology</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Noise and physical activities leading to disturbance (schedule 1 breeding birds, SPA qualifying features and SSSI designated species using functionally linked land).</li> <li>• Disturbance, direct killing or reduced chance of survival of individual animals through aquatic habitat loss/damage.</li> <li>• Water pumping leading to scour of a riverbed (habitats loss or damage).</li> <li>• Noise/vibration as a result of construction activities leading to disturbance.</li> <li>• Habitat fragmentation through working areas creating barriers to species dispersal.</li> <li>• Direct killing or reduced chance of survival of individual animals and local species populations through habitat loss/damage.</li> <li>• Removal/degradation of irreplaceable habitats e.g. ancient woodland.</li> <li>• Generation of sediment laden surface water run-off leading to deterioration in the water quality of aquatic environment features e.g. rivers.</li> <li>• Damage or destruction of nests.</li> <li>• Loss of roosting, breeding, foraging, hibernating or resting habitat.</li> <li>• Light pollution through security lighting used at working areas spilling onto surrounding habitats.</li> </ul> <p><b>Operation</b></p> <ul style="list-style-type: none"> <li>• Noise/vibration as a result of operation activities affecting surrounding features.</li> <li>• Light pollution through security lighting used at the development spilling onto surrounding habitats.</li> <li>• Hydrostatic testing leading to disturbance or scour of riverbeds/substrates/habitats and/or transfer of non-native species.</li> <li>• Habitat fragmentation through the development creating a barrier to species dispersal.</li> </ul>

Environmental topic	Scope of assessment
<b>Chapter 6: Historic Environment</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Potential for permanent loss of archaeological remains.</li> <li>• Potential damage to below ground remains arising from changes to drainage.</li> <li>• Potential loss of historic landscape features.</li> <li>• Potential for temporary change to setting of heritage assets.</li> </ul> <p><b>Operation</b></p> <ul style="list-style-type: none"> <li>• Potential for perceptual change to historic landscape features.</li> <li>• Potential for permanent change to setting of heritage assets.</li> </ul>
<b>Chapter 7: Water Environment</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Potential deterioration in the water quality of aquatic environment receptors via generation of sediment laden run-off or pollutant spills.</li> <li>• Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance (including from new watercourse crossings).</li> <li>• Potential deterioration in groundwater quality and/ or groundwater levels via the contamination of the groundwater environment.</li> <li>• Potential changes to fluvial flood risk associated with loss of floodplain storage, change in floodplain flow conveyance and/or compartmentalisation of floodplain.</li> <li>• Potential changes to watercourse flow conveyance.</li> <li>• Potential changes to surface water flood risk due to changes in runoff rates.</li> <li>• Potential effects on river flows and groundwater levels due to abstraction.</li> <li>• Potential deterioration in the water quality of aquatic environment receptors affected by surface water discharge.</li> <li>• The potential effects on surface water resource availability.</li> <li>• Potential effects on river flows and groundwater levels due to abstraction.</li> <li>• Potential deterioration in the water quality of aquatic environment receptors affected by surface water discharge.</li> </ul>
<b>Chapter 8: Landscape and Visual</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Potential changes to the fabric of the landscape due to the potential loss of or changes to high value landscape elements.</li> </ul>

Environmental topic	Scope of assessment
	<ul style="list-style-type: none"> <li>Potential effects on landscape designations, landscape character and visual receptors from potential views of temporary construction activity.</li> </ul> <p><b>Operation</b></p> <ul style="list-style-type: none"> <li>Potential effects on visual receptors resulting from visibility of HAGI infrastructure.</li> </ul>
<b>Chapter 9: Air Quality</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>Potential effects from fugitive dust emissions and increases in PM<sub>10</sub> and PM<sub>2.5</sub> during construction.</li> <li>Potential effects from combustion product emissions arising from construction traffic.</li> </ul>
<b>Chapter 10: Noise and Vibration</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>Potential increased road traffic noise on local roads due to construction traffic.</li> <li>Potential vibration effects from HGV movements on poorly maintained roads.</li> <li>Potential construction effects from piling noise (if required) and vibration, and vibration from vibratory ground compaction at the HAGIs.</li> <li>Potential construction noise and vibration effects if the HDD sites (if required) are very close to sensitive receptors.</li> </ul> <p><b>Operation</b></p> <ul style="list-style-type: none"> <li>Potential noise effects from HAGIs on sensitive receptors.</li> </ul>
<b>Chapter 11: Traffic and Transport</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>Impact of construction traffic at sensitive highway receptors.</li> <li>Impact of traffic and proposed infrastructure on public rights of way (PRoW).</li> </ul>
<b>Chapter 12: Ground Conditions</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>Potential effects on receptors from the mobilisation of contamination due to construction activities.</li> <li>Explosion or asphyxiation as a result of ingress and accumulation of ground gas, including the risk that construction activities cause gas migration to adjacent properties.</li> <li>Damage to newly constructed infrastructure from land affected by contamination.</li> <li>Damage to, or detrimental impact on sites of geological importance.</li> <li>Potential effects on controlled waters due to accidental spillages and leaks.</li> </ul>

Environmental topic	Scope of assessment
	<p><b>Operation</b></p> <ul style="list-style-type: none"> <li>• Potential mobilisation of landfill leachate, which, if not properly managed, could impact upon controlled waters.</li> <li>• Potential damage to infrastructure from land affected by contamination.</li> <li>• Potential for explosion or asphyxiation as a result of ingress and accumulation of ground gas in existing or newly constructed infrastructure on and adjacent to the Project red line boundary.</li> <li>• Potential effects on controlled waters due to the mobilization of landfill leachate, or accidental spillages and leaks from operational vehicles and equipment.</li> </ul>
<b>Chapter 13: Agriculture and Soil Resources</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Potential for changes to soil structure (e.g., due to compaction of soil) resulting in loss of soil functions due to construction activities.</li> <li>• Potential for soil erosion to occur due to construction activities.</li> <li>• Potential for damage to topsoil or permanent loss of topsoil due to construction activities.</li> <li>• Potential effects from the permanent loss of agricultural land and topsoil due to construction of HAGIs (land take).</li> <li>• Potential effects on land drainage systems due to construction activities.</li> <li>• Potential effects due to temporary loss of productive agricultural land from construction activities.</li> </ul>
<b>Chapter 14: Land Use</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Direct effects from land use required during construction activities on tourism and recreational receptors.</li> <li>• Indirect effects on amenity of users on tourism and recreational receptors.</li> </ul> <p><b>Operation</b></p> <ul style="list-style-type: none"> <li>• Direct effects from land take on tourism and recreational receptors and minerals resources.</li> <li>• Indirect amenity effects from HAGIs on tourism and recreational receptors.</li> </ul>
<b>Chapter 15: People and Communities</b>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Lack of or reduced access to land, services and amenities (such as agricultural land, public services and rights of way, recreational and health facilities).</li> <li>• Disruption to users of transport infrastructure, including increased travel times and reduced access.</li> </ul>

Environmental topic	Scope of assessment
	<ul style="list-style-type: none"> <li>• Potential health impacts on sensitive receptors, inconvenience and nuisance from construction works and transport movements.</li> <li>• Increased demand for directly-employed labour.</li> <li>• Increased direct, indirect and induced expenditure in the economy, with associated increases in jobs and GVA.</li> <li>• Increased demand for specialist materials, equipment and services output from industry and service sectors.</li> </ul> <p><b>Operation</b></p> <ul style="list-style-type: none"> <li>• Effects on climate and the global community from delivering national decarbonisation targets.</li> <li>• Cost-effective access to and use of hydrogen infrastructure for landowners in the vicinity of the Project; users and producers of hydrogen.</li> <li>• Loss of land required for certain Project infrastructure together with restrictions or other influence on potential future land uses.</li> <li>• Advanced technical and commercial knowledge of hydrogen pipeline development.</li> <li>• Public concern around use of hydrogen leading to changes in public behaviour with possible effects on use and value of amenities and/or market prices.</li> </ul>
<p><b>Chapter 16: Major Accidents and Disasters</b></p>	<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• Potential harm to Project workforce due to construction works causing damage to existing utilities.</li> <li>• Potential harm to Project workforce and other human or environmental receptors due to fire in the construction compounds.</li> <li>• Potential impacts on mines or storage caverns which may lead to loss of containment or loss of structural integrity to existing underground structures which could cause serious harm to the Project workforce and any human populations associated with the mines or storage caverns.</li> <li>• Potential effects on the project workforce due to accidents during commissioning.</li> <li>• Potential effects on construction workforce or other human or environmental receptors due to land movement.</li> <li>• Potential effects on the project workforce due to a major accident occurring on an external site or third-party pipeline involving hazardous substances.</li> </ul> <p><b>Operation</b></p> <ul style="list-style-type: none"> <li>• Potential effects on human, ecological or historic environment receptors from the potential release of hydrogen from project infrastructure.</li> </ul>

Environmental topic	Scope of assessment
<b>Chapter 17: Climate Change</b>	<ul style="list-style-type: none"> <li>• Potential effects on human, ecological or historic environment receptors resulting in the event of fires at HAGI locations.</li> <li>• Potential effects on human, ecological or historic environment receptors due to land movement affecting project infrastructure.</li> </ul> <p><b>Construction</b></p> <ul style="list-style-type: none"> <li>• GHG emissions associated with preliminary studies and works, pre-site surveys, ground investigations and construction compounds.</li> <li>• GHG emissions associated with the materials used to construct the pipelines and any associated Project facilities. These comprise embodied GHG emissions associated with the raw material assets required to construct the Project.</li> <li>• GHG emissions associated with the transport of construction materials resources and equipment from point of purchase to the works site. Commuting of workforce during construction.</li> <li>• GHG emissions associated with construction and installation processes (including fuel and electricity consumption) of the temporary works, ground works, landscaping and permanent works. Emissions associated with site water demand.</li> <li>• GHG emissions associated with waste management activities (transport, processing, final disposal) associated with waste arising from the Project.</li> <li>• GHG emissions associated with land use change.</li> <li>• Effects on health of construction staff and third-party dependencies due to extreme temperatures leading to heatwaves and an increase in maximum daily temperatures in summer.</li> <li>• Effects on health of construction staff and third-party dependencies and the natural environment extreme precipitation events leading to an increase in fluvial and pluvial flood risk.</li> <li>• Effects on health of construction staff and third-party dependencies and project assets from storm events leading to high winds and precipitation.</li> </ul> <p><b>Operation</b></p> <ul style="list-style-type: none"> <li>• Avoided carbon emissions associated with the Project including potential for re-use, recovery and recycling of materials and/or energy and associated GHG emissions beyond the system boundary.</li> </ul>

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**Environmental topic**      **Scope of assessment**

- Effects on project assets and human health due to increased temperatures leading to extreme heatwaves and an increase in daily maximum temperatures.
- Effects on project assets and the natural environment due to increased temperatures and decreases in rainfall in the summer leading to drought conditions.
- Effects on project assets and the natural environment due to increased temperatures and decrease in rainfall in the summer, coupled with increases in winter rainfall leading to subsidence and shrink swell processes.
- Effects on project assets and the natural environment due to high temperatures leading to changes in vegetation and the spread of invasive species and disease.
- Effects on project assets, the natural environment and third-party dependencies due to an increase in frequency and severity of flood events from all sources.
- Effects on project assets due to increased frequency of storm events.



# Appendix 1A Abbreviations

Table 1A.2 Abbreviations

<b>Abbreviation</b>	<b>Definition</b>
<b>AA</b>	Appropriate Assessment
<b>AADT</b>	Annual Average Daily Flow
<b>AADT</b>	Annual Average Daily Traffic
<b>ACM</b>	Asbestos Containing Material
<b>AGI</b>	Above Ground Installation
<b>AIL</b>	Abnormal Indivisible Load
<b>ALARP</b>	As Low As Reasonably Practicable
<b>ALC</b>	Agricultural Land Classification
<b>ANC</b>	Association of Noise Consultants
<b>AONB</b>	Areas of Natural Beauty
<b>AQAL</b>	Air Quality Assessment Level
<b>AQMA</b>	Air Quality Management Area
<b>AQO</b>	Air Quality Objective
<b>AStGWF</b>	Areas Susceptible to Ground Water Flooding
<b>BAP</b>	Biodiversity Action Plan
<b>BGS</b>	British Geological Society
<b>BGS</b>	British Geological Survey
<b>BMV</b>	Best and Most Versatile
<b>BNL</b>	Basic Noise Level
<b>BoCC</b>	Birds of Conservation Concern
<b>BPM</b>	Best Practical Means
<b>BSI</b>	British Standards Institute
<b>BTO</b>	British Trust for Ornithology
<b>C&amp;WRSG</b>	Cheshire & Wirral Raptor Study Group
<b>CBRN</b>	Chemical, Biological, Radiological or Nuclear

<b>Abbreviation</b>	<b>Definition</b>
<b>CCOP</b>	Defra 2009 Construction Code of Practice for the sustainable use of soils on construction sites
<b>CCR</b>	Climate Change Resilience
<b>CCRA</b>	Climate Change Risk Assessment
<b>CDM</b>	Construction (Design and Management)
<b>CDM Regulations</b>	Construction (Design and Management) Regulations 2015
<b>CDOIF</b>	Chemical and Downstream Oil Industries Forum
<b>CEH</b>	Centre for Ecology and Hydrology
<b>CEMP</b>	Construction Environmental Management Plan
<b>CIfA</b>	Chartered Institute for Archaeologists
<b>CIRIA</b>	Construction Industry Research and Information Association
<b>CL:AIRE</b>	Contaminated Land: Applications in Real Environments
<b>CNI</b>	Critical National Infrastructure
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CO<sub>2</sub>e</b>	Carbon dioxide equivalent
<b>COCP</b>	Code of Construction Practice
<b>COMAH</b>	Control of Major Accident Hazards Regulations 2015
<b>CPNI</b>	Centre for the Protection of National Infrastructure
<b>CRTN</b>	Calculation of Road Traffic Noise
<b>CSM</b>	Conceptual Site Model
<b>CTMP</b>	Construction Traffic Management Plan
<b>CWT</b>	Cheshire Wildlife Trust
<b>DCO</b>	Development Consent Order
<b>DECC</b>	Department of Energy and Climate Change
<b>Defra</b>	Department for Environment, Food and Rural Affairs
<b>DETR</b>	Department of the Environment, Transport and the Regions

<b>Abbreviation</b>	<b>Definition</b>
<b>DfT</b>	Department for Transport
<b>DMRB</b>	Design Manual for Roads and Bridges
<b>DoWCoP</b>	Definition of Waste Code of Practice
<b>DSEAR</b>	Dangerous Substances and Explosive Atmospheres Regulations 2002
<b>EA</b>	Environment Agency
<b>EC</b>	European Commission
<b>EEA</b>	European Economic Area
<b>EIA</b>	Environmental Impact Assessment
<b>ELD</b>	Environmental Liability Directive
<b>EN-1 NPS</b>	Overarching National Policy Statement for Energy
<b>EN-4 NPS</b>	National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines
<b>EPA</b>	Environmental Protection Act 1990
<b>EPR</b>	Environmental Permitting (England and Wales) Regulations
<b>EPS</b>	European Protected Species
<b>ES</b>	Environmental Statement
<b>ESA</b>	Environmentally Sensitive Areas
<b>FRA</b>	Flood Risk Assessment
<b>GEART</b>	Guidelines for the Environmental Assessment of Road Traffic
<b>GHG</b>	Greenhouse Gas
<b>GMC</b>	Greater Manchester, Merseyside and Cheshire
<b>GPA 2</b>	Historic England Good Practice Advice in Planning Note 2: Managing Significance in decision-taking in the Historic Environment 2015
<b>GPA 3</b>	Historic England Good Practice Advice in Planning Note 3: The Setting of Heritage Assets 2017
<b>GSMR</b>	Gas Safety (Management) Regulations 1996

<b>Abbreviation</b>	<b>Definition</b>
<b>GWDTE</b>	Groundwater Dependant Terrestrial Ecosystems
<b>GWMU</b>	Groundwater Management Unit
<b>HAGI</b>	Hydrogen Above Ground Installation
<b>HDD</b>	Horizontal Directional Drilling
<b>HER</b>	Historic Environment Record
<b>HGV</b>	Heavy Goods Vehicle
<b>HLC</b>	Historic Landscape Characterisation
<b>HPI</b>	Habitat of Principal Importance
<b>HRA</b>	Habitat Regulations Assessment
<b>HS2</b>	High Speed 2
<b>HSE</b>	Health and Safety Executive
<b>HSWA</b>	Health and Safety at Work etc. Act 1974
<b>HV</b>	Heavy Vehicles
<b>I&amp;C</b>	Instrumentation and Control
<b>IAQM</b>	Institute of Air Quality Management
<b>BV</b>	Block Valves
<b>IDBs</b>	Internal Drainage Boards
<b>IEMA</b>	Institute of Environmental Management and Assessment
<b>IGEM</b>	Institution of Gas Engineers and Managers
<b>ILI</b>	In-Line Inspection
<b>IPC</b>	Infrastructure Planning Commission
<b>ISO</b>	International Standards Organisation
<b>LCA</b>	Landscape Character Area
<b>LCT</b>	Landscape Character Type
<b>LBAP</b>	Local Biodiversity Action Plan
<b>LCRM</b>	Land Contamination: Risk Management

<b>Abbreviation</b>	<b>Definition</b>
<b>LiDAR</b>	Light Detection and Ranging
<b>LIGS</b>	Locally Important Geological Site
<b>LLFAs</b>	Lead Local Flood Authorities
<b>LNR</b>	Local Nature Reserve
<b>LOAEL</b>	Lowest Observed Adverse Effect Level
<b>LOLER</b>	Lifting Operations and Lifting Equipment Regulations 1998
<b>LPA</b>	Local Planning Authority
<b>LV</b>	Light Vehicle
<b>LWS</b>	Local Wildlife Site
<b>LWT</b>	Wildlife Trust for Lancashire, Manchester and North Merseyside
<b>MA&amp;D</b>	Major Accidents and Disasters
<b>MAGIC</b>	Multi Agency Geographic Information for the Countryside
<b>mAOD</b>	Metres Above Ordnance Datum
<b>MCZ</b>	Marine Conservation Zones
<b>Met Office</b>	Meteorological Office
<b>MHSWR</b>	Management of Health and Safety Regulations 1999
<b>MMP</b>	Materials Management Plan
<b>NAP</b>	National Adaptation Programme
<b>NE</b>	Natural England
<b>NERC</b>	Natural Environment and Rural Communities (NERC) Act 2006 (as amended)
<b>NFRA</b>	National River Flow Archive
<b>NH</b>	National Highways
<b>NHBC</b>	National House Building Council
<b>NHLE</b>	National Heritage List for England
<b>NHS</b>	National Health Service

<b>Abbreviation</b>	<b>Definition</b>
<b>NNR</b>	National Nature Reserve
<b>NO<sub>2</sub></b>	Nitrogen dioxide
<b>NOEL</b>	No Observed Effect Level
<b>NO<sub>x</sub></b>	Oxides of nitrogen
<b>NPPF</b>	National Planning Policy Framework
<b>NPS</b>	National Policy Statements
<b>NPSE</b>	Noise Policy Statement for England
<b>NRMM</b>	Non-Road Mobile Machinery
<b>NRR</b>	National Risk Register
<b>NSR</b>	Noise Sensitive Receptor
<b>NTEM</b>	National Trip End Model
<b>NVZs</b>	Nitrate Vulnerable Zones
<b>OEP</b>	Office for Environmental Protection
<b>ONR</b>	Office for Nuclear Regulation
<b>OS</b>	Ordnance Survey
<b>PBDE</b>	Polybrominated diphenyl ethers
<b>PEIR</b>	Preliminary Environmental Information Report
<b>PFOS</b>	Perfluorooctane sulphonate
<b>PICP</b>	Pollution Incident Control Plan
<b>PINS</b>	Planning Inspectorate
<b>PM<sub>10</sub></b>	Particulate Matter under 10µm in aerodynamic diameter
<b>PM<sub>2.5</sub></b>	Particulate Matter under 2.5µm in aerodynamic diameter
<b>PPE</b>	Personal Protective Equipment
<b>PPG-N</b>	Planning Practice Guidance – Noise
<b>PPGs</b>	Pollution Prevention Guidelines
<b>PPV</b>	Peak Particle Velocity

<b>Abbreviation</b>	<b>Definition</b>
<b>PRoW</b>	Public Right of Way
<b>PRU</b>	Pressure Reduction Unit
<b>R2P2</b>	Reducing Risks, Protecting People (HSE, 2001)
<b>RBMP</b>	River Basin Management Plan
<b>RIGS</b>	Regionally Important Geological Site
<b>SAC</b>	Special Area of Conservation
<b>SADPD</b>	Site Allocations and Development Policies Document
<b>SBI</b>	Sites of Biological Interest
<b>SCI</b>	Sites of Community Importance
<b>SFRA</b>	Strategic Flood Risk Assessment
<b>SMP</b>	Soil Management Plan
<b>SOAEL</b>	Significant Observed Adverse Effect Level
<b>SPA</b>	Special Protection Area
<b>SPI</b>	Species of Principal Importance
<b>SPR</b>	Source-Pathway-Receptor
<b>SPZ</b>	Source Protection Zone
<b>SRN</b>	Strategic Road Network
<b>SSSI</b>	Site of Special Scientific Interest
<b>SuDS</b>	Sustainable Drainage Systems
<b>TEMPro</b>	Trip End Model Presentation Programme
<b>TRL</b>	Transport and Road Research Laboratory
<b>UK</b>	United Kingdom
<b>UKCEH</b>	United Kingdom Centre for Ecology and Hydrology
<b>UKCP18</b>	UK Climate Projections 2018
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UST</b>	Underground Storage Tank



<b>Abbreviation</b>	<b>Definition</b>
<b>UXO</b>	Unexploded Ordnance
<b>VDV</b>	Vibration Dose Value
<b>WCA</b>	Wildlife and Countryside Act 1981 (as amended)
<b>WFD</b>	Water Framework Directive
<b>WHO</b>	World Health Organisation
<b>WSI</b>	Written Scheme of Investigation
<b>ZOI</b>	Zone of Influence
<b>ZTV</b>	Zone of Theoretical Visibility

# Appendix 3A Planning Policy Summary

The appendix summarises the planning policy relevant to technical topics discussed in **Chapters 5-17**. **Table 3A.3** summarises national planning policies and **Table 1A.2** summarises local planning policies.

**Table 3A.3 Summary of relevant national planning policy**

Policy Reference	Policy Context
<b>Ecology</b>	
<p><b>Overarching National Policy Statement for Energy (EN-1)</b><sup>453</sup></p>	<p><b>Section 5.3:</b> <i>“The applicant should ensure the Environmental Statement (ES) clearly sets out any effects on internationally, nationally and locally designated sites of ecological importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity”.</i></p> <p><i>International Sites:</i> <i>“The most important sites for biodiversity identified through international conventions and European Directives. The Habitats Regulations provide statutory protection for these sites. . . . Listed Ramsar sites should also receive the same protection”.</i></p> <p><i>SSSIs:</i> for development considered likely to have an adverse effect on an SSSI consent should not normally be granted. For adverse effects after mitigation, consent should only be made where the benefits clearly outweigh the impact on features of the site and the national network of SSSIs.</p> <p><i>Regional / Local sites:</i> <i>“given the need for new infrastructure, these should not be used in themselves to refuse consent”.</i></p> <p><i>Ancient woodland:</i> consent should not be granted that results in loss/damage unless outweighed by the benefits. The loss of aged/veteran trees outside of areas of ancient woodland should be avoided and where affected all alternatives considered prior.</p> <p><i>SPI and HPI:</i> important for the conservation of biodiversity in England and therefore should be protected from adverse effects.</p>

## Policy Reference

## Policy Context

**National Planning Policy Framework (NPPF)<sup>455</sup>**

**Section 15 Conserving and enhancing the natural environment:** NPPF requires planning policies and decisions to contribute to and enhance the natural and local environment by protecting and enhancing sites of biodiversity in proportion with statutory status or identified quality; recognising wider benefits from natural capital and ecosystem services; and minimising impacts on and providing net gains for biodiversity (**paragraph 174**).

Plans should protect and enhance biodiversity interest, including green corridors and designated sites as well as promoting conservation, restoration and enhancement including HPI and SPI, as well as securable net gain (**paragraph 179**).

If significant harm to biodiversity will result from a development that cannot be avoided, mitigated, or compensated for, permission will be refused unless the benefits of development outweigh impacts, or exceptional reasons and compensation apply (**paragraph 180**).

Potential, possible, listed or proposed sites, and those that are an identified compensatory measure, are to be protected as the equivalent designation (**paragraph 181**).

Potential impacts on sites requiring appropriate assessment will be considered ahead of the presumption for sustainable development (**paragraph 182**).

**National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)<sup>456</sup>**

**Section 2.21:** The ES should include an assessment of biodiversity. “*The application should also include proposals for reinstatement of the pipeline route as close to its original state as possible and take into account any requirements for agreements with the landowner to access areas for aftercare and management work. Where it is unlikely to be possible to restore landscape to its original state, the applicant should set out measures to avoid, mitigate, or employ other landscape measures to compensate for, any adverse effect on the landscape*”.

Policy Reference	Policy Context
<b>Draft Overarching NPS-EN1, September 2021</b> <sup>454</sup>	<p><i>“In circumstances where the habitat to be crossed contains ancient woodland, trees subject to a Tree Preservation Order, or hedgerows subject to the Hedgerows Regulations 1997, the applicant should consider whether it would be feasible to use horizontal direct drilling under the ancient woodland or thrust bore under the protected tree or hedgerow”.</i></p> <p><b>Section 4.5:</b> <i>“Energy Nationally Significant Infrastructure Project (NSIP) proposals should seek opportunities to contribute to and enhance the natural environment by providing net gains for biodiversity where possible. Applicants are encouraged to use the most current version of the Defra biodiversity metric to calculate their biodiversity baseline and inform their biodiversity net gain outcomes and to present this data as part of their application”.</i></p>
<b>Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)</b> <sup>456</sup>	<p><b>Section 2.21:</b> The ES should include an assessment of biodiversity. The application should also include proposals for reinstatement of the pipeline route as close to its original state as possible.</p>
<b>Historic Environment</b>	
<b>Overarching National Policy Statement for Energy (NPS EN-1)</b> <sup>453</sup>	<p><b>Section 5.8:</b> NPS EN-1 requires change to the significance of heritage assets to be considered in developing an understanding of the potential effects of the proposed development. Further, that setting contributes to a heritage asset’s significance and should be drawn into consideration of baseline conditions and assessment of significance. It recommends conditions for refusal due to substantial harm and sets out criteria for this.</p>

<sup>453</sup> Department of Energy and Climate Change, (2011). Overarching National Policy Statement for Energy (EN-1) (online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf) (Accessed November 2021).

## Policy Reference

## Policy Context

**Draft Overarching NPS EN-1, September 2021**<sup>454</sup>

**Section 5.9:** Reiterates the requirements of EN-1 with regards to the historic environment, with additional requirements to provide clear statements of effect pathways, consider how the scheme will make a positive impact to the historic environment, assess impacts on non-designated heritage assets, and explicitly consider different types of setting impacts. Further, in line with NPPF, it reinforces that any level of harm to a heritage asset constitutes harm.

**National Planning Policy Framework (NPPF)**<sup>455</sup>

**Section 16** of the NPPF is consistent with EN-1 and is not, therefore, repeated here.

## Water Environment

**Overarching National Policy Statement for Energy (EN-1)**<sup>453</sup>

**Section 4.8:** Sets out how the effects of climate change should be considered.

**Section 5.7:** To ensure that flood risk from all sources is considered at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk.

**Section 5.15:** To ensure that all potential adverse effects on water quantity and quality including the ecological effects resulting from physical modifications are considered at all stages of the development.

<sup>454</sup> Department of Energy and Climate Change, (2021). Draft Overarching National Policy Statement for Energy (EN-1) (online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1015233/en-1-draft-for-consultation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf) (Accessed November 2021).

<sup>455</sup> Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework, (online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1005759/NPPF\\_July\\_2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf) (Accessed November 2021).

## Policy Reference

## Policy Context

**Draft National Policy Statement for Gas Supply Overarching National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)**<sup>456</sup>

**Section 2.2:** Sets out how the effects of climate change should be considered..

**Section 22.2:** Sets out the policy on the protection of the water environment during construction, operation and decommissioning

**National Planning Policy Framework (NPPF)**<sup>455</sup>

**161-169 Sequential Test:** To steer new development to areas with the lowest probability of flooding in accordance with Table 3 of the Flood Risk and Coastal Change NPPG.

**161-169 Exception Test:** The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available or appropriate, as long as the development can be demonstrated to be safe and provides wider sustainability benefits.

**167 Sustainable Drainage Systems (SuDS):** A presumption that SuDS will be incorporated into new developments to minimise the impacts of development from any increase in surface runoff.

**174-188 Conserving and enhancing the natural environment:** Decisions should contribute to protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils. Preventing new and existing development from creating unacceptable risk from water or pollution and help

<sup>456</sup> Department of Business Energy & Industrial Strategy, (2011). Overarching National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). (Online). Accessible at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/37049/1941-nps-gas-supply-oil-en4.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37049/1941-nps-gas-supply-oil-en4.pdf) (Accessed November 2021)

Policy Reference	Policy Context
	improve the local environmental conditions such as and water quality, taking into account relevant information such as river basin management plans.
<b>Landscape and Visual</b>	
<b>Overarching National Policy Statement for Energy (EN-1)</b> <sup>453</sup>	<p><b>Paragraphs 5.9.6, 5.9.7 and 5.9.17 to 5.9.20:</b> The LVIA should consider construction and operational effects upon landscape components and character and visibility of the proposals including impacts on views and visual amenity SoS to consider whether the project has been designed carefully with consideration of environmental effects on the landscape and siting, operational and other relevant constraints, to minimise landscape harm including by reasonable mitigation.</p> <p>Adverse landscape and visual effects may be minimised through appropriate siting of infrastructure within that site, design, including colours and materials, and landscaping schemes.</p>
<b>National Planning Policy Framework (NPPF)</b> <sup>455</sup>	<p><b>Paragraph 130:</b> Planning policies and decisions should ensure that development (amongst other criteria):</p> <ul style="list-style-type: none"> <li><i>'(b) are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;</i></li> <li><i>(c) are sympathetic to local character and history, including the surrounding built environment and landscape setting'</i></li> </ul> <p>Paragraph 174: It is stated that 'planning policies and decisions should contribute to and enhance the natural and local environment by [amongst other criteria] <i>'protecting and enhancing valued landscapes... (in a manner commensurate with their statutory status or identified quality in the development plan) [and] 'recognising the intrinsic character and beauty of the countryside.'</i></p>



**Policy Reference**

**Policy Context**

Whilst there are no national landscape designations within the draft LVIA Study Area, the LVIA will assess the effects of the development on local landscape designations and landscape character.

**Air Quality**

**Overarching National Policy Statement for Energy (EN-1)<sup>453</sup>**

Sets out overarching guidance and requirements for nationally significant energy infrastructure projects.

Section 5.2 discusses air quality and emissions, and notes the variety of potential pollutants and impacts on human health and on ecological sites. Section 5.2.6 states: *“Where the project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the Environmental Statement (ES).”* This paragraph identifies what the ES should describe. Section 5.2 also explains how the Planning Inspectorate should take air quality into account when making a decision, and how they should consider requirements for mitigation.

Section 5.2.7 outlines what the ES should describe in relation to air quality including: *“any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project; the predicted absolute emission levels of the proposed project, after mitigation methods have been applied; existing air quality levels and the relative change in air quality from existing levels; and any potential eutrophication impacts.”*

Policy Reference	Policy Context
<b>The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)</b> <sup>457</sup>	<p>In addition, section 4.10.2 says: <i>“Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment or human health.”</i></p> <p>Section 5.6.1 says: <i>“During the construction, operation and decommissioning of energy infrastructure there is potential for the release of a range of emissions such as odour, dust, steam, smoke, artificial light and infestation of insects. All have the potential to have a detrimental impact on amenity or cause a common law nuisance or statutory nuisance under Part III, Environmental Protection Act 1990.”</i></p> <p>Provides a framework for improving air quality at a national and local level and supersedes the previous strategy published in 2000. It imposes a number of obligations on local authorities to manage air quality but does not directly impose obligations on developers.</p> <p>To carry out an air quality review and assessment under the LAQM process, local authorities produce an Annual Status Report which describes areas identified to be at potential risk of exceeding the objectives in the regulations, and progress towards meeting the objectives. Review and assessments of local air quality aim to identify areas where national policies to reduce vehicle and industrial</p>

<sup>457</sup> Department for Environment, Food and Rural Affairs (Defra) in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1). (Online). Available from:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf)

## Policy Reference

## Policy Context

emissions are unlikely to result in air quality meeting the Government's AQOs by the required dates.

For the purposes of determining the focus of review and assessment, local authorities should have regard to those locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective.

Where the assessment indicates that some or all of the objectives may be potentially exceeded, the local authority has a duty to declare an Air Quality Management Area (AQMA). The declaration of an AQMA requires the local authority to implement an Air Quality Action Plan, to reduce air pollution concentrations so that the required AQOs are met.

Clean Air Strategy 2019<sup>458</sup>

The Environment Act 1995 required the adoption of an Air Quality Strategy containing standards, objectives and measures for improving ambient air quality. The 2007 Air Quality Strategy is designed to meet that requirement and provides a framework for improving air quality at a national and local level and supersedes the previous strategy published in 2000. It imposes a number of obligations on local authorities to manage air quality. Central to the Air Quality Strategy are health-based criteria for certain air pollutants; these criteria are based on medical and scientific reports on how and at what concentration each pollutant affects human health and mirror the AQOs set out in the Air Quality (England) Regulations 2000. The AQOs are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, over a specified averaging period.

<sup>458</sup> Defra, 2019. Clean air strategy 2019. (Online). Available from:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/770715/clean-air-strategy-2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf)

## Policy Reference

## Policy Context

National Planning Policy Framework (NPPF)<sup>455</sup>

A key part of the Government's reforms to make the planning system less complex and more accessible. The NPPF acts as guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications. Paragraph 186 states that policies and plans should sustain and improve air quality. In addition, paragraph 174(e) indicates that developments should, wherever possible, help to improve local environmental conditions such as air quality.

## Noise and Vibration

Overarching National Policy Statement for Energy (EN-1)<sup>453</sup>

**Chapter 5.11** of EN-1 describes the effects of adverse impacts of noise on sensitive receptors, how to assess the likely impact of proposed energy developments and the requirements of the developments to mitigate adverse impacts due to noise.

**Paragraph 5.11.1** *'Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance or sleep disturbance) and use and enjoyment of areas of value such as quiet places and areas with high landscape quality. The Government's policy on noise is set out in the Noise Policy Statement for England. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings.'*

**Paragraph 5.11.2** *'Noise resulting from a proposed development can also have adverse impacts on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed by the IPC in accordance with the Biodiversity and Geological Conservation section of this NPS.'*

## Policy Reference

## Policy Context

**Paragraph 5.11.3** *'Factors that will determine the likely noise impact include:*

- the inherent operational noise from the proposed development, and its characteristics;*
- the proximity of the proposed development to noise sensitive premises (including residential properties, schools and hospitals) and noise sensitive areas (including certain parks and open spaces);*
- the proximity of the proposed development to quiet places and other areas that are particularly valued for their acoustic environment or landscape quality; and*
- the proximity of the proposed development to designated sites where noise may have an adverse impact on protected species or other wildlife.'*

**Paragraph 5.11.4:** *'Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:*

- a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise;*
- identification of noise sensitive premises and noise sensitive areas that may be affected;*
- the characteristics of the existing noise environment;*
- a prediction of how the noise environment will change with the proposed development;*
- in the shorter term such as during the construction period;*
- in the longer term during the operating life of the infrastructure; at particular times of the day, evening and night as appropriate.*
- an assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas; and*
- measures to be employed in mitigating noise.*

*The nature and extent of the noise assessment should be proportionate to the likely noise impact.'*

## Policy Reference

## Policy Context

**Paragraph 5.11.5:** *'The noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation, should also be considered.'*

**Paragraph 5.11.6:** *'Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. [...] For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies.'*

**Paragraph 5.11.7:** *'The applicant should consult Environment Agency (EA) and Natural England (NE), or the Countryside Council for Wales (CCW), as necessary and in particular with regard to assessment of noise on protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be taken into account.'*

**Paragraph 5.11.8:** *'The project should demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission.'*

**Paragraph 5.11.9:** *'The IPC [now the Planning Inspectorate] should not be grant development consent unless it is satisfied that the proposals will meet the following aims:*

- avoid significant adverse impacts on health and quality of life from noise;*
- mitigate and minimise other adverse impacts on health and quality of life from noise; and*

## Policy Reference

## Policy Context

- where possible, contribute to improvements to health and quality of life through the effective management and control of noise’.

**Paragraph 5.11.10:** ‘When preparing the development consent order, the IPC [now the Planning Inspectorate] should consider including measurable requirements or specifying the mitigation measures to be put in place to ensure that noise levels do not exceed any limits specified in the development consent.’

**Paragraphs 5.11.11 to 5.11.13:** Consideration should be given in decision making to whether mitigation measures are needed for operational and/or construction noise over and above any which form part of the requirements. Mitigation measures are suggested, including through engineering, lay-out and administrative measures (restricting activities, specifying noise limits, seasonality for wildlife). It states that only when all other forms of mitigation have been exhausted should the decision maker consider requiring noise mitigation through improved sound insulation to dwellings.

### National Policy Statement for Oil and Gas Supply and Storage (EN-4)<sup>456</sup>

**General:** EN-4 is not the determinant policy document for this project, but some of its policy advice may be a material consideration.

**Paragraph 2.20.1:** The applicant will need to identify all noise and vibration sensitive receptors likely to be affected during construction and operation.

**Paragraph 2.20.2:** Assessment required for noise and vibration impacts from any pre-construction seismic surveys, construction activities and any increased HGV traffic on local roads for movement of materials.

**Paragraph 2.20.3:** Commissioning new pipelines can involve extensive periods of drying after hydrotesting, which uses air compressors, which may require noise mitigation.

## Policy Reference

## Policy Context

Draft Overarching NPS-EN1, September 2021<sup>454</sup>

**Paragraph 2.20.4:** Explains that Above Ground Installations may be required which could be in quiet rural areas, potentially requiring noise mitigation.

The UK government has published draft national policy statements for energy infrastructure which when finalised, will guide decision makers on the application of government policy when determining applications for development consent for NSIP under the 2008 Planning Act. Information regarding its relevance to Hynet is provided in **Chapter 3**. The draft EN-1 contains content on assessment principles and generic impacts, and the following content relevant to noise. Much of the content of the draft is the same as the existing EN-1.

**Section 4.3:** Covers health, stating that energy production has the potential to impact health and well-being. Negative impacts may result, with noise included in the direct the impacts identified (paragraph 4.3.3).

**Paragraph 4.3.5:** Aspects of energy infrastructure most likely to have significant detrimental impact on health are subject to separate regulation which constitutes effective mitigation, but others, including noise are not. *'...the Secretary of State will want to take account of health concerns when setting requirements relating to a range of impacts such as noise'*.

**Paragraph 4.6.2:** Section 4.6 sets out information on criteria for 'Good Design' of energy infrastructure, which is explained to include siting and use of appropriate technologies in mitigating adverse impacts such as noise. Good design should be applied during the early stages of the project lifecycle.

**Paragraph 4.6.2:** Energy infrastructure projects should be sustainable, and *'having regard to regulatory and other constraints, are as attractive, durable, and adaptable ... as they can be'*.



## Policy Reference

## Policy Context

**Section 4.11:** Noise and vibration emission may be subject to separate regulation under the pollution control framework or other consenting regimes. Pollution from industrial sources is controlled through the Environmental Permitting (England and Wales) Regulations 2016 (EPR), which requires industrial facilities to have an environmental permit and to meet limits on emissions, and (for larger facilities) use Best Available Techniques to reduce emissions.

**Paragraph 5.9.13:** A proportionate noise study will be required for heritage assets affected.

**Paragraph 5.9.13:** Where opportunities exist, the NPS encourages the applicant to make a positive contribution to the historic environment, such as considering how noise impacts can affect heritage assets and to consider opportunities to enhance access, interpretation, understanding and appreciation of affected assets.

**Paragraph 5.10.8:** The applicant's Landscape and Visual assessment should demonstrate how noise and light pollution impacts on sensitive receptors from construction and operational activities will be minimised.

**Section 5.12:** The Noise and Vibration specific section essentially covers the same points as the current EN1, which are set out above, albeit with some minor wording differences. Some additional text has been included, with the items relevant for this assessment set out below. In the section on the Applicant's Assessment where items to be considered are listed (paragraph 5.12.4), it adds the following two clauses. (1) '*...including an assessment of any likely impact on health and well-being where appropriate*' (2) '*measures to be employed in mitigating the effects of noise - applicants should consider using best available techniques to reduce noise impacts*'. Reference to development in accordance

**Policy Reference**

**Policy Context**

**National Planning Policy Framework (NPPF)<sup>455</sup>**

with statutory requirements for noise, and due regard being given to Noise Policy Statement for England, the National Planning Policy Framework, and the government’s associated planning guidance on noise is added.

**Paragraph 174:** The planning system should contribute to and enhance the natural and local environment by, (amongst other considerations), preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution.

**Paragraph 185:** Planning policies and decisions should mitigate and reduce to a minimum other adverse impacts and avoid noise giving rise to significant adverse impacts on health and the quality of life from noise from new development; and Tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value should be identified and protected.

**Paragraph 187:** Planning policies and decisions should ensure that new development can be integrated effectively with existing business and community facilities, with existing businesses not having unreasonable restrictions placed on them as a result of new development permitted after the business was established.

Where the operation of an existing business or community facility could have a significant adverse effect on a new development, the application should provide suitable mitigation before the development is complete.

This should be taken into account when considering whether proposed development is an acceptable use of land.

**Paragraph 1.6:** Sets out the long-term vision of Government noise policy, i.e. to *‘promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.’*

**Policy Reference****Noise Policy Statement for England (NPSE) <sup>459</sup>,  
March 2010****Policy Context**

**Paragraph 1.7:** The NPSE vision is supported by aims to effectively manage and control environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development by avoiding significant adverse impacts, mitigating and minimising adverse impacts and contributing to the improvement of health and quality of life.

**Paragraph 2.20:** To identify “significant adverse” and “adverse” impact in line with the three aims of NPSE there are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organization:

- No Observed Effect Level (NOEL): This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise;
- Lowest Observed Adverse Effect Level (LOAEL): This is the level above which adverse effects on health and quality of life can be detected. Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level; and

Significant Observed Adverse Effect Level (SOAEL). This is the level above which significant adverse effects on health and quality of life occur.

**Paragraph 2.24:** Where an impact lies somewhere between LOAEL and SOAEL all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

<sup>459</sup> Defra (2010). Noise Policy Statement for England (NPSE). (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69533/pb13750-noise-policy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf)

## Policy Reference

## Policy Context

**Paragraph 2.22:** The NPSE notes that *'it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.'*

**Planning Practice Guidance-Noise (PPG-N), 2014<sup>460</sup>**

**Paragraph 005:** The PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome.

**Paragraph 006:** No objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

*'...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation'*.

**Paragraph 015:** The PPG suggests noise standards applicable to proposed developments within the local authority's administrative boundary, although it states that:

<sup>460</sup> Ministry of Housing, Communities & Local Government (2019). Planning Practice Guidance – Noise. (online). Available at: <https://www.gov.uk/guidance/noise--2> (Accessed 22 Nov 2021).

Policy Reference

Policy Context

*‘These values are not to be regarded as fixed thresholds and as outcomes that have to be achieved in every circumstance.’*

Traffic and Transport

Overarching National Policy Statement for Energy (EN-1)<sup>453</sup>

**Paragraph 5.13.2:** 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 2.2 of NPS EN-1.

**Paragraph 5.13.3:** If significant transport effects are likely the ES should be accompanied by a Transport Assessment, developed in consultation with the National Highways and Highways Authorities.

**Paragraph 5.13.4:** Requirement, where appropriate, to prepare a Travel Plan and provide details of proposed measures to improve access by public transport, walking and cycling to mitigate transport impacts.

**Paragraph 5.13.6:** The Secretary of State (SoS) should ensure the applicant has sought to mitigate substantial impacts on transport infrastructure. Where insufficient the SoS should consider the requirements to mitigate such effects.

**Paragraph 5.13.11:** Where substantial HGV traffic is likely to occur the SoS may attach requirements to consent to control numbers and routing of HGV movements, make sufficient provision for HGV parking and make arrangement for reasonably foreseeable abnormal disruption.

Overarching National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)<sup>456</sup>

**Paragraph 2.19.8:** When designing the route of new pipelines applicants should research relevant constraints including proximity of existing and planned residential properties, schools and hospitals, railway crossings, major road crossings, below surface usage and proximity to environmentally sensitive areas,

Policy Reference	Policy Context
<p><b>National Planning Policy Framework (NPPF)</b><sup>455</sup></p>	<p>main river and watercourse crossings. These can be undertaken by means of desk top studies in the first instance, followed up by consulting the appropriate authority, operator, or conservation body if necessary.</p> <p><b>Paragraph 111:</b> In terms of transport, a development proposal should only be refused if the proposed development has unacceptable impact on highway safety or if the residual cumulative impacts on the road network would be severe.</p> <p><b>Paragraph 113:</b> If significant transport effects are likely then a Travel Plan is required along with a Transport Statement or Transport Assessment.</p>
<p><b>Ground Conditions</b></p>	
<p><b>Overarching National Policy Statement for Energy (EN-1)</b><sup>453</sup></p>	<p>NPS EN-1 includes guidance on what matters are to be considered in the assessment of energy projects including the potential effects in relation to geological conservation.</p> <p><b>Paragraph 5.3.3:</b> The ES will need to demonstrate that effects on internationally, nationally, and locally designated sites of geological conservation importance have been identified.</p> <p><b>Paragraph 5.10.8:</b> Where development occurs on previously developed land, the ES will need to demonstrate consideration of the risk posed by land contamination.</p>
<p><b>National Planning Policy Framework (NPPF)</b><sup>455</sup></p>	<p>The NPPF sets out the Government’s planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced.</p>

**Policy Reference**

**Policy Context**

**Paragraphs 120, 174, 183, 184 and 210 to 214:** The ES will need to demonstrate that:

- The Project makes effective use of land, including the use of suitable brownfield land, and provides an opportunity to remediate land affected by contamination.
- The Project site is suitable for the proposed use taking account of ground conditions arising from contamination.
- If remediation is required, then, as a minimum, after remediation, the land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990.
- Adequate site investigation information, prepared by a competent person, is provided.
- Cadent have met the requirement to secure a safe development with respect to land contamination.
- The Project is appropriate for its location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the sensitivity of the site and wider area to impacts that could arise from the Project.

With respect to land, the Project will need to demonstrate that the potential for migration of contaminants to affect sensitive receptors has been considered and there will be no significant effects.

**Agriculture and Soil Resources**

**Overarching National Policy Statement (NPS) for Energy (EN-1)<sup>453</sup>**

EN-1 NPS sets out guidance and requirements for major energy infrastructure projects and is relevant to the Project as it requires a pipeline over 16.093km (10 miles) long.

## Policy Reference

## Policy Context

**Paragraph 5.10.8:** *“Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed.”*

**Paragraph 5.10.15:** *“The Infrastructure Planning Commission (IPC) should ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. It should give little weight to the loss of poorer quality agricultural land (in grades 3b, 4 and 5), except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy.”*

**National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)<sup>456</sup>**

EN-4 NPS sets out guidance and requirements for major energy infrastructure projects and is relevant to the Project as it requires a pipeline over 16.093km (10 miles) long.

**Paragraph 2.23.1:** *“New pipelines will be installed in a variety of geological conditions. It will be important for applicants to understand the soil types and the nature of the underlying strata. Underground cavities and unstable ground conditions may present particular risks to pipeline projects. Impacts could include sterilisation of mineral resources or loss of soil quality.”*

**Paragraphs 2.23.7 to 2.23.8:** *“The IPC should take into account the impact on ... soils when considering a pipeline project. A proposal will be acceptable from the point of view of soil ... if the applicant has proposed a route and other*



## Policy Reference

## Policy Context

*measures (if applicable) that either eliminates any adverse impacts on soil ... or reduces them to an acceptable level.”*

*Mitigation measures to minimise any adverse effects on soil ... should include measures to ensure that residual impacts on the surface are minor, for example some differential vegetation growth. Mitigation measures should include appropriate treatment of soil (and in particular topsoil) during site construction and other infrastructure activity (and appropriate soil storage and reinstatement in line with the principles and practices outlined in the Code of Practice for the Sustainable Management of Soils on Construction Sites<sup>461</sup>. The IPC should consider what appropriate conditions should be attached to any consent. Where HDD is proposed, the applicant should provide an alternative plan for installing the pipeline in the event that HDD fails. Such alternative means could include open cut, micro-tunnelling and tunnelling.*

**National Planning Policy Framework (NPPF)<sup>455</sup>**

The NPPF at Paragraph 8 states that:

*“Achieving sustainable development means that the planning system has three overarching objectives...:*

*c) an environmental objective – to contribute to protecting and enhancing our natural... environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, ... mitigating and adapting to climate change... “*

**Paragraph 120** states that:

*“planning policies and decisions should:*

<sup>461</sup> Defra (2009) The Code of Practice for the Sustainable Management of Soils on Construction Sites. (Online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/716510/pb13298-code-of-practice-090910.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf) (Accessed November 2021).

**Policy Reference****Policy Context**

*b) recognise that some undeveloped land can perform many functions, such as for wildlife, recreation, flood risk mitigation...carbon storage or food production*

**Paragraph 174** states that:

*“Planning policies and decisions should contribute to and enhance the natural and local environment by:*

*a) ...protecting and enhancing... valued landscapes, sites of biodiversity... value and soils... (in a manner commensurate with their identified quality in the development plan)*

*b)...recognising the economic and other benefits of the best and most versatile agricultural land.*

*d) ...minimising impacts on and providing net gains for biodiversity”*

*e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil... pollution or land instability*

*f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.”*

**Paragraph 175, footnote 53:**

*“Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.”*

Note: Best and most versatile land is defined as land in grades 1, 2 and 3a of the Agricultural Land Classification (ALC) system of England and Wales.

**Land Use**

Policy Reference	Policy Context
<b>Overarching National Policy Statement for Energy (EN-1)</b> <sup>453</sup>	Sets out Assessment Principles and Generic Impacts which apply to all energy infrastructure. Assessment Principles and Generic Impacts are set out. Of relevance to Land Use are: <p><b>Paragraph 5.10.5:</b> <i>“Regarding land use including open space, green infrastructure &amp; Green Belt, it is a requirement to identify existing and proposed land uses near the project, any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing.”</i></p> <p><b>Paragraph 10.5.9:</b> <i>“Applicants should safeguard any minerals resources on the proposed site as far as possible”.</i></p> <p><b>Paragraph 5.10.12:</b> <i>“An applicant may be able to demonstrate that a particular type of energy infrastructure, such as an underground pipeline, which, in Green Belt policy terms, may be considered as an “engineering operation” rather than a building is not in the circumstances of the application inappropriate development.”</i></p>
<b>Overarching National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)</b> <sup>456</sup>	Covers pipelines which transport natural gas or oil. However, policy advice in this NPS may be a material consideration when identifying impacts. It includes specific sections on how pipelines may have to consider: noise and vibration, biodiversity, landscape and visual, water quality and resources and soil and geology (which includes minerals sterilisation).
<b>Draft Overarching NPS-EN1, September 2021</b> <sup>454</sup>	When finalised will guide decision makers when determining applications for Development Consent under the 2008 Planning Act. It contains similar advice to the existing NPS EN-1 on the subjects that must be considered in a pipeline application.

## Policy Reference

## Policy Context

**Draft Overarching National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)<sup>462</sup>**

It also confirms that for hydrogen pipeline and storage infrastructure, there will not be a topic specific NPS and in that case, the emerging NPS EN-1 will have effect alone and be the primary consideration for decision making.

Draft NPS EN-1 is clear in that it is the primary policy document in relation to hydrogen pipelines, however the draft NPS EN-4 Gas Supply Infrastructure and Gas and Oil Pipelines provides policy advice which may be a material consideration. As with the existing NPS EN-4, the emerging raft contains subject specific advice on noise and vibration, biodiversity, landscape and visual, water quality and resources and soil and geology.

**Paragraph 187:** *“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities. Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established.”*

**Paragraph 81:** *“Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development.”*

**Paragraph 98:** *“Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and well-”*

<sup>462</sup> Department of Business Energy & Industrial Strategy, (2021). Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (online). Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1015237/en-4-draft-for-consultation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf) (Accessed November 2021).

## Policy Reference

## Policy Context

*being of communities, and can deliver wider benefits for nature and support efforts to address climate change.”*

**Paragraph 210:** Identifies that minerals safeguarding or consultation areas should be defined, along side relevant policies, to ensure that minerals resources are not unnecessarily sterilised by non-minerals developments.

**Paragraph 212:** States that non-minerals development should not normally be permitted in mineral safeguarding areas if it might constrain future minerals extraction.

## People and Communities

Overarching National Policy Statement for Energy (EN-1)<sup>453</sup>

EN-1 considers effects on People and Communities both in overview and more specifically. It includes the following:

*“where the proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate”.*

EN-1 notes effects from *“increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation, and increases in pests”*

The following statement is particularly relevant to network development: *“New energy infrastructure may also affect the composition, size and proximity of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport or the use of open space for recreation and physical activity.”*

## Policy Reference

## Policy Context

EN-1 notes that *“This assessment should consider all relevant socio-economic impacts, which may include:*

- *the creation of jobs and training opportunities;*
- *the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;*
- *effects on tourism;*
- *the impact of a changing influx of workers during the different*

*construction, operation and decommissioning phases of the energy infrastructure [.., including] on social cohesion”*

The particular importance of cumulative effects is noted as follows: *“The impacts of more than one development may affect people simultaneously, so the applicant and the IPC should consider the cumulative impact on health”* as well as noting that *“if development consent were to be granted to for [sic] a number of projects within a region and these were developed in a similar timeframe, there could be some short-term negative effects, for example a potential shortage of construction workers”*.

National Planning Policy Framework (NPPF)<sup>455</sup>

The National Planning Policy Framework (NPPF) seeks to protect the environment and to promote sustainable growth. There is an overarching presumption in favour of sustainable development that should be the basis of every plan and every decision. The NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development. The NPPF notes at paragraph 8 that there are three dimensions to sustainable development: economic, social and environmental.

## Policy Reference

## Policy Context

NPPF Chapter 6 Building a strong, competitive economy states: *“Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development. The approach taken should allow each area to build on its strengths, counter any weaknesses and address the challenges of the future. This is particularly important where Britain can be a global leader in driving innovation, and in areas with high levels of productivity, which should be able to capitalise on their performance and potential.”*

Regarding existing businesses and community facilities the NPPF states *“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”*

NPPF Chapter 8 Promoting healthy and safe communities states: *“Planning policies and decisions should aim to achieve healthy, inclusive and safe places which:(a) promote social interaction [..], (b) are safe and accessible [..],and (c) enable and support healthy lifestyles [..].”* and implicitly notes an ongoing community requirement for amenities and facilities through reference to *“the social, recreational and cultural facilities and services the community needs”*.

## Policy Reference

## Policy Context

It further includes the statements regarding health and well-being which are relevant to the Project which may in particular affect access and open space:

*“Planning policies and decisions should promote public safety”*

*“Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and well-being of communities”*

*“Existing open space, sports and recreational buildings and land, including playing fields, should not be built on unless:(a) [...] surplus to requirements; or (b) the loss resulting from the proposed development would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location; or (c) [...] the development is for alternative sports and recreational provision[.]”*

UK Hydrogen Strategy<sup>463</sup>

The strategy sets a social and economic context and rationale for the development of a hydrogen infrastructure for the UK that is applicable to both wider and more detailed assessment including the development by the Project of the hydrogen network in the north west of England.

## Major Accidents and Disasters

**Overarching National Policy Statement for Energy (EN-1)<sup>453</sup>**

Section 4.11 and 4.12 of the policy denote that the Health and Safety Executive (HSE) is the regulator for occupational Health and Safety regulations including those which cover major accidents. The policy indicates that certain infrastructure or establishments will require Hazardous Substance Consent or be considered

<sup>463</sup> BEIS (2021). UK Hydrogen Strategy (online). Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1011283/UK-Hydrogen-Strategy\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011283/UK-Hydrogen-Strategy_web.pdf) (Accessed November 2021).



Policy Reference	Policy Context
<b>Draft (for consultation) Overarching National Policy Statement for Energy (EN-1)</b> <sup>454</sup>	Control of Major Accident Hazards (COMAH) establishments, and there are specific requirements for these forms of development. The distribution pipelines and HAGIs that would be provided by this Project will not have sufficient inventories of Hazardous Substances to meet these requirements.
<b>National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)</b> <sup>456</sup>	While this NPS is explicitly not relevant to the Project, it makes specific requirements for the development of hydrocarbon pipelines. These requirements are to be considered as good practice for hydrogen pipelines.  Section 2.19 of the policy refers to existing regulatory requirements and good practice for pipeline projects.
<b>Draft (Overarching National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)</b> <sup>456</sup>	The section relating to pipeline safety (Section 2.19) has essentially the same content as the existing NPS, so will have no specific impact on this EIA with respect to scoping.
<b>Climate Change and GHG (International Policy)</b>	
<b>The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement</b> <sup>464</sup>	The UNFCCC is the major international body responsible for managing climate change and carbon emissions. In 2015, it adopted the Paris Agreement, the aims of which are stated as: <i>“This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the</i>

<sup>464</sup> UNFCCC (2015) Paris Agreement 2015. (Online) Available at: <https://unfccc.int/sites/default/files/resource/docs/2015/cop21/eng/10a01.pdf> (Accessed November 2021).

Policy Reference	Policy Context
<b>UNFCCC Kyoto Protocol, 1997<sup>465</sup></b>	<p><i>threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: (a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change</i>". The agreement sets targets for countries' GHG emissions, but these are not legally binding or enforceable. In December 2020, the UK submitted its first Nationally Determined Contribution (NDC) to the UNFCCC, committing to "at least a 68%" reduction in GHG emissions below 1990 levels (1995 levels for F-gases) by 2030, aligned with the UK's 2050 net-zero GHG emissions target.</p>
<b>Glasgow Climate Pact, 2021<sup>466</sup></b>	<p>The Kyoto Protocol was adopted in December 1997 and there are currently 192 Parties to the Kyoto Protocol. It commits industrialised countries and economies to transition to limit and reduce GHG emissions in accordance with agreed individual targets. These have been strengthened in more recent international agreements culminating in the Paris Agreement (UNFCCC, 2015), as described above.</p> <p>The Glasgow Climate Pact recognises that keeping with the Paris Agreement and recognises that this requires "accelerated action in this critical decade". Limiting global warming to 1.5°C is noted as requiring "rapid, deep and sustained reductions in greenhouse gas emissions" to achieve a 45% reduction by 2030 globally relative to 2010 levels and to be net zero around mid-century.</p>
<b>Climate Change and GHG (National Policy)</b>	

<sup>465</sup> UNFCCC (1997). Kyoto Protocol. (Online) Available at: <https://unfccc.int/resource/docs/convkp/kpeng.pdf> (Accessed January 2022).

<sup>466</sup> UNFCCC (2021). Glasgow Climate Pact, 2021. (Online) Available at: [https://unfccc.int/sites/default/files/resource/cop26\\_auv\\_2f\\_cover\\_decision.pdf](https://unfccc.int/sites/default/files/resource/cop26_auv_2f_cover_decision.pdf) (Accessed January 2022).

## Policy Reference

## Policy Context

**Overarching National Policy Statement for Energy (EN-1)<sup>453</sup>**

EN-1 sets out general assessment principles for applications relating to energy infrastructure. This includes that the Secretary of State should take into account the potential benefits of a project including meeting needs for energy infrastructure and job creation and long term or wider benefits.

The Energy NPS aims to “speed up the transition to a low carbon economy and thus help to realise the UK climate change commitments sooner than continuation under current planning system” [1.7.2]. Note the “current planning system” as described in the Energy NPS has since been updated with more ambitious carbon reduction targets.

EN-1 notes that the ES should consider the impacts of climate change when planning the location, design, build and

**Clean Growth Strategy<sup>467</sup>**

This report, prepared by BEIS, provides the strategy for the UK’s future clean growth to allow carbon budgets to be met and support economic growth. It sets out policies and targets out to 2050 for reducing GHG emissions across a number of sectors. Whilst not in itself planning policy it is a material consideration.

**The UK’s Nationally Determined Contribution (NDC) under the Paris Agreement**

In December 2020, the UK submitted its first NDC under the Paris Agreement to the UNFCCC, committing to “at least a 68%” reduction in economy-wide GHG emissions below 1990 levels (1995 levels for F-gases) by 2030, aligned with the UK’s 2050 net-zero GHG emissions target.

<sup>467</sup> BEIS (2018). Clean Growth Strategy, 2018 (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/700496/clean-growth-strategy-correction-april-2018.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf) (Accessed January 2022).

## Policy Reference

## Policy Context

National Planning Policy Framework (NPPF)<sup>455</sup>

The 2021 revision of the NPPF, paragraph 148 states: *“The planning system should support the transition to a low carbon future in a changing climate... shape places in ways that contribute to radical reductions in greenhouse gas emissions... and support renewable and low carbon energy and associated infrastructure”*.

It also requires in paragraph 154 that new development should be planned for in ways that *“can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government’s policy for national technical standards”*.

Furthermore, it is stated in paragraph 155, that local planning authorities should expect new development to:

a) *“comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.”*

## Climate Change and CCR Assessment (International Policy)

## The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement

The UNFCCC is the major international body responsible for managing climate change and carbon emissions. In 2015, it adopted the Paris Agreement, the aims of which are stated as:

*“This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:*

Policy Reference	Policy Context
<b>The United Nations Framework Convention on Climate Change (UNFCCC) Glasgow Climate Pact</b>	<p><i>...(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.”</i></p> <p>The Glasgow Pact emphasised the urgency of the scaling up of action and support to “<i>enhance adaptive capacity, strengthen resilience and reduce the vulnerability to climate change</i>”.</p>
<b>Climate Change and CCR Assessment (National Policy)</b>	
<b>National Planning Policy Framework (NPPF)<sup>455</sup></b>	<p>The NPPF sets out the Government’s planning policies for England. The planning process aims to achieve sustainable development following three overarching objectives: economic, social and environmental including adapting to climate change. Within the framework it is recognised that plans should take a proactive approach to adapting to climate change. “<i>New Development should be planned for in ways that: avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.</i>”.</p>
<b>Overarching National Policy Statement for Energy (EN-1)<sup>453</sup></b>	<p>EN-1 sets out the national policy for energy infrastructure and aims to speed up the transition to a low carbon economy to help realise the UK climate change commitments.</p> <p>Section 4.8 sets out the requirement for the ES to include: “<i>how the proposal will take account of the projected impacts of climate change</i>”.</p> <p>Paragraph 4.8.6 states that “<i>the IPC should be satisfied that applicants for new energy infrastructure have taken into account the potential impacts of climate change using the latest UK Climate Projects available.</i>”.</p>

Policy Reference	Policy Context
<b>National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)<sup>456</sup></b>	<p>Applicants should apply as a minimum, the emissions scenario that the Independent Committee on Climate Change suggests the world is currently most closely following – and the 10%, 50% and 90% estimate ranges. Any adaptation measures should be based on the latest set of UK Climate Projections, the Government’s latest UK Climate Change Risk Assessment, when available and in consultation with the EA.</p> <p>EN-4 states applicants should in particular set out how the proposal would be resilient to:</p> <ul style="list-style-type: none"> <li>• Increased risk of flooding;</li> <li>• Effects of rising sea levels and increased risk of storm surge;</li> <li>• Higher temperatures;</li> <li>• Increased risk of earth movement or subsidence from increased risk of flooding and drought; and</li> <li>• Any other increased risks identified in the applicant’s assessment.</li> </ul>
<b>National Adaptation Programme (NAP)<sup>468</sup></b>	<p>The climate change resilience measures will form part of the ES.</p> <p>The NAP sets out the actions that government and others will take to adapt to climate change in England over a five-year period. The second NAP runs from 2018 to 2023.</p>

<sup>468</sup> Defra (2018). National Adaptation Programme (NAP). (Online) Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/727252/national-adaptation-programme-2018.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727252/national-adaptation-programme-2018.pdf) (Accessed January 2022).

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**Policy Reference**

**Policy Context**

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**25 Year Environment Plan<sup>469</sup>**

This plan sets out how government action will help the natural world and how we will tackle the effects of climate change.

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<sup>469</sup> Defra (2018). 25 Year Environment Plan. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/693158/25-year-environment-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf)  
(Accessed January 2022).

Table 3A.2 Summary of relevant local planning policy

Policy Reference	Policy Context
<b>Ecology</b>	
<b>Cheshire West and Chester Adopted Development Plan, 2015<sup>476</sup></b>	<p><b>Policy ENV4:</b> Biodiversity and geodiversity should be safeguarded through the identification and protection of sites and/or features of international, national and local importance.</p> <p><i>“Developments should not result in any net loss of natural assets and should seek to provide net gains. Where there is unavoidable loss or damage to habitats, sites or features because of exceptional overriding circumstances, mitigation and compensation will be required to ensure there is no net loss of environmental value”.</i></p>
<b>Cheshire East Local Plan Strategy, 2017<sup>471</sup></b>	<p><b>Policy SE3:</b> The policy states that a proposal which may adversely affect the integrity of any internationally designated site will not be permitted unless there are no alternative solutions; there are imperative reasons of overriding public interest; and that suitable compensatory measures will be provided.</p> <p><i>“Development proposals which are likely to affect a Site of Special Scientific Interest (SSSI), National Nature Reserve or the Peak District National Park fringe will not normally be permitted. An exception should only be made where the benefits of the development, clearly outweigh both the impacts that it is likely to have on the designated features and any broader impacts on the national network of SSSIs”.</i></p> <p>Development proposals which are likely to have a significant adverse impact on a site with local or regional designation, habitat or species will not be permitted except where the reasons for or benefits of the Project outweigh the impact of it.</p> <p><i>“All developments ... must aim to positively contribute to the conservation and enhancement of biodiversity and geodiversity and should not negatively affect these interests. When appropriate, conditions will be put in place to make sure</i></p>



## Policy Reference

## Policy Context

*appropriate monitoring is undertaken and make sure mitigation, compensation and offsetting is effective”.*

*“Development proposals that are likely to have a significant impact on a non-designated asset or a site valued by the local community . . . will only be permitted where suitable mitigation and / or compensation is provided to address the adverse impacts of the proposed development, or where any residual harm following mitigation/compensation, along with any other harm, is clearly outweighed by the benefits of the development”.*

**Trafford Local Plan Core Strategy, 2012<sup>472</sup>**

**Policy R2:** *“To ensure the protection and enhancement of the natural environment of the Borough, developers will be required to demonstrate through a supporting statement how the proposal will: Protect and enhance the landscape character, biodiversity, geodiversity and conservation value of its natural urban and countryside assets having regard not only to its immediate location but its surroundings; and protect the natural environment throughout the construction process. Where the Council considers it necessary, in order to protect the natural environment, developers will be required to provide an appropriate ecological assessment report to enable the Council to properly assess and determine the merits or otherwise of the development proposal. All planning applications submitted for development within, or in close proximity to, any of the Borough’s assets, must be supported by such a report”.*

Assets include designated sites; woodland, hedgerows and trees; areas of open water and watercourses; areas of strategic importance as identified in The Greater Manchester Ecological Framework and Trafford’s Climate Change Strategy; Historic Parks and Gardens and historic landscapes including Dunham Massey; and habitats and species identified in the Greater Manchester Biodiversity Action Plan.

**Policy Reference****Policy Context****Warrington Local Plan Core Strategy, 2014<sup>473</sup>**

**Policy QE5:** Proposals for development which may affect European Sites of International Importance will not be permitted unless there is no alternative solution; and there are imperative reasons of over-riding public interest for the development or land use change.

Proposals for development in or likely to affect SSSI will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard the national network of such sites.

Proposals for development likely to have an adverse effect on regionally and locally designated sites will not be permitted unless it can be demonstrated that there are reasons for the development which outweigh the need to safeguard the nature conservation value of the site.

Proposals for development which may adversely affect the integrity or continuity of UK Key habitats or other habitats of local importance, or adversely affect EU Protected Species, UK Priority Species or other species of local importance, or Local Action Plan species will only be permitted if it can be shown that the reasons for the development outweigh the need to retain the habitats or species affected and that mitigating measures can be provided which would reinstate the habitats or provide equally viable alternative refuge sites for the species affected.

**St Helens Core Strategy 2012<sup>474</sup>**

**Policy CQL2:** The policy states: That developers will be required to plant new trees, woodland and hedgerows on appropriate sites; conserve, enhance and manage existing trees, woodlands and hedgerows; protect all ancient woodland within the Borough; ensure that development does not damage or destroy any tree subjected to a Tree Preservation Order, any other protected tree, any other tree of value including veteran trees, or hedgerow unless it can be justified for arboricultural reasons or there is a public benefit, which outweighs the value of the tree(s) and/or hedgerow(s). Where trees are justifiably lost the replacement of trees will be required on at least a 2 for 1 ratio.

Policy Reference	Policy Context
	<p><b>Policy CQL3:</b> The policy aims to protect and manage species and habitats, as well as enhancing and creating habitats and linkages. The following will therefore be required by developers, where appropriate: To incorporate habitat features, which will contribute to the Borough's ecological resource; ensure suitable mitigation measures are implemented to enhance or recreate features, either on or off-site and bring sites into positive conservation management where harm to protected species or habitats is unavoidable; reduce habitat and species fragmentation by developing a functioning ecological framework for the Borough; undertake appropriate ecological assessment including surveys for the relevant habitats, species, flora and fauna; and ensure that any development affecting nationally, and locally important sites and protected species will only be acceptable if there is clear evidence that the development outweighs the nature conservation interest.</p>
<p><b>Halton Core Strategy, 2013<sup>475</sup></b></p>	<p><b>Policy CS20:</b> Designated sites and Halton's natural assets will be protected and enhanced. Replacement or compensatory measures will also be employed to ensure that there is no net loss of natural or heritage assets or landscape character as a result of development.</p>
<p><b>Historic Environment</b></p>	<p><b>ENV5 Historic Environment:</b> Development should safeguard or enhance heritage assets; loss or harm to their significance should be avoided. Development which is likely to have an unavoidable significant adverse effect on heritage assets or where an asset cannot be preserved in situ is unlikely to be permitted.</p>
<p><b>Cheshire West and Chester Local Plan (Part One) Strategic Policies 2015<sup>470</sup></b></p>	

<sup>470</sup> Cheshire West and Chester (2015). Cheshire West and Chester Local Plan (Part One) Strategic Policies 2015 (online). Available at: [https://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/adopted\\_cwac\\_lp/lp\\_1\\_adopted?pointId=3252243#document-3252243](https://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/lp_1_adopted?pointId=3252243#document-3252243) (Accessed November 2021).

Policy Reference	Policy Context
<b>Cheshire East Local Plan Strategy 2017</b> <sup>471</sup>	<b>SE7 The Historic Environment:</b> Development should seek to avoid harm to heritage assets and make a positive contribution to the character of Cheshire East's historic environment. Development that causes harm must include detail of heritage asset significance and contribution of its setting within an application. There is a presumption that heritage assets should be retained and reused. Harm to heritage assets should be outweighed by public benefits and any loss or harm should be mitigated to ensure that there is no net loss of heritage value.
<b>Trafford Local Plan Core Strategy 2012</b> <sup>472</sup>	<b>R1 Historic Environment:</b> Development must take account of surrounding building style, landscape, and historic distinctiveness. Proposals must complement and enhance the existing historic environment, particularly in relation to conservation areas, listed buildings and other identified heritage assets. Developers must identify the presence, absence, or potential for archaeological remains and set out a mitigation plan.
<b>Warrington Local Plan Core Strategy 2014</b> <sup>473</sup>	<b>QE8 Historic Environment:</b> Development proposals which affect the character and setting of all heritage assets will be required to provide supporting information proportionate to the designation of the asset. This includes an understanding of an asset's significance, the avoidance of unnecessary loss, recognition of its contribution to local character, and the provision of suitable mitigation measures.

<sup>471</sup> Cheshire East Council, (2017). Cheshire East Local Plan Strategy 2010-2030, (online). Available at: <https://www.cheshireeast.gov.uk/pdf/planning/local-plan/local-plan-strategy-web-version-1.pdf> (Accessed November 2021).

<sup>472</sup> Trafford Council, (2012). Trafford Local Plan Core Strategy, (online). Available at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/core-strategy-adopted-final.pdf> (Accessed 22 November 2021).

<sup>473</sup> Warrington Borough Council, (2014). Local Plan Core Strategy, (online). Available at: [https://www.warrington.gov.uk/sites/default/files/2019-08/local\\_plan\\_core\\_strategy\\_adopted\\_2014.pdf](https://www.warrington.gov.uk/sites/default/files/2019-08/local_plan_core_strategy_adopted_2014.pdf) (Accessed 22 November 2021).

Policy Reference	Policy Context
<b>St Helens Core Strategy 2012</b> <sup>474</sup>	<b>CQL4 Heritage and Landscape:</b> Development must respect the significance and distinctiveness of the historic environment and should be sited and designed with regards to historic landscape, setting, character and context.
<b>Halton Core Strategy 2013</b> <sup>475</sup>	<b>CS20 Natural and Historic Environment:</b> The Borough's heritage assets should be conserved and enhanced, and special regard should be given to their setting. An overarching aim is to conserve and enhance local character and distinctiveness.
<b>Water Environment</b>	
<b>Cheshire West and Chester Adopted Development Plan, 29 January 2015</b> <sup>476</sup>	<p><b>V1 Flood Risk and Water Management:</b> Seeks to reduce flood risk and to protect and enhance water quality through an appropriate Flood Risk Assessment (FRA), mitigation and designed to reduce surface water run-off rates to include the implementation of Sustainable Drainage Systems (SuDS).</p> <p><b>ENV7 Alternative energy supplies:</b> The council will support renewable and low carbon energy proposals where there are no unacceptable impacts on water, biodiversity, the natural environment</p>
<b>Cheshire East Local Plan Strategy, 27 July 2017</b> <sup>471</sup>	<b>SE12 Pollution, Land Contamination and Land Instability:</b> Requires that no development results in a harmful or cumulative impact upon surface water and

<sup>474</sup> St Helens Council, (2012). St Helens Core Strategy 2012, (online). Available at: <https://www.sthelens.gov.uk/planning-building-control/planning-policy/core-strategy/> (Accessed 22 November 2021).

<sup>475</sup> Halton Borough Council. (2013). Halton's Local Plan Core Strategy April 2013, (online). Available at: <https://www3.halton.gov.uk/Documents/planning/planning%20policy/CoreStrategy.pdf> (Accessed 22 November 2021).

<sup>476</sup> Cheshire West and Cheshire Council, (2015). Cheshire West and Chester Adopted Development Plan, (online). Available at: [http://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/adopted\\_cwac\\_lp/lp\\_1\\_adopted?tab=files](http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/lp_1_adopted?tab=files) (Accessed 22 November 2021).

## Policy Reference

## Policy Context

groundwater quality, soil contamination pollution, or any other pollution which would unacceptably affect the natural and built environment, or cause harm.

**SE13 Flood Risk and Water Management:** All developments at risk of flooding should be supported by an appropriate Flood Risk Assessment (FRA) to reduce the risk of flooding taking into account the impacts of Climate Change in line with the Cheshire East SFRA. In addition, improvements to the current surface water drainage network are sought and to be designed to manage surface water. This should include appropriate sustainable drainage systems (SuDS) and must not result in an increase in runoff. Developments should enhance and protect surface and ground water quality and comply with the Water Framework Directive in ensuring suitable mitigation measures are in place.

**Trafford Local Plan Core Strategy, January 2012<sup>472</sup>**

**L5 Climate Change:** Any development that has potential to cause adverse pollution of water or ground) will not be permitted unless it includes mitigation measures. The council will also control development in areas at risk of flooding considering the level of risk, requiring an appropriate FRA at the planning application stage. In addition, surface water run-off should be reduced through the use of appropriate SuDS based on mapping within the Council's Strategic Flood Risk Assessment.

**R2 Natural Environment:** Ensures the protection and enhancement of the natural environment biodiversity, designated sites of national, regional and local importance and areas of open water and watercourses.

**R3 Green Infrastructure:** Ensure through high quality and multi-functional green infrastructure enhance flood risk management through water storage or run-off Embedded Environmental Measures (Section 7.12) protection, integrating mitigation measures such as SuDS into the design and reducing water pollution

Policy Reference	Policy Context
<p><b>Warrington Local Plan Core Strategy, 21 July 2014<sup>473</sup></b></p>	<p><b>Policy QE 4 Flood Risk:</b> Support will be given where the risk of flooding has been fully assessed and justified by an agreed Flood Risk Assessment where:</p> <ul style="list-style-type: none"> <li>• 1 hectare or greater in Flood Zone 1 and Critical Drainage Areas as defined by the SFRA;</li> <li>• for new development in Flood Risk Zones 2 and 3; and</li> <li>• minor development or change of use in Flood Risk Zones 2 and 3 where a more vulnerable use may be susceptible to other sources of flooding.</li> </ul> <p>The policy outlines the requirements to manage surface water run-off, to ensure that flood risk is not increased, the use of Sustainable Drainage Systems, floodplain compensatory storage and safe design within development proposals. Any development identified as at intermediate and high risk of surface water flooding (greater than 0.5 hectares) should be supported by a Flood Risk Assessment which considers information in Warrington's Strategic Flood Risk Assessment and Preliminary Flood Risk Assessment.</p> <p><b>Policy QE 6 Environment and Amenity Protection:</b> To ensure no adverse impact on the environment including:</p> <ul style="list-style-type: none"> <li>• the integrity and continuity of tidal and fluvial flood defences;</li> <li>• the quality of water bodies, including canals, rivers, ponds and lakes; and</li> <li>• groundwater resources in terms of their quantity, quality and the ecological features they support.</li> </ul>
<p><b>St Helens Core Strategy, 31 October 2012<sup>474</sup></b></p>	<p><b>Policy CP 1 Ensuring Quality Development:</b> To ensure the protection of watercourses from encroachment, modification and degradation and return modified and degraded water bodies to sustainable, natural environments. Also</p>

## Policy Reference

## Policy Context

Halton Core Strategy, April 2013<sup>475</sup>

to mitigate against the effects of water pollution (including contamination of soil, surface water and groundwater resources).  
For environmental quality any development should be located in an area compatible with the identified Flood Zone in the SFRA, avoiding adding to the causes and sources of flood risk and ensuring no adverse impact on other sites. In addition, the protection from the risk of flooding, through the use of SuDS and/or other appropriate measures and/or flood defences will be required.

**Policy CS19 Sustainable Development and Climate Change:** Development should incorporate appropriate climate change resilience including passive design features, conservation measures, and the management of surface water run-off.

**Policy CS20: Natural and Historic Environment:** A hierarchical approach will be given to the protection, nature conservation and enhancement of biodiversity including:

1. sites of international importance including the Mersey Estuary Special Protection Area (SPA) and 'Ramsar' site;
2. sites of national importance including Sites of Special Scientific Interest (SSSI) namely; The Mersey Estuary, Flood Brook Clough and Red Brow Cutting; and,
3. sites of local importance including Local Nature Reserves (LNRs), Local Wildlife Sites and Ancient Woodland.

**Policy CS21 Green Infrastructure:** To sustain the protection of internationally important sites for biodiversity.

**Policy CS23 Managing Pollution and Risk:** To control development which may give rise to pollution of water. To manage flood risk and not exacerbate existing levels of flood risk nor place residents or property at risk. This is to be achieved



Policy Reference	Policy Context
	<p>by predicting the level of flood risk, both at present and taking into consideration the likely effects of climate change and using Halton’s Strategic Flood Risk Assessment (SFRA) in accordance with national planning policy. The requirement of site-specific Flood Risk Assessments for proposals in areas at risk from flooding as identified in the Halton SFRA.</p>
<p><b>Landscape and Visual<sup>477</sup></b></p>	
<p><b>Cheshire West and Chester Adopted Development Plan, 29 January 2015 (part 1)<sup>470</sup></b></p>	<p><b>SO12 Strategic objective Environmental Page 18:</b> New development should be of sustainable and high-quality design that respects local distinctiveness and the character and appearance of the landscape and townscape.</p> <p><b>STRAT 9 Green Belt and countryside Page 43:</b> The intrinsic character and beauty of the countryside will be protected by restricting development to that which requires a countryside location and cannot be accommodated within identified settlements. Development must be of an appropriate scale and design to not harm the character of the countryside</p> <p><b>ENV 2 Landscape Page 85:</b> The Local Plan will protect and, wherever possible, enhance landscape character and local distinctiveness. The development should take account of the characteristics of the development site and surroundings and where appropriate views into, over and out of the site. Features of landscape quality should be retained and incorporated into the design.</p>

<sup>477</sup> Neighbourhood Plans approved at referendum will be reviewed as part of the statutory development plan and policies relevant to landscape and visual matters will be reviewed as part of the LVIA chapter of the PEIR.

Policy Reference	Policy Context
	<p><b>ENV 3 Green Infrastructure Page 87:</b> The Local Plan will support the creation, enhancement, protection and management of a network of high quality multi-functional Green Infrastructure.</p>
	<p><b>ENV 6 High quality design and sustainable construction Page 94:</b> Development should, where appropriate, respect local character and be sympathetic to landscape assets. Development should meet applicable nationally described standards for design and construction.</p>
	<p><b>ENV 7 Alternative energy supplies Page 97:</b> Low carbon energy proposals will be supported where there are no unacceptable impacts on landscape, visual or residential amenity considerations. Proposals should be accompanied by appropriate arrangements for decommissioning.</p>
<p><b>Cheshire West and Chester Adopted Development Plan (Part Two), 29 January 2015<sup>478</sup></b></p>	<p><b>GBC 2 - Protection of landscape Page 82:</b> Where development requires a countryside location, it must, be sympathetic to the character, protect and, wherever possible, enhance landscape character and distinctiveness, and preserve special landscape character and scenic value.</p>
	<p><b>DM 3 - Design, character and visual amenity Page 119:</b> Development will be expected to respect, contribute positively to the character and protect the visual amenity of the local area. Development should contribute positively to the character of the area, respect and where appropriate enhance the landscape, and be sympathetic to the characteristics of the development site.</p>
	<p><b>DM 44 - Protecting and enhancing the natural environment Page 203:</b> Development will be supported where there is no net loss of natural assets and,</p>

<sup>478</sup> Cheshire West and Chester Council (2015). Local Plan (Part Two) Land Allocations and Detailed Policies (Online). Available at: [https://cheshirewestandchester.objective.co.uk/portal/cwc/ldf/adopted\\_cwac\\_lp/parttwo\\_adopted?tab=files](https://cheshirewestandchester.objective.co.uk/portal/cwc/ldf/adopted_cwac_lp/parttwo_adopted?tab=files) (Accessed 30 August 2021).

Policy Reference

Policy Context

wherever possible, it delivers net gains within the borough. Developments will be supported that; utilise native species in landscaping schemes, where appropriate.

**DM 45 - Trees, woodland and hedgerows Page 206:** Development will be supported where it conserves, manages and, wherever possible, enhances existing trees, woodlands, traditional orchards, and hedgerows.

**DM 49 - Registered Parks and Gardens and Battlefields**

**Page 214:** Development proposals affecting landscapes identified on the Register of Historic Parks and Gardens of special historic interest in England (Registered Parks and Gardens) will only be supported where it has been demonstrated that:

great weight is given to the asset's conservation and significance, taking into consideration the integrity of the landscape, setting and key views, the prevention of sub-division of the landscape.

**Strategic Priority 3 Protecting and enhancing environmental quality Page 45:** Protecting and enhancing environmental quality

This will be delivered by respecting the character and distinctiveness of places, buildings and landscapes through the careful design and siting of development

Cheshire East Local Plan Strategy, 27 July 2017<sup>471</sup>

**Policy SD 2 Sustainable Development Principles Page 83:** Respect and, where possible, enhance the landscape character of the area, particular attention will be paid toward significant landmarks and landscape features. Creating or reinforcing local distinctiveness.

**Policy SE 2 Efficient Use of Land Page 127:** The Council will manage development to protect previously developed land where it can be clearly demonstrated that either the landscape amenity or biodiversity value of the site

Policy Reference	Policy Context
	<p>has become of a high value and as such would be compromised through redevelopment of the site.</p> <p><b>Policy SE 4 The Landscape Page 132:</b> All development should conserve the landscape character and quality and should where possible, enhance and effectively manage the historic, natural, and man-made landscape features that contribute to local distinctiveness of both rural and urban landscapes.</p> <p><b>Policy SE 5 Trees, Hedgerows and Woodland Page 134:</b> Trees, Hedgerows and Woodland will be protected development proposals which will result in the loss of, or threat to, the continued health and life expectancy of trees, hedgerows or woodlands that provide a significant contribution to the amenity and landscape character will not normally be permitted, except where there are clear overriding reasons for allowing the development.</p> <p><b>Policy SE 6 Green Infrastructure Page 135:</b> Cheshire East aims to deliver a good quality, green infrastructure. This will be done by Linking the various assets of Cheshire East's unique landscape and enhancing and protecting the green infrastructure. Any development should contribute to the creation of a good quality network of green spaces.</p>
<p><b>Congleton Borough Local Plan First Review (Adopted January 2005)<sup>479</sup></b></p>	<p><b>PS9 Areas of Special County Value:</b> The spatial extents of Areas of Special County Value now known as Local Landscape Designations are relevant until reviewed and updated through the production of a Site Allocations and</p>

<sup>479</sup> Cheshire East Council (2005). Congleton Borough Local Plan First Review. (online). Available at: [https://www.cheshireeast.gov.uk/pdf/planning/spatial-planning/local-plan-consultations/cbc\\_local\\_plan\\_first\\_review\\_written\\_statement.pdf](https://www.cheshireeast.gov.uk/pdf/planning/spatial-planning/local-plan-consultations/cbc_local_plan_first_review_written_statement.pdf) (Accessed 30 August 2021).

Policy Reference	Policy Context
<b>Borough Of Crewe and Nantwich Replacement Local Plan 2011 (Adopted February 2005)<sup>480</sup></b>	<p>Development Policies DPD. New local plan Cheshire East Local Plan Strategy, 2017 Policy SE4 includes restrictions and aims within the local landscape designations.</p> <p><b>NE3 Areas of Special County Value:</b> Areas of Special County Value are now known as Local Landscape Designations which are addressed by Policy SE 4. Until reviewed and updated through the production of a Site Allocations and Development Policies DPD, the spatial extent of Local Landscape Designation Areas in the former Borough of Crewe and Nantwich is shown as Areas of Special County Value in the proposals maps of the existing Crewe and Nantwich Local Plan.</p>
<b>Macclesfield Borough Local Plan (Adopted January 2004)<sup>481</sup></b>	<p><b>NE1 Areas of Special County Value Page 18:</b> The spatial extents of Areas of Special County Value now known as Local Landscape Designations are relevant until reviewed and updated through the production of a Site Allocations and Development Policies DPD. New local plan Cheshire East Local Plan Strategy, 2017 Policy SE4 includes restrictions and aims within the local landscape designations</p> <p><b>NE3 Landscape Conservation Page 19:</b> The conservation and enhancement of the rural landscape will be encouraged through the creation and restoration of hedgerows, woodlands, drystone walls and ponds and other natural features. Preference will be given to the use of native species. Developments of 1 hectare or more which</p>

<sup>480</sup> Cheshire East Council (2005). Borough of Crewe and Nantwich Replacement Local Plan 2011. (online). Available at: <https://www.cheshireeast.gov.uk/pdf/planning/spatial-planning/strategic-planning/en-ldf-cnbcllocalplan.pdf> (30 August 2021).

<sup>481</sup> Borough of Macclesfield (2004). Macclesfield Borough Local Plan (online). Available at: <https://www.cheshireeast.gov.uk/pdf/planning/spatial-planning/local-plan-consultations/macc-local-plan-combined-chapters.pdf> (Accessed 30 August 2021).

Policy Reference

Policy Context

include such measures will normally be permitted, subject to green belt and countryside policies.

**NE5 Conservation of Parkland Landscapes Page 20:** The borough council will promote the conservation and enhancement of historic landscapes, parklands and gardens. Development which would adversely affect their special historic interest, setting or the enjoyment of any part of their grounds will not normally be allowed.

**DC8 Design – Landscaping Page 172:** Where appropriate, applications for new development must include a landscape scheme which should, achieve a balance the development and open space, provide screening, retain trees and shrubs, utilise species which are in sympathy with the character of the area, make provision for maintenance of the scheme.

**St Helens Core Strategy, 31 October 2012<sup>474</sup>**

**CP1 Quality Developments Page 90:** All proposals for development within the Borough will be expected to maintain or enhance the overall character and appearance of the local environment, provide landscaping as an integral part of the development, protecting existing landscape features, providing open space and enhancing the public realm.

**CQL 1 Green Infrastructure Page 126:** The Council will protect, manage, enhance and where appropriate expand the Green Infrastructure network reinforcing greenways and linkages, promote and improve the accessibility.

**CQL 2 Trees and Woodland Page 129:** Trees, woodlands and hedgerows, will be protected and enhanced, developers are required where appropriate to plant new trees, woodlands and hedgerows on appropriate sites, and conserve enhance and manage existing trees, woodlands and hedgerows.

Policy Reference	Policy Context
	<p><b>CQL 4 Heritage and Landscape Page 134:</b> The Council will protect, conserve, preserve and enhance St. Helens historic built environment and landscape character, by implementing Management Plans, education, interpretation, and public access measures; Ensuring all new development respects the landscape character and context.</p>
<p><b>St Helens, Unitary Development Plan, 1998 Saved Policies</b><sup>482</sup></p>	<p><b>ENV 3 Greenways Page 136:</b> A strategic network of Greenways will be safeguarded.</p> <p><b>ENV 12 Development Affecting Existing Trees Page 145:</b> Proposals affecting existing trees and woodlands will not normally be permitted if they result in significant loss of existing trees and do not incorporate retention or make provision for replanting.</p>
<p><b>Bold Forest Park Area Action Plan (adopted July 2017)</b><sup>483</sup></p>	<p><b>BFP1 A Sustainable Forest Park Page 31:</b> In developing the Forest Park infrastructure and attractions, the Council will work with its partners to seek an economic focus, balanced with environmental sustainability, initiatives include; Enhancing the landscape character. Enhancing the natural environment through targeted delivery of Green Infrastructure programmes that improve and expand the biodiversity and landscape quality of Bold Forest Park area.</p>

<sup>482</sup> St. Helens Metropolitan Borough Council (2007). St Helens Unitary Development Plan (Originally Adopted by St. Helens Metropolitan Borough Council on 2nd July 1998) (online). Available at: <https://www.sthelens.gov.uk/media/3391/sthelens-unitary-development-plan-saved-policies-2013-addendum.pdf> (Accessed 30 August 2021)

<sup>483</sup> St Helens Council (2017). Bold Forest Park Area Action Plan (online). Available at: <https://www.sthelens.gov.uk/media/6442/bold-forest-park-area-action-plan-adopted-2017-web.pdf> (Accessed 30 August 2021).

Policy Reference	Policy Context
	<p><b>BFP ENV1 Enhancing Landscape Character Page 51:</b> Ensure a high-quality landscape within Bold Forest Park. taking in a range of issues including, landscape amenity; wildlife Habitat Land use, background noise amelioration, and heritage.</p>
<p><b>Trafford Local Plan Core Strategy, January 2012<sup>472</sup></b></p>	<p><b>QE 3 Green Infrastructure Page 85:</b> The Council will work with partners to develop and adopt an integrated approach to the provision, care and management of the borough's Green Infrastructure.by; protecting existing provision, increasing the functionality of existing provision and improving the quality of existing provision, including local networks and corridors.</p> <p><b>CC 2 Protecting the Countryside Page 140:</b> Development proposals in the countryside which accord with Green Belt policies set out in national planning policy will be supported provided that. the detailed siting and design of the development relates satisfactorily to its rural setting, in terms of its scale, layout and use of materials; and the development respect local landscape character, both in terms of immediate impact, or from distant views.</p>
<p><b>Halton Core Strategy, April 2013<sup>475</sup></b></p>	<p><b>CS18 High Quality design Page 113:</b> Achieving and raising the quality of design is a priority for all development in Halton. Development proposals, will be expected to incorporate appropriate landscape schemes into development designs, integrating local habitats and biodiversity.</p> <p><b>CS20 Natural and historic environment Page 118:</b> Development must, where appropriate, enhance the value of Halton's natural assets including restoring or adding to natural habitats and other landscape features, and the creation of habitats where appropriate and conserve and enhance landscape character. informed by the Halton Landscape Character Assessment.</p>



Policy Reference	Policy Context
Halton Unitary Development Plan (UDP) 2005, Saved policies <sup>484</sup>	<p><b>CS21 Green Infrastructure Page 121:</b> Halton’s green infrastructure network will be protected, enhanced and expanded, where appropriate. Development should Support the delivery of programmes and strategies to protect, enhance and expand green infrastructure across the Borough including local and sub-regional strategies and Regional Park initiatives.</p>
	<p><b>S23 Open Countryside Page 46:</b> Within the Green Belt boundary shown on the proposals map as open countryside, new development will not be permitted unless it is essential for agriculture, forestry, outdoor recreation or for other purposes appropriate to a rural area.</p>
	<p><b>GE10 Protection of Linkages in Greenspace Systems Page 102:</b> Development affecting a “greenspace system” will not be permitted if development affects visual, physical, functional or structural linkages within the system and cause any detriment to its use.</p>
	<p><b>GE11 Protection of Incidental Greenspaces Page 103:</b> Development that would result in the loss of incidental greenspace within housing, commercial and industrial areas will not be permitted where the greenspace is of amenity value, as measured against the criteria for designation of greenspace.</p>
	<p><b>GE23 Protection of Areas of Special Landscape Value Page 113:</b> Development within Areas of Special Landscape Value will not be permitted if it would have an unacceptable effect on the visual and physical characteristics for which an area was designated as having special landscape value.</p>

<sup>484</sup> Halton Borough Council (2005). Halton Unitary Development Plan (online). Available at: [https://www3.halton.gov.uk/Documents/planning/planning%20policy/UDP\(FullText\)Prt.pdf](https://www3.halton.gov.uk/Documents/planning/planning%20policy/UDP(FullText)Prt.pdf) (Accessed 30 August 2021).

Policy Reference	Policy Context
<b>Warrington Local Plan Core Strategy, 21 July 2014</b> <sup>473</sup>	<p><b>GE24 Protection of Important Landscape Features Page 115:</b> Development will not be permitted if it would have an unacceptable effect on the visual or physical characteristics for which a site was designated as having Important Landscape Features.</p> <p><b>GE26 Protection of Hedgerows Page 116:</b> Development will not be permitted if it is likely to damage or destroy an existing hedgerow, either directly or indirectly, unless the importance of the Project can be shown to clearly outweigh both the amenity value and nature conservation value of the hedgerow.</p> <p><b>GE27 Protection of Trees and Woodland Page 117:</b> Development will not be permitted if it is likely to damage or destroy a tree protected by a Tree Preservation Order or a tree within a Conservation Area or a woodland which is greater than 0.25 hectare in size, has more than 50% canopy and is more than fifty years old.</p>
<b>Air Quality</b>	<p><b>QE 3 Green Infrastructure Page 85:</b> The Council will work with partners to protect, enhance, increase functionality, improve the quality, and increase green infrastructure.</p>
<b>Cheshire West and Chester Adopted Development Plan, 29 January 2015 (part 1)</b> <sup>470</sup>	<p><b>SOC 5 Health and well-being states:</b> <i>“Development that gives rise to significant adverse impacts on health and quality of life (e.g. soil, noise, water, air or light pollution, and land instability, etc) including residential amenity, will not be allowed”</i></p>
<b>Cheshire East Local Plan Strategy (2017)</b> <sup>471</sup>	<p><b>SE 12 Pollution, Land Contamination and Land Instability states:</b> <i>“1. The council will seek to ensure all development is located and designed so as not to result</i></p>

**Policy Reference**

**Policy Context**

*in a harmful or cumulative impact upon air quality, surface water and groundwater, noise, smell, dust, vibration, soil contamination, light pollution or any other pollution which would unacceptably affect the natural and built environment, or detrimentally affect amenity or cause harm. Developers will be expected to minimise, and mitigate the effects of possible pollution arising from the development itself, or as a result of the development (including additional traffic) during both the construction and the life of the development. Where adequate mitigation cannot be provided, development will not normally be permitted.*

*2. Development for new housing or other environmentally sensitive development will not normally be permitted where existing air pollution, soil contamination, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.*

*3. Development should support improvements to air quality, not contradict the Air Quality Strategy or Air Quality Action Plan and seek to promote sustainable transport policies”*

**Trafford Local Plan Core Strategy (2012)<sup>472</sup>**

**L5.13-15 Pollution** states: “L5.13: Development that has potential to cause adverse pollution (of air, light, water, ground), noise or vibration will not be permitted unless it can be demonstrated that adequate mitigation measures can be put in place.”

**L5.14:** “Where development is proposed close to existing sources of pollution, noise or vibration, developers will be required to demonstrate that it is sited and designed in such a way as to confine the impact of nuisance from these sources to acceptable levels appropriate to the proposed use concerned. L5.15: Within

Policy Reference	Policy Context
	<p><i>the Borough’s Air Quality Management Zones developers will be required to adopt measures identified in the Greater Manchester Air Quality Action Plan, to ensure that their development would not have an adverse impact on the air quality.”</i></p>
<p><b>Warrington Local Plan Core Strategy (2014)</b><sup>473</sup></p>	<p><b>QE6 Environment and Amenity Protection</b> states: <i>“The Council, in consultation with other Agencies, will only support development which would not lead to an adverse impact on the environment or amenity of future occupiers or those currently occupying adjoining or nearby properties, or does not have an unacceptable impact on the surrounding area. The Council will take into consideration several criteria, including Air Quality.”</i></p>
<p><b>St Helens Core Strategy (2012)</b><sup>474</sup></p>	<p><b>CP 1 Ensuring Quality Development in St. Helens</b> states: <i>“Minimise and mitigate against the effects of air, light and water pollution (including contamination of soil, surface water and groundwater resources) and noise, vibration, smells, dust and electromagnetic fields caused by the development; Development that is located within or would impact on Air Quality Management Areas will require special consideration with regard to their impacts on air quality”.</i></p>
<p><b>Halton Core Strategy (2013)</b><sup>475</sup></p>	<p><b>CS23 Managing Pollution and Risk</b> states: <i>“To control development which may give rise to pollution:</i></p> <ul style="list-style-type: none"> <li><i>• Development proposals should not exacerbate and where possible, should minimise, all forms of emissions and odour, water, noise and light pollution.</i></li> <li><i>• Proposals for development within or close to identified Air Quality Management Areas (AQMA) in the Borough should have specific regard to how the exceedance in air pollutants can be addressed and how the impact on receptors can be reduced.”</i></li> </ul>
<p><b>Noise and Vibration</b></p>	

Policy Reference	Policy Context
<b>Cheshire West and Chester Council Local Plan (Part One): Strategic Policies 2015<sup>470</sup></b>	<b>SOC 5 Health and Wellbeing:</b> <i>‘Development that gives rise to significant adverse impacts on health and quality of life (e.g., soil, noise, water, air or light pollution, and land instability, etc) including residential amenity, will not be allowed.’</i>
	<b>ENV 7: Alternative energy supplies:</b> <i>‘The Local Plan will support renewable and low carbon energy proposals where there are no unacceptable impacts on [...] Noise, air, water, highways or health.’</i>
<b>Cheshire West and Chester Council, Supplementary Planning Document: Oil and Gas Exploration, Production and Distribution, May 2017<sup>485</sup></b>	<b>Paragraph 5.5:</b> Supplementing the policies in the Local Plan, providing advice for applicants, and decision makers. The document refers back to Local Plan Strategic Policies in addition to identifying noise as a “key issue”: <i>Where development is proposed, a noise impact assessment should be submitted. The Council's Environmental Protection team have identified that the starting point is that onshore oil and gas development should not result in an unacceptable rise in background noise levels as measured as an L<sub>90dB(A)</sub> at the nearest sensitive receptors. The noise impact assessment should demonstrate that the noise levels as a result of the development shall be 5dB(A) or more below the measured background level at the nearest facade of the residential property when measured as a rating level in accordance with British Standard BS4142:2014. In the event that the appropriate level cannot be achieved without mitigation, applicants should carry out detailed investigations and submit appropriate levels of mitigation, including details of the noise output, and the provision of purpose designed attenuation for all noise generative plant and equipment.’</i>

<sup>485</sup> Cheshire West and Chester Council (2017). Supplementary Planning Document: Oil and Gas Exploration, Production and Distribution (online). Available at: [https://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/spd/oil\\_gas\\_spd?pointId=4158906](https://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/spd/oil_gas_spd?pointId=4158906) (Accessed 22 Nov 2021)

Policy Reference

Policy Context

**5.9 Flaring:** *‘The noise and visual impacts of any flaring or venting will be taken into account and should be minimised as much as possible.’*

**5.16 Heavy goods vehicles:** *‘(HGVs) can have adverse impacts on residents and other sensitive land-uses [...] they can contribute to noise and they can impact on road safety, if unsuitable roads are used.’*

**Cumulative development 5.28:** *‘Oil and gas development should not cause an unacceptable cumulative impact arising from the interactions between minerals and waste developments, and between mineral, waste and other forms of development in the locality. These cumulative impacts may relate to many of the impacts identified above such as noise, visual impact, water resources etc. The potential cumulative impacts of oil and gas developments (including both simultaneous and sequential development) and the way they relate to existing developments must be addressed to an acceptable standard as part of a planning application. Applicants must consider the interaction with other existing developments in the area such as housing, and impacts on existing surrounding uses and planned development.’*

Cheshire East Council Local Plan Strategy, 27 July 2017<sup>471</sup>

**General:** The Cheshire East Local Plan Strategy 2010-2030 was adopted on 27 July 2017. It sets out the overall vision and planning strategy for development in the borough and contains planning policies to ensure that new development addresses the economic, environmental and social needs of the area.

**SE8:** *‘Weight will be given to the wider environmental, economic and social benefits arising from renewable and low carbon energy schemes, whilst considering the anticipated adverse impacts, individually and cumulatively upon: [...]*  
*ii. Residential amenity including visual intrusion, air, dust, noise, odour, traffic generation, recreation and access’*

Policy Reference	Policy Context
	<p><b>SE12:</b> <i>'The Council will seek to ensure all development is located and designed so as not to result in a harmful or cumulative impact upon air quality, surface water and groundwater, noise, smell, dust, vibration, soil contamination, light pollution or any other pollution which would unacceptably affect the natural and built environment, or detrimentally affect amenity or cause harm. Developers will be expected to minimise and mitigate the effects of possible pollution arising from the development itself, or as a result of the development (including additional traffic) during both the construction and the life of the development. Where adequate mitigation cannot be provided, development will not normally be permitted.'</i></p>
	<p><b>13.132:</b> <i>'Noise and vibration during the construction process can often cause disturbance and detrimentally affect amenity to occupants of neighbouring properties. The Council will, where necessary, seek to attach planning conditions assessing each case on its individual merits.'</i></p>
<p><b>Cheshire East Council, Revised Publication Draft Site Allocations and Development Policies Document (SADPD) ('Clean' version) September 2020<sup>486</sup></b></p>	<p><b>General:</b> Once finalised the SADPD will form the second part of the council's local plan, providing further detailed planning policies and site allocations to support the strategic policies and sites contained in the Local Plan Strategy.</p> <p><b>ENV 15 New development and existing uses:</b> <i>'New development must effectively integrate with existing uses, and existing businesses and community facilities must not have unreasonable restrictions placed on them as a result of it. Where the operation of an existing business or facility could have a significant adverse effect on a proposed new development in its vicinity, the applicant shall submit appropriate information to demonstrate that such impacts will not arise or</i></p>

<sup>486</sup> Cheshire East Council (2020). Revised Publication Draft Site Allocations and Development Policies Document ('Clean' version) (online). Available at: <https://cheshireeast-consult.objective.co.uk/portal/planning/cs/sadpd/rpdsadpd?pointId=5716755> (Accessed 22 Nov 2021)

Policy Reference	Policy Context
	<i>can be prevented through suitable mitigation measures. Where such impacts will arise and cannot be avoided through mitigation, planning permission will be refused.'</i>
<b>Cheshire East Council, Environmental Protection Supplementary Planning Document Consultation Draft October 2021<sup>487</sup></b>	<b>General:</b> This document adds further detail to the policies in the development plan and is used to provide guidance for development on specific sites, or on particular issues. Provides details regarding NPSE levels of adverse effect, what should be included in a NIA and references specific standards for different types of development (included where relevant within this chapter), examples on mitigation techniques, standard construction hours.
<b>Halton Borough Council Local Plan 2014 – 2037, Revised Core Strategy Policies and Delivery and Allocations Publication Document, 2017<sup>488</sup></b>	<p><b>RD5 Primary Residential Areas, paragraph 9.32:</b> <i>'The introduction of non-residential uses may be appropriate in certain locations subject to not adversely impacting on the residential character of the area or introducing nuisance to remaining residential populations, by way of traffic, parking, noise, odours or other factors.'</i></p> <p><b>HE7 Pollution and Nuisance:</b> <i>'Where applications for development identify risks that would negatively impacting on the quality of the environment through: a. air pollution; b. noise nuisance; c. odour nuisance; d. light pollution and nuisance; e. land and soil contamination; f. water pollution; and g. other forms of pollution and nuisance, must be accompanied by an appropriate impact assessment and,</i></p>

<sup>487</sup> Cheshire East Council (2021), Environmental Protection Supplementary Planning Document Consultation Draft 9online). Available at: [https://www.cheshireeast.gov.uk/planning/spatial-planning/cheshire\\_east\\_local\\_plan/site-allocations-and-policies/sadpd-examination/documents/examination-library/ed01b-revised-pub-draft-sadpd-clean-version.pdf](https://www.cheshireeast.gov.uk/planning/spatial-planning/cheshire_east_local_plan/site-allocations-and-policies/sadpd-examination/documents/examination-library/ed01b-revised-pub-draft-sadpd-clean-version.pdf) (Accessed 22 Nov 2021)

<sup>488</sup> Halton Borough Council, (2014) Halton Local Plan 2014-2037 Revised Core Strategy Policies and Delivery and Allocations Publication Document (online). Available at <https://moderngov.halton.gov.uk/documents/s47370/DALP%2028June17.pdf.pdf> (Accessed 22 Nov 2021)



## Policy Reference

## Policy Context

*where necessary, demonstrate that mitigation measures have been incorporated through a mitigation scheme.'*

**Policy GR5: Renewable and Low Carbon Energy:** *'Development proposals for renewable energy developments will need to take into account, and minimise where appropriate, the potential environmental effects of the development on: a. Residential / workplace amenity b. The visual amenity of the local area, including landscape character c. Local nature resources, including air and water quality d. The natural and built environments e. Any heritage assets and their settings f. Biodiversity g. The openness and visual amenity of the Green Belt h. The amenities of sensitive neighbouring uses (including by virtue of noise, dust, odour or traffic) i. Other site constraints.'*

**Halton Borough Delivery and Allocations Local Plan (incorporating Partial Review of the Core Strategy): Proposed Submission Draft, May 2019** <sup>489</sup>

**General:** Sets out the planning policies and land allocations to guide decisions on the location, scale and type of development and changes in the way land and buildings are used. Supersedes some of the 2017 Core Strategy. GR5 unchanged from above. Paragraph 9.32 within RD5, identified above, removed.

**HE7:** *'Applications for development that risks negatively impacting on the quality of the environment through: a. air pollution; b. noise nuisance; c. odour nuisance; d. light pollution and nuisance; e. land and soil contamination; f. water pollution; and g. other forms of pollution and nuisance, must be accompanied by an appropriate impact assessment and, where necessary, demonstrate that mitigation measures have been incorporated through a mitigation scheme. 2. Where risks for pollution and nuisance are identified, planning permission will be granted for development providing: a. The level of air borne pollutants caused by*

<sup>489</sup>Halton Borough Council, (2019). Halton Local Plan 2014-2037, Delivery and Allocations Local Plan (incorporating Partial Review of the Core Strategy) (online). Available at: <https://moderngov.halton.gov.uk/documents/s56900/Halton%20Local%20Plan%20-%20PropSubmsn%20Committee%202019-02-28%201831%20r1.pdf> (Accessed 22 Nov 2021)

**Policy Reference**

**Policy Context**

*the proposed development does not exceed statutory guidelines, unless appropriate mitigation measures are agreed. b. Noise nuisance is not likely to cause a significant increase in ambient noise levels for either day or night time conditions. c. Odour which can be detected beyond the boundary of the site and that is detrimental to neighbouring and / or local amenity is kept to a practical minimum. d. External lighting proposals avoid unnecessary light pollution beyond the specific area intended to be lit. e. Appropriate pollution control measures are incorporated where necessary to protect both ground and surface waters.'*

**Warrington Borough Council Local Plan Core Strategy, 21 July 2014<sup>473</sup>**

**Policy DC4: Ecological Network, paragraph 8.4.12:** *'Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.'*

**Policy ENV8 Environmental and Amenity Protection, paragraph 2:** *'Development proposals, as appropriate to their nature and scale, should demonstrate that environmental risks have been evaluated and appropriate measures have been taken to minimise the risks of adverse impacts to air, land and water quality, whilst assessing vibration, light and noise pollution both during their construction and in their operation.'*

**Noise Pollution Section:** *'11. The Council encourages consideration for noise and acoustic mitigation during early stages of design, having regard for layout, siting and internal features. 12. Developments which are noise sensitive end uses near to busy roads or noisy existing businesses will need to demonstrate with any application that appropriate mitigation can be employed and implemented to prevent adverse impacts on health and quality of life for future site users. Such developments need to consider and implement the 'agent of change' principle in accordance within the NPPF*

Policy Reference	Policy Context
	<p><i>13. New developments should not place unreasonable restrictions on existing businesses or business activities through the restriction of activities, prohibition of works or otherwise. 14. Development proposals generating noise which is likely to create significantly adverse impacts on health and quality of life and which cannot be mitigated and/or controlled through the use</i></p> <p><i>9.8.11 National guidance sets out what levels of noise are considered acceptable within the Noise Policy Statement for England (NPSE). Further information, including reference to relevant British Standards, can be found in the Council's Environmental Protection SPD. Noise and acoustic mitigation should always be designed into developments from the outset considering layout, siting and internal design. Sensitive development near to significant noise sources or in noise mapped areas or important areas (noise) will often require acoustic mitigation to be implemented fully prior to use, where this is acknowledged from the outset of the design stage the implementation is often easier and less costly.'</i></p>
<p><b>Environmental Protection: Supplementary planning Document, May 2013<sup>490</sup></b></p>	<p><b>General:</b> Sets out in detail the Council's approach to environmental protection including noise with a tool kit of information, guidance on what assessment should contain and guidance on how noise is assessed</p>
<p><b>Trafford Council Local Plan Core Strategy, January 2012<sup>472</sup></b></p>	<p><b>General:</b> Once adopted, the Local Plan will replace the following Development Plan documents:</p> <ul style="list-style-type: none"> <li>• The Trafford Core Strategy (adopted January 2012) and</li> </ul>

<sup>490</sup> Warrington Borough Council (2013) Environmental Protection: Supplementary planning Document <https://www.warrington.gov.uk/sites/default/files/2020-09/Environmental%20protection%20-%20supplementary%20planning%20guidance.pdf> (Accessed January 2022).

Policy Reference	Policy Context
	<ul style="list-style-type: none"> <li>The Revised Trafford Unitary Development Plan (adopted June 2006).</li> </ul>
	<p><b>Policy L5: Climate Change, paragraph L5.13:</b> <i>‘Development that has potential to cause adverse pollution (of air, light, water, ground), noise or vibration will not be permitted.’</i></p>
	<p><b>Energy Generating Infrastructure Opportunities – Commercial or Community, paragraph 14.17:</b> <i>‘Matters of protecting amenity: the development to be compatible with the surrounding area; not prejudice the amenity of the future occupiers of the development and/or occupants of adjacent properties by reason of overbearing, overshadowing, overlooking, visual intrusion, noise and/or disturbance, odour or in any other way.’</i></p>
	<p><b>Policy 7: Design, Protecting Amenity, paragraph L7.3:</b> <i>‘In relation to matters of amenity protection, development must:</i></p> <ul style="list-style-type: none"> <li><i>Be compatible with the surrounding area; and</i></li> <li><i>Not prejudice the amenity of the future occupiers of the development and/or occupants of adjacent properties by reason of overbearing, overshadowing, overlooking, visual intrusion, noise and/or disturbance, odour or in any other way.’</i></li> </ul>
<p><b>PG16 – Noise Standards (April 1995)</b></p>	<p>Provides advice on noise matters in planning, assessment requirements and standards.</p>
<p><b>Traffic and Transport</b></p>	

## Policy Reference

## Policy Context

**Cheshire and Cheshire West Adopted Development Plan, 2015<sup>476</sup>**

**STRAT 10 Transport and Accessibility:** Developments that generate significant amounts of traffic should be accompanied by a Transport Assessment and Travel Plan.

New development will be required to demonstrate that:

- Additional traffic can be accommodated safely and satisfactorily within the existing, or proposed, highway network
- Satisfactory arrangements can be made to accommodate the additional traffic before the development is brought into use.

Current and disused transport corridors and infrastructure, including roads, railway lines, sidings and stations, will be safeguarded from development which would preclude their future transport use.

**Cheshire and Cheshire West Local Transport Plan 2011-2026<sup>491</sup>**

The Cheshire and Cheshire West Local Transport Plan sets out the Council's long-term vision for Transport within an integrated transport strategy document which covers the plan period between 2011 and 2016. The document sets out six local transport goals and supporting objectives. The goal to reduce carbon emissions from transport and adapt transport networks to the effects of climate change is of particular relevance to this project and is supported by the following objectives.

- Improve and encourage the use of sustainable (low carbon) transport;
- Promote the use of new technology and alternative fuels to reduce carbon emissions from transport;

<sup>491</sup> Cheshire West and Chester (2011). Local Transport Plan 2011-2026 (online). Available at:

[https://www.cheshirewestandchester.gov.uk/documents/your\\_council/policies/local\\_transport\\_plan/documents/Local%20Transport%20Plan%20Summary\\_v7\\_web.pdf](https://www.cheshirewestandchester.gov.uk/documents/your_council/policies/local_transport_plan/documents/Local%20Transport%20Plan%20Summary_v7_web.pdf)

**Policy Reference**

**Policy Context**

- Ensure that new development takes place in accessible locations which minimise the need for travel; and
- Ensure that local transport networks are resistant and adaptable to the impacts of climate change, including adverse weather conditions.

**Cheshire East Local Plan Strategy**<sup>471</sup>

**Policy C01 Sustainable Travel and Transport:** The Council expects development to achieve the following:

- Reduce the need to travel. This includes provision to guide development to sustainable and accessible locations or locations that can be made sustainable or accessible.
- Improve pedestrian facilities so that walking is attractive for shorter journeys.
- Improve cyclist facilities so that cycling is attractive for shorter journeys.
- Improve public transport integration, facilities, capacity, service levels, access for all users and reliability.
- Improve and develop appropriate road, rail and water freight transport routes and associated intermodal freight transport facilities in order to assist in the sustainable and efficient movement of goods.

**Policy CO2 Enabling Business Growth through Transport Infrastructure:** The Council will support new developments that are, or can be made, well connected and accessible.

**Policy CO4 Travel Plans and Transport Assessments:** All major development proposals that are likely to generate significant additional journeys will be

Policy Reference	Policy Context
<b>Cheshire East Local Transport Plan 2019-2024<sup>492</sup></b>	<p>accompanied by a Transport Assessment and, where appropriate, a Travel Plan. The Transport Assessment will be required to demonstrate that the capacity and efficiency of the highway network will not be severely affected by the development. Transport assessments should be prepared following Cheshire East guidance.</p> <p>The Cheshire East Local transport plan sets out the Councils vision for Transport development within Cheshire East over the plan period. The plan sets out the challenges which are needed to be overcome to achieve the council's vision. The plan provides actions which will need to be undertaken to overcome the challenges and reach the vision set out in the plan. Actions which are relevant to this project include the following:</p> <ul style="list-style-type: none"> <li>• Action 4.3 – The Council will support implementation of the Industrial Strategy locally including contributing towards meeting the challenges for clean growth, mobility, and a data driven economy.</li> <li>• Action 4.5 – The Council will support activities which reduce the carbon intensity and resilience of our transport system.</li> <li>• Action 4.6 – The Council will support the delivery of green and blue infrastructure improvements.</li> </ul>
<b>Trafford Local Plan Core Strategy<sup>472</sup></b>	<p><b>Policy L4.7 Sustainable Transport and Accessibility:</b> Planning Permission will not be granted for development that is likely to have a significant adverse impact on the highway network unless or until appropriate mitigation or improvements are secured.</p>

<sup>492</sup> Cheshire East (2019) Cheshire East Local Transport Plan 2019-2024. (Online) Accessible at: <https://moderngov.cheshireeast.gov.uk/ecminutes/documents/s72327/Local%20Transport%20Plan%20-%20app%201.pdf>

Policy Reference	Policy Context
	<p><b>Policy L4.10 Safeguarded Highway and Public Transport Routes and Infrastructure:</b> Existing or proposed public transport or infrastructure will be safeguarded from development that would prejudice their development or continued use.</p> <p><b>Policy L4.11 Freight Transport Network:</b> Road, Rail and Water freight networks will be safeguarded and improvement and developments to these networks will be promoted. In particular the following will be safeguarded and promoted:</p> <ul style="list-style-type: none"> <li>• Trafford Park Rail network</li> <li>• Intermodal freight facilities within Trafford Park.</li> <li>• Manchester Ship Canal as a sustainable transport route.</li> </ul> <p><b>Policy L4.13 Transport Assessments and Travel Plans:</b> Where development is likely to have significant transport implications The Council require a Transport Assessment which includes measures to mitigate impacts by proposing appropriate improvements, reducing car use and makes contributions to sustainable transport measures.</p>
<p><b>Trafford Transport Strategy, 2009<sup>493</sup></b></p>	<p>The Trafford Transport Strategy sets out the council’s vision for transport development over a 15-year period since adoption in 2009. The strategy is composed of 15 overarching objectives which set out the vision of the strategy. The strategy sets out challenges and issues which form barriers to the vision of the strategy. An action plan is provided within the strategy which sets out actions which can be taken to overcome the issues and challenges identified.</p>

<sup>493</sup> Trafford (2009) Trafford Transport Strategy, 2009. (Online) Accessible at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/trafford-transport-strategy-2009.pdf> (Accessed January 2022).



Policy Reference	Policy Context
	<p>Included within the action plan are Highways schemes, Public Transport Schemes, Cycling and Walking schemes, Freight Schemes, Travel Planning schemes, Parking schemes and maintenance schemes.</p>
<p><b>Warrington Local Plan Core Strategy<sup>473</sup></b></p>	<p><b>Policy CS 4 Overall Spatial Strategy Transport:</b> The Council will support improvements to Warrington’s Transport Network that reduce the impact of traffic on air quality and reduce carbon emissions to help tackle climate change.</p> <p><b>Policy MP 5 Freight Transport:</b> The Council will support freight related development where this reduces road traffic kilometres across the local highway network. It should be demonstrated that proposals will not an adverse impact on local roads, residential roads, and congested areas.</p> <p><b>Policy MP 6 Transport Infrastructure:</b> The Council will prioritise and safeguard land for development which is proposed to form schemes included within the Local Transport Plan.</p> <p><b>Policy MP 7 Assessments and Travel Plans:</b> Developments will be required to demonstrate that they will not harm highway safety and any trips generated can adequately be served by the local transport network. Where there are significant effects, appropriate mitigation should be provided.</p>
<p><b>Warrington Fourth Local Transport Plan<sup>494</sup></b></p>	<p>The Fourth Local Transport Plan sets out Warrington councils’ vision for transport over the plan period to 2040. The plan sets out challenges to overcome to achieve the plans vision and promotes policies to ensure development is guided to achieve the Council’s vision.</p>

<sup>494</sup> Warrington (2019) Warrington Fourth Local Transport Plan (Online) Accessible at: [https://www.warrington.gov.uk/sites/default/files/2019-12/final\\_ltp4\\_parts\\_a\\_and\\_b.pdf](https://www.warrington.gov.uk/sites/default/files/2019-12/final_ltp4_parts_a_and_b.pdf)

## Policy Reference

## Policy Context

	<p>Policies are promoted to encourage the following:</p> <ul style="list-style-type: none"> <li>• Active Travel</li> <li>• Smarter travel choices</li> <li>• improve public transport</li> <li>• make travel safer</li> <li>• use of cleaner fuels</li> <li>• asset management</li> <li>• network management</li> <li>• freight management</li> </ul> <p>Policy CF2 and CF3 are promoted within the Transport Plan to support the use of cleaner fuels.</p>
<p><b>St Helens Core Strategy</b><sup>474</sup></p>	<p><b>Policy CP2 Creating an accessible St Helens:</b> This policy sets out six principles to guide development to ensure access to Transport is provided to all people within St Helens:</p> <ul style="list-style-type: none"> <li>• Ensuring a choice in mode of travel,</li> <li>• Ensuring access to local facilities,</li> <li>• Safe and adequate access to and from the public highway,</li> <li>• Sustainable location of significant generators of journeys,</li> <li>• Reduce the adverse impacts of traffic on the community,</li> <li>• Support Local Plan Priorities.</li> </ul>

Policy Reference	Policy Context
<b>Halton Core Strategy Local Plan<sup>475</sup></b>	<p>The policy includes provision to support initiatives to reduce congestion, air pollution and noise on key routes.</p> <p>The support of local plan priorities includes provision that the council will ensure that development does not prejudice improvements to rail links between Manchester and Wigan, improvements to rail capacity to Liverpool, or improved station accessibility and facilities.</p> <p><b>Policy CS15 Sustainable Transport:</b> This policy encourages sustainable transport and supports the existing sustainable transport network within Halton. The policy sets out the requirement for a Transport Assessment and a Travel plan, where appropriate, for development which generates a significant number of trips. The policy also encourages the provision of improvements to the sustainable transport network including capacity for innovative transport technology including the use of alternative fuels and sources of power.</p>
<b>Halton Local Transport Plan<sup>495</sup></b>	<p>The Third Halton Local Transport Plan sets out the council's vision for development of transport infrastructure and services over the plan period, 2011-2026. The Plan identifies challenges and opportunities in reaching the vision of the Local transport plan. The plan sets out 22 primary strategies to guide development, these include:</p> <ul style="list-style-type: none"> <li>• Strategy 6 - Freight Distribution</li> <li>• Strategy 12 - Peak oil production and emerging vehicle technology</li> <li>• Strategy 14 - Public Rights of Way and Greenways.</li> </ul>

<sup>495</sup> Halton Borough Council (2011) Halton Third Local Transport Plan (Online) Accessible at: [https://www3.halton.gov.uk/Documents/council%20and%20democracy/transport/Final\\_LTP3\\_Web\\_Version.pdf](https://www3.halton.gov.uk/Documents/council%20and%20democracy/transport/Final_LTP3_Web_Version.pdf) (Accessed January 2022).

Policy Reference	Policy Context
	<p>Strategy 6 recognises the importance of freight terminals and associated infrastructure which lies in the Halton Borough. The strategy highlights initiatives including the Mersey Multimodal Gateway and identifies potential improvements to physical infrastructure.</p> <p>Strategy 12 recognises the transport sectors reliance on oil and states that the case for supporting emerging vehicle technologies including vehicles using hybrid power, electricity and hydrogen, amongst others, is strong.</p> <p>Strategy 14 references a Rights of Way improvement plan in which Halton propose to develop, promotes, and protect public rights of way.</p>
<p><b>Liverpool City Region Combined Authority Transport Plan<sup>496</sup></b></p>	<p>The Liverpool City Region Combined Authority Transport plan sets out the vision of the Combined Authority regarding transport development. The Transport Plan was adopted in 2015 and identifies issues, challenges and objectives which are proposed to be met to achieve the vision of the transport plan. Objectives identified in the Plan are supported by Priority actions, which include the following:</p> <ul style="list-style-type: none"> <li>• Priority action 2.3 – the combined authority will consider the contribution of freight and logistics to environmental and air quality challenges and will support innovations that address these issues.</li> <li>• Priority action 4.1 - the combined authority will promote clean alternatives to fossil fuels and will seek to include the promotion of alternative fuels in a Spatial Development Strategy.</li> </ul>
<p><b>Ground Conditions</b></p>	

<sup>496</sup> Liverpool City Region Combined Authority (2015) Liverpool City Region Combined Authority Transport Plan (Online) Accessible at [https://www.liverpoolcityregion-ca.gov.uk/wp-content/uploads/Item\\_5a\\_Transport\\_Plan\\_for\\_Growth\\_App1.pdf](https://www.liverpoolcityregion-ca.gov.uk/wp-content/uploads/Item_5a_Transport_Plan_for_Growth_App1.pdf) (Accessed January 2022).

Policy Reference	Policy Context
<p><b>Cheshire West and Chester Council</b></p> <p><b>Cheshire East Council</b></p> <p><b>Trafford Council</b></p> <p><b>St Helens Borough Council</b></p> <p><b>Warrington Borough Council</b></p> <p><b>Halton Borough Council</b></p>	<p>The local and emerging planning policies of these planning authorities all refer to implementation of the requirements of the NPPF in respect of the assessment of the effects on ground conditions receptors.</p>
<p><b>Agriculture and Soil Resources</b></p>	
<p><b>Cheshire West and Chester Council, Cheshire West and Chester Adopted Development Plan, 29 January 2015<sup>476</sup></b></p>	<p><b>Policy EC21:</b> ‘Agricultural land’ includes a requirement to minimise the loss of greenfield land and high grade agricultural land</p> <p><b>Policy GE3:</b> ‘Impact on residential amenity’ states that development that gives rise to significant adverse impacts on health and quality of life (e.g. soil...) ... will not be allowed.</p>
<p><b>Cheshire East Council, Cheshire East Local Plan Strategy, 27 July 2017<sup>471</sup></b></p>	<p><b>Policy PG6:</b> ‘Open Countryside’ states that “<i>within the open countryside only development that is essential for the purposes of ... public infrastructure ... will be permitted.</i>”</p> <p><b>Policy SD1:</b> ‘Sustainable Development In Cheshire East’ states that in order to achieve sustainable development, wherever possible, development should: “<i>make efficient use of land, protect the best and most versatile agricultural land and make best use of previously developed land where possible</i>”.</p>

Policy Reference	Policy Context
	<p><b>Policy SD2:</b> ‘Sustainable Development Principles’ states that all development will be expected to: <i>“avoid the permanent loss of areas of agricultural land quality of 1, 2 or 3a, unless the strategic need overrides these issues”</i>.</p> <p><b>Policy SE2:</b> ‘Efficient Use of Land’ states that development should safeguard natural resources including high quality agricultural land (grades 1, 2, and 3a), geology, minerals, air, soil and water.</p> <p><b>Policy SE12:</b> ‘Pollution, Land Contamination and Land Instability’ states that the council will seek to ensure that all development is located and designed <i>“so as not to result in a harmful or cumulative impact upon ... surface water and groundwater..., soil contamination... or any other pollution which would unacceptably affect the natural and built environment. Developers will be expected to minimise, and mitigate the effects of possible pollution arising from the development itself, or as a result of the development (including additional traffic) during both the construction and the life of the development. Where adequate mitigation cannot be provided, development will not normally be permitted.”</i></p>
<p><b>Warrington Borough Council, Warrington Local Plan Core Strategy, 21 July 2014<sup>473</sup></b></p>	<p><b>Policy CC2:</b> ‘Protecting the Countryside’ states that Development proposals in the countryside which accord with Green Belt policies set out in national planning policy will be supported provided that <i>“... it can be demonstrated that there would be no detrimental impact on agricultural interests.”</i></p> <p>The Local Plan vision for 2027 states that the borough is exercising careful stewardship of the natural environment and has acted to safeguard and enhance vital natural resources including water, air, and soil which help to both mitigate and adapt to climate change.</p>

Policy Reference	Policy Context
<b>Trafford Council, Trafford Local Plan Core Strategy, January 2012<sup>472</sup></b>	<p><b>Policy R4.5:</b> ‘Agricultural land’ states that The Council will protect existing agricultural land as an important resource for Trafford’s local economy. In particular, the Council will seek to protect the Borough’s:</p> <ul style="list-style-type: none"> <li><i>(a) Richest soils located south of Carrington Moss (Settled Sandlands) for agricultural purposes; and</i></li> <li><i>(b) Pastural landscape located within the Timperley Wedge for agriculture and recreational purposes.</i></li> </ul> <p><b>Policy R4.7</b> states that the Council will protect the following areas of open land (that are not included within the Green Belt) from development:</p> <ul style="list-style-type: none"> <li><i>(a) Land in Warburton (immediately to the south of Partington); and</i></li> <li><i>(b) Land south of Shell, Carrington.</i></li> </ul>
<b>St. Helens Council, St Helens Core Strategy, 31 October 2012<sup>474</sup></b>	<p><b>Policy CAS5</b> for rural St, Helens states that the positive use of the rural areas will be encouraged to: protect, manage and enhance biodiversity and create opportunities for biodiversity; protect and enhance landscape character; and retain land in agricultural, forestry and related uses.</p> <p><b>Policy CP1</b> states that proposals for development within the Borough will be expected, where appropriate, to meet the following standards as a minimum: <i>(2)(v) Avoid loss or damage to high quality soils where possible and minimise loss or damage where this can be shown to be unavoidable; and (2)(vi). Ensure protection of watercourses from ... modification and degradation... and, (3)(i) Minimise and mitigate against the effects of ... water pollution (including contamination of soil, surface water and groundwater resources).</i></p>
<b>Land Use</b>	

## Policy Reference

## Policy Context

**Cheshire West and Chester Adopted Development Plan 2015**

**STRAT1 Sustainable Development:** Seeks to enable development that improves and meets the economic, social and environmental objectives of the borough in line with the presumption in favour of sustainable development. Including *“Mitigate and adapt to the effects of climate change, ensuring development makes the best use of opportunities for renewable energy use and generation.”*

**STRAT2 Strategic Development:** *“Promote strong, prosperous and sustainable communities by delivering ambitious development targets whilst protecting the high quality environment that contributes to the attractiveness and success of Cheshire West and Chester as a place to live and work.”*

**STRAT8 Rural area:** *“Within the rural area the Council will support development that serves local needs in the most accessible and sustainable locations to sustain vibrant rural communities.”*

**STRAT9 Green Belt and Countryside:** *“Protects the intrinsic character and beauty of the Cheshire countryside by restricting development to that which requires a countryside location and cannot be accommodated within identified settlements”*

**ECON1 Economic growth, employment and enterprise:** *“Promotes sustainable economic growth in the borough and wider sub-region, supporting existing businesses, encouraging indigenous business growth and attracting new inward investment.”*

**ECON3 Visitor Economy:** *“Supports the expansion of existing tourism assets or the creation of new tourism opportunities where this would enhance the existing tourism offer, benefit the local economy and be of a suitable scale and type for its location.”*



## Policy Reference

## Policy Context

**SOC6 Open space, sport and recreation:** *“The Council will seek to protect, manage and enhance existing open spaces, sport and recreation facilities to provide a network of diverse, multi-functional open spaces.”*

**SOC5 Health and Wellbeing:** *“In order to meet the health and well-being needs of residents... Does not allow for development that gives rise to significant adverse impacts on health and quality of life (e.g. soil, noise, water, air or light pollution, and land instability, etc) including residential amenity.”*

**ENV3 Green Infrastructure:** *“Supports the creation, enhancement, protection and management of a network of high quality multi-functional Green Infrastructure”*

**ENV9 Minerals supply and safeguarding:** States that *“provision will made for the supply of sand, gravel, salt and brine contributing to the sub-national guidelines for aggregates production, including through the provision of mineral safeguarding areas.”*

**Cheshire East Local Plan Strategy, adopted 27<sup>th</sup> July 2017<sup>471</sup>**

**Policy MP1 Presumption in favour of Sustainable Development:** *“When considering development proposals the council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework.”*

**Policy SD1 Sustainable Development in Cheshire:** Sets out requirements for development. Of relevance is to provide appropriate infrastructure to meet the needs of the local community including energy; and use appropriate technologies to reduce carbon emissions and create a low carbon economy.

**Policy SD2 Sustainable Development Principles:** Sets out a wide range of criteria which all development will be expected to meet.

## Policy Reference

## Policy Context

**Policy PG3 Green Belt:** Sets out the purposes of the Green Belt and states that planning permission will not be granted for inappropriate development, except in very special circumstances, in accordance with national policy.

**PG6 Open Countryside:** *“Within the Open Countryside only development that is essential for the purposes of agriculture, forestry, outdoor recreation, public infrastructure, essential works undertaken by public service authorities or statutory undertakers, or for other uses appropriate to a rural area will be permitted.”*

**EG2 Rural Economy:** Supports developments that provide opportunity for rural development that supports the vitality of rural settlements, among other things, where it meets a range of criteria including sustainable development objectives in MP1, SD1 and SD2 and does not conflict with policies of the Plan.

**EG4 Tourism:** The policy seeks to protect and enhance the unique features of Cheshire East that attract visitors to the area, including their settings, whilst encouraging investment, achieved in a number of ways including protecting visitor attraction sites, and improving access to natural and historic landscapes through enhancing our vital public rights of way network.

**SC1 Leisure and Recreation:** Seeks to provide appropriate leisure and recreational facilities for the communities of Cheshire East by protecting and enhancing existing facilities and supporting the provision of better leisure and recreational facilities in a number of ways, including by ensuring appropriate developments contribute to new or improved facilities.

**SC2 Indoor and Outdoor Sports Facilities:** This policy ensures provision of appropriate sports facilities for the communities of Cheshire East by protecting existing and supporting new indoor and outdoor facilities.

Policy Reference

Policy Context

Trafford Local Plan Core Strategy Adopted  
January 2012<sup>472</sup>

**SE2 Efficient use of land:** *“Development should safeguard natural resources including...minerals.”*

**SE6 Green Infrastructure:** *“Aims to deliver a good quality, and accessible network of green spaces for people to enjoy, providing for healthy recreation and biodiversity and continuing to provide a range of social, economic and health benefits. This will be done by linking the various assets together, safeguarding and supporting the potential of green assets and Strengthening the contribution that sport and playing fields, open space and recreation facilities make to Cheshire East’s green infrastructure network.”*

**SE10 Sustainable provision of minerals:** Includes for the safeguarding of minerals, including sand and gravel (which is relevant to the study area).

Trafford Local Plan Core Strategy Adopted  
January 2012<sup>472</sup>

**L7 Design:** Sets out criteria which development must meet in relation to design quality, functionality, protecting amenity, security and accessibility.

**W1 Economy:** *“Supports growth and encourages the development of clusters of economic activity – the council will identify a range of sites for a variety of employment uses, with the appropriate infrastructure to attract key economic growth sectors to Trafford. The Council recognises the significant contribution that existing successful manufacturing industries make to the economy of the Borough and will continue to support these industries where appropriate within the context of the Development Plan for Trafford”*

**R3 Green Infrastructure:** States that the Council will develop an integrated network of high quality and multi-functional green infrastructure that will among other things, contribute to the diversification of the local economy and tourist development through the enhancement of existing, and provision of new facilities; and Improve health and well being.

## Policy Reference

## Policy Context

**Greater Manchester Joint Minerals Plan<sup>497</sup> (as it relates to Trafford)**

**R4 Green Belt, Countryside and other protected open land:** *“The Council will continue to protect the Green Belt from inappropriate development. New development, will only be permitted within these areas where it is for one of the appropriate purposes specified in national guidance, where the proposal does not prejudice the primary purposes of the Green Belt set out in national guidance by reason of its scale, siting, materials or design or where very special circumstances can be demonstrated in support of the proposal.”*

**R5 Open Space, Sport and Recreation:** *“In order to remedy deficiencies in the provision of facilities, the Council will secure the provision and maintenance of a range of Sizes of good quality, accessible, play, sport, leisure, informal recreation and open space facilities. Developers will be required as appropriate to demonstrate how their development will protect and encourage the use of Trafford’s open space and sports/ recreation facilities.”*

**R6 Culture and Tourism:** Encourages and supports culture and tourism offer, and related developments where appropriate, that highlight and enhance the cultural heritage of the Borough in key locations - and outside of these areas supports appropriate improvements to and the expansion of the tourism and cultural offer.

**Policy 8 Prior Extraction of Mineral Resources:** The Minerals Plan identifies minerals safeguarding areas and Policy 8 states that the extraction of minerals in advance of non-minerals development should take place. There is also criteria set for the consideration of proposals where prior-extraction is not proposed.

<sup>497</sup> Manchester City Council (2013). Greater Manchester Joint Minerals Plan. (Online) Available at: [https://www.greatermanchester-ca.gov.uk/media/1995/the\\_minerals\\_plan\\_april\\_2013\\_final.pdf](https://www.greatermanchester-ca.gov.uk/media/1995/the_minerals_plan_april_2013_final.pdf) (Accessed January 2022).

## Policy Reference

## Policy Context

**Warrington Local Plan Core Strategy, Adopted 21 July 2014<sup>473</sup>**

**CS1 Delivering Sustainable Development:** Welcomes development proposals that are sustainable without delay. *“Proposals must have regard to, amongst other things: the need to improve equality of access and opportunity; the need to develop sites, services and facilities in appropriate locations accessible by public transport, walking and cycling; the priority afforded to the protection of the Green Belt and the character of the countryside.”*

**CS5 Green Belt:** States that *“the Council will maintain the general extent of the Green Belt at least until 2032... development proposals within the Green Belt will be approved where they accord with relevant national policy.”*

**CS6 Strategic Green Links:** States the Council will adopt a strategic approach to the care and management of the borough's Green Infrastructure. Its states a commitment to supporting wider programmes and initiatives which seek to connect the borough's Strategic Green Links with employment areas, residential communities, and Green Infrastructure Assets.

**PV1 Development in existing employment areas:** *“Development within existing employment areas for purposes other than those listed will be permitted where it can be demonstrated that: the development relates to ancillary services which will support the employment area by making it more sustainable, viable and/or attractive or: the site is no longer suitable or viable for employment uses and; the proposal will not undermine the viability of existing employment uses in close proximity to the site and; the alternative use is in accordance with or does not undermine the Overall Spatial Strategy”*

**PV7 Promoting the Visitor Economy:** Gives support for proposals which sustain and enhance Warrington's visitor and tourism economy which amongst other things: expand or improve existing visitor attractions and facilities to ensure they remain viable and continue to actively contribute to the visitor economy;

## Policy Reference

## Policy Context

enhance heritage and natural environment assets, where appropriate, to encourage visitors to use and enjoy such assets; enhance the diversification of the local economy in the borough's countryside without harm to the openness of the Green Belt and the character of the local landscape.

**SN6 Sustaining the Local Economy and Services:** Seeks to assist the continued viability and growth of the local economy and support the sustainability of local communities by ensuring development proposals: do not lead to the loss of viable, accessible sites and buildings used for industrial/commercial purposes or other employment generating uses in local communities including the countryside and its settlements; avoid the loss or change of use of viable convenience shops, cultural facilities, post offices and public houses where the loss would impact on the diversity of local services in communities; support the retention of viable local health and community facilities; support the diversification of farm enterprises; support the sustainable growth of existing businesses.

**QE3 Green Infrastructure:** Supports an integrated approach to the provision, care and management of the borough's green infrastructure. Focus will be on protecting existing provision, increasing its functionality, improving the quality, including local networks and corridors, specifically to increase its attractiveness as a sport, leisure and recreation opportunity and its value as a habitat for biodiversity; protecting and improving access to and connectivity between existing and planned provision and securing new provision in order to cater for anticipated increases in demand.

**QE6 Environment and Amenity Protection:** States that the Council "*Will only support development which would not lead to an adverse impact on the environment or amenity of future occupiers or those currently occupying adjoining or nearby properties or does not have an unacceptable impact on the*

**Policy Reference**

**Policy Context**

*surrounding area - taking into consideration a number of environmental factors, for which detailed assessments may be required.”*

**MP9 Minerals:** States that a separate Minerals Local Plan will be brought forward to identify Minerals Safeguarding Areas. (However no Minerals Local plan has been produced, safeguarding areas are instead identified in the emerging replacement Local Plan).

**MP10 Infrastructure:** Seeks to ensure that Warrington’s future growth is supported and enhanced through the timely delivery of necessary transport, utility, social and environmental infrastructure required, through a number of measures.

**CC2 Protecting the Countryside:** Supports development proposals in the countryside which accord with Green Belt policies set out in national planning policy provided that; the detailed siting and design of the development relates satisfactorily to its rural setting, in terms of its scale, layout and use of materials; they respect local landscape character, both in terms of immediate impact, or from distant views; unobtrusive provision can be made for any associated servicing and parking facilities or plant, equipment and storage; they relate to local enterprise and farm diversification; and it can be demonstrated that there would be no detrimental impact on agricultural interests.

**Warrington Proposed Submission Local Plan 2021**

**ENV3 Safeguarding of Minerals Resources:** Identifies minerals safeguarding areas and states that sand and gravel will be protected from permanent sterilisation from non-minerals development. There is also criteria set for the consideration of proposals where non-minerals development is proposed in a safeguarding area.

**Policy Reference****St Helens Core Strategy Adopted October 2012<sup>474</sup>****Policy Context**

**CSD1 National Planning Policy Framework (NPPF):** This policy is based on a Presumption in Favour of Sustainable Development and sets out how the Council's approach will reflect that set out in the NPPF.

**CP1 Ensuring Quality Development in St. Helens:** Sets an expectation for all new development within the Borough, where appropriate, to meet minimum standards (set out in detail) relating to: quality of the built environment, protection of the natural and historic environment, environmental quality and resource management. Also requires developments to incorporate renewable and low-carbon energy generation.

**CE1 A strong and sustainable Economy:** Sets out how sufficient land and premises will be provided to strengthen and diversify the Borough's economic base and to support the City Growth Strategy and other economic regeneration and development initiatives.

**CQL1 Green Infrastructure:** Sets out the ways in which the Council will protect, manage, enhance and where appropriate expand the Green Infrastructure network.

**CQL2 Trees and Woodland:** Sets out how the multi-purpose value of trees, woodlands and hedgerows will be protected and enhanced.

**CQL5 Social Infrastructure:** Sets out how social Infrastructure including health, education, neighbourhood retail or leisure, built sports, cultural, emergency service and community facilities and institutions will be protected, provided and enhanced to support sustainable communities.

**CR1 Minerals:** States that Minerals Safeguarding Areas will be identified for coal, brick clay and sandstone.



## Policy Reference

## Policy Context

### Halton Core Strategy, Adopted April 2013<sup>475</sup>

**CS2 Presumption in Favour of Development:** States that the Council will take a positive approach when considering development proposals that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will always work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

**CS6 Green Belt:** Commits to a green belt review in order to ensure a sufficient ongoing supply of deliverable development land.

**CS19 Sustainable Development and Climate Change:** States that all development should be sustainable and be designed to have regard to the predicted effects of climate change including reducing carbon dioxide (CO2) emissions and adapting to climatic conditions. It sets out principles to guide future development.

**CS21 Green Infrastructure:** *“Halton’s green infrastructure network will be protected, enhanced and expanded, where appropriate. Halton Borough Council working alongside other partners and agencies responsible for the delivery and maintenance of green infrastructure will achieve this through a number of measures set out.”*

**CS(R)25 Minerals HE10 Minerals Safeguarding Areas:** CS(R)25 States that Minerals Safeguarding Areas will be identified and HE10 then identifies these areas. The policy states that the extraction of minerals in advance of non-minerals development should take place. There is also criteria set for the consideration of proposals where prior-extraction is not proposed.

## People and Communities

Policy Reference	Policy Context
Core Strategies, Local Plans and supporting documents prepared and adopted by Local authorities	Policies adopted by the six councils responsible for the area in which the Project will be implemented provide information on the socio-economic context for the considerations of effects upon People and Communities. Policies provide a reference to current and ongoing concerns and an indication of relevant issues when comparing Project effects with socio-economic development and change in the area.
<b>Major Accidents and Disasters</b>	
<b>Cheshire West and Chester Local Plan 2015 – Part 2 – Land Allocations and Detailed Policies</b> <sup>476</sup>	Policy DM 33 which concerns new or extension to hazardous installations includes pipelines, and supports development proposals where: <ul style="list-style-type: none"> <li>i. <i>“the development does not create or increase risk to the general public or environmental sensitive areas and retains an appropriate distance from the hazard; and</i></li> </ul> <i>it does not significantly restrict the type of development on the surrounding land.”</i>
<b>Halton Local Plan 2019 – Core Strategy</b> <sup>475</sup>	<b>Policy CS23:</b> Managing Pollution and Risk sets out three principles to reduce risk from hazardous installations; minimise risk to public safety and property, control development surrounding existing installations to ensure individual risk does not exceed 10 chances per million, and ensure proposals for new/expanded installations are considered in terms of environmental, social and economic factors.
<b>Cheshire East Local Plan – Draft Site Allocations and Development Policies Document 2020</b> <sup>471</sup>	<b>Policy INF 7:</b> Hazardous installations includes criteria for accepting proposals for new/extended hazardous installations. Proposed installations will only be permitted if they do not: <ul style="list-style-type: none"> <li>i. <i>“introduce unacceptable hazards or risks to people in the surrounding area;</i></li> </ul> <i>or</i> <i>impose significant development restrictions upon surrounding land that could frustrate the sustainable development or regeneration of the area.”</i>

Policy Reference	Policy Context
<b>Warrington Local Plan Draft Submission 2021<sup>498</sup></b>	<b>Policy ENV7</b> Renewable and Low Carbon Energy Development states that: <i>“proposals for developments that produce, store and/or distribute low carbon or renewable energy, including the retrofitting of infrastructure to existing development/buildings, will be permitted provided that they satisfy the requirements of other relevant Plan policies and would not result in unacceptable harm to the local environment.”</i>
<b>St Helens Local Plan Draft Submission 2020<sup>499</sup></b>	<b>Policy LPC13</b> Renewable and Low Carbon Energy Development sets out the requirements for proposed developments, including the need to avoid causing unacceptable harm to the surroundings.
<b>Trafford Local Plan Draft Submission 2021<sup>500</sup></b>	<b>Policy EP4</b> Hazardous Installations contains conditions that must be met by proposed installations. These conditions include demonstrating that the development will not increase the risk for residents and members of the public unless suitable measures can be agreed to mitigate risk, and will not bring about a significant deterioration in the quality of the environment of the surrounding areas.
<b>Climate Change and GHG (Local Policy)</b>	

<sup>498</sup> Warrington Borough Council (2021). Warrington Local Plan Draft Submission 2021 – 2038 (Online) Accessible at: [https://www.warrington.gov.uk/sites/default/files/2021-09/warrington\\_updated\\_proposed\\_submission\\_version\\_local\\_plan\\_upsvlp\\_2021-2038\\_-\\_september\\_2021.pdf](https://www.warrington.gov.uk/sites/default/files/2021-09/warrington_updated_proposed_submission_version_local_plan_upsvlp_2021-2038_-_september_2021.pdf) (Accessed January 2022).

<sup>499</sup> St Helens Council (2021). St Helens Local Plan Draft Submission. (Online) Available at: <https://www.sthelens.gov.uk/media/332815/st-helens-local-plan-draft-schedule-of-modifications-v1.pdf> (Accessed January 2022).

<sup>500</sup> Trafford Council (2021) Trafford Local Plan Draft Submission 2021 <https://www.trafford.gov.uk/planning/strategic-planning/docs/Draft-Local-Plan-Jan-2021.pdf> (Accessed January 2022).

Policy Reference	Policy Context
<p><b>Cheshire West and Chester Adopted Development Plan</b><sup>476</sup></p>	<p>Cheshire West and Chester wish to promote energy efficiency and energy generation from low carbon and renewable resources. This is to allow action on Climate Change.</p> <p><b>Policy ENV 7</b> addresses alternative energy supplies. It is stated that the Local Plan will support low carbon energy proposals, however there must be no unacceptable impacts on air or health.</p> <p>The Climate Change chapter will ensure that impacts to air are identified through assessing the total amount of GHG emissions expected from The Project.</p>
<p><b>Cheshire East Local Plan Strategy 2010 - 2030</b><sup>471</sup></p>	<p>In 2011 Cheshire East’s energy uses resulted in carbon dioxide emissions of 3.159 million tonnes of CO2e. This is more than the regional average per person. Through the Local Plan Strategy, Cheshire East introduced policies that encourage the reduction of carbon dioxide emissions.</p> <p><b>Policy SD 1 Sustainable Development in Cheshire East</b> states that “Developments should where possible [...] use appropriate technologies to reduce carbon emissions and create a low carbon economy.”</p>
<p><b>Warrington Local Plan Core Strategy, 2014</b><sup>473</sup></p>	<p>Minimising the causes of climate change is stated as a key issue in Warrington. Warrington’s vision for 2027 is a reduction in the Borough’s carbon footprint, achieved by generating more energy from low carbon sources.</p> <p>Policy CS 1 Overall Spatial Strategy Development must have regard to the need to address the causes of climate change.</p> <p>Policy QE 1 Decentralised Energy Networks and Low Carbon Development</p>

Policy Reference	Policy Context
<b>St Helens Core Strategy, 2012<sup>474</sup></b>	Development proposals in all locations should seek to minimise carbon dioxide emissions.
<b>Halton Local Plan Core Strategy, 2013<sup>475</sup></b>	St Helens recognises reducing the impact of climate change as a key issue in the Core Strategy.
<b>Climate Change and CCR Assessment (Local Policy)</b>	Strategic Objective 2.2 aims to mitigate the effects of, and minimise the impact of, development on climate change.
<b>Greater Manchester Infrastructure Framework 2040<sup>501</sup></b>	Halton recognises the challenge to put in place mitigation and adaptation measures to deal with the threat of climate change. Strategic Objective 9 aims to minimise Halton’s contribution to climate change through reducing carbon emissions.  <b>Policy CS19 Sustainable Development and Climate Change:</b> states “All development should be sustainable and be designed to have regard to the predicted effects of climate change including reducing carbon dioxide emissions”.
<b>Greater Manchester Infrastructure Framework 2040<sup>501</sup></b>	The Greater Manchester Combined Authority (GMCA) recognise the importance of infrastructure and its importance to continue to grow despite environmental and climate change.
<b>Greater Manchester Infrastructure Framework 2040<sup>501</sup></b>	<b>Key Challenge 11: Resilience.</b> Refers to ensuring the security of supply throughout each day against challenges associated with ‘shocks’ e.g. flooding.

<sup>501</sup> Greater Manchester Combined Authority (2020). Greater Manchester Infrastructure Framework 2040. (Online) Accessible at: <https://www.greatermanchester-ca.gov.uk/media/1715/greater-manchester-infrastructure-framework-2040.pdf> (Accessed January 2022).

Policy Reference	Policy Context
<b>Greater Manchester Combined Authority Joint Local Development Plan (LDP) 'Places for Everyone', draft 2021<sup>502</sup></b>	<p>Due for public examination in 2022, one of the aims of the draft LDP is to ensure Greater Manchester's capacity to function is maintained, of which a significant challenge is the ability to respond to future impacts from climate change.</p> <p><b>Policy JP-S 4 Resilience</b></p> <p>Key measures of resilience include:</p> <ul style="list-style-type: none"> <li>• Ensuring developments make appropriate provision for response and evacuation in the case of emergency or disaster.</li> <li>• Locating critical infrastructure and vulnerable uses away from locations at a high risk of acute shocks.</li> </ul> <p>Increasing the size, spread, quality and interconnectedness of the green infrastructure network.</p>
<b>Trafford District Council Local Plan: Core Strategy, 2012<sup>472</sup></b>	<p>The Core Strategy highlights that climate risk and vulnerability at the centre of the planning system.</p> <p><b>Strategic Objective 7 Secure sustainable development</b></p> <p>This includes the use of new technologies to combat and adapt to climate change to minimise impact of all new development on the environment.</p>
<b>Cheshire West and Chester Adopted Development Plan, Part One: Strategic Policies 2015<sup>476</sup></b>	<p>The overall vision for the Development Plan includes positive adaptation to climate change through <b>Strategic Objective 14</b> to mitigate and adapt to the effects of climate change by addressing flood risk and water management and support the development of new buildings and infrastructure that are resilient, resistant and adapted to the effects of climate change.</p>

<sup>502</sup> Greater Manchester Combined Authority Joint Local Development Plan Publication Plan (online). Accessible at: <https://www.greatermanchester-ca.gov.uk/media/4838/places-for-everyone.pdf> (Accessed January 2022).

**Policy Reference**

**Policy Context**

	<p><b>Policy ENV 6 High quality design and construction</b> states that: “Development should, where appropriate, mitigate and adapt to the predicted effects of climate change”.</p>
<p><b>Cheshire East Council Local Plan Strategy 2010 - 2030</b><sup>471</sup></p>	<p>A strategic priority of Cheshire East is to reduce the Borough’s impact on climate change by avoiding development in land that may be at risk from the effects of climate change (<b>Strategic Priority 3</b>).</p> <p>The following policies are of particular relevance:</p> <p><b>Policy SD 2 Sustainable Development Principles</b> Development is expected to use appropriate design and construction to create developments that are resilient to climate change.</p> <p><b>Policy SE 1 Design</b> Sustainable design should encourage the introduction of climate change adaptation features in spaces and detailed design.</p>
<p><b>Warrington Borough Council Adopted Core Strategy 2014</b><sup>473</sup></p>	<p>Warrington Council’s strategy vision of the town includes <b>Strategic Objective W6</b> to ensure development is energy efficient, safe and resilient to climate change.</p> <p><b>Policy CS 1 Overall Spatial Strategy – Delivering sustainable development</b> states that: “Development must [...] have regard to the need to address the causes of and be resilient to the effects of climate change”.</p>
<p><b>Halton Borough Council Core Strategy 2013</b><sup>475</sup></p>	<p>The Halton Core Strategy identifies the challenge to put in place adaptation measures to deal with the threat of climate change. This is reflected in <b>Strategic</b></p>

## Policy Reference

## Policy Context

**Objective 9** to ensure the Borough is resilient to the adverse effects of climate change.

**Policy CS19 Sustainable Development and Climate Change** states that: “Development should incorporate climate change resilience measures”.

**St Helens Council Core Strategy 2012**<sup>474</sup>

St Helen’s Core Strategy embeds resilience into **Strategic Objective 2.2** to minimise the impact of climate change on development



# Appendix 6A Historic Environment

**Table 6A.1 Designated Assets within Study Area, excluding grade II listed buildings**

<b>NHLE (National Heritage List for England) number</b>	<b>Name</b>	<b>Heritage Significance &amp; Designation</b>
<b>1004917</b>	Cannington Shaw Bottle Shop, Sherdley Works	High – Scheduled Monument
<b>1006768</b>	Bank Quay transporter bridge	High – Scheduled Monument
<b>1006769</b>	Roman settlement at Wilderspool	High – Scheduled Monument
<b>1009585</b>	Swineyard Hall moated site	High – Scheduled Monument
<b>1009635</b>	Ince Manor monastic grange and fishpond	High – Scheduled Monument
<b>1009847</b>	Middleton moated monastic grange, eight fishponds and connecting channels	High – Scheduled Monument
<b>1010703</b>	Old Bold Hall moated site, Bold	High – Scheduled Monument
<b>1011123</b>	Bowl barrow 160m north-east of Moultonbank Farm	High – Scheduled Monument
<b>1011166</b>	Bowl barrow 120m east of Village Lane	High – Scheduled Monument
<b>1011888</b>	Cranshaw Hall moated site	High – Scheduled Monument
<b>1011891</b>	New Manor Farm moated site	High – Scheduled Monument
<b>1012122</b>	Moated site, fishpond and connecting channel, Elton	High – Scheduled Monument
<b>1012329</b>	Micklehead Green moated site	High – Scheduled Monument
<b>1012354</b>	Tabley Old Hall moated site and gatehouse.	High – Scheduled Monument

NHLE (National Heritage List for England) number	Name	Heritage Significance & Designation
1012356	Hulme Hall moated site	High – Scheduled Monument
1012413	Holford Hall moated site	High – Scheduled Monument
1013292	Promontory fort on Helsby Hill 250m north west of Harmers Lake Farm	High – Scheduled Monument
1013296	Bradley promontory fort above Beechbrook 50m south of Beechmill House	High – Scheduled Monument
1013363	Barrow Old Hall moated site, Great Sankey	High – Scheduled Monument
1018703	Dovecote at the site of Aston Old Hall, 40m east of Gamekeepers Cottage	High – Scheduled Monument
1020908	Number nine Tank House: The Jubilee glassworks 100m south west of the Government Offices on Chalon Way	High – Scheduled Monument
1014723	Roman fortlet at Ince, 150m north east of Hall Farm	High – Scheduled Monument
1016862	Vale Royal Abbey	High – Scheduled Monument
1018593	Belmont moated site and fishpond	High – Scheduled Monument
1019449	St Anne's Well	High – Scheduled Monument
1019531	Heavy Anti-aircraft gun site 380m east of South Lane Farm	High – Scheduled Monument
1019849	Heavy Anti-aircraft gun site, 400m west of Sutton Fields Farm	High – Scheduled Monument
1020100	Drakelow Hall moated site, fishponds, and moated enclosure	High – Scheduled Monument
1020841	Lion Salt Works and remains of part of the Alliance Salt Works	High – Scheduled Monument

NHLE (National Heritage List for England) number	Name	Heritage Significance & Designation
1021152	Anderton Boat Lift, aqueduct, basins, meter building, toll houses and buried remains of salt chutes, inclined planes, the east basin, and dockside features	High – Scheduled Monument
1417593	Daresbury	High – Scheduled Monument
1450800	Former soda ash and calcium nitrate works	High – Scheduled Monument
1000637	Arley Hall	High – Grade II* Registered Park and Garden
1000645	Tabley House	High – Grade II Registered Park and Garden
1000853	Dunham Massey	High – Grade II* Registered Park and Garden
1001622	Castle Park, Frodsham	High – Grade II Registered Park and Garden
1001632	Taylor Park	High – Grade II Registered Park and Garden
1412004	Landscape associated with the former Pilkingtons Headquarters complex	High – Grade II Registered Park and Garden
1138491	Church of St Peter	High - Grade I Listed Building
1138810	Manor House of Abbey of St Werburgh Chester, Including Old Hall and Monastery Cottages	High - Grade I Listed Building
1139129	Belmont Hall	High - Grade I Listed Building
1139156	Church of St Mary and All Saints	High - Grade I Listed Building
1253572	Sutton Hall	High - Grade I Listed Building

NHLE (National Heritage List for England) number	Name	Heritage Significance & Designation
1261276	Western Outbuilding to Town Hall	High - Grade I Listed Building
1287233	Church of St Mary	High - Grade I Listed Building
1310245	Winnington Hall	High - Grade I Listed Building
1329696	Cruck Barn Approximately 100 Yards to West of Arley Hall	High - Grade I Listed Building
1329725	Town Hall	High - Grade I Listed Building
1329748	Eastern Outbuilding to Town Hall	High - Grade I Listed Building
1330242	Church of St Mary	High - Grade I Listed Building
1067868	Church of St George	High - Grade II* Listed Building
1075878	Statue of Queen Victoria	High - Grade II* Listed Building
1075879	Tank House, Beside Canal at Crown Glass Works	High - Grade II* Listed Building
1115517	Swineyard Hall	High - Grade II* Listed Building
1130422	Parish Church of St John the Evangelist	High - Grade II* Listed Building
1130450	Church of All Saints	High - Grade II* Listed Building
1138369	Rock Farmhouse	High - Grade II* Listed Building
1138416	Bostock Hall	High - Grade II* Listed Building

<b>NHLE (National Heritage List for England) number</b>	<b>Name</b>	<b>Heritage Significance &amp; Designation</b>
1138431	Davenham Hall	High - Grade II* Listed Building
1138456	Bridge Over Moat at Hulme Hall	High - Grade II* Listed Building
1138463	Whatcroft Hall	High - Grade II* Listed Building
1138815	Church of St James	High - Grade II* Listed Building
1139011	Tabley Old Hall	High - Grade II* Listed Building
1139127	The Old Schoolhouse	High - Grade II* Listed Building
1139134	Church of St Luke	High - Grade II* Listed Building
1139352	Church of St John the Evangelist	High - Grade II* Listed Building
1139363	Tanyard Farm farm building	High - Grade II* Listed Building
1139399	Ye Olde Barley Mow Public House (Excluding the side Facade)	High - Grade II* Listed Building
1139433	Transporter Bridge to part of Joseph Crosfield and Sons Limited's Works	High - Grade II* Listed Building
1139505	Chapel of St Mary at Arley Hall	High - Grade II* Listed Building
1139509	Aston Park	High - Grade II* Listed Building
1139516	Chapel of St Mary	High - Grade II* Listed Building
1160324	Hulme Hall	High - Grade II* Listed Building

<b>NHLE (National Heritage List for England) number</b>	<b>Name</b>	<b>Heritage Significance &amp; Designation</b>
1160862	Vale Royal Abbey	High - Grade II* Listed Building
1161522	Church of the Holy Trinity	High - Grade II* Listed Building
1216523	Dutton Railway Viaduct	High - Grade II* Listed Building
1239919	Lamps on East and West Drives of Town Hall	High - Grade II* Listed Building
1253349	Manor Farmhouse	High - Grade II* Listed Building
1253573	The Cottage	High - Grade II* Listed Building
1261277	Entrance Gates, Piers and Lamps	High - Grade II* Listed Building
1287121	Hefferston Grange (Part of the Grange Hospital)	High - Grade II* Listed Building
1287228	The Beeches	High - Grade II* Listed Building
1287596	Hall Green Farmhouse and attached Front Garden Wall	High - Grade II* Listed Building
1310100	Ye Olde Barley Mow Public House (only the side Facade)	High - Grade II* Listed Building
1329664	Holford Hall	High - Grade II* Listed Building
1329694	Arley Hall	High - Grade II* Listed Building
1329734	Church of St Elphin	High - Grade II* Listed Building
1329757	Church of St Luke	High - Grade II* Listed Building

NHLE (National Heritage List for England) number	Name	Heritage Significance & Designation
1329859	Cogshall Hall	High - Grade II* Listed Building
1330337	Daresbury Hall	High - Grade II* Listed Building
1330357	Moore Hall	High - Grade II* Listed Building
	Trent and Mersey Canal	High – Conservation Area
	Bartington	High – Conservation Area
	Bostock	High – Conservation Area
	Great Budworth	High – Conservation Area
	Lower Whitley	High – Conservation Area
	Higher Whitley	High – Conservation Area
	Dunham Woodhouses	High – Conservation Area
	Daresbury	High – Conservation Area
	Greenalls Brewery	High – Conservation Area
	Thornton le Moors	High – Conservation Area
	Ince	High – Conservation Area
	Elton	High – Conservation Area
	Frodsham: Town and Castle Park	High – Conservation Area
	Overton: Five Crosses and St Lawrence	High – Conservation Area
	Weston	High – Conservation Area
	Higher Runcorn	High – Conservation Area
	Onston	High – Conservation Area
	Weaverham: Village and West Road	High – Conservation Area
	Cuddington	High – Conservation Area
	Sandiway	High – Conservation Area



NHLE (National Heritage List for England) number	Name	Heritage Significance & Designation
	Hartford	High – Conservation Area
	Northwich	High – Conservation Area
	Whitegate	High – Conservation Area
	Davenham	High – Conservation Area
	Marston	High – Conservation Area
	Tabley House	High – Conservation Area
	Arley	High – Conservation Area
	Dunham Town	High – Conservation Area
	Walton Village	High – Conservation Area
	Grappenhall: Victoria Road and York Drive, and Village	High – Conservation Area
	Stockton Heath: London Road and Grappenhall Road, and Ackers Road and Marlborough Crescent	High – Conservation Area
	Thelwall Village	High – Conservation Area
	Warrington: Bewsey Street, Winwick Street, Bridge Street, Buttermarket Street, Church Street, Palmyra Square, and Town Hall	High – Conservation Area
	Moore	High – Conservation Area
	Rainhill	High – Conservation Area
	St Helen's: Victoria Square, and George Street	High – Conservation Area

# Appendix 9A Air Quality Automatic and Passive monitoring data

The details of automatic monitoring undertaken by the six local authorities, found to be within the 10km search area around the Scoping red line boundary are detailed in **Table 1A.2**. A summary of the monitoring results for Nitrogen Dioxide (NO<sub>2</sub>), Particulate Matter (PM) PM<sub>10</sub> and PM<sub>2.5</sub> are presented in **Table 9A.5**, **Table 9A.6** and

### Table 9A.7.

A summary of the passive monitoring locations and NO<sub>2</sub> passive monitoring data is presented in **Table 9A.8** and **Table 9A.9**.

### Table 9A.4 Summary of automatic monitoring locations

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
<b>Cheshire West and Chester Council</b>							
FMH	Frodsham	Urban background	352445	104906	NO <sub>2</sub> , PM <sub>10</sub>	24.0	7.0
TLP	Thornton-le-Moors	Industrial	344103	104963	NO <sub>2</sub> , SO <sub>2</sub> PM <sub>10</sub>	38.0	Not applicable
WH	Whitby Rd	Roadside	340197	104963	NO <sub>2</sub>	15.0	2.5
<b>Warrington Council</b>							
CM1	Selby Street	Urban Background	359151	388218	NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub>	22	50
CM2	Parker Street	Roadside	360015	387907	NO <sub>2</sub>	1	2
CM3	Chester Road	Roadside	360331	386454	NO <sub>2</sub>	1	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
<b>Cheshire East Council</b>							
RTA1	A556 Chester Road, Mere	Roadside	373004	382626	NO <sub>2</sub>	5	2
RTA6	RTA Manchester Road Roadside	Roadside	374973	378784	NO <sub>2</sub>	5	2
<b>Trafford Council</b>							
TRF3	Trafford Wellacre Academy	Urban Background	373758	394473	NO <sub>2</sub>	79	160
TRAF	Trafford	Urban Background	378783	394726	NO <sub>2</sub> , PM <sub>10</sub> , SO <sub>2</sub>	60	98
TRF2	Trafford A56	Urban Traffic	379413	394014	NO <sub>2</sub> , PM <sub>10</sub>	40	2
<b>Halton Borough Council</b>							
HBC1	Milton Road	Roadside	351358	385621	NO <sub>2</sub> , PM <sub>10</sub>	<10	1
HBC2	Marzahn Way	Roadside	352042	386285	NO <sub>2</sub> , PM <sub>10</sub>	<10	1
HBC3	Runcorn Hill	Industrial	350758	380915	NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub>	N/A	N/A

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
<b>St Helens Council</b>							
SR	St Helens Southworth Road	Roadside	360045	395643	NO <sub>2</sub>	10	3.2
HS	St Helens High Street	Roadside	358975	395804	NO <sub>2</sub>	1.06	3.65
BR	St Helens Borough Road	Roadside	350403	394961	NO <sub>2</sub>	23	2.5
LW	St Helens Linkway	Roadside	350815	395260	NO <sub>2</sub> , PM <sub>10</sub>	165	5.35

Table 9A.5 Summary of NO<sub>2</sub> automatic monitoring data (µg/m<sup>-3</sup>)

Site ID	2013	2014	2015	2016	2017	2018	2019	2020	Average
<b>Cheshire West and Chester Council</b>									
FMH	-	-	-	16	14	14	15	13	14.4
TLP	-	-	-	16	13	13	13	9	12.8
WH				40	36	37	35	28	35.2
	-	-	-						
<b>Warrington Council</b>									

Site ID	2013	2014	2015	2016	2017	2018	2019	2020	Average
CM1	-	-	-	24.4	25	21	21.4	20.5	22.5
CM2	-	-	-	40	47	37.9	38.1	41	40.8
CM3	-	-	-	37	34	32	30	30	32.6
<b>Cheshire East</b>									
RTA1	-	-	34	38	25	-	-	-	32.3
RTA6	-	-	39		-	-	-	-	39.0
<b>Trafford District Council</b>									
TRF3				17	15	15	15	11	14.6
TRAF				22	19	18	19	14	18.4
TRF2				33	30	29	30	21	28.6
<b>Halton Borough Council</b>									
HBC1	45.0	40.0	36	45	n/a	-	-	-	41.5
HBC2	-	-	31	42	n/a	-	-	-	36.5
HBC3	-	-	13.5	18	12.8	-	-	-	14.8
<b>St Helens Council</b>									
SR	-	-	53	51	50	45	43	-	48.4
HS	-	-	33	38	31	35	31	-	33.6

Site ID	2013	2014	2015	2016	2017	2018	2019	2020	Average
BR	-	-	38	39	29	30	29	-	33.0
LW	-	-	84	38	38	34	33	-	43.3

Table 9A.6 Summary of PM<sub>10</sub> automatic monitoring data (µg/m<sup>3</sup>)

Site ID	2013	2014	2015	2016	2017	2018	2019	2020	Average
<b>Cheshire West and Chester Council</b>									
FMH	-	-	-	14	13	16	15	12	14
TLP	-	-	-	16	13	13	14	13	13.8
<b>Halton Borough Council</b>									
HBC1	25.0	20.0	17.0	18	n/a	-	-	-	20
HBC2	-	-	23.0	28	n/a	-	-	-	25.5
HBC3	-	-	19.4	25.7	23.3	-	-	-	22.8
<b>Warrington Borough Council</b>									
CM1	-	-	15	16	12	13	17	-	14.6
<b>Trafford District Council</b>									
TRAF	-	-	-	15	13	14	15	13	14
TRF2	-	-	-	17	15	18	17	14	16.2
<b>St Helens Council</b>									

Site ID	2013	2014	2015	2016	2017	2018	2019	2020	Average
AN1	-	-	19	19	16	18	20	-	18.4

Table 9A.7 Summary of PM<sub>2.5</sub> automatic monitoring data (µg/m<sup>3</sup>)

Site ID	2013	2014	2015	2016	2017	2018	2019	2020	Average
<b>Warrington Borough Council</b>									
CM1			11	11	10	9	11	-	10.4

Table 9A.8 Summary of passive monitoring locations

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
<b>Cheshire West and Chester Council</b>							
AHH	Holly House	Other	373255	371475	NO <sub>2</sub>	0	68
AP	Pine Cottage	Roadside	373386	371500	NO <sub>2</sub>	0.0	34.0
BE	Bedward Row	Roadside	340239	366418	NO <sub>2</sub>	0.5	2.4
BJ	Backpackers Jade	Roadside	341401	366512	NO <sub>2</sub>	0.5	2.5
BO	Boughton RTA	Roadside	341864	366444	NO <sub>2</sub>	25	2



Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
BSP	Brookside Primary	Roadside	338380	375840	NO <sub>2</sub>	12.0	0.5
C11	Christleton Road (11)	Roadside	341915	366427	NO <sub>2</sub>	0.0	1.0
C36	Christleton Road (36)	Roadside	342000	366374	NO <sub>2</sub>	0.5	1.4
C75	Christleton Road (75)	Roadside	342056	366354	NO <sub>2</sub>	0.5	2.0
CAN	Canal Street	Roadside	340375	366730	NO <sub>2</sub>	1	1.5
CBI	Chester Bus Interchange	Roadside	340647	366803	NO <sub>2</sub>	5.1	6.6
CBR	Bus Ram CBR	Other	340676	366782	NO <sub>2</sub>	0	N/A
CFL	Church Street (Lower)	Roadside	351762	377862	NO <sub>2</sub>	4.8	1
CM	Christleton Mill	Roadside	343761	365528	NO <sub>2</sub>	0	5
CN	Chesterway (62)	Kerbside	366070	373905	NO <sub>2</sub>	3.8	1.6
CP3	Canal Place (3)	Roadside	343970	365295	NO <sub>2</sub>	4	2.3

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
CPL	Plough Lane	Roadside	344377	365374.6	NO <sub>2</sub>	1.1	0.7
CRH	Rookery Cottages CRH	Roadside	364171	372697	NO <sub>2</sub>	0	3.5
CVR	Caldy Valley Road	Roadside	342930	365901	NO <sub>2</sub>	3.5	3
DA	Davenham DA	Roadside	365953	371113	NO <sub>2</sub>	0.1	1.6
EB	Boughton Edgeley	Roadside	341658	366487	NO <sub>2</sub>	0.0	2.0
FH	High Street (72)	Roadside	352146	378139	NO <sub>2</sub>	0.2	2.0
FJ	Fluin Junction	Roadside	352171	378140	NO <sub>2</sub>	0.5	2.0
FM	Fluin Lane (Manor Farm)	Roadside	352189	378094	NO <sub>2</sub>	0.3	2.0
FRC	Rock Cottage High Street	Roadside	352023	378121	NO <sub>2</sub>	1.3	1.6
FT	Fluin Lane (terrace)	Roadside	352176	378105	NO <sub>2</sub>	0.2	1.7

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
FTG	Trinity Gardens	Roadside	351993	378102	NO <sub>2</sub>	4.5	0.8
GB	Greenbank Lane	Roadside	364619	372594	NO <sub>2</sub>	8	0.7
GE	George Street (S)	Roadside	340657	366730	NO <sub>2</sub>	1	5
GR	Griffiths Road	Roadside	368634	374714	NO <sub>2</sub>	0.2	8
GSW	Gorse Stacks (Waterside)	Roadside	340700	366687	NO <sub>2</sub>	1	1.6
GT	George Street (N)	Roadside	340611	366747	NO <sub>2</sub>	0	1.9
HB	Hoole Lane - Boughton	Roadside	341605	366527	NO <sub>2</sub>	3	1.2
HHB	Holme Street HHB	Roadside	347953	366723	NO <sub>2</sub>	5.3	2.9
HO	Hoole Road	Roadside	341311	367207	NO <sub>2</sub>	0	7.1
HSS	High Street Sch. HSS	Roadside	364711	366339	NO <sub>2</sub>	8.0	4.0
HTC	Holme Street	Roadside	348333	366763	NO <sub>2</sub>	3.1	2.0

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
	HTC						
HW	Hoole Way	Roadside	340881	366826	NO <sub>2</sub>	1	1.9
IC	Ingham Close	Roadside	342068	366332	NO <sub>2</sub>	2.0	2.0
KR	King St. Rudheath	Roadside	368432	372988	NO <sub>2</sub>	4.5	2.2
LH	Lincoln House	Roadside	341126	366540	NO <sub>2</sub>	3.0	2.0
LI2	Liverpool Road	Roadside	340354	367034	NO <sub>2</sub>	7.0	2.5
LU	Lumley Place	Roadside	340838	366215	NO <sub>2</sub>	0	9.4
LVR	Love St Residential	Roadside	340980	366315	NO <sub>2</sub>	0	1.8
LVS	Love St School	Roadside	340990	366317	NO <sub>2</sub>	8	1.8
MCC	Mill Cottages (A41)	Roadside	343785	365502	NO <sub>2</sub>	0.5	2.4
MUL	Mulberry Close MUL	Roadside	346258	375321	NO <sub>2</sub>	0.0	27.0
NCS	New Crane St	Roadside	339857	366460	NO <sub>2</sub>	0	1.8
NIN	Nicholas St (North)	Roadside	340284	366199	NO <sub>2</sub>	0	3

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
NIS	Nicholas St (South)	Roadside	340329	366114	NO <sub>2</sub>	0	4.3
NSR	Station Road	Roadside	366796	373984	NO <sub>2</sub>	0.6	1.7
NWH	Winnington Hill	Roadside	365590	373904	NO <sub>2</sub>	2.4	0.7
OB	Boughton (105)	Roadside	341633	366510	NO <sub>2</sub>	0.6	2.5
OF	St Oswalds OF	Roadside	340453	366853	NO <sub>2</sub>	0.0	4.8
ON	St Oswalds ON	Roadside	340718	366815	NO <sub>2</sub>	4.4	15.5
OP	Oulton Place OP	Roadside	340636	366770	NO <sub>2</sub>	0.0	1.6
OSQ	Over Square OSQ	Roadside	364053	365977	NO <sub>2</sub>	5.5	2.2
OVH	Overleigh Road OVH	Roadside	340770	365605	NO <sub>2</sub>	0.0	1.3
OW	St Oswalds OW	Roadside	340623	366823	NO <sub>2</sub>	2.3	2.3
PA	Parkgate Road PA	Roadside	340313	367014	NO <sub>2</sub>	2.4	0.8

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
PG	Parkgate Road PG	Roadside	340322	366989	NO <sub>2</sub>	0.2	1.8
RM	Parkgate Road RM	Roadside	340291	367108	NO <sub>2</sub>	0.0	3.8
RPS	Rudheath Primary RPS	Roadside	367856	372667	NO <sub>2</sub>	19.0	5.2
RR	Whitby Road RR	Roadside	340180	376338	NO <sub>2</sub>	3.0	2.1
SA	Upper Northgate SA	Roadside	340364	366929	NO <sub>2</sub>	0.2	2.5
SAB	Stanley Arms SAB	Roadside	340838	366746	NO <sub>2</sub>	4.9	2.3
SF	Station Road SF	Roadside	341238	366976	NO <sub>2</sub>	0.0	3.2
SLW	Stanney Wellington	Roadside	339889	375755	NO <sub>2</sub>	3.0	3.2
SMH	St Martins SMH	Roadside	340243	366511	NO <sub>2</sub>	0.7	2.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
SR	Station Road SR	Roadside	340435	376790	NO <sub>2</sub>	0.0	1.6
ST	St. Annes Place ST	Roadside	340794	366778	NO <sub>2</sub>	18.4	0.1
SV2	South View Road SV2	Roadside	339836	366620	NO <sub>2</sub>	0.4	1.5
SZ	Boughton SZ	Roadside	341819	366475	NO <sub>2</sub>	0.5	2.0
T11	Tarvin Road T11	Roadside	341931	366458	NO <sub>2</sub>	2.7	1.5
T44	Tarvin Road T44	Roadside	342085	366446	NO <sub>2</sub>	3.5	1.0
T6	Tarvin Road T6	Roadside	341926	366446	NO <sub>2</sub>	0.2	2.0
TA	Tarvin Road TA	Roadside	344519	366898	NO <sub>2</sub>	6.0	2.0
TB	Bars TB	Roadside	341202	366470	NO <sub>2</sub>	2.0	1.0
TBV	Tarvin Road TBV	Roadside	344013	366830	NO <sub>2</sub>	14.4	1.4

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
UN	Upper Northgate Street UN	Roadside	340357	366960	NO <sub>2</sub>	0.2	3.0
VXR	Vicars Cross Road VXR	Roadside	343365	366694	NO <sub>2</sub>	1.7	11.2
WCR	Whitchurch Road WCR	Roadside	342951	366029	NO <sub>2</sub>	7.2	1.5
WG	Watergate Street WG	Roadside	340217	366209	NO <sub>2</sub>	0.2	1.5
WGW	Watergate Street WGW	Roadside	340165	366198	NO <sub>2</sub>	0.0	2.2
WH1	Whitby Road WH	Roadside	340196	376363	NO <sub>2</sub>	0.5	1.2
WVC	Weaver Court	Roadside	365788	373744	NO <sub>2</sub>	0.0	4.0
XR	Boughton Heath XR	Roadside	343117	365949	NO <sub>2</sub>	4.5	3.2
<b>Halton Borough Council</b>							



Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
HC1	Deacon Road 1	Roadside	351726	386125	NO <sub>2</sub>	4	1.5
HC2	Deacon Road 2	Kerbside	351748	386112	NO <sub>2</sub>	6	<1
HC3	Deacon Road 3	Roadside	351798	386076	NO <sub>2</sub>	3	2
HC4	Deacon Road 4	Kerbside	351767	386088	NO <sub>2</sub>	2	<1
HC5	Milton Road 1	Roadside	351343	385625	NO <sub>2</sub>	4	2
HC6	Milton Road 2	Roadside	351382	385648	NO <sub>2</sub>	3	2
HC7	Milton Road 3	Roadside	351418	385661	NO <sub>2</sub>	0	2.5
HC8	Peel House Lane 1	Kerbside	352078	386306	NO <sub>2</sub>	2	<1
HC9	Peel House Lane 2	Kerbside	352044	386290	NO <sub>2</sub>	2	<1
HC10	Peel House Lane 3	Roadside	352038	386316	NO <sub>2</sub>	20	2
HC11	Heath Road South	Roadside	350896	380810	NO <sub>2</sub>	10	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
HC12	Montpelier Avenue	Roadside	351042	380684	NO <sub>2</sub>	10	2
HC13	Moughland Lane	Kerbside	351213	381822	NO <sub>2</sub>	20	<1
HC14	Clifton Road	Kerbside	351379	381458	NO <sub>2</sub>	35	<1
HC15	Catherine Street	Kerbside	351620	385053	NO <sub>2</sub>	5	<1
<b>Warrington Borough Council</b>							
DT1	WA08 Risley Moss	Rural	366949	392004	NO <sub>2</sub>	N/A	N/A
DT2	WA22 Selby Street	Urban Background	359152	388218	NO <sub>2</sub>	N/A	50
DT3	WA23 Selby Street	Urban Background	359152	388218	NO <sub>2</sub>	N/A	50
DT4	WA24 Selby Street	Urban Background	359152	388218	NO <sub>2</sub>	N/A	50
DT5	WA111 M6 Manchester Road	Roadside	366102	389214	NO <sub>2</sub>	0	16

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
DT6	WA123 M62 Radley Lane	Roadside	361655	391914	NO <sub>2</sub>	0	60
DT7	WA124 M56 Queastybirch	Roadside	360233	381994	NO <sub>2</sub>	17	17
DT8	WA20 Parker St	Roadside	360044	388048	NO <sub>2</sub>	2	1.5
DT9	WA102 Wilson Patten Street	Roadside	360309	387848	NO <sub>2</sub>	4.5	1
DT10	WA67 Crosfield Island 2	Roadside	359509	388235	NO <sub>2</sub>	0	14.5
DT11	WA65 Baxter Street 1	Urban Centre	359452	388111	NO <sub>2</sub>	0	2
DT12	WA85 Old Liverpool Road 4	Roadside	359430	387947	NO <sub>2</sub>	4	2
DT13	WA68 Chester Road	Roadside	360648	387388	NO <sub>2</sub>	3	3

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
DT14	WA87 Chester Road 5	Roadside	360407	386237	NO <sub>2</sub>	4	2
DT15	WA93 Walton Terrace	Roadside	360450	386052	NO <sub>2</sub>	3	2
DT16	WA76 Wilderspool Causeway	Roadside	360880	387247	NO <sub>2</sub>	2.5	2.5
DT17	WA118 Wilderspool Causeway 3	Roadside	361220	386874	NO <sub>2</sub>	10	3.3
DT18	WA94 Wilderspool Causeway 2	Roadside	361319	386508	NO <sub>2</sub>	0	2
DT19	WA90 Stockton Heath 3	Roadside	361470	385981	NO <sub>2</sub>	3	2
DT20	WA77 Knutsford Road 1	Roadside	361898	387430	NO <sub>2</sub>	0	3

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
DT21	WA92 Kingsway South (Latchford)	Urban Centre	362810	387187	NO <sub>2</sub>	0	3
DT22	WA105 Latchford Village 2	Roadside	362779	387288	NO <sub>2</sub>	1	1.5
DT23	WA115 Latchford Village 3	Roadside	362604	387222	NO <sub>2</sub>	55	2
DT24	WA78 Mersey Street	Roadside	361005	388145	NO <sub>2</sub>	2.5	6
DT25	WA80 Bewsey Street	Roadside	360462	388501	NO <sub>2</sub>	0	30 (to train line)
DT26	WA83 Crosfield Street	Roadside	360040	388406	NO <sub>2</sub>	4.5	2.5
DT27	WA89 King Edward Street	Roadside	362392	389101	NO <sub>2</sub>	2.5	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
DT28	WA107 Padgate Lane 1	Roadside	362235	389248	NO <sub>2</sub>	2.5	1.5
DT29	WA108 Padgate Lane 2	Roadside	362060	389170	NO <sub>2</sub>	2.5	2
DT30	WA125 Steel Street	Roadside	362131	389473	NO <sub>2</sub>	7	1.5
DT31	WA95 Winwick Road 1	Roadside	360598	389820	NO <sub>2</sub>	5.5	5
DT32	WA96 Winwick Road 2	Roadside	360484	390416	NO <sub>2</sub>	5.5	3
DT33	WA112 Winwick Road 3	Roadside	360434	390968	NO <sub>2</sub>	0	2
<b>Cheshire East Borough Council</b>							
CE40	Knutsford Day Nursery	Roadside	375457	378412	NO <sub>2</sub>	0.2	6.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
CE42	RTA Manchester Road	Roadside	374973	378784	NO <sub>2</sub>	6.8	2.55
CE47	17 Manchester Road	Roadside	374940	378825	NO <sub>2</sub>	0.65	2.2
CE48	Holly Tree Cottage, Mere	Roadside	373152	383345	NO <sub>2</sub>	0	7.6
CE50	Westholme, Mere	Roadside	373081	382842	NO <sub>2</sub>	0	32
CE51	RTA, Chester Road, Mere	Roadside	373002	382631	NO <sub>2</sub>	0	3.6
CE54	Almond Tree Cottage, Mere	Roadside	372260	379249	NO <sub>2</sub>	0	3.5
CE55	Old Hall Lane, Mere	Roadside	372269	379717	NO <sub>2</sub>	0	4.9
CE57	Cobblestones, Tabley	Roadside	372357	380062	NO <sub>2</sub>	0.1	6.5
CE61	Mere Corner Cottage, Mere	Roadside	372765	381544	NO <sub>2</sub>	0	14.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
CE62	Mere Home Farm, Mere	Roadside	372668	381542	NO <sub>2</sub>	0.2	65.3
CE63	Old Smithy Cottage, Mere	Roadside	373205	383713	NO <sub>2</sub>	0	13.5
CE64	Mereside Farm, Mere	Roadside	373766	384824	NO <sub>2</sub>	0.18	8.8
CE65	Intac Farm, High Legh (M6)	Other	367000	383414	NO <sub>2</sub>	0.05	6.9
CE68	Newlyn, High Legh (M56)	Other	370333	385246	NO <sub>2</sub>	4.3	40.3
CE76	Denfield Cottages, Mere	Roadside	372938	383846	NO <sub>2</sub>	0	N/A
CE77	Kenilworth Cottage, Mere	Roadside	372106	381399	NO <sub>2</sub>	0	N/A
CE78	Yarwood Heath Farm, Rostherne	Roadside	374626	385487	NO <sub>2</sub>	0.18	N/A
CE84	Tollbar Cottage, Mere	Roadside	372545	380724	NO <sub>2</sub>	0	2.7



Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
CE94	15 Chelford Road	Roadside	375858	378106	NO <sub>2</sub>	0	1.35
CE128	Brereton Heath Park/Nature Reserve	Rural	379521	365453	NO <sub>2</sub>	0	5
CE131	25 Fairacre Drive	Urban background	371011	364574	NO <sub>2</sub>	0	11.5
CE133	Lewin Street, Middlewich	Roadside	370524	366000	NO <sub>2</sub>	0.17	15
CE134	White Horse, Lewin Street	Roadside	370468	366037	NO <sub>2</sub>	0	1.2
CE136	51 Chester Road	Roadside	369855	366422	NO <sub>2</sub>	0	2.3
CE139	Allotment View, Oak Tree Lane	Roadside	374250	369134	NO <sub>2</sub>	0	99.2
CE141	Holmes Chapel	Roadside	376334	366963	NO <sub>2</sub>	25	3.5
CE154	4/6 London Road	Roadside	373949	361475	NO <sub>2</sub>	2.85	1.75

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
CE156	Oak Tree Lane, Cranage	Other	373831	369016	NO <sub>2</sub>	47.3	222
CE248	Woodlands Farm, 62 Northwich Road	Roadside	373591	370681	NO <sub>2</sub>	0	40.5
CE267	238 Booth Lane	Roadside	371176	364733	NO <sub>2</sub>	2.67	2.39
CE268	216 Booth Lane	Roadside	371606	364859	NO <sub>2</sub>	2.79	1.97
CE269	Nr 35 Lewin Street	Roadside	370496	366010	NO <sub>2</sub>	0.3	1.4
CE270	Outside Longcross Court	Roadside	370433	366136	NO <sub>2</sub>	1.24	1.85
CE271	1 Cledford Lane	Roadside	371104	364886	NO <sub>2</sub>	5.84	1.07
CE275	10 Nantwich Road	Roadside	369941	366342	NO <sub>2</sub>	0.25	1.98
CE276	15/17 Chester Road	Roadside	369936	366394	NO <sub>2</sub>	0.41	1.32

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
CE280	23 Newton Bank	Roadside	369855	366368	NO <sub>2</sub>	0.1	2.6
CE281	The Lindens, 12 - 14 Chester Road	Roadside	369783	366466	NO <sub>2</sub>	11.3	2.05
CE282	The DIY shop, 5 Lewin Street	Roadside	370449	366119	NO <sub>2</sub>	0.2	2.02
CE286	The Willows, Chelford Road	Roadside	375934	378010	NO <sub>2</sub>	0	1.3
CE287	Old Smithy Cottage	Roadside	373212	383727	NO <sub>2</sub>	0.15	9.2
CE291	Park Cottage, 19 Chelford Road	Roadside	375945	378019	NO <sub>2</sub>	0.18	4
CE292	Dairy Farm Cottage, Chester Road	Roadside	372264	379723	NO <sub>2</sub>	0.15	40
CE296	Bella Casa/1 Williams Row, Middlewich Road	Roadside	376342	366925	NO <sub>2</sub>	8.8	2.7

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
CE297	Bella Casa/1	Roadside	376182	367343	NO <sub>2</sub>	0.5	2.25
CE298	Mere Corner Cottage	Roadside	372778	381560	NO <sub>2</sub>	10	2.55
CE300	The Grove Cottage	Roadside	372237	379257	NO <sub>2</sub>	7	5
CE301	The Windmill pub	Roadside	372255	379334	NO <sub>2</sub>	9.5	1.8
CE302	84 & 86 Lewin Street	Roadside	370535	365910	NO <sub>2</sub>	3.3	1.15
<b>Trafford Council</b>							
TR13NO	13 A56 White City	Roadside	381221	396441	NO <sub>2</sub>	300	5
TR15NO	Bradley Lane, Stretford	Roadside	379089	393282	NO <sub>2</sub>	350	5
TR16ANO	Kingsway Park School, Urmston	Roadside	377418	395689	NO <sub>2</sub>	30	2
TR16NO	Kingsway Park School, Urmston	Roadside	377418	395689	NO <sub>2</sub>	30	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
TR18NO	10 A56 Marsland Road	Urban Background	378822	389010	NO <sub>2</sub>	15	15
TR19ANO	19w Moss Park School (AQMA)	Urban Background	378783	394728	NO <sub>2</sub>	65	100
TR19BNO	19w Moss Park School (AQMA)	Urban Background	378783	394728	NO <sub>2</sub>	65	100
TR19NO	19w Moss Park School (AQMA)	Urban Background	378783	394728	NO <sub>2</sub>	65	100
TR20ANO	20w A56 Chester Road AQMA	Roadside	379411	394014	NO <sub>2</sub>	42	5
TR20BNO	20w A56 Chester Road AQMA	Roadside	379411	394014	NO <sub>2</sub>	42	5
TR20NO	20w A56 Chester Road AQMA	Roadside	379411	394014	NO <sub>2</sub>	42	5
TR21NO	21w Cleansing Depot	Roadside	379619	396371	NO <sub>2</sub>	700	5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
TR22NO	22w A56 corner of De Quincey Road	Kerbside	377061	390086	NO <sub>2</sub>	50	1
TR23ANO	Borton Road	Roadside	376395	396360	NO <sub>2</sub>	3	4
TR23NO	Stroma Gardens	Roadside	376438	396383	NO <sub>2</sub>	3	10
TR24NO	Tithebarn Road	Roadside	379263	385812	NO <sub>2</sub>	16	3
TR25ANO	Wellacre Academy	Urban Background	373755	394477	NO <sub>2</sub>	10	160
TR25BNO	Wellacre Academy	Urban Background	373755	394477	NO <sub>2</sub>	10	160
TR25NO	Wellacre Academy	Urban Background	373755	394477	NO <sub>2</sub>	10	160
TR26ANO	A56 Stretford	Kerbside	379272	393666	NO <sub>2</sub>	160	1
TR26NO	A56 Stretford	Kerbside	379272	393666	NO <sub>2</sub>	160	1
TR27NO	Warburton Lane Partington	Kerbside	371419	390760	NO <sub>2</sub>	20	1

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
TR28NO	Stamford New Road, Altrincham	Kerbside	376851	387792	NO <sub>2</sub>	100	1
TR5NO	5 Sale Leisure Centre	Urban Background	379052	392043	NO <sub>2</sub>	10	5
TR9NO	9 Trafford, Town Hall 12 (m)	Urban Background	380933	395889	NO <sub>2</sub>	20	100
<b>St Helens Council</b>							
DT1	170 Southworth Road	Roadside	360109	395661	NO <sub>2</sub>	0	16.3
DT2	1 Skitters Grove	Roadside	356549	399577	NO <sub>2</sub>	0	22.8
DT3	Taylor Park	Urban Background	349485	394766	NO <sub>2</sub>	32.15	N/A
DT4	27 Syston Avenue	Suburban	352451	396735	NO <sub>2</sub>	0	12.85
DT5	151 West End Road	Suburban	353891	396714	NO <sub>2</sub>	0	4.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
DT6	Parkside	Suburban	359498	394646	NO <sub>2</sub>	45.35	1.65
DT7	160 Southworth Road	Roadside	360055	395638	NO <sub>2</sub>	0	11.1
DT8	157 High Street	Roadside	358774	395880	NO <sub>2</sub>	0	10.6
DT9	3 Waterworks Cottages	Roadside	359915	395639	NO <sub>2</sub>	0	11.5
DT10	160 Southworth Road	Roadside	360055	395638	NO <sub>2</sub>	0	11.1
DT11	Southworth Road Lamp post 11	Roadside	360065	395653	NO <sub>2</sub>	0	4.6
DT12	24 Norlands Lane	Roadside	350239	389824	NO <sub>2</sub>	0	12.8
DT13	22 Union Bank Lane	Roadside	352391	390301	NO <sub>2</sub>	0	7.55
DT14	19 High Street	Roadside	359147	395705	NO <sub>2</sub>	0	5.9



Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
DT15	2 Parkside Cottages	Roadside	358220	397077	NO <sub>2</sub>	0	27.4
DT16	297 Liverpool Road	Roadside	354377	397475	NO <sub>2</sub>	0	14.3
DT17	446 Liverpool Road	Roadside	354403	397561	NO <sub>2</sub>	0	7.9
DT18	Linkway Monitor	Roadside	350815	395265	NO <sub>2</sub>	165	5.35
DT19	55 Borough Road	Roadside	350438	395005	NO <sub>2</sub>	0	2.55
DT20	33 Langholm Road	Suburban	355322	399625	NO <sub>2</sub>	0	2.6
DT21	24 Greenfield Road	Roadside	350135	396128	NO <sub>2</sub>	0	6.2
DT22	Linkway Monitor	Roadside	350815	395265	NO <sub>2</sub>	165	5.35
DT23	19 High Street	Roadside	359147	395705	NO <sub>2</sub>	0	5.9
DT24	55 Borough Road	Roadside	350438	395005	NO <sub>2</sub>	0	2.55

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants monitored	Distance to relevant exposure (m)	Distance to kerb (m)
DT25	High Street Monitor lamppost	Roadside	358975	395804	NO <sub>2</sub>	1.1	3.65
DT26	33 Blackbrook Road	Roadside	353129	396240	NO <sub>2</sub>	0	6.4
DT27	51 Carr Mill Road	Roadside	352336	397653	NO <sub>2</sub>	0	13.6
DT28	206 Borough Road	Roadside	350156	394848	NO <sub>2</sub>	0	6.4
DT29	25 Prescott Road	Roadside	350456	395135	NO <sub>2</sub>	0	1.9
DT30	4 Union Bank Lane	Roadside	352262	390226	NO <sub>2</sub>	0	7.5
DT31	160 Southworth Road	Roadside	360055	395638	NO <sub>2</sub>	0	11.1
DT32	High Street Monitor lamppost	Roadside	358975	395804	NO <sub>2</sub>	1.1	3.65
DT33	Warrington Road	Roadside	350386	389936	NO <sub>2</sub>	5.1	11.9



Table 9A.9 Summary of NO2 passive monitoring data ( $\mu\text{g}/\text{m}^3$ )

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
<b>Cheshire West and Chester Council</b>								
AHH	-	-	-	21.5	17.7	19.4	18.9	-
AP	-	-	-	31.2	28.3	25.3	23.9	16.3
BE	-	-	-	<b>40.2</b>	37.5	33.8	32.1	22.2
BJ	-	-	-	39.0	38.7	39.5	33.9	24.6
BO	-	-	-	30.5	29.2	28.7	23.1	-
BSP	-	-	-	-	-	-	-	16.2
C11	-	-	-	<b>43.3</b>	<b>43.0</b>	<b>41.1</b>	<b>41.0</b>	27.8
C36	-	-	-	<b>51.5</b>	<b>50.8</b>	<b>47.6</b>	<b>43.9</b>	31.8
C75	-	-	-	30.4	26.9	27.2	26.4	18.9
CAN	-	-	-		25.1	32.6	31.2	19.4
CBI	-	-	-	<b>44.6</b>	38.9	36.4	26.4	
CBR	-	-	-	-	-	-	-	24.4
CFL	-	-	-	31.3	30.4	30.5	29.9	21.6
CM	-	-	-	-	30.8	33.9	32.6	23.1
CN	-	-	-	-	-	33.0	31.0	24.1

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
CP3	-	-	-	-	31.9	31.3	30.9	22.9
CPL	-	-	-	-	-	19.0	18.2	11.8
CRH	-	-	-	-	-	-	-	12.6
CVR	-	-	-	-	30.3	30.2	27.8	19.9
DA	-	-	-	-	-	-	19.1	14.9
EB	-	-	-	34.8	34.5	31.6	30.7	22.4
FH	-	-	-	<b>44.2</b>	39.4	38.5	36.9	27.4
FJ	-	-	-	<b>42.2</b>	<b>40.5</b>	38.2	36.9	28.6
FM	-	-	-	36.5	33.2	35.0	29.4	24.3
FRC	-	-	-	-	-	34.0	31.0	24.3
FT	-	-	-	34.9	34.2	32.1	29.8	23.7
FTG	-	-	-	-	-	33.2	30.6	22.4
GB	-	-	-	-	-	17.3	16.0	-
GE	-	-	-	24.8	26.9	32.0	30.7	20.1
GR	-	-	-	-	-	24.1	21.6	17.0
GSW	-	-	-	27.8	33.3	34.3	33.9	23.2
GT	-	-	-	-	26.1	34.1	30.5	23.0

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
HB	-	-	-	33.7	32.9	32.0	30.9	21.6
HHB	-	-	-	-	-	-	32.1	17.8
HO	-	-	-	-	-	31.7	28.6	21.6
HSS	-	-	-	-	-	-	-	19.2
HTC	-	-	-	-	-	-	33.2	19.7
HW	-	-	-	39.9	36.0	35.8	32.0	21.1
IC	-	-	-	38.5	36.7	34.5	34.5	23.7
KR	-	-	-	35.2	33.9	32.0	32.2	26.0
LH	-	-	-	38.4	39.2	36.9	29.7	22.8
LI2	-	-	-	39.4	39.7	38.6	38.8	27.6
LU	-	-	-		27.9	27.0	24.1	16.4
LVR	-	-	-	<b>40.8</b>	35.9	36.5	34.9	19.7
LVS	-	-	-	39.1	36.0	31.4	28.3	19.2
MCC	-	-	-	<b>44.5</b>	<b>40.8</b>	38.0	36.9	22.9
MUL	-	-	-	-	-	-	16.8	13.4
NCS	-	-	-	-	-	30.5	27.8	20.4
NIN	-	-	-	39.1	39.8	34.7	33.9	24.0

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
NIS	-	-	-	22.6	28.6	31.7	29.0	21.2
NSR	-	-	-	-	-	38.0	35.3	27.6
NWH	-	-	-	-	-	<b>41.5</b>	<b>41.7</b>	27.8
OB	-	-	-	<b>41.2</b>	39.8	<b>44.8</b>	36.1	29.0
OF	-	-	-	38.8	35.3	34.3	30.6	21.5
ON	-	-	-	-	-	-	23.3	16.5
OP	-	-	-	-	28.3	32.1	30.8	22.3
OSQ	-	-	-	-	-	-	-	23.2
OVH	-	-	-	-	-	-	-	19.3
OW	-	-	-	<b>51.0</b>	<b>51.8</b>	<b>43.6</b>	<b>43.3</b>	27.2
PA	-	-	-	<b>42.3</b>	<b>42.7</b>	<b>41.2</b>	<b>40.3</b>	27.9
PG	-	-	-	<b>46.9</b>	<b>46.0</b>	<b>45.2</b>	<b>40.8</b>	29.9
RM	-	-	-	<b>43.1</b>	<b>41.3</b>	<b>45.7</b>	38.8	28.6
RPS	-	-	-	-	-	<b>42.4</b>	<b>40.5</b>	29.0
RR	-	-	-	39.9	36.8	36.5	35.2	30.0
SA	-	-	-	39.8	36.9	37.7	34.4	24.8
SAB	-	-	-	-	-	-	28.5	23.3

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
SF	-	-	-	-	32.3	33.3	32.0	21.8
SLW	-	-	-	-	-	-	-	16.8
SMH	-	-	-	-	-	-	26.0	15.7
SR	-	-	-	36.5	34.3	33.8	31.0	26.3
ST	-	-	-	-	<b>44.6</b>	<b>42.4</b>	<b>40.2</b>	30.1
SV2	-	-	-	-	-	25.4	22.7	16.6
SZ	-	-	-	36.3	36.4	36.1	32.1	22.9
T11	-	-	-	-	32.0	31.8	28.6	19.6
T44	-	-	-	<b>42.8</b>	<b>40.2</b>	39.2	37.6	25.7
T6	-	-	-	<b>50.3</b>	<b>45.5</b>	<b>43.6</b>	<b>43.6</b>	31.5
TA	-	-	-	-	<b>47.4</b>	<b>44.5</b>	38.6	26.7
TB	-	-	-	38.7	36.0	36.7	33.3	25.0
TBV	-	-	-	-	-	-	<b>44.4</b>	28.2
UN	-	-	-	<b>40.1</b>	36.8	38.1	33.5	21.4
VXR	-	-	-	-	-	-	-	19.0
WCR	-	-	-	-	<b>41.1</b>	39.0	<b>41.1</b>	25.8
WG	-	-	-	<b>43.5</b>	<b>42.8</b>	39.8	35.2	27.3



Site ID	2013	2014	2015	2016	2017	2018	2019	2020
WGW	-	-	-	37.1	33.3	33.7	29.6	23.7
WH1	-	-	-	34.4	32.3	35.7	31.4	25.8
WVC				-	-			17.3
XR				-	-	31.1	29.7	18.2
<b>Halton Borough Council</b>								
HC1	38	35	33	34	34	-	-	-
HC2	38	29	32	32	32	-	-	-
HC3	38	38	36	35	33	-	-	-
HC4	34	33	31	37	36	-	-	-
HC5	35	37	37	34	32	-	-	-
HC6	39	37	40	39	38	-	-	-
HC7	38	37	36	37	35	-	-	-
HC8	33	34	33	33	33	-	-	-
HC9	39	<b>40</b>	<b>40</b>	39	38	-	-	-
HC10	35	39	35	34	42	-	-	-
HC11	21	18	18	18	18	-	-	-
HC12	21	19	19	18	18	-	-	-

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
HC13	23	23	20	22	18	-	-	-
HC14	24	22	21	23	19	-	-	-
HC15	-	-	-	27	31	-	-	-
<b>Warrington Council</b>								
DT1	-	-	25.2	18.8	17.3	16.1	16.3	-
DT2	-	-	24.4	24.7	21.2	21.4	19.7	-
DT3	-	-	25.0	25.6	21.6	21.3	20.4	-
DT4	-	-	24.4	24.4	21.5	21.7	20.2	-
DT5	-	-	<b>55.5</b>	<b>44.2</b>	39.4	<b>45.6</b>	<b>41.0</b>	-
DT6	-	-	-	-	-	29.7	23.5	-
DT7	-	-	-	-	-	34.2	32.5	-
DT8	-	-	<b>55.2</b>	<b>55.7</b>	<b>45.2</b>	<b>45.9</b>	<b>43.8</b>	-
DT9	-	-	<b>47.0</b>	<b>49.5</b>	<b>40.7</b>	39.5	36.1	-
DT10	-	-	<b>41.2</b>	37.5	32.8	32.2	30.7	-
DT11	-	-	<b>51.0</b>	<b>49.9</b>	<b>42.1</b>	39.6	39.1	-
DT12	-	-	<b>41.1</b>	<b>42.3</b>	37.7	35.5	31.7	-
DT13	-	-	<b>44.7</b>	<b>46.6</b>	36.2	36.6	34.1	-

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
DT14	-	-	<b>40.1</b>	38.4	34.5	34.1	30.7	-
DT15	-	-	<b>45.1</b>	<b>40.9</b>	37.1	34.5	31.4	-
DT16	-	-	39.1	38.7	34.1	31.0	28.8	-
DT17	-	-	-	-	31.8	30.1	29.7	-
DT18	-	-	<b>45.6</b>	<b>40.4</b>	34.8	33.7	30.6	-
DT19	-	-	35.3	33.4	28.5	27.5	25.1	-
DT20	-	-	<b>40.2</b>	38.0	33.1	30.2	29.9	-
DT21	-	-	<b>42.0</b>	<b>42.2</b>	36.2	35.2	32.5	-
DT22	-	-	<b>49.3</b>	<b>48.3</b>	<b>41.4</b>	39.9	34.8	-
DT23	-	-	35.4	<b>42.5</b>	34.5	33.7	31.0	-
DT24	-	-	<b>45.9</b>	<b>43.4</b>	38.4	37.7	35.3	-
DT25	-	-	36.6	37.7	32.9	32.3	30.6	-
DT26	-	-	<b>45.7</b>	<b>41.9</b>	32.2	36.0	33.4	-
DT27	-	-	<b>45.6</b>	<b>47.4</b>	<b>42.2</b>	37.9	35.1	-
DT28	-	-	<b>41.4</b>	<b>42.1</b>	38.0	35.1	32.5	-
DT29	-	-	<b>45.8</b>	<b>45.3</b>	37.6	35.1	34.1	-
DT30	-	-	-	-	-	<b>42.4</b>	35.9	-

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
DT31	-	-	39.5	39.9	34.7	32.6	30.2	-
DT32	-	-	<b>47.2</b>	<b>50.0</b>	<b>44.2</b>	<b>40.3</b>	36.6	-
DT33	-	-	<b>52.0</b>	<b>55.0</b>	<b>49.3</b>	<b>43.9</b>	39.8	-
<b>Cheshire East Council</b>								
CE40	-	-	-	28.8	30.9	27.6	24.9	25.3
CE42	-	-	-	35.5	<b>40.9</b>	32.8	30.6	28.0
CE47	-	-	-	36.4	<b>43.4</b>	34.0	32.5	30.1
CE48	-	-	-	36.8	<b>50.2</b>	-	-	-
CE50	-	-	-	23.9	23.8	17.5	-	-
CE51	-	-	-	<b>44.5</b>	<b>48.7</b>	-	-	-
CE54	-	-	-	<b>51.2</b>	<b>53.4</b>	<b>49.5</b>	<b>42.7</b>	<b>40.5</b>
CE55	-	-	-	<b>50.8</b>	<b>53.0</b>	35.4	-	-
CE57	-	-	-	39.1	<b>45.1</b>	24.1	-	-
CE61	-	-	-	<b>42.5</b>	<b>41.8</b>	21.4	-	-
CE62	-	-	-	18.5	20.6	13.5	-	-
CE63	-	-	-	29.8	32.9	21.6	-	-
CE64	-	-	-	25.3	27.5	22.9	23.3	23.2

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
CE65	-	-	-	30.9	34.5	32.4	35.7	27.8
CE68	-	-	-	29.4	30.8	28.8	25.4	24.8
CE76	-	-	-	16.0	17.7	16.7	17.3	17.0
CE77	-	-	-	13.3	15.5	15.5	14.9	14.2
CE78	-	-	-	20.3	22.2	19.9	-	-
CE84	-	-	-	<b>45.8</b>	<b>45.8</b>	24.8	-	-
CE94	-	-	-	-	<b>52.7</b>	<b>45.1</b>	39.7	35.9
CE128	-	-	-	10.2	11.6	9.8	10.6	9.3
CE131	-	-	-	12.9	14.5	12.1	13.0	11.7
CE133	-	-	-	21.0	22.0	-	-	-
CE134	-	-	-	35.9	38.9	36.0	34.4	29.9
CE136	-	-	-	39.0	<b>41.1</b>	35.3	34.5	32.8
CE139	-	-	-	-	23.2	23.4	21.3	20.7
CE141	-	-	-	37.1	<b>40.6</b>	37.6	-	-
CE154	-	-	-	33.1	34.1	29.9	26.9	26.5
CE156	-	-	-	17.9	20.0	-	-	-
CE248	-	-	-	-	36.7	31.6	27.4	29.2

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
CE267	-	-	-	-	-	24.5	23.5	22.6
CE268	-	-	-	-	-	32.0	32.6	30.4
CE269	-	-	-	-	-	<b>41.5</b>	39.5	35.8
CE270	-	-	-	-	-	33.8	34.0	31.7
CE271	-	-	-	-	-	24.5	26.6	25.3
CE275	-	-	-	-	-	34.1	31.2	29.0
CE276	-	-	-	-	-	<b>45.0</b>	<b>43.9</b>	<b>42.6</b>
CE280	-	-	-	-	-	<b>40.1</b>	36.7	34.3
CE281	-	-	-	-	-	38.9	36.2	31.9
CE282	-	-	-	-	-	<b>43.5</b>	<b>41.9</b>	38.4
CE286	-	-	-	-	-	36.5	30.3	29.0
CE287	-	-	-	-	-	20.0	-	-
CE291	-	-	-	-	-	29.2	23.0	22.3
CE292	-	-	-	-	-	35.2	26.1	26.0
CE296	-	-	-	-	-	-	35.7	32.7
CE297	-	-	-	-	-	-	34.2	30.7
CE298	-	-	-	-	-	-	26.4	26.5

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
CE300	-	-	-	-	-	-	39.7	36.9
CE301	-	-	-	-	-	-	<b>42.8</b>	<b>40.6</b>
CE302	-	-	-	-	-	-	29.9	28.9
<b>Trafford Council</b>								
TR13NO	-	-	-	32.7	38.3	35.9	37.5	23.2
TR15NO	-	-	-	33.3	30.6	29.2	29.9	20.7
TR16ANO, TR16NO	-	-	-	33.0	29.6	30.2	30.5	22.2
TR18NO	-	-	-	26.4	18.1	17.3	18.0	14.5
TR19ANO, TR19BNO, TR19NO	-	-	-	21.9	18.2	20.4	20.4	13.6
TR20ANO, TR20BNO, TR20NO	-	-	-	33.1	32.4	30.2	28.7	21.2
TR21NO	-	-	-	26.0	25.6	23.4	27.0	18.5
TR22NO	-	-	-	35.6	32.1	33.7	35.3	22.7
TR23ANO	-	-	-	-	-	35.8	36.5	25.1
TR23NO	-	-	-	39.8	39.6	36.5	36.6	25.1

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
TR24NO	-	-	-	30.7	27.2	24.1	23.5	15.6
TR25ANO, TR25BNO, TR25NO	-	-	-	17.0	14.7	16.0	15.2	13.0
TR26ANO, TR26NO	-	-	-	-	<b>45.2</b>	37.9	38.5	29.1
TR27NO	-	-	-	-	-	-	21.7	18.6
TR28NO	-	-	-	-	-	-	29.8	24.9
TR5NO	-	-	-	25.5	24.1	24.0	24.3	16.3
TR9NO	-	-	-	25.5	25.0	24.8	24.1	16.5
<b>St Helens Council</b>								
DT1	-	-	32.8	29.2	26.5	25.0	24.9	-
DT2	-	-	35.8	30.5	25.0	25.9	24.7	-
DT3	-	-	13.6	14.9	13.5	13.2	14.3	-
DT4	-	-	22.8	22.8	22.6	20.5	20.9	-
DT5	-	-	24.2	23.5	21.9	22.3	22.5	-
DT6	-	-	23.6	24.3	23.6	21.3	21.5	-
DT7	-	-	<b>40.3</b>	36.4	37.6	33.2	30.7	-



Site ID	2013	2014	2015	2016	2017	2018	2019	2020
DT8	-	-	26.5	25.5	22.5	24.1	23.0	-
DT9	-	-	24.1	24.1	20.9	21.8	21.7	-
DT10	-	-	<b>41.7</b>	37.3	37.9	33.6	31.0	-
DT11	-	-	-	-	-	-	34.0	-
DT12	-	-	24.1	25.3	23.5	22.8	23.8	-
DT13	-	-	26.1	25.1	24.6	24.4	22.2	-
DT14	-	-	34.9	33.3	33.3	31.3	32.5	-
DT15	-	-	32.8	32.3	31.4	28.4	27.1	-
DT16	-	-	24.5	23.7	22.3	22.2	20.7	-
DT17	-	-	28.9	31.4	29.3	27.5	28.4	-
DT18	-	-	31.5	35.6	35.1	30.5	29.3	-
DT19	-	-	<b>41.3</b>	<b>48.9</b>	<b>45.1</b>	<b>46.7</b>	<b>45.3</b>	-
DT20	-	-	-	-	-	-	15.0	-
DT21	-	-	22.7	25.1	23.7	23.4	23.8	-
DT22	-	-	29.8	33.5	33.9	30.4	30.7	-
DT23	-	-	34.1	33.7	33.3	31.6	30.7	-
DT24	-	-	<b>42.1</b>	<b>46.8</b>	<b>42.9</b>	<b>48.1</b>	<b>44.3</b>	-

Site ID	2013	2014	2015	2016	2017	2018	2019	2020
DT25	-	-	32.5	34.2	31.4	30.8	29.8	-
DT26	-	-	27.0	29.4	27.2	27.5	25.0	-
DT27	-	-	-	-	-	19.5	22.2	-
DT28	-	-	25.5	25.8	25.9	25.7	25.2	-
DT29	-	-	24.5	26.5	25.0	25.5	25.6	-
DT30	-	-	23.5	22.6	22.8	20.7	19.8	-
DT31	-	-	39.8	34.7	37.7	34.9	31.4	-
DT32	-	-	32.0	32.6	30.7	31.5	30.0	-
DT33	-	-	36.7	33.1	30.2	33.4	30.7	-

# Appendix 16A

## Scoping Assessment of Major Accidents and Disasters

Table 16A.1 Scoping Assessment of Major Accidents and Disasters

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
<b>Internal Major Accidents</b>				
Accidents during commissioning e.g. pressure testing	x		In	Following the construction of the pipeline, there will be a period of initial testing called pre-commissioning. This period is used to confirm that the pipeline has been correctly installed and has not been damaged during the construction phase prior to flammable gases being introduced. There is the potential for a major accident to occur during commissioning such as a pipe failure which could harm members of the Project workforce.
Accidents during maintenance		x	Out	<p>The HAGIs and pipeline are normally unoccupied but personnel visit for inspection and maintenance checks at least annually, and to carry out any repairs which may be required. Maintenance accidents are work-related accidents that could affect only one or two workers carrying out the task, the effects of which, do not extend to receptors within the wider environment. Under UK Health and Safety legislation, employers are required to manage the risk to their employees and others who could be affected by their activities and ensure that the risk is reduced to ALARP. The ALARP principle requires compliance with good practice as a minimum.</p> <p>The facility will be designed with consideration of the potential occupational health and safety hazards such as electrocution, falls from height and trip hazards. These will be mitigated</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				through application of the hierarchy of controls: i.e. hazards will be designed out or minimised where practicable, and appropriate measures to prevent and mitigate residual risks implemented. All staff who undertake maintenance on the system will be suitably qualified and experienced professionals, whether they are working on the gas pipework, or other ancillary systems. The location of the HAGIs will have only a minimal impact on the risk of these issues occurring.
Construction phase accidents including dropped objects, heavy plant and temporary works	x		Out	<p>The potential for accidents to occur during the construction process will be identified and dealt with through appropriate risk assessment and mitigation (applying the hierarchy of controls) as required to comply with UK health and safety legislation and environmental legislation. The CEMP will require risk assessment of construction activities (including any necessary earthworks or demolition activities) and this assessment shall identify and mitigate, where necessary, the potential impact of all major accidents or disasters, including those affecting non-human receptors. These risk assessments shall count for adverse weather and prevailing environmental conditions.</p> <p>The potential major accidents arising from construction activity on the environment and human populations include a spill from temporary fuel storage tanks, collapse of excavations, fire during construction, accidents during testing/commissioning or the collapse of a crane/piling rig. While most of these accidents</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				<p>would affect at most, one or two workers, a structural collapse or fire during construction could affect more workers (up to 10), (although they are unlikely to affect members of the public as the construction activities will be segregated). Materials such as fuel oil are not expected to be held onsite in volumes that could lead to a major accident. All of the construction works will be managed in accordance with a CEMP and relevant regulations such as the Construction (Design and Management) Regulations 2015 (the CDM Regulations).</p> <p>Under the CDM Regulations, all structures must be designed so that they can be built and maintained safely, the designer must also ‘design out’ hazards where possible, by applying the hierarchy of controls and will produce a designer’s risk assessment to inform the construction contractors. The construction process must be managed to take account of the risks to people affected by the work, including the public. These include measures to manage fire risk, electrical hazards, structural integrity (including excavations). This must be documented in a CDM Design Risk Register. This ensures that the risk of such effects occurring is extremely low and will be reduced to ALARP. This process will be managed by the construction contractor.</p> <p>Construction accidents are also work-related accidents that could generally affect only one or two workers carrying out the task, the</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				effects of which, do not extend to receptors within the wider environment. Under UK Health and Safety legislation, employers are required to manage the risk to their employees and others who could be affected by their activities and ensure that the risk is reduced to ALARP. The ALARP principle requires compliance with good practice as a minimum.
<b>Construction phase activities impact on UXO</b>	X		Out	<p>The CEMP will require risk assessment of construction activities (including any necessary earthworks or demolition activities) and this assessment shall identify the potential for UXO hazard and mitigate, where necessary, the potential impacts. This will include Industry Good Practice measures such as desk-based risk assessment, and non-intrusive surveys/ site clearance where necessary.</p> <p>Encountering UXO during intrusive construction works is scoped out. The UXO hazard across the study area is mostly low with some areas of moderate hazard based upon historical bombing rates. There are well developed construction industry practices which allow safe construction of thousands of Projects each year in low and moderate hazard areas.</p> <p>Construction accidents are also work-related accidents that could generally affect only one or two workers carrying out the task, the effects of which, do not extend to receptors within the wider environment. Under UK Health and Safety legislation, employers</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				are required to manage the risk to their employees and others who could be affected by their activities and ensure that the risk is reduced to ALARP. The ALARP principle requires compliance with good practice as a minimum. The Project is not considered to present a significant risk of major accident due to UXO.
Construction traffic accidents	x		Out	The Project will require road transport movements for the construction workforce and construction materials. However, the numbers of vehicle movements will not be significant compared to the background rate across the widespread area covered by the Project. A full assessment of the impact on traffic is in <b>Chapter 11: Traffic and Transport</b> . It is therefore not considered further in the assessment of Major Accidents and Disasters.
Damage to existing utilities	x		In	The presence and location of underground utilities are not yet known, as the routes have yet to be defined. There is potential to damage these utilities which could harm the Project workforce or lead to contamination of the ground/groundwater.
Fires	x	x	In	There will be construction compounds including temporary welfare facilities and vehicle fuelling facilities established in order to facilitate construction. There is the potential for a fire in the construction compounds which could cause serious harm to the Project workforce.



Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				There will be electrical equipment and other consumables in the HAGI once operational, with a low potential risk of fire during the operational phase which will be assessed at the PEIR/ES stages.
Impacts on aviation	x	x	Out	<p>There are three airports which lie within 10km of the route corridors, namely City Airport (Barton) 5km North of Partington, Liverpool John Lennon 5km West of the pipeline at Runcorn and 6km North of the pipeline at Stanlow and Manchester Airport 9km to the East of the pipeline at Broomsedge.</p> <p>These airports are all at significant distance from the Project. All of the airports have a significant amount of infrastructure between them and the Project including major rivers, motorways, industrial sites and residential areas, which will ensure there are negligible potential impacts on any airport.</p> <p>The Airport Operators Association publish 5 Advice Notes (AN) on safety in the proximity to airports. AN04 states that good practice in line with BS 7121 requires the Project to consult with the aerodrome/airfield manager for any crane exceeding 10m in height within 6km of the aerodrome. Two or three small sections of the Scoping red line boundary lie within 6km of airports. It is not yet known whether any cranes will be required in these locations but, if they are, it is unlikely they will exceed 10m in height.</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
Impacts on mines and storage caverns	x		In	<p>Cheshire is known for salt caverns, which have been used for storage of both liquid and gas hydrocarbon fuels. The Project will be routed to avoid these wherever reasonable practicable, and the pipeline will be laid at a relatively shallow depth compared to the caverns. However, as the route has not yet been defined, the potential to impact any subsurface storage caverns will be assessed in the EIA.</p> <p>St Helens and the surrounding areas are located in Merseyside, although they are included within the Lancashire reporting area for the Coal Authority maps. The maps indicate that areas of the proposed route corridor located between the Clock tower HAGI and end-users in St Helens are defined as High Development Risk Areas and with Past or Possible Previous Shallow Coal Working Areas. It should however be noted that these areas have been significantly developed into urban areas such as Lea Green, Sutton Heath and Ravenhead and Green Bank.</p>
Impacts on transport networks and network impacts on pipeline	x	x	Out	<p>The pipelines would be required to cross transport networks including major rail and road infrastructure. It is anticipated that these will likely be crossed using trenchless techniques to minimise the potential impact on these networks.</p> <p>HAGIs require vehicular access for maintenance purposes and hence may be sited in the vicinity of public or other roads. Taking into account local circumstances, the actual siting of a HAGI will be such the effects of a road or rail transport accident will not</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				<p>affect the safe operation of the HAGI. The pipeline at a crossing point would be designed with sufficient depth, wall thickness and, if necessary impact protection, such that it would be protected from any rail or road accidents. It is noted that there are a very large number of natural gas pipelines which are buried in public highways and cross railways, and experience gained over many decades ensures that the risk of damage by traffic collisions on the road/rail surface is or negligible.</p> <p>Both road and railway crossings are well understood from the natural gas industry and will be addressed through the design of the pipeline. Industry Good Practice design will be adopted for the whole pipeline system, and this includes utilisation of relevant design standards such as IGEM/TD/1<sup>503</sup> which includes a specific section on the design of road/railway crossings. In addition, pipeline crossings of railways and major roads are subject to approval by the relevant network authority.</p> <p>On this basis, it is proposed to scope out the impact on transport networks and the potential for transport networks to cause a Major Accident at the Project.</p>
Impact on watercourse	x	x	Out	The pipelines will need to cross various water courses including the River Mersey, Manchester Ship Canal and River Weaver. It

<sup>503</sup> Institution of Gas Engineers and Managers (2021). IGEM/TD/1 Edition 6: Steel pipelines for high pressure gas transmission. Kegworth, UK; IGEM.

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
crossings and watercourse impacts on pipeline				<p>is anticipated that major rivers and canals would likely be crossed using trenchless techniques to minimise the potential impact on these networks i.e. closing waterbodies to facilitate construction. Smaller watercourse crossings including ditches and streams would generally be crossed using an open cut technique.</p> <p>Hydrogen is not classified as harmful to the aquatic environment, it is not readily soluble in water, and is buoyant, so that in the very unlikely event of an accident involving the pipeline, any release is likely to migrate rapidly to the water surface and disperse in the atmosphere. If a release were to be ignited, it would have localised thermal effects but would not be anticipated to cause widespread harm to habitats.</p> <p>The pipeline itself will be buried beneath the watercourse and therefore not located within the surface water body. The design of the pipeline in such locations will ensure that it is protected from foreseeable forces including to sedimentation, scour or dredging. These are well understood from the natural gas industry and will be addressed through the design of the pipeline. Industry Good Practice design will be adopted for the whole pipeline system, and this includes utilisation of design standards such as IGEM/TD/1<sup>503</sup> which includes a specific section on the design of waterway crossings.</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				On this basis, it is proposed to scope out the impact on watercourses and the potential for watercourses to cause a Major Accident at the Project.
Leaks and spills - pollution to water or ground	x	x	Out	<p>There will be small amounts of chemicals and fuels used and stored within the construction compounds. These will be stored in line with industry good practice and the quantities will be minimised. <b>Chapter 12: Ground Conditions</b> will assess the potential for ground contamination during the construction phases and it is therefore not considered further in the assessment of Major Accidents and Disasters.</p> <p>There will be no significant inventories of hazardous substances other than hydrogen present at the HAGIs or in the pipeline, and no provision for the storage of hydrogen. Hydrogen as a buoyant gas is lighter than air and not considered to be capable of contaminating the ground or water courses.</p>
Release of hydrogen from pipeline or HAGI during operation		x	In	The release of flammable gases has the potential to lead to fire/explosion hazards.
Structural collapse of assets		x	Out	The design of the HAGIs will be undertaken by suitably qualified and experienced personnel including civil and structural engineers. The design will account for the expected ground

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				<p>conditions and design loads, e.g. due to wind, accounting for the effects of climate change, and will be ensured through compliance with good practice in structural design including compliance with the Eurocodes and any relevant BSI published documents. As part of the application, compliance with the Building Regulations 2010 will also be provided, in particular, Part A which relates to structure.</p> <p>The pipeline will be designed in accordance with appropriate British Standards by suitably qualified and experienced personnel, with the ground being reinstated following construction.</p> <p>This will ensure appropriate design of the Project and a reduction of the risk of structural hazards during operation such as building collapse to low levels, which are considered to be ALARP.</p>
<b>External Major Accidents</b>				
Aircraft crash	x	x	Out	<p>The risk of an aircraft crash impacting the Project is considered to be extremely low. The Project represents a small construction workforce population which will be located a significant distance from any airport. The Project will represent predominantly buried gas transmission infrastructure, which is unlikely to have any material impact on aviation. Given the narrow, buried linear nature of the Project, the risk of a plane crash impacting the</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				<p>Project is extremely small. The potential to adversely affect aviation is considered above.</p> <p>As the Project will not materially alter the risk of an aircraft crash, it will not have a significant effect and is therefore scoped out of the EIA.</p>
External MA - Chemicals	x	x	In	<p>There are a large number of COMAH Establishments and potentially further sites holding Hazardous Substance Consents within the Scoping red line boundary, including some sites which are associated with the scheme as users or suppliers of hydrogen.</p> <p>A major accident at one of these sites could impact the construction workforce or could potentially initiate a major release through damage to the pipeline.</p>
External MA - Nuclear	x	x	Out	<p>The nearest licensed nuclear site is the Urenco site at Capenhurst. This site is more than 7km from the nearest part of the Scoping red line boundary, and the Outline Emergency Planning Zone applied by Cheshire West and Chester Council on the basis of risk to the public is 5km. The area between the Urenco site and the Project also includes the entire town of Ellesmere Port. Therefore, there are considered to be no significant effects of an external nuclear accident impacting the Project.</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
Loss of utilities	x	x	Out	<p>During the construction and operation of the Project, there will be a reliance on utility systems to provide services to the Project. For example, electricity will be required for lighting, and powering control systems for operation of the HAGIs, it may also be used to provide heating and welfare facilities during construction. However, the loss of utility systems including water, power or telecommunications will only lead to construction phase/operational inconvenience, but it will not lead to Major Accident level consequences, as all items will be designed to 'fail-safe' in the event of loss of utilities.</p>
<b>External Major Accident – Malicious Actions</b>				
Cyber attack		x	Out	<p>The National Risk Register includes cyber attacks as one of the types of terrorism which may affect the UK. In recent years, other countries have seen successful cyber attacks against power stations or grid infrastructure and the UK NHS has also been a victim of a ransomware attack. The Project would have little cyber infrastructure which could be attacked; the only foreseeable consequence would be a malicious actor attempting to take control of the remotely operated systems such as the Block Valve Stations or other HAGIs.</p> <p>The design of the HAGIs and control systems would ensure that someone gaining access to the system could not remotely cause an accident by releasing hydrogen. It is anticipated that the new control systems used for the Project would use modern</p>



Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				encryption methods and would therefore present a more difficult target than existing natural gas infrastructure.
Terrorism	x	x	Out	<p>Terrorism is the act of inflicting violence as a means of inflicting terror for political reasons. At the time of writing (Nov 2021), MI5 rates the current UK-wide threat level as SEVERE which means an attack in the UK is considered ‘highly likely’ following an attempted bombing of a hospital. The National Risk Register for the UK lists various types of terrorist attack as potential major accidents including attacks on publicly accessible locations, transport systems, infrastructure, as well as Chemical, Biological, Radiological or Nuclear (CBRN) or Cyber-attacks.</p> <p>The Project is not a publicly accessible location or transport system, it is also does not represent a potential target or vector for a CBRN attack.</p> <p>Cyber-attacks are considered separately above.</p> <p>The Centre for the Protection of National Infrastructure (CPNI) sets the definition of Critical National Infrastructure (CNI). Security provisions have already been allowed for within the design of the Project and consideration will be given to the appropriate additional measures if the Project is designated as CNI.</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				<p>Additionally, it is worth noting that the Project is infrastructure which is dispersed over significant distances and will be buried. This will make it extremely difficult to 'destroy' in the conventional sense as it is protected by its disparate nature, unlike a power station or water treatment facility, which presents a more consolidated target.</p> <p>The potential effects on the Project of terrorism are not considered significant.</p>
Widespread public disorder	x	x	Out	<p>The National Risk Register states that public disorder '<i>may be caused by a combination of long-standing grievances and a spontaneous response to a single incident.</i>'</p> <p>The UK is a developed economy with a stable democratic political regime, such that prolonged civil unrest is considered extremely unlikely. Periodically, political protests may turn violent but these are rarely widespread and are usually in response to a 'precipitating event'.</p> <p>As the Project represents a significant step forward in the UKs drive to a Net Zero Carbon economy, it is not considered that the Project is likely to be either a target or a precipitating event for widespread public disorder.</p>
<b>Disasters</b>				

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
Biological threats e.g. disease epidemics, animal diseases	x	x	Out	<p>The Project will not materially alter the populations who may be exposed to biological threats, nor will it increase or decrease their likelihood, as the construction populations will be small. The Project will not therefore materially alter the background risk of biological threats.</p> <p>Any impacts that these threats may have on the Project such as temporary cessation of construction or requirements for social distancing measures as were required for the Coronavirus pandemic are not considered to be Major Accidents.</p> <p>Therefore the assessment of biological threats is scoped out.</p>
Dam / Reservoir breaches	x	x	Out	<p>A Flood Risk Assessment will be undertaken in <b>Chapter 7: Water Environment</b>. To avoid duplication, flood risk is therefore scoped out of the Major Accidents and Disasters assessment.</p>
Extreme weather conditions (temperature, wind, precipitation, drought)	x	x	Out	<p>The design of the Project including any temporary structures will be undertaken by suitably qualified and experienced personnel including civil and structural engineers. The design will account for the expected ground conditions and design loads, e.g. due to wind and will be ensured through compliance with good practice in structural/process design, including compliance with the Eurocodes and any relevant BSI published documents.</p> <p>The design of the Project will include allowances for the anticipated changes in climate over the lifecycle of the Project</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				<p>and will incorporate measures to allow adaption where required. This is described and assessed within <b>Chapter 17: Climate Change</b>.</p> <p>There are considered to be no significant effects relating to extreme weather and it is therefore scoped out of the Major Accidents and Disasters assessment.</p>
Flood risk incl pluvial, fluvial and coastal flooding	x	x	Out	A Flood Risk Assessment will be undertaken in <b>Chapter 7: Water Environment</b> . To avoid duplication, flood risk is therefore scoped out of the Major Accidents and Disasters assessment.
Land movement - incl landslide	x	x	In	The potential for ground movement will be considered in <b>Chapter 12: Ground Conditions</b> . The potential for this to impact the Project leading to a disaster will be considered in the Major Accidents and Disasters assessment.
Lightning	x	x	Out	<p>The majority of the pipeline infrastructure will be buried and therefore at negligible risk of a lightning strike.</p> <p>The potential consequences of a lightning strike on any HAGI are likely to be restricted to damage to the HAGI building and potential injury to any workers who may be present. The Project will be provided with adequate lightning protection compliant with</p>

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				BS EN 62305 <sup>504</sup> (BSI, 2011) to ensure the risk from lightning is reduced further and is considered to be reduced to ALARP. Adequate lightning protection for temporary structures or plant during construction will be required by any CEMP.
Seismic	x	x	Out	As described in the current baseline, the UK does not typically experience significant seismic activity. The design of the Project will account for any foreseeable loads e.g. due to seismic activity in line with British Standards. It is therefore considered there are no significant effects arising from seismic hazards. Details on the fault lines within the Scoping red line boundary are given in <b>Chapter 12: Ground Conditions</b> .
Space weather	x	x	Out	Severe space weather is divided into three categories in the NRR <sup>505</sup> : Solar flares, solar energetic particles and coronal mass ejections. These have the capacity to cause a loss of power or interference with satellite or radio based communication technologies. While these events affecting the UK are extremely rare, they are known to have occurred in 1921, 1960, 1989, 1991 and 2003.

<sup>504</sup> British Standards Institution (2011). BS EN 62305-1. Protection against lightning. London, UK; BSI.

<sup>505</sup> Cabinet Office (2020). National Risk Register of Civil Emergencies. (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/952959/6.6920\\_CO\\_CCS\\_s\\_National\\_Risk\\_Register\\_2020\\_11-1-21-FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952959/6.6920_CO_CCS_s_National_Risk_Register_2020_11-1-21-FINAL.pdf) (Accessed November 2021)

Potential Major Accident/ Disaster	Project Phase		Scoped (In/Out)	Justification
	Construction	Operation		
				<p>The only foreseeable impact to the Project is a temporary loss of power or telemetry systems. Good engineering design practices will ensure that in the event of loss of services (power or communications), the Project will be maintained in a safe condition.</p> <p>It is noted that the Project is no more vulnerable than other similar infrastructure such as the natural gas systems across the UK, and much less than vulnerable than other industries which have a more onerous reliance on satellites such as aviation.</p> <p>As space weather does not have the capacity to cause a major accident which may impact the Project and is therefore not considered further.</p>

# Appendix 16B

## Major Accidents and Disasters Harm Criteria

The Major Accidents and Disasters assessment examines effects resulting from unplanned but reasonably foreseeable events of high magnitude. They are unlikely to occur during the life of a development; however, should they occur, the consequences are so serious that their scrutiny during the planning process is warranted to ensure that a development is not unduly vulnerable to them.

Criteria for the severity of harm, duration of harm and number of people affected are outlined in **Table 16B.1**, **Table 16B.2**, and **Table 16B.3** respectively.

### *Receptor sensitivity*

Receptor sensitivity, which relates to the intrinsic value and/or sensitivity of receptors, is embedded within the 'severity of harm', 'duration of harm' and 'number of people affected' criteria to establish their threshold levels and scaling factors. For this reason, as receptor sensitivity is embedded within the harm criteria, it is not explicitly considered as an additional criteria in the Major Accidents and Disasters assessment.

### *Non-human receptors*

The environmental (non-human) criteria have been directly extracted from the Chemical and Downstream Oil Industries Forum (CDOIF) guidance which sets a maximum or minimum severity ranking for some receptors. Where severity of harm categories do not apply to certain receptors, these are noted as not applicable (N/A) in the table.

Where two threshold parameters are given within a single category, the lesser of the two is taken to be the threshold for a given receptor.

### *Population and human health*

These criteria are aligned to and largely extracted from definitions used in commonly applied major hazard guidance for the environment and risk tolerability criteria for people applied by the Health and Safety Executive<sup>506</sup>. The descriptions for population and human health severity criteria in **Table 16B.10** have been further developed to include wider health, social and economic effects drawn from the Civil Contingencies guidance<sup>507</sup>.

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<sup>506</sup> Health and Safety Executive, Reducing Risks Protecting People (R2P2), 2001

<sup>507</sup> Cabinet Office, 2012, Chapter 4 Local Responder Risk Assessment Duty, (Online)

Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/61027/Chapter-4-Local\\_20Responder-Risk-assessment-duty-revised-March.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/61027/Chapter-4-Local_20Responder-Risk-assessment-duty-revised-March.pdf)

(Accessed November 2021)

### *Differences between CDOIF and EIA*

In **Table 16B.10**, the term ‘not significant’ is used to refer to a level of harm that might lead to noticeable pollution or a minor impact on people, but one which is not considered to reach the thresholds of a Major Accident. In the CDOIF guidance, this category is called ‘significant’ (rather than ‘not significant’). It has been renamed to ‘not significant’ here to avoid confusion since significant has a different meaning within the Environmental Impact Assessment (EIA) context.

In line with the CDOIF<sup>508</sup> and DETR guidance<sup>509</sup>, destruction of Grade II listed buildings, or Grade II registered parks and gardens, are not considered to be a major accident.

However, if the incident which led to their destruction could endanger human life, or a relevant population of particular species, then it would be considered as a major accident under the appropriate receptor. Damage to Grade II assets is not considered to be ‘wholly exceptional’ under the National Planning Policy Framework<sup>510</sup>.

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<sup>508</sup> Chemical and Downstream Oil Industries Forum (2016). Guideline – Environmental risk tolerability for COMAH establishments. (Online) Available at:

[https://www.sepa.org.uk/media/219154/cdoif\\_guideline\\_environmental\\_risk\\_assessment\\_v2.pdf](https://www.sepa.org.uk/media/219154/cdoif_guideline_environmental_risk_assessment_v2.pdf) (Accessed January 2022).

<sup>509</sup> Department of the Environment, Transport and the Regions (1999). Guidance on the Interpretation of Major Accidents to the environment for the purposes of COMAH Regulations. (Online) Available at: <https://www.sepa.org.uk/media/219153/detr-guidance-1999.pdf> (Accessed January 2022).

<sup>510</sup> Ministry of Housing, Communities, and Local Government (2021). National Planning Policy Framework. (Online), Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1005759/NPPF\\_July\\_2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf) (Accessed November 2021).



**Table 16B.10 Major Accidents and Disasters severity of harm criteria**

Receptor Type	Severity of Harm			
	Not significant	Severe	Large	Very Large
<b>Human populations (public)</b>	Small number of minor injuries	<p>Substantial number of people requiring medical attention.</p> <p>Events of this magnitude may also involve some damage to housing, with low numbers of people being displaced. Potential for localised interruption to utilities and damage to infrastructure.</p>	<p>Multiple life changing injuries and/or potential loss of life in low numbers</p> <p>Events of this magnitude are also likely to involve significant community impact such as:</p> <ul style="list-style-type: none"> <li>• Many people requiring medical treatment.</li> <li>• Many people suffering long term mental health issues related to the event</li> <li>• Housing and business premises rendered uninhabitable with many people displaced for significant periods</li> <li>• Significant adverse medium-term economic effects locally</li> <li>• Significant clean-up and recovery costs</li> <li>• Potential for disruption to regional infrastructure, utilities and services</li> </ul>	<p>Potential loss of life in high numbers and/or substantial number of life changing injuries.</p> <p>Events of this magnitude are also likely to involve significant community impact such as:</p> <ul style="list-style-type: none"> <li>• Very many people requiring medical treatment</li> <li>• Widespread mental health issues related to the event</li> <li>• Large areas of housing and business premises rendered uninhabitable with large numbers of people displaced for extended periods</li> <li>• Extensive adverse long-term economic effects regionally and nationally</li> <li>• Extensive clean-up and recovery costs</li> <li>• Potential for disruption to regional infrastructure, utilities and services</li> </ul>

Receptor Type	Severity of Harm			
	Not significant	Severe	Large	Very Large
			<ul style="list-style-type: none"> <li>Incident requiring emergency response at County/Regional scale.</li> </ul>	<ul style="list-style-type: none"> <li>Incident requiring emergency response at National/International scale.</li> </ul>
<b>Human populations (workers)</b>	Substantial number of people requiring medical attention	Multiple life changing injuries	<p>Multiple life changing injuries, potential loss of life in low numbers.</p> <p>Events of this magnitude are also likely to involve:</p> <ul style="list-style-type: none"> <li>Many people suffering long term mental health issues related to the event</li> <li>Significant adverse medium-term effects to local economy</li> <li>Significant clean-up and recovery costs to the local community</li> <li>Potential for disruption to regional infrastructure, utilities and services</li> <li>Incident requiring emergency response at County/Regional scale.</li> </ul>	<p>Potential loss of life in high numbers and substantial numbers of life changing injuries.</p> <p>Events of this magnitude are also likely to involve:</p> <ul style="list-style-type: none"> <li>Widespread mental health issues related to the event</li> <li>Extensive adverse long-term economic effects regionally and nationally</li> <li>Extensive clean-up and recovery costs to society</li> <li>Potential for disruption to regional infrastructure, utilities and services</li> <li>Incident requiring emergency response at National/International scale.</li> </ul>

Receptor Type	Severity of Harm			
	Not significant	Severe	Large	Very Large
<b>Designated land/water sites (internationally important)</b> <sup>511</sup>	<0.5 hectares (ha) or <5% (<5% linear feature or population) adversely affected <sup>512</sup>	>0.5ha or 5-25% of site area or 5-25% of associated linear feature or population adversely affected	25-50% of site area, associated linear feature or population adversely affected	>50% of site area, associated linear feature or population adversely affected
<b>Designated land/water sites (nationally important)</b> <sup>511</sup>	<0.5ha or <10% adversely affected	>0.5ha or 10-50% of site area, associated linear feature or population adversely affected	>50% of site area, associated linear feature population adversely affected	N/A
<b>Other designated land</b> <sup>511</sup>	<10ha or <10% adversely affected	10-100ha or 10-50% of land adversely affected	>100ha or >50% of land adversely affected	N/A
<b>Scarce habitat</b> <sup>511</sup>	<2ha or <10% adversely affected	2-20ha or 10-50% of habitat adversely affected	>20ha or >50% of habitat adversely affected	N/A
<b>Widespread habitat – non-designated land</b> <sup>511</sup>	Contamination of <10ha	Contamination of 10-100ha of land, preventing growing of crops, grazing of domestic animals or renders the area inaccessible to the public because of possible skin contact with dangerous	Contamination of 100 – 1000 ha (applied as per text under ‘Severe’)	Contamination of >1,000ha (applied as per text under ‘Severe’)

<sup>511</sup> Criteria extracted directly from CDOIF Guidance Criteria<sup>508</sup>

<sup>512</sup> ‘adversely affected’ is defined for each receptor category in the DETR Guidance, but generally refers to serious damage to habitats or designated features of the habitat or designated site<sup>509</sup>.

Receptor Type	Severity of Harm			
	Not significant	Severe	Large	Very Large
		substances. Alternatively, contamination of 10ha or more of vacant land.		
<b>Widespread habitat – non-designated water</b> <sup>511</sup>	N/A	Contamination of aquatic habitat which prevents fishing or aquaculture or renders it inaccessible to the public.	N/A	N/A
<b>Particular species (these criteria apply nationally)</b> <sup>511</sup>	Loss of <1% of animal or <5% of plant ground cover in a habitat.	Loss of 1-10% of animal or 5-50% of plantground cover.	Loss of 10-90% of animal or 50-90% of plant ground cover.	Total loss (>90%) of animal or plantground cover.
<b>Fresh and estuarine water habitats</b> <sup>511</sup>	Impact below that indicated to be severe	Water Framework Directive (WFD) chemical or ecological status lowered by one class for 2-10km of watercourse or 2-20ha or 10-50% area of estuaries or ponds. Interruption of drinking water supplies, as per Groundwater Source of Drinking Water.	WFD chemical ecological status lowered by one class for 10-200km of watercourse or 20-200ha or 50-90% area of estuaries and ponds. Interruption of drinking water supplies, as per Groundwater Source of Drinking Water.	WFD chemical or ecological status lowered by one class for >200km of watercourse or >200ha or >90% area of estuaries and ponds. Interruption of drinking water supplies, as per Groundwater Source of Drinking Water.
<b>Marine</b> <sup>511</sup>	<2ha littoral or sub-littoral zone, <100ha of open sea benthic community, <100	2-20ha littoral or sub-littoral zone, 100- 1,000ha of open sea benthic community, 100-1,000 dead sea birds (500-5,000 gulls), 5-50	20-200ha littoral or sub-littoral zone, 100-10,000ha of open sea benthic community, 1000-10,000 dead sea birds (5,000-50,000 gulls), 50-500	>200ha littoral and sub-littoral zone, >1,000ha of open sea benthic community, >10,000 dead sea birds (>50,000 gulls), >500

Receptor Type	Severity of Harm			
	Not significant	Severe	Large	Very Large
	dead sea birds (<500 gulls), <5 dead/significantly impaired sea mammals.	dead/significantly impaired sea mammals.	dead/significantly impaired sea mammals.	dead/significantly impaired sea mammals.
<b>Groundwater source of drinking water</b> <sup>511</sup>	Interruption of drinking water supply <1000 person-hours or for England and Wales only <1ha Source Protection Zones (SPZ)	Interruption of drinking water supplied from a ground or surface source (where persons affected x duration in hours [at least 2] >1,000) or for England and Wales only 1-10ha of SPZ where drinking water standards are breached	>1 x 10 <sup>7</sup> person-hours interruption of drinking water (a town of ~100,000 people losing supply for month) or for England and Wales only 10-100ha SPZ drinking water standards breached	>1 x 10 <sup>9</sup> person-hours interruption of drinking (~1 million people losing supply for 1 month) or for England and Wales only >100ha SPZ drinking water standards breached
<b>Groundwater - non drinking water source</b> <sup>511</sup>	<1ha	1-100ha of aquifer where water quality standards are breached (or hazardous substance is discernible)	100-10,000ha	>10,000ha
<b>Soil or sediment (i.e. as receptor rather than purely a pathway)</b> <sup>511</sup>	Contamination not leading to environmental damage (as per Environmental Liability Directive (ELD)), or not	Contamination of 10-100ha of land etc. as per widespread habitat; contamination sufficient to be deemed environmental damage (ELD)	Contamination of 100-1,000ha of land, as per widespread habitat; contamination rendering the soil immediately hazardous to humans (e.g. skin contact) or the living	Contamination of >1,000ha of land, as per widespread habitat; contamination rendering the soil immediately hazardous to humans (e.g. skin contact) or the living

Receptor Type	Severity of Harm			
	Not significant	Severe	Large	Very Large
	significantly, affecting overlying water quality.		environment, but remediation available.	environment and remediation difficult or impossible.
<b>Historic environment</b> <sup>511</sup>	Damage below a level at which designation of importance would be withdrawn.	Damage sufficient for designation of importance to be withdrawn.	Feature of historic environment subject to designation of importance entirely destroyed.	N/A

### Duration of harm

The duration of harm, which might also be considered as the recovery period, is also a factor in establishing criteria for the magnitude of change relating to Major Accidents and Disasters on non-human receptors. This is given in **Table16B.11**. The criteria are taken directly from the CDOIF guidance<sup>508</sup>.

Four categories of duration are considered: short term, medium term, long term and very long term.

**Table16B.11 Major Accidents and Disasters duration of harm criteria (non-human receptors)**

Description	Short term	Medium term	Long term	Very long term
<b>Groundwater or surface water drinking water source (public or private)</b>	N/A	N/A	Harm affecting drinking water source or Source Protection Zone (SPZ) <6years	Harm affecting drinking water source or SPZ >6 years
<b>Groundwater (except drinking water sources):</b>	Water Framework Directive (WFD) hazardous substances <3 months	WFD hazardous substances >3 months	WFD hazardous substances >6 years	WFD hazardous substances >20 years
	WFD non-hazardous substances <1 year	WFD non-hazardous substances >1 year	WFD non-hazardous substances >10 years	WFD non-hazardous substances >20 years
<b>Surface water (except drinking water sources - see above)</b>	<1 year	>1 year	>10 years	>20 years
<b>Land</b>	<3 years	>3 years or >2 growing seasons for agricultural land	>20 years	>50 years
<b>Historic environment</b>	Can be repaired in <3 years, such that its designation	Can be repaired in >3 years, such that its designation	Feature destroyed, cannot be rebuilt, all features except	Feature destroyed, cannot be rebuilt, world heritage site

Description	Short term	Medium term	Long term	Very long term
	can be reinstated.	can be reinstated.	world heritage site.	

*Number of people affected*

For human receptors the magnitude of change is categorised based on the number of people affected (**Table 16B.12**) to provide appropriate positioning against HSE risk tolerability concepts<sup>506</sup>.

**Table 16B.12**      **Number of people affected**

	Number of people affected		
	Low	Medium-High	Very High
<b>Human Populations</b>	Less than 5	5 or more up to 10s of people	100s of people



# HyNet North West Hydrogen Pipeline

Delivering clean growth

