H2NorthEast Project

Volume II: Environmental Impact Assessment Scoping Report Figures and Appendices

Synopsis:

The Planning Act 2008

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 Regulations – Regulation 10 (Application for a Scoping Opinion)

Document Ref: (PINS Reference): EN0710005

Revision	Issue Date	By	Checked	Description
1.0	10/02/25	Arup	H2NorthEast Limited	Issue

Abbreviations

Abbreviations	Definitions
the 2008 Act	The Planning Act 2008
AA	Appropriate Assessment
AADT	annual average daily traffic
Advice Note 7	Environmental Impact Assessment: Preliminary Environmental Information and Environmental Statements
AEL	achievable emission level
AEP	annual exceedance probability
AGI	above ground installation
AGL	above ground level
AIL	abnormal indivisible load
ALARP	as low as reasonably practicable
ALC	Agricultural Land Classification
AOD	above ordnance datum
AONB	Area of Outstanding Natural Beauty
APFP Regulations	Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations
APIS	Air Pollution Information System
the Applicant	H2NorthEast Limited
the Application	DCO form, content and accompanying documents
Application for EIA Scoping Opinion	Regulation 10 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
AQMA	Air Quality Management Area
AQMAU	Air Quality Management and Assessment Unit
Arup	Ove Arup & Partners Limited
ASNW	ancient and semi-natural woodland
Associated Development	Aspects of the Proposed Development beyond the HPF and Hydrogen Pipeline(s)

Abbreviations	Definitions
	that are not automatically considered as an NSIP but are to be considered as development for which development consent is required.
ASR	annual status report
ASU	air separation unit
ATR	auto-thermal reformer
BAP	biodiversity action plan
BAT	Best Available Techniques
BESS	battery energy storage system
BGS	British Geological Survey
BMV	best and most versatile
BNG	biodiversity net gain
BoCC	Birds of Conservation Concern
BPM	Best Practicable Means
BREF	Best Available Techniques reference document
BRES	Business Register and Employment Survey
BS	British Standard
BTO	British Trust for Ornithology
CAA	Civil Aviation Authority
CATS	Central Area Transmission System
CBC	Common Bird Census
CCP	carbon capture plant
CCR	carbon capture readiness
CCR	climate change resilience
CCRA	climate change risk assessment
CCS	carbon capture and storage

Abbreviations	Definitions
CCUS	carbon capture use and storage
CDM	Construction Design and Management
CDOIF	Chemicals and Downstream Oil Industries Forum
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CFMP	catchment flood management plan
CH_4	methane
CIBSE	Chartered Institution of Building Services Engineers
CIEEM	Chartered Institute of Ecology and Environmental Management
CiFA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research Information Association
CITES	The 'Washington' Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNP	critical national priority
CO	carbon monoxide
CO_2	carbon dioxide
COMAH	Control of Major Accident Hazards
COPA	Control of Pollution Act 1974
COSHH	Control of Substances Hazardous to Health
CP	cathodic protection
CRR	Community Risk Register
CRTN	Calculation of Road Traffic Noise
CSO	combined sewer overflow
CTMP	construction traffic management plan
CWTP	construction workers' travel plan

Abbreviations	Definitions
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DEMP	decommissioning environmental management plan
DESNZ	Department for Energy Security and Net Zero
DM	do-minimum
DML	deemed marine licence
DMRB	Design Manual for Roads and Bridges
DNO	distribution network operator
DPD	development plan documents
DS	do-something
DSEAR	Dangerous Substances and Explosive Atmospheres Regulations
DSM	digital surface model
DTM	digital terrain model
DWPA	drinking water protected area
DWSZ	drinking water safeguard zone
EcIA	ecological impact assessment
ECC	East Coast Cluster
eDNA	environmental DNA
EEA	European Economic Area
EHO	environmental health office(r)
EIA	environmental impact assessment
EIA Regulations	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
ELV	emission limit value
EMODnet	European marine observation data network
EMS	environmental management system

Abbreviations	Definitions
EnvCoW	Environmental Clerk of Works
EPR	Environmental Permitting Regulations
EPS	European Protected Species
EQS	Environmental Quality Standard
ERIC NE	Environmental Records Information Centre for the Northeast of England
ES	Environmental Statement
EU	European Union
EUNIS	European University Information Systems
FAS	flood alleviation scheme
FEED	front end engineering design
FRA	flood risk assessment
FTE	full-time equivalent
GCN	great crested newt
GHG	greenhouse gas
GHR	gas heated reformer
GI	ground investigation
GLTA	ground level tree assessment
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, third edition
GPA	Good Practice Advice
GPP	guidance for pollution prevention
GVA	gross value added
GW	gigawatt
GWth	gigawatt thermal
GWDTE	groundwater dependent terrestrial ecosystem
H_2	hydrogen gas
H_2S	hydrogen sulphide

Abbreviations	Definitions
ha	hectares
Habitats Regulations	Conservation of Habitats and Species Regulations 2017
HAZID	hazard identification
HAZOP	hazard and operability study
HBC	Hartlepool Borough Council
HDD	horizontal directional drilling
HDV	heavy duty vehicle
HER	historic environment record
HFC	hydrofluorocarbon
HGV	heavy goods vehicle
HHV	higher heating value
HMSO	Her Majesty's Stationery Office
HPF	hydrogen production facility
HPMA	highly protected marine areas
HRA	Habitat Regulations Assessment
HSE	Health and Safety Executive
HSI	habitat suitability index
HSWA	Health and Safety at Work etc. Act
Hydrogen Pipeline(s)	hydrogen distribution pipelines that comprise part of the Proposed Development
IAMMWG	Inter-Agency Marine Mammal Working Group
IAQM	Institute of Air Quality Management
ICCI	in-combination climate change impact
ICE	Inventory of Carbon and Energy Database
ICES	International Council for the Exploration of the Sea
IED	Industrial Emissions Directive

Abbreviations	Definitions
IEMA	Institute of Environmental Management and Assessment
IHBC	Institute of Historic Building Conservation
IHLS	International Herring Larvae Surveys
IMD	index of multiple deprivation
INCA	Industry Nature Conservation Association
INNS	invasive non-native species
ISO	International Standards Organisation
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
LAA	local aggregate assessment
LBAP	local biodiversity action plan
LBMEP	landscape and biodiversity management and enhancement plan
LCA	Landscape Character Area
LCP	large combustion plant
LCRM	land contamination risk management
LDV	light duty vehicle
LGV	light goods vehicle
LLFA	lead local flood authority
LNR	Local Nature Reserve
LPA	local planning authority
LSE	likely significant effect(s)
LSOA	lower super output area
LVIA	landscape visual impact assessment
LWS	Local Wildlife Site
MA&D	major accidents and disasters

Abbreviations	Definitions
MAFF	Ministry of Agriculture, Fisheries and Food
MAGIC	Multi-Agency Geographic Information for the Countryside
MAH	major accident hazard
MAPP	major accident prevention plan
MBT	microbore tunnel
MCA	Marine Character Area
MCAA	Marine and Coastal Access Act
MCP	medium combustion plant
MCZ	Marine Conservation Zone
MHCLG	Ministry of Housing, Communities & Local Government
MHWS	mean high-water spring
MID	method of implementation document
ML	marine licence
MMO	Marine Management Organisation
MMP	materials management plan
MOP	maximum operating pressure
MPS	marine policy statement
MSA	mineral safeguarding area
MSFD	Marine Strategy Framework Directive
$MtCO_2$	million tonnes of carbon dioxide
$MtCO_2e$	million tonnes of carbon dioxide equivalent
MW	megawatt
MWth	megawatt thermal
N_2	nitrogen
N_20	nitrous oxide
NBN	National Biodiversity Network

Abbreviations	Definitions
NCA	National Character Area
NCN	National Cycle Network
NEP	Northern Endurance Partnership
NERC	Natural Environment and Rural Communities Act 2006
NF_3	nitrogen trifluoride
NH_3	ammonia
NHLE	National Heritage List for England
NIA	Noise Important Area(s)
NMU	non-motorised user(s)
NNG	Night Noise Guidelines
NNR	National Nature Reserve
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NPG	Northern Powergrid
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NRMM	non-road mobile machinery
NRR	National Risk Register
NSIP	Nationally Significant Infrastructure Project
NSR	noise sensitive receptor
NSRI	National Soil Resources Institute
NTS	National Transmission System
NTS	non-technical summary
NVC	National Vegetation Classification

Abbreviations	Definitions
NVZ	nitrate vulnerable zones
NWL	Northumbrian Water Limited
NZT	Net Zero Teesside
O&M	operation and maintenance
O_2	oxygen
OD	Ordnance Datum
OGV	other goods vehicle
OMH	open mosaic habitat
ONR	Office of Nuclear Regulation
ONS	Office for National Statistics
ORVal	Outdoor Recreation Valuation Tool
OS	Ordnance Survey
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
PC	process contribution
PEA	preliminary ecological appraisal
PEC	predicted environmental concentration
PEIR	Preliminary Environmental Information Report
PHE	Public Health England
PIA	personal injury accident
PINS	Planning Inspectorate
PM_{10}	particulate matter of 10 micrometres (µm) diameter or less
$PM_{2.5}$	particulate matter of 2.5 micrometres (µm) diameter or less
PPG	Planning Practice Guidance
PRA	preliminary roost assessment
PRF	potential roost feature

Abbreviations	Definitions
the Proposed Development Site	The land at Seal Sands, in Stockton-on-Tees and Redcar and Cleveland, Teesside
PRoW	public right(s) of way
PSA	pressure swing adsorption
PSR	Pipeline Safety Regulations
PWS	private water supplies
RBMP	river basin management plan
RCBC	Redcar and Cleveland Borough Council
RCP	representative concentration pathways
RICS	Royal Institution of Chartered Surveyors
RSPB	Royal Society for the Protection of Birds
SAC	Special Area(s) of Conservation
SBC	Stockton-on-Tees Borough Council
SCR	selective catalytic reduction
SF_6	sulphur hexafluoride
SFRA	strategic flood risk assessment
SLM	sound level meter
SMR	small modular reactor
SMRU	Sea Mammal Research Unit
SNCI	Site of Nature Conservation Importance
SoPI	Species of Principle Importance
SoS	Secretary of State
SO_x	sulphur dioxide
SPA	Special Protection Area
SPD	supplementary planning documents
SPG	supplementary planning guidance
SPL_{RMS}	sound pressure level root mean square

Abbreviations	Definitions
SPMP	site protection and monitoring programme
SPZ	source protection zone
SRFA	strategic flood risk assessment
SRN	strategic road network
SSSI	Site of Special Scientific Interest
STW	sewage treatment works
SWMP	site waste management plan
TA	transport assessment
T&S	transportation and storage
T&T	traffic and transport
TCO_2e	tonnes of carbon dioxide equivalent
TET	Teesside Environmental Trust
TGPP	Teesside Gas Processing Plant
ToLSE	test of likely significant effects
TraC	transitional and coastal waters
Track 1	The first two clusters identified by Department for Energy Security and Net Zero sequenced for deployment in the UK by the mid-2020s
TTWA	Travel to Work Area
TVCA	Tees Valley Combined Authority
UKCP18	United Kingdom Climate Projections 2018
UKHab	United Kingdom Habitat Classification
UNFCCC	United Nations Framework Convention on Climate Change
UXB	unexploded bombs
UXO	unexploded ordnance
VP	vantage point
WCA	Wildlife and Countryside Act

Abbreviations	Definitions
WeBS	wetland bird survey
WEEE	waste electrical and electronic equipment
WFD	Waste Framework Directive
WFD	Water Framework Directive
WHO	World Health Organisation
ZoI	zone of influence
ZTV	zone of theoretical visibility

Contents

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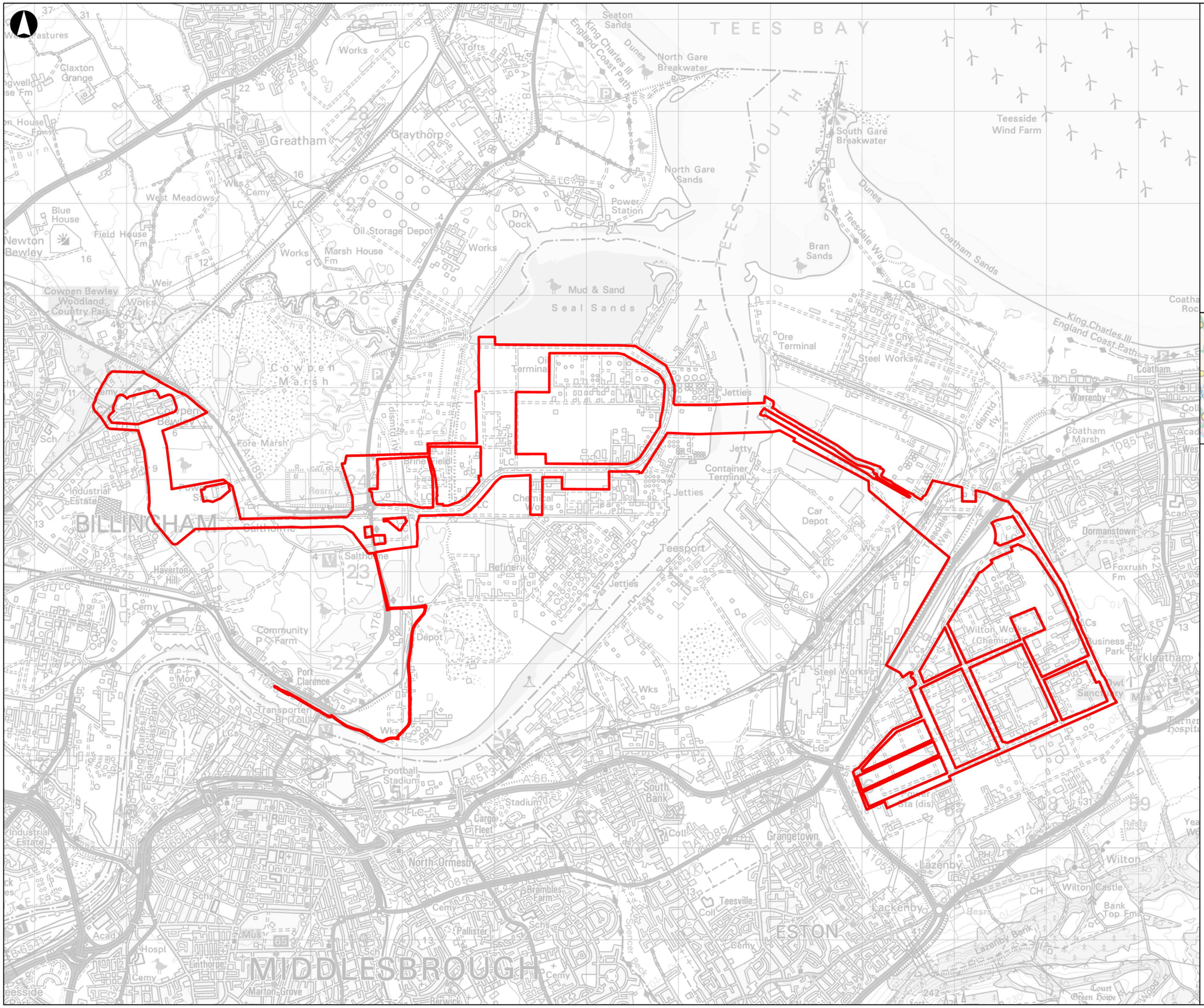

Indicative Proposed Development Site Boundary

A3

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

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P01	28/01/25	CWILL	LPAG	JGRA	MAIN

ARUP

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Client

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Project Name

H2NorthEast

Drawing Title

Figure 1.1 - Proposed Development Site Boundary

Scale

1:40,000

Role

GEN

Suitability

Issue

Project Number

305601-00

Rev

P01

Figure Number

1.1

Indicative Proposed Development Site Boundary

A3

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

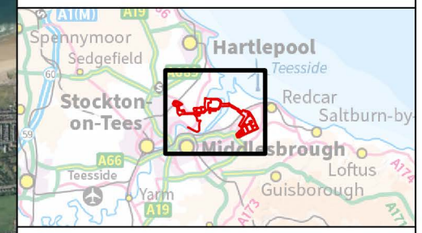

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Figure 1.2 - Proposed Development Site Boundary (Aerial)

Scale

1:40,000

Role

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Figure Number

1.2

A3

- Indicative Proposed Development Site Boundary
- Construction Haul Route
- Existing CATS Terminal
- Hydrogen Production Facility (HPF) Area
- Indicative Hydrogen Pipeline (west)
- Indicative Hydrogen Pipeline (east)
- Third Party Natural Gas AGI
- NEP CO2 AGI
- C02 Export Connection Corridor
- C02 Piping Connection
- Temporary Construction Facility and/or Laydown Area
- Construction Access
- Shared Pipeline Corridor

Hydrogen Production Facility (HPF) Connections

- Effluent Water Connection Corridor
- Wastewater Connection Corridor

Coordinate System: British National Grid

Metres
0 500 1,000 2,000

Metres
0 150 300 600
Scale at A3: 1:10,000

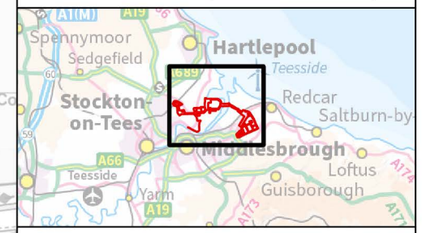

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Figure 3.1 - Indicative Site Layout

Scale
1:37,750

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P01

Figure Number
3.1

A3

- Indicative Proposed Development Site Boundary
- Construction Haul Route
- Temporary Construction Facility and/or Laydown Area
- Construction Access

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

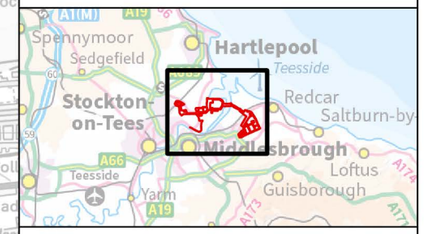

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Figure 3.2 - Key Construction Components

Scale

1:40,000

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3.2

A3

Indicative Proposed Development Site Boundary
Developments on the Long List

HBC1
HBC4
HBC3
MLA1
HBC2
HBC5
HBC6
MLA5
RCBC9
RCBC5
NSIP4
RCBC7
NSIP1
RCBC8
RCBC1
RCBC11
NSIP3
SBC12
SBC2
SBC6
SBC11
SBC5
SBC13
NSIP7
SBC1
SBC15
MLA4
MLA3
SBC8
SBC9
SBC10
SBC3
SBC7
SBC14
NSIP6
MLA7
MLA6
RCBC6
NSIP5
SBC4
MLA2
RCBC4
RCBC2
NSIP2
RCBC3
MBC1

HARTLEPOOL
TEES BAY
BILLINGHAM
STOCKTON-ON-TEES
MIDDLESBROUGH
ESTON

Coordinate System: British National Grid

Metres
0 500 1,000 2,000

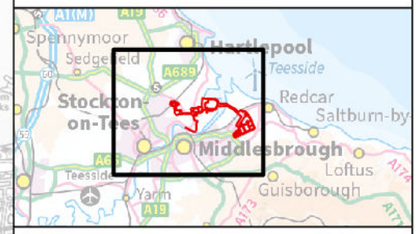

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Figure 5.1- Cumulative Assessment Long List

Scale
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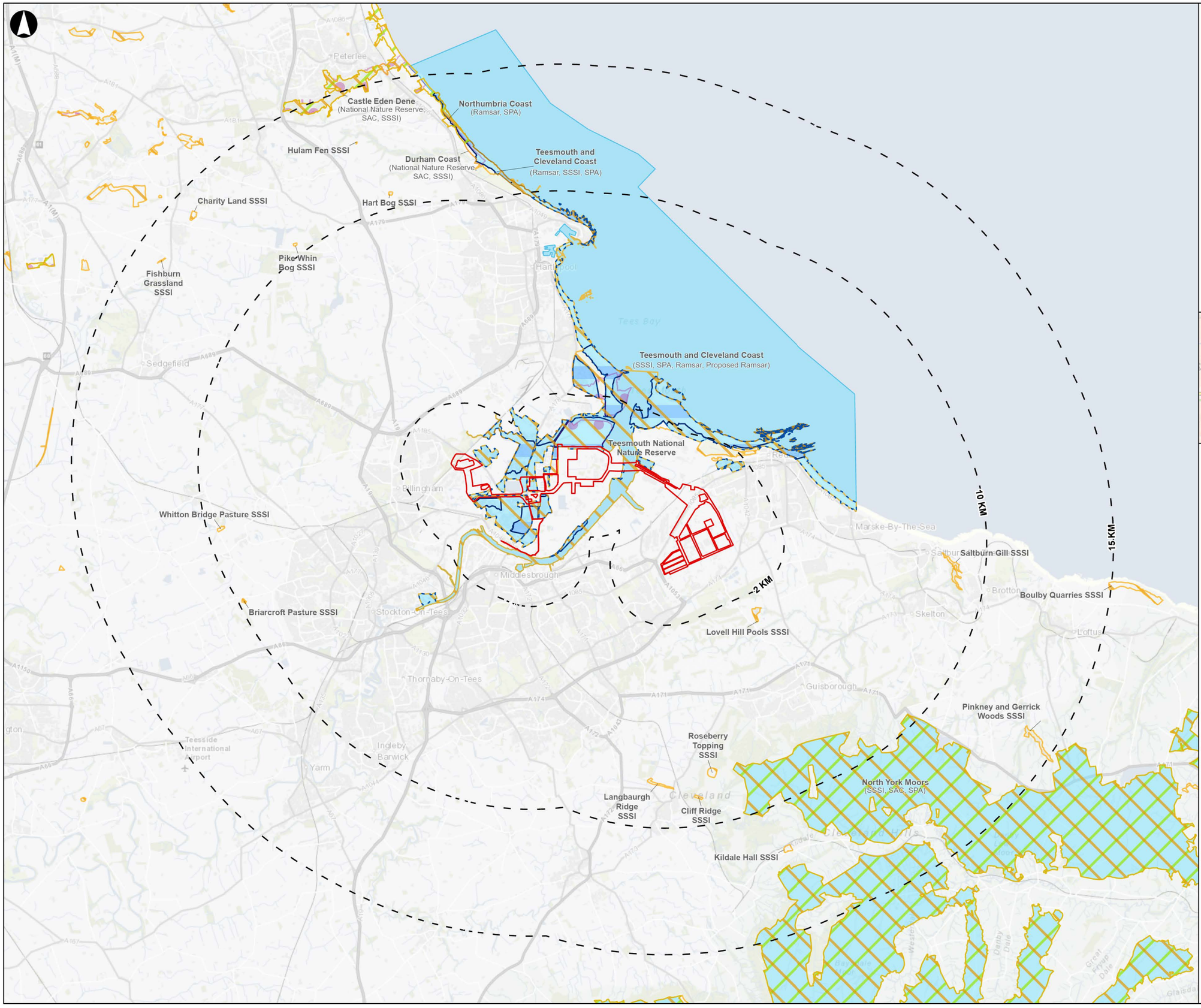
5.1



A3

Indicative Proposed Development Site Boundary

2KM, 10KM, and 15KM Buffer of Site Boundary

Statutory Sites

- Ramsar Site
- Proposed Ramsar Site
- National Nature Reserve
- Site of Special Scientific Interest (SSSI)
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

Coordinate System: British National Grid

Kilometres

0 2 4 8

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Figure 6.2.1 - Statutory Designated Sites within 15km of Proposed Development

Scale

1:145,000

Role

ENV

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Issue

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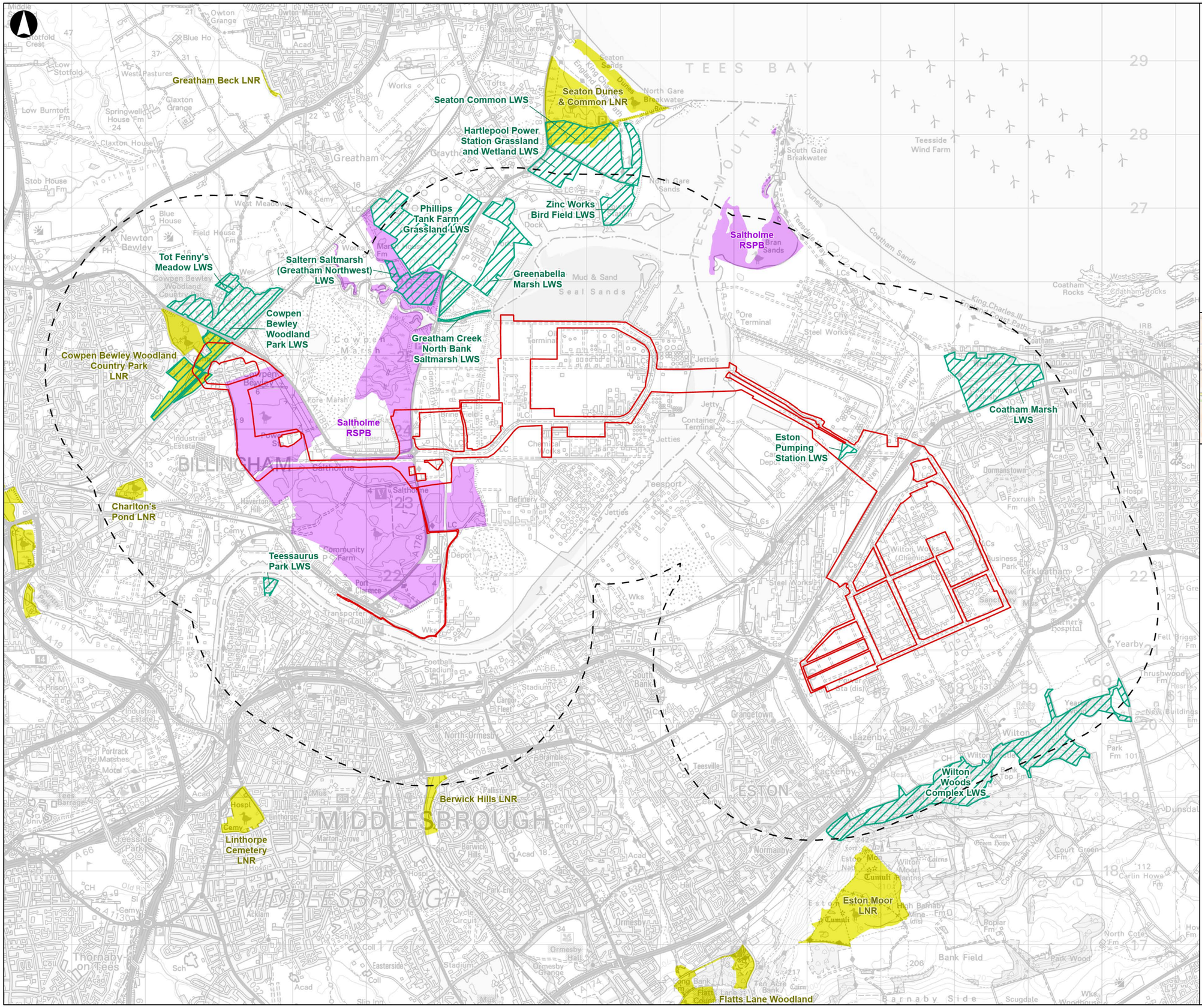
305601-00	**P01**

Figure Number

6.2.1



A3

Indicative Proposed Development Site Boundary

2km Buffer of Site Boundary

Non-Statutory Designated Sites

Royal Society for the Protection of Birds (RSPB) Reserve

Local Nature Reserve (LNR)

Local Wildlife Site (LWS)

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

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Figure 6.2.2 - Non-Statutory Designated Sites within 2km of Proposed Development

Scale

1:50,000

Role

ENV

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Issue

Project Number

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Figure Number

6.2.2

A3

Indicative Proposed Development Site Boundary

2km Buffer of Site Boundary

Open Mosaic Habitats

Priority Habitats

- Ancient Woodland
- Deciduous woodland
- Ponds
- Upland flushes fens and swamps
- Coastal and floodplain grazing marsh
- Coastal and floodplain grazing marsh, Coastal saltmarsh
- Coastal saltmarsh, Saline lagoons
- Saline lagoons
- Coastal saltmarsh
- Reedbeds
- Reedbeds, Coastal saltmarsh
- Coastal sand dunes
- Mudflats
- Lowland fens
- Lowland heathland
- Lowland calcareous grassland
- Purple moor grass and rush pastures
- No main habitat but additional habitats present

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

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Figure 6.2.3 - Protected and Notable Habitats within 2km of Proposed Development

Scale

1:50,000

Role

ENV

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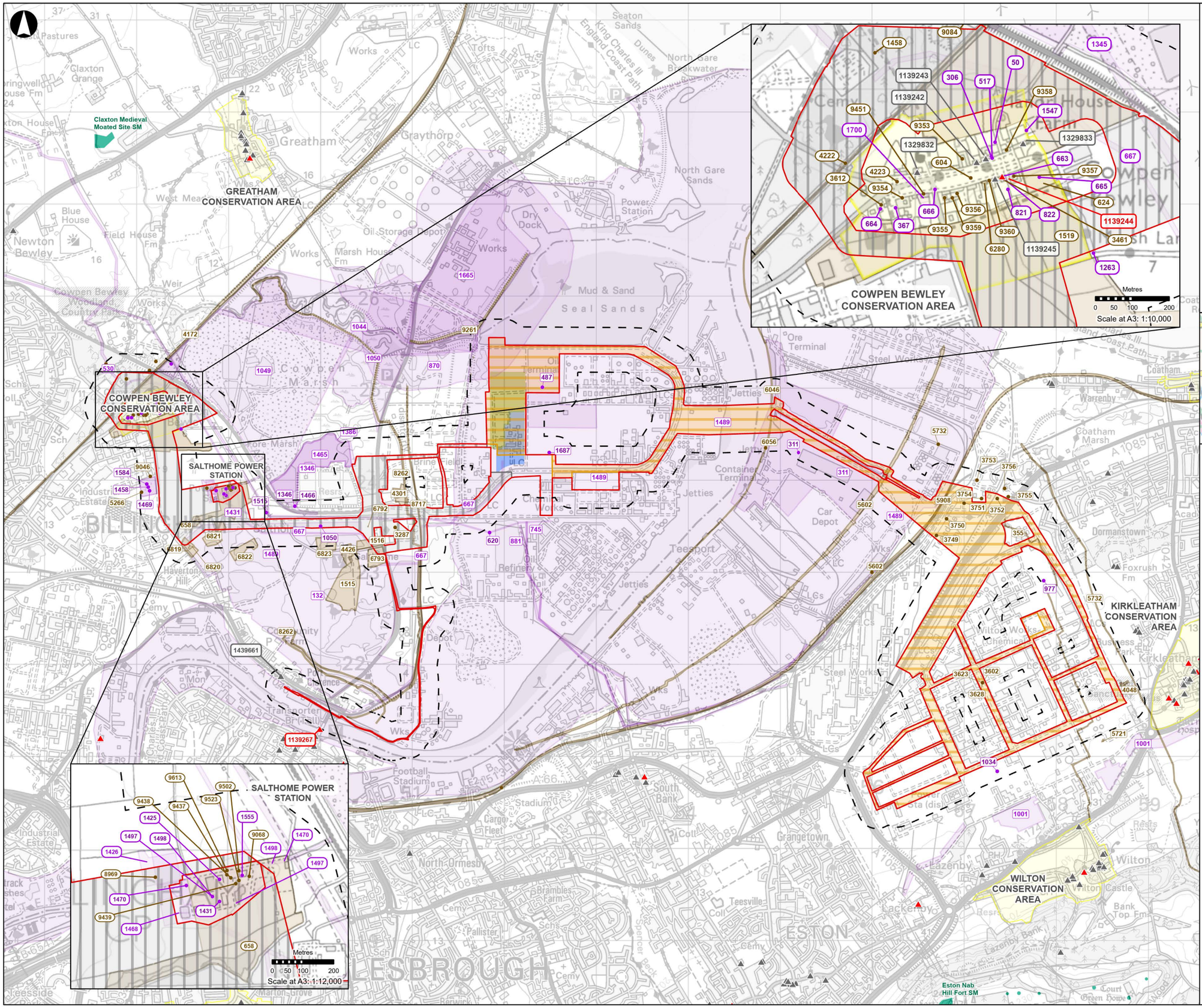
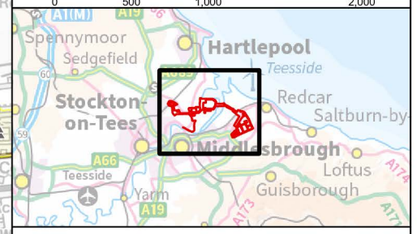
A3





- Indicative Proposed Development Site Boundary (Inner Study Area)
- 200m Buffer of Site Boundary (Outer Study Area)
- Hydrogen Production Facility
- Existing CATS Terminal

Indicative Hydrogen Pipeline Corridors

- Indicative Hydrogen Pipeline (west)
- Indicative Hydrogen Pipeline (east)

Heritage Assets

- Grade II Listed Building
- Grade II* Listed Building
- Cultural Heritage Asset (Point)
- Cultural Heritage Asset (Polygon)
- Conservation Area
- Scheduled Monument

Archaeological Events

- Event Record (Point)
- Event Record (Polygon)

Metres
0 500 1,000 2,000

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Figure 6.4.1 - Cultural Heritage Assets

Scale
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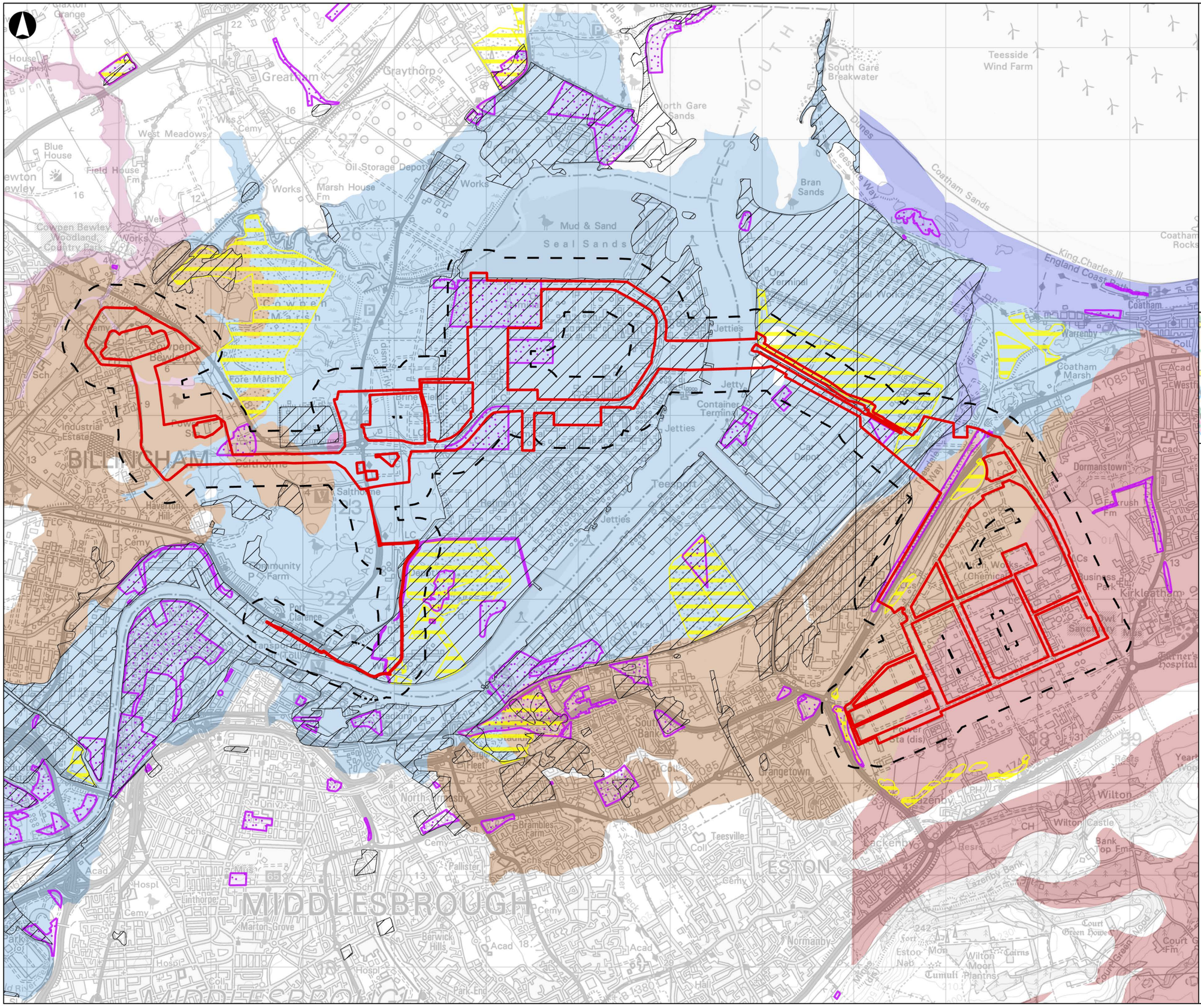

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Figure 6.6.1 - Superficial Geology And Permitted Waste Sites

Scale
1:40,000

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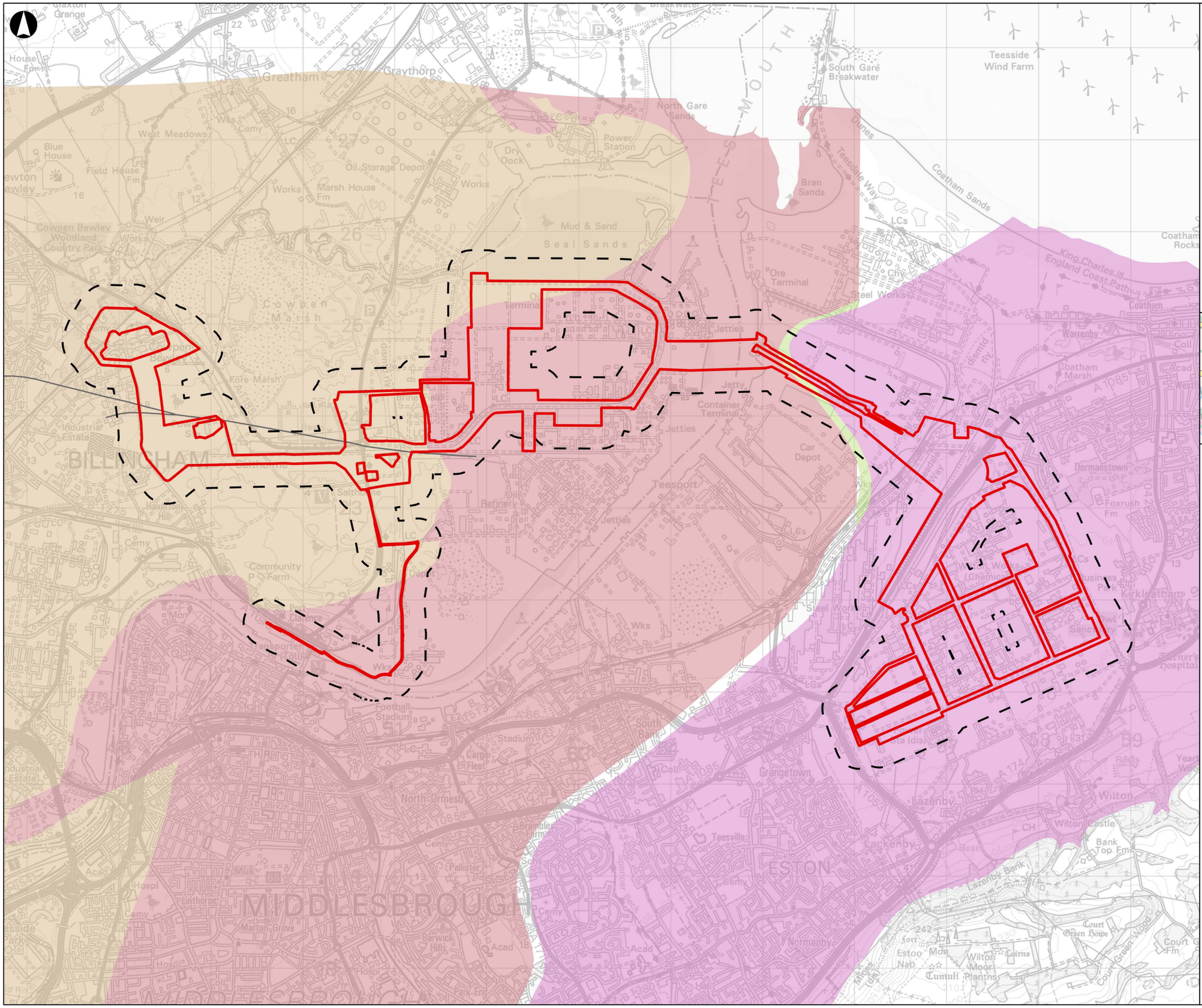

A3

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

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Drawing Title

Figure 6.6.2 - Solid Geology at Rockhead

Scale

1:40,000

Role

GEN

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305601-00

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Figure Number

6.6.2

The Zone of Theoretical Visibility (ZTV) is modelled using the 'Viewshed' tool in ESRI ArcMap GIS Software which shows areas from which the Proposed Development is theoretically visible or not visible. The ZTV will be prepared using a digital terrain model and is based on the maximum height of the proposed development. For all of ZTVs an assumed viewing height of 1.6m above ground level has been used to simulate the eye level of a person at the top of the range set out in paragraph 6.11 of GLVIA3 to represent the worst-case scenario.

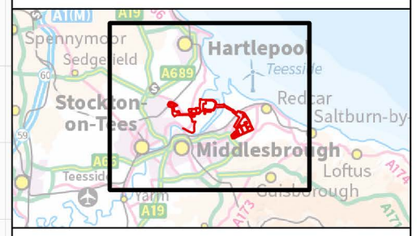
A3

- Indicative Proposed Development Site Boundary
- HPF Tower
- Proposed LVIA Study Area for ES
- LVIA Study Area for Scoping
- Hydrogen Production Facility
- Zone of Theoretical Visibility with 110m Tower within the Hydrogen Production Facility
- North York Moors National Park

Coordinate System: British National Grid

LDAR DTM considers bare earth with no screening elements.
Image:
North York Moors National Park INSPIRE Web Map Service:

Metres
0 1,000 2,000 4,000



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Drawing Title
Figure 6.7.1 - Zone of Theoretical Visibility – Digital Terrain Model (DTM)

Scale
1:80,000

Role
LUS

Suitability
Issue

Project Number
305601-00

Rev
P01

Figure Number
6.7.1

The Zone of Theoretical Visibility (ZTV) is modelled using the 'Viewshed' tool in ESRI ArcMap GIS Software which shows areas from which the Proposed Development is theoretically visible or not visible. The ZTV will be prepared using a digital surface model and is based on the maximum height of the proposed development. For all of ZTVs an assumed viewing height of 1.6m above ground level has been used to simulate the eye level of a person at the top of the range set out in paragraph 6.11 of GLVIA3 to represent the worst-case scenario.

A3

- Indicative Proposed Development Site Boundary
- Proposed Representative Viewpoints
- Proposed LVIA Study Area for ES
- LVIA Study Area for Scoping
- Zone of Theoretical Visibility with 110m Tower within the Hydrogen Production Facility
- North York Moors National Park

Coordinate System: British National Grid

LDAR DTM considers bare earth with no screening elements.
Image:

Metres
0 1,000 2,000 4,000

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Figure 6.7.2 - Zone of Theoretical Visibility –Digital Surface Model (DSM) (that includes existing buildings and woodland) and Representative Viewpoint Locations

Scale
1:80,000
Role
LUS
Suitability
Issue
Project Number
305601-00
Rev
P01
Figure Number
6.7.2

A3

10km

2km

- Indicative Proposed Development Site Boundary
- LVIA Study Area for Scoping
- Proposed LVIA Study Area for ES
- North York Moors National Park
- North East Marine Plan Area

National Character Assessment

- NCA 23 Tees Lowlands

Stockton on Tees Landscape Character Assessment 2011

- East Billingham to Teesmouth LCA
- MCA22: Tyne, Tees and Wear Estuaries and Coastal Waters

Coordinate System: British National Grid

Image:

Metres

0 1,000 2,000 4,000

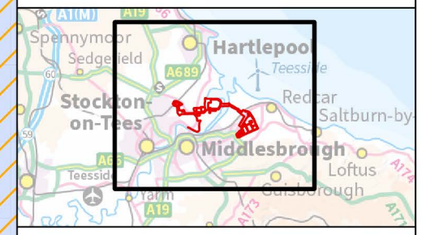

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Figure 6.7.3 - Landscape Character

Scale

1:80,000

Role

LUS

Suitability

Issue

Project Number

305601-00

Rev

P01

Figure Number

6.7.3

Title	View from South Crescent, adjacent to the Heugh Breakwater	HFoV (°)	39.6	Visualisation type	1	View direction	South
Date, time	13 March 2024, 12:19	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 1 of 13

Title	View from the A178 at the junction of Church Street	HFoV (°)	39.6	Visualisation type	1	View direction	South
Date, time	13 March 2024, 12:50	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 2 of 13

Title	View from Zinc Works Road near to the junction of the A178	HFoV (°)	39.6	Visualisation type	1	View direction	South
Date, time	13 March 2024, 12:57	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 3 of 13

Title	View from Zinc Works Road adjacent to Teesmouth National Nature Reserve	HFoV (°)	39.6	Visualisation type	1	View direction	South-west
Date, time	13 March 2024, 13:07	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 4 of 13

Title	View from South Gare Breakwater Viewpoint	HFoV (°)	39.6	Visualisation type	1	View direction	South-west
Date, time	14 March 2024, 09:41	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 5 of 13

Title	View from Eston Beacon Viewpoint	HFoV (°)	39.6	Visualisation type	1	View direction	North-west
Date, time	14 March 2024, 11:07	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 6 of 13

Title	View from River Tees Viewpoint	HFoV (°)	39.6	Visualisation type	1	View direction	North-west
Date, time	14 March 2024, 09:07	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 7 of 13

Title	View from Middlesbrough Docks	HFoV (°)	39.6	Visualisation type	1	View direction	North-east
Date, time	14 March 2024, 08:49	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 8 of 13

Title	View from A1185 adjacent to Saltholme Nature Reserve	HFoV (°)	39.6	Visualisation type	1	View direction	North-east
Date, time	13 March 2024, 14:46	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 9 of 13

Title	View from Seal Sands Roundabout	HFoV (°)	39.6	Visualisation type	1	View direction	North-east
Date, time	13 March 2024, 14:36	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 10 of 13

Title	View from Seal Sands Car Park	HFoV (°)	39.6	Visualisation type	1	View direction	South-east
Date, time	13 March 2024, 13:21	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

Issue	Date	By	Chkd	Appd
P1	04-04-2024	BG	KA	JR

Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 11 of 13

Title	View from Cowpen Bewley Woodland Park	HFoV (°)	39.6	Visualisation type	1	View direction	South-east
Date, time	13 March 2024, 15:16	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

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Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 12 of 13

Title	View from Cowpen Bewley Road, adjacent to the settlement edge	HFoV (°)	39.6	Visualisation type	1	View direction	East
Date, time	13 March 2024, 15:45	Scale/ Enlargement factor	100% at A3	Projection	Planar	Camera (lens)	Canon EOS R6 II, FFS (Canon 50mm)

ARUP

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Job No: 305601-00

The H2NorthEast Project
Figure 6.7.4
Sheet 13 of 13

A3

- Indicative Proposed Development Site Boundary
- Pre-existing Pipeline
- Proposed Development
- Mean High Water Springs
- District Borough Unitary Region
- Marine plan areas - NE
- Ramsar
- Effluent Water Connection Corridor
- Wastewater Connection Corridor
- Sites of Special Scientific Interest
- Special Protected Areas
- Local Wildlife Sites
- Coastal and floodplain grazing marsh
- Coastal saltmarsh
- Coastal sand dunes
- Deciduous woodland
- Mudflats
- No main habitat but additional habitats present
- Reedbeds

Coordinate System: British National Grid

Image:

Metres
0 250 500 1,000

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Figure 6.8.1 - Marine Biodiversity

Scale
1:20,000

Role
ENV

Suitability
Issue

Project Number
305601-00

Rev
P01

Figure Number
6.8.1

A3

- Indicative Proposed Development Site Boundary
- Operational Noise Study Area (1km)
- Construction Noise Study Area (300m)
- Construction Vibration Study Area (100m)
- Noise Important Area 1km
- Hydrogen Production Facility
- Existing CATS Terminal

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

NIA ID-2343

NIA ID-2344

NIA ID-10102

NIA ID-6726

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Drawing Title

Figure 6.11.1 - Construction and Operational Noise and Vibration Study Area

Scale

1:40,000

Role

GEN

Suitability

Issue

Project Number

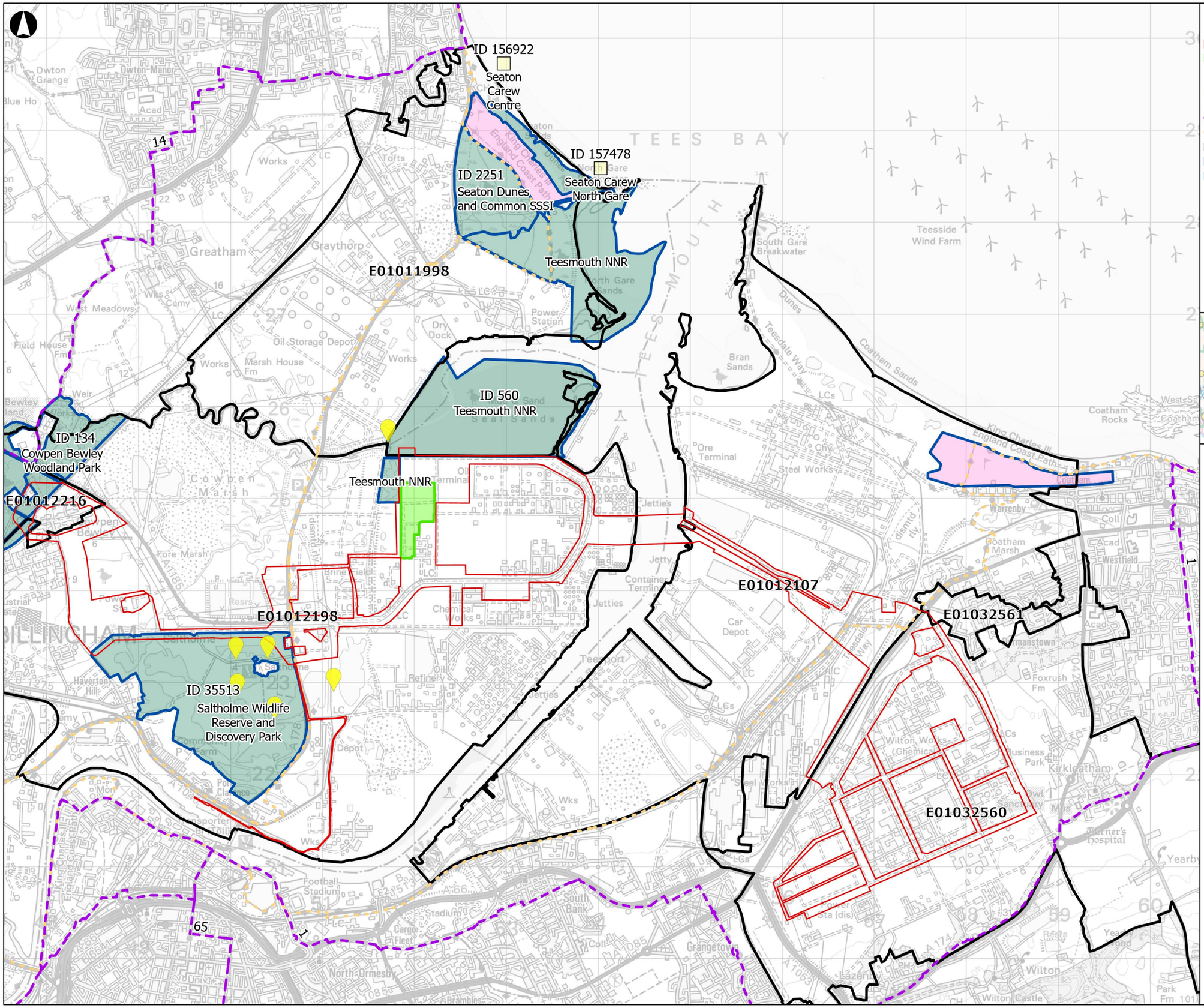
305601-00

Rev

P01

Figure Number

6.11.1



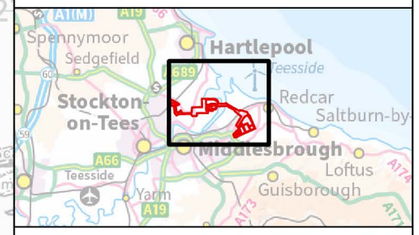
A3

- Indicative Proposed Development Site Boundary
- Hydrogen Production Facility
- Beaches
- Bird Hides
- National Cycle Network
- King Charles III England Coast Path
- Lower Super Output Areas (LSOAs)
- Golf Area
- Nature Areas

Coordinate System: British National Grid

Image:

Metres
0 500 1,000 2,000



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Drawing Title
Figure 6.12.1 - Socioeconomics Baseline

Scale
1:40,000

Role
GEN

Suitability
Issue

Project Number
286378-00

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P01

Figure Number
6.12.1

A3

Indicative Proposed Development Site Boundary

Traffic Survey Locations (June 2024)

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

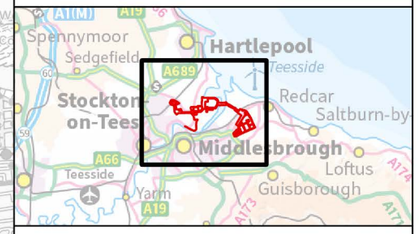

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Figure 6.13.1 - Traffic Survey Site Locations (June 2024)

Scale

1:50,000

Role

GEN

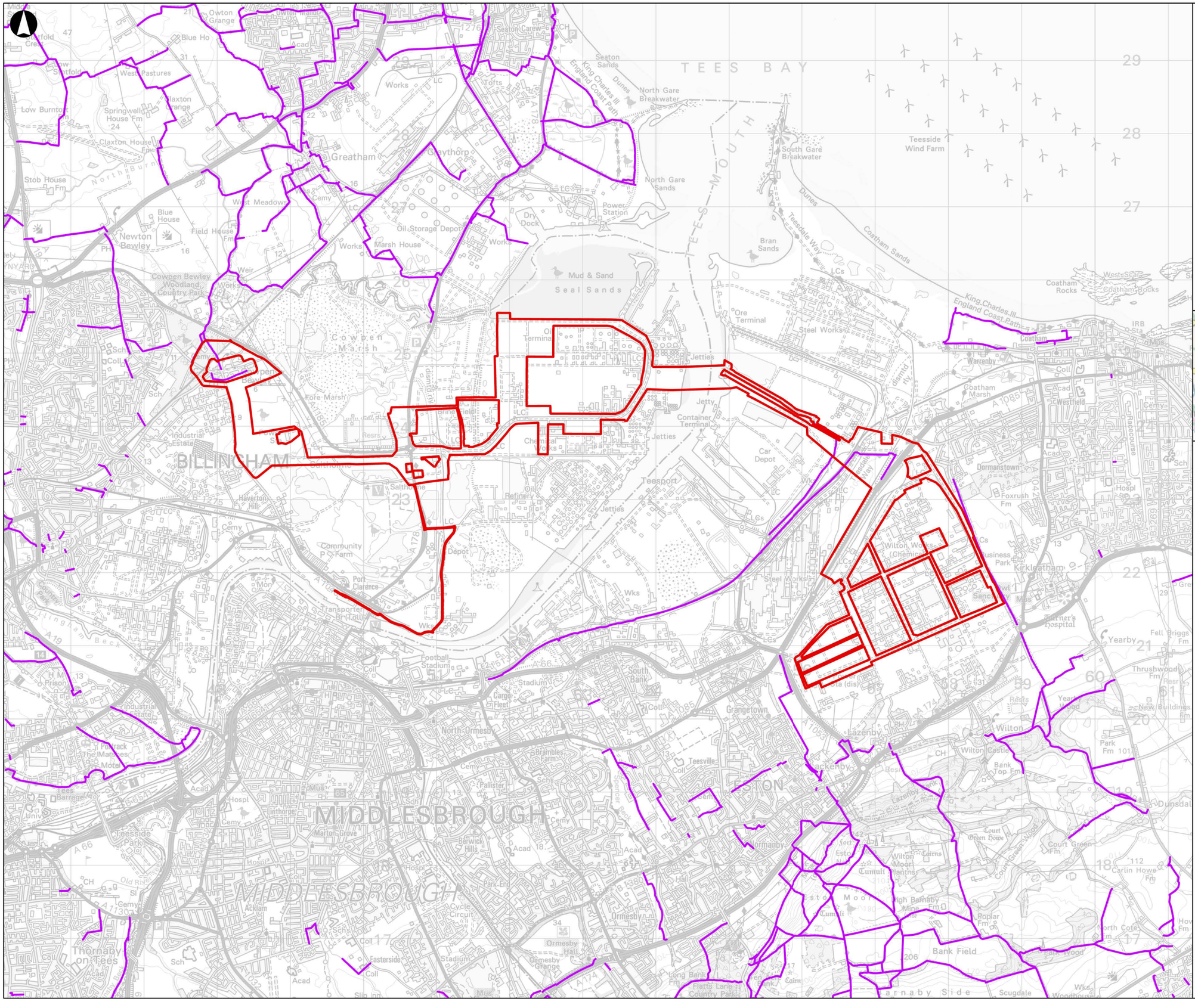
Suitability

Issue

Project Number	Rev
305601-00	**P01**

Figure Number

6.13.1



Indicative Proposed Development Site Boundary

Public Rights of Way

A3

Coordinate System: British National Grid

Metres

0 500 1,000 2,000

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Drawing Title

Figure 6.13.2 - Public Rights of Way

Scale

1:50,000

Role

GEN

Suitability

Issue

Project Number

305601-00

Rev

P01

Figure Number

6.13.2

A3

Indicative Proposed Development Site Boundary

1km Buffer of Site Boundary

Water Framework Directive (WFD) Water Bodies

Ordinary Watercourse

River

Transitional water body

Groundwater Classification

Good

Poor

Surface Water Features

Named Watercourse

Abstraction Licence

Discharge Location

Private Water Supply

Coordinate System: British National Grid

Metres

0 250 500 1,000

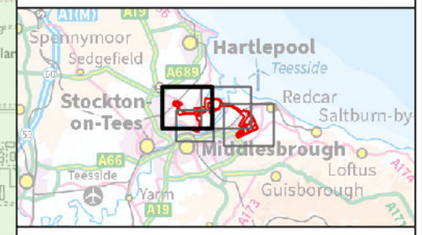

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Figure 6.14.1 - Hydrological Constraints
Water Framework Directive Waterbodies

Page Information

Western Section
Sheet 1 of 4

Scale
1:20,000

Role
EWG

Suitability
Issue

Project Number
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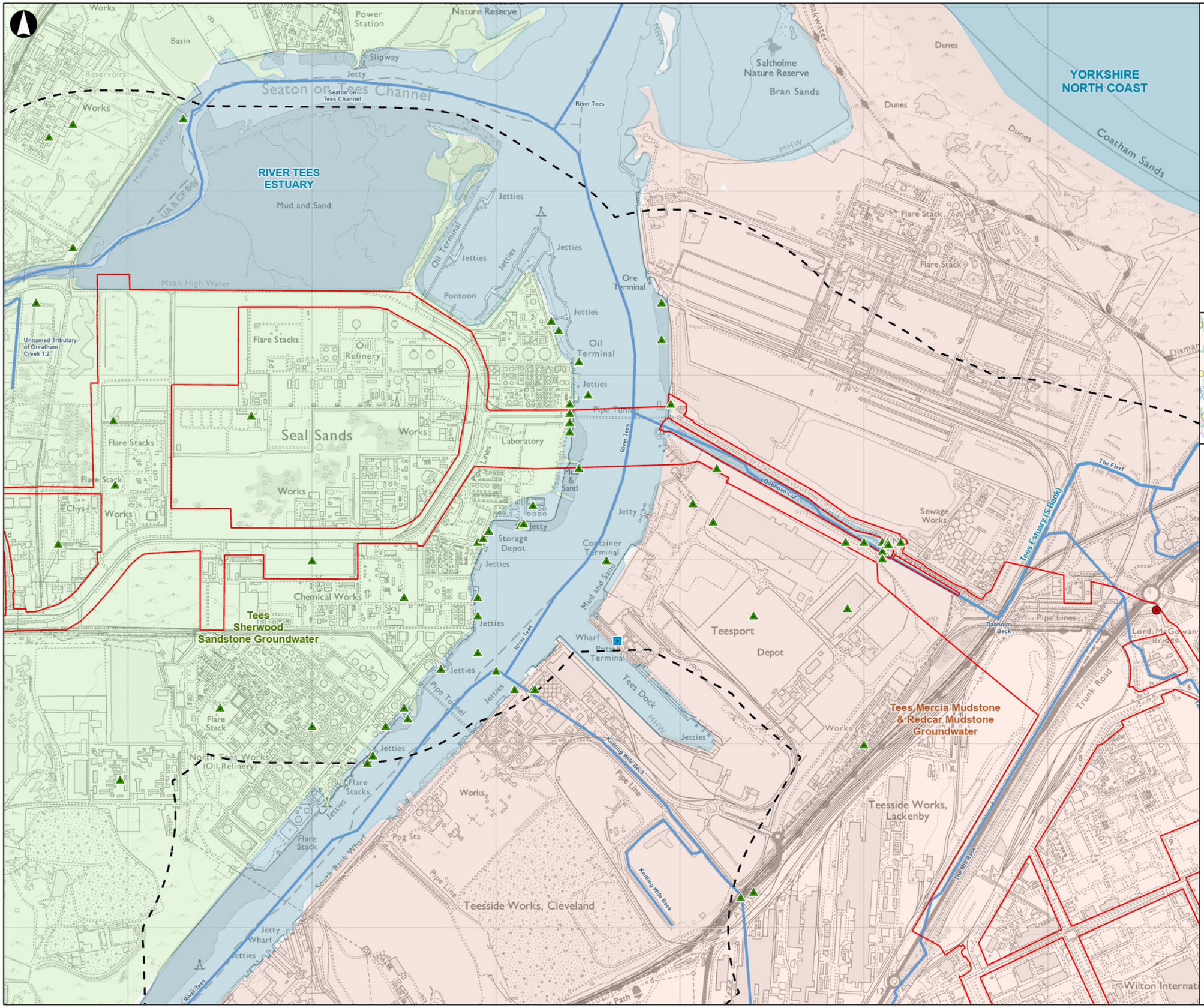
P01

Figure Number
6.14.1



A3

- Indicative Proposed Development Site Boundary
- 1km Buffer of Site Boundary

Water Framework Directive (WFD) Water Bodies

- Ordinary Watercourse
- River
- Transitional water body

Groundwater Classification

- Good
- Poor

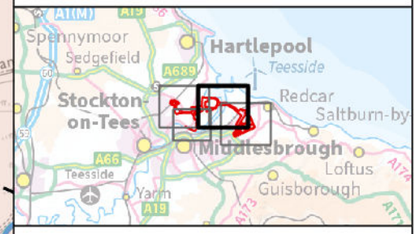
Surface Water Features

- Named Watercourse
- Abstraction Licence
- Discharge Location
- Private Water Supply

Coordinate System: British National Grid

Metres

0 250 500 1,000



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Drawing Title

Figure 6.14.1 - Hydrological Constraints
Water Framework Directive Waterbodies

Page Information

Central Section
Sheet 2 of 4

Scale

1:20,000

Role

EWG

Suitability

Issue

Project Number	Rev
305601-00	P01

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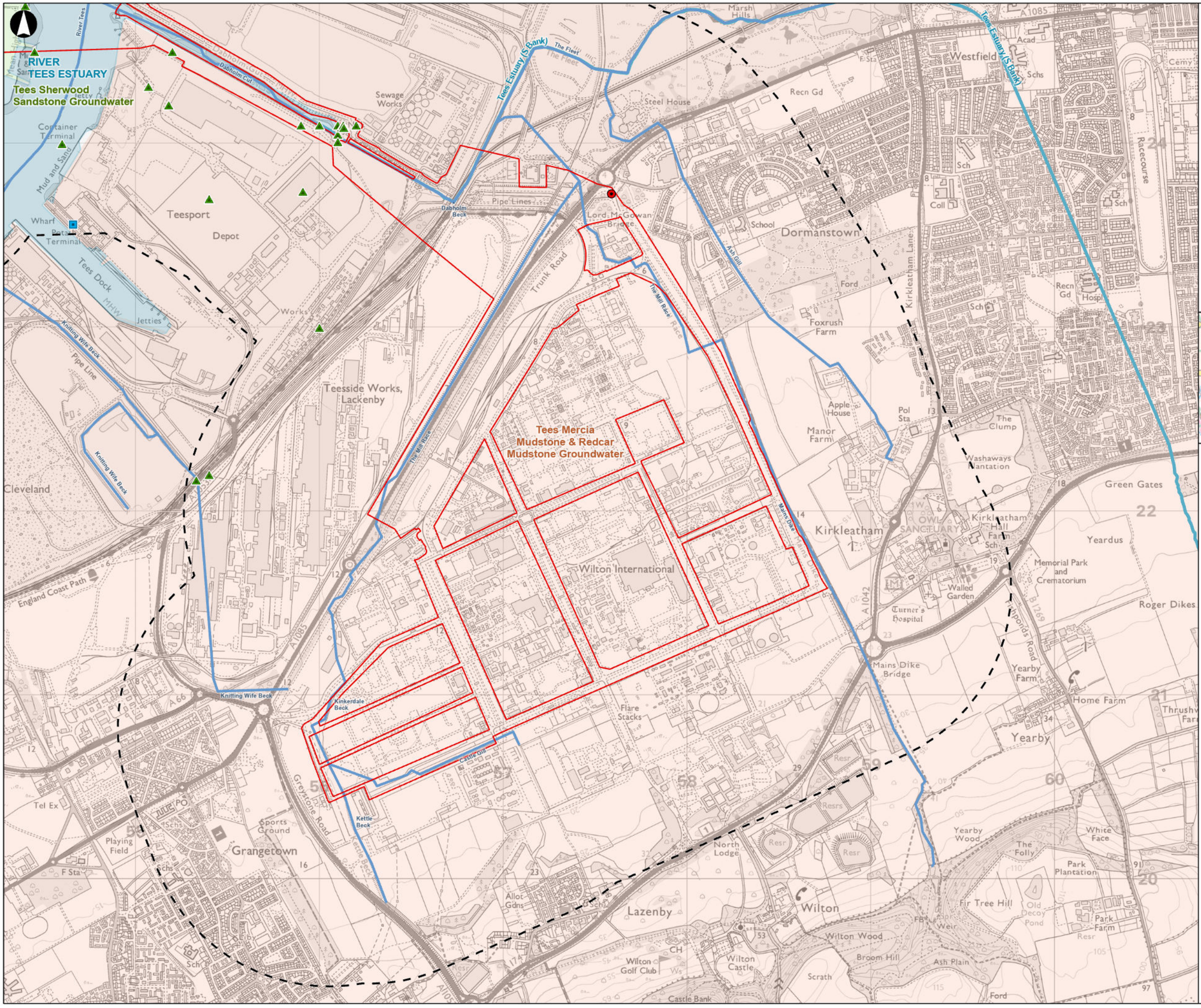
6.14.1



Indicative Proposed Development Site Boundary

1km Buffer of Site Boundary

Water Framework Directive (WFD) Water Bodies

Ordinary Watercourse

River

Transitional water body

Groundwater Classification

Good

Poor

Surface Water Features

Named Watercourse

Abstraction Licence

Discharge Location

Private Water Supply

Coordinate System: British National Grid

Metres

0 250 500 1,000

A3

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Figure 6.14.1 - Hydrological Constraints
Water Framework Directive Waterbodies

Page Information

Eastern Section
Sheet 3 of 4

Scale
1:20,000

Role
EWG

Suitability
Issue

Project Number
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Rev
P01

Figure Number
6.14.1

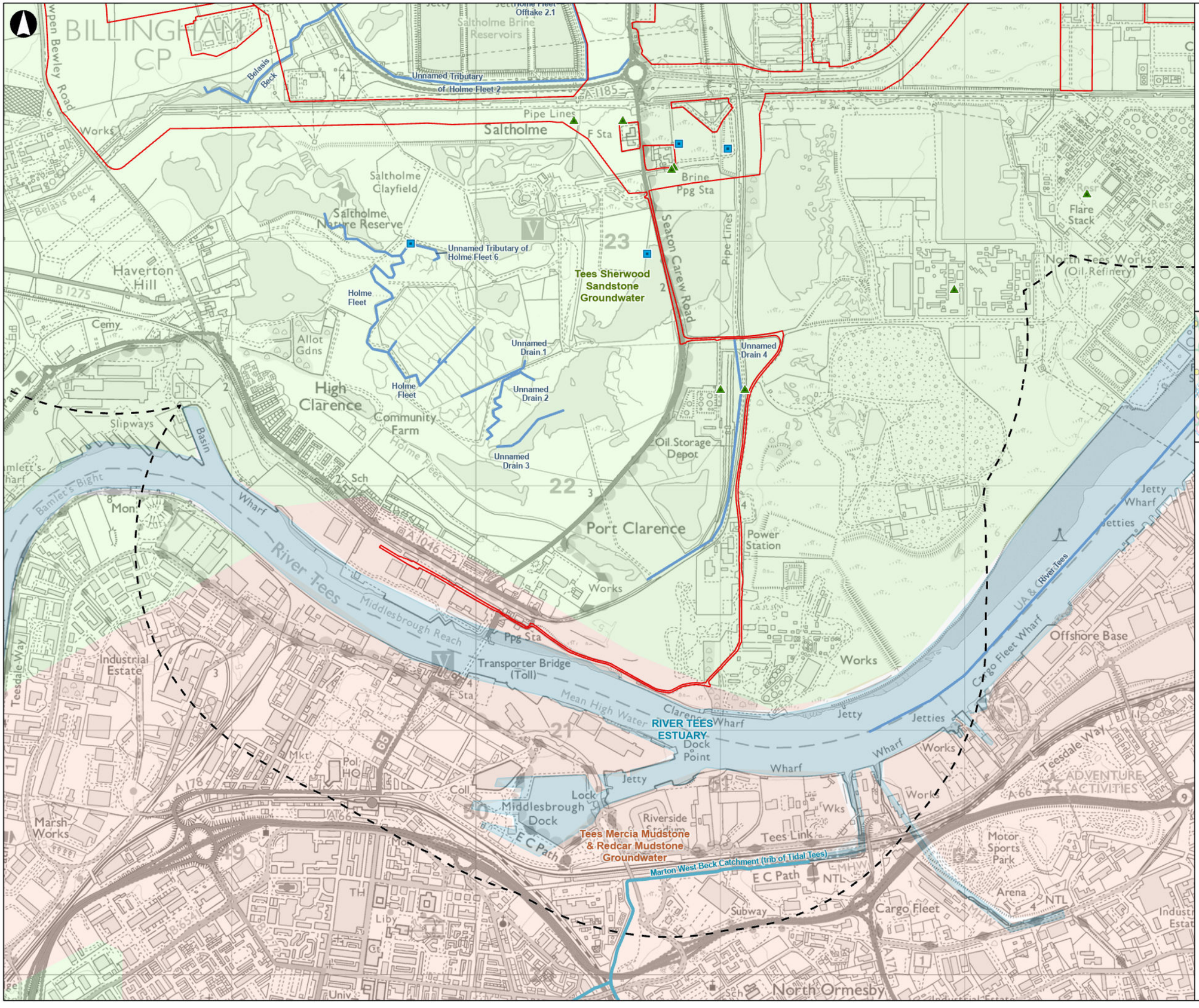

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Figure 6.14.1 - Hydrological Constraints
Water Framework Directive Waterbodies

Page Information
Construction Haul Route
Sheet 4 of 4

Scale
1:15,000

Role
EWG

Suitability
Issue

Project Number
305601-00

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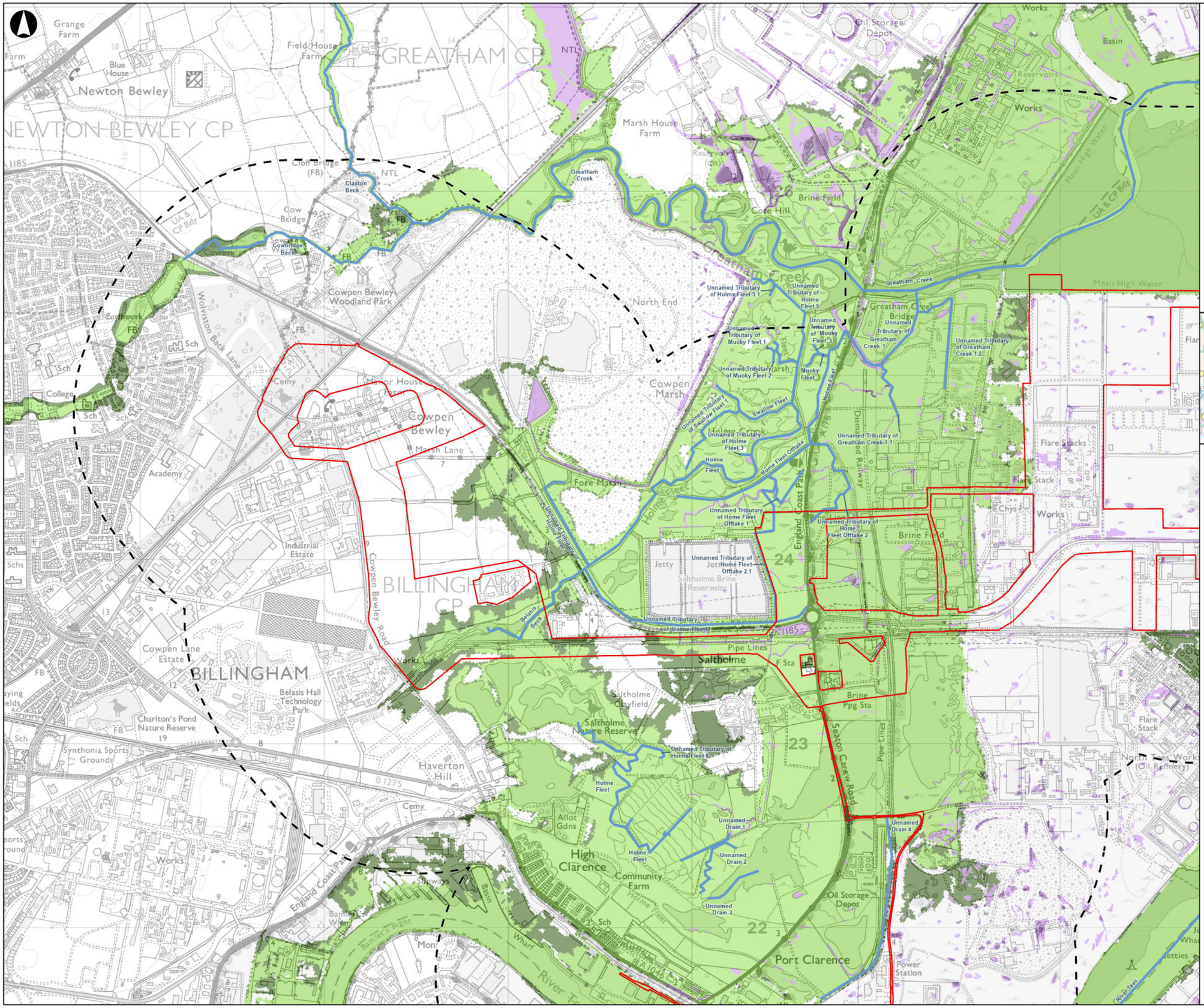
Figure Number
6.14.1



Indicative Proposed Development Site Boundary

1km Buffer of Site Boundary

Surface Water Features

Named Watercourse

Pluvial Flood Extent Risk

Low - 1 in 1000 year event

Medium - 1 in 100 year event

High - 1 in 30 year event

Fluvial and Coastal Flood Risk

Flood Zone 2

Flood Zone 3

A3

Coordinate System: British National Grid

Metres

0 250 500 1,000

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Drawing Title

Figure 6.14.2 - Hydrological Constraints
Flood Risk

Page Information

Western Section
Sheet 1 of 4

Scale

1:20,000

Role

EWG

Suitability

Issue

Project Number

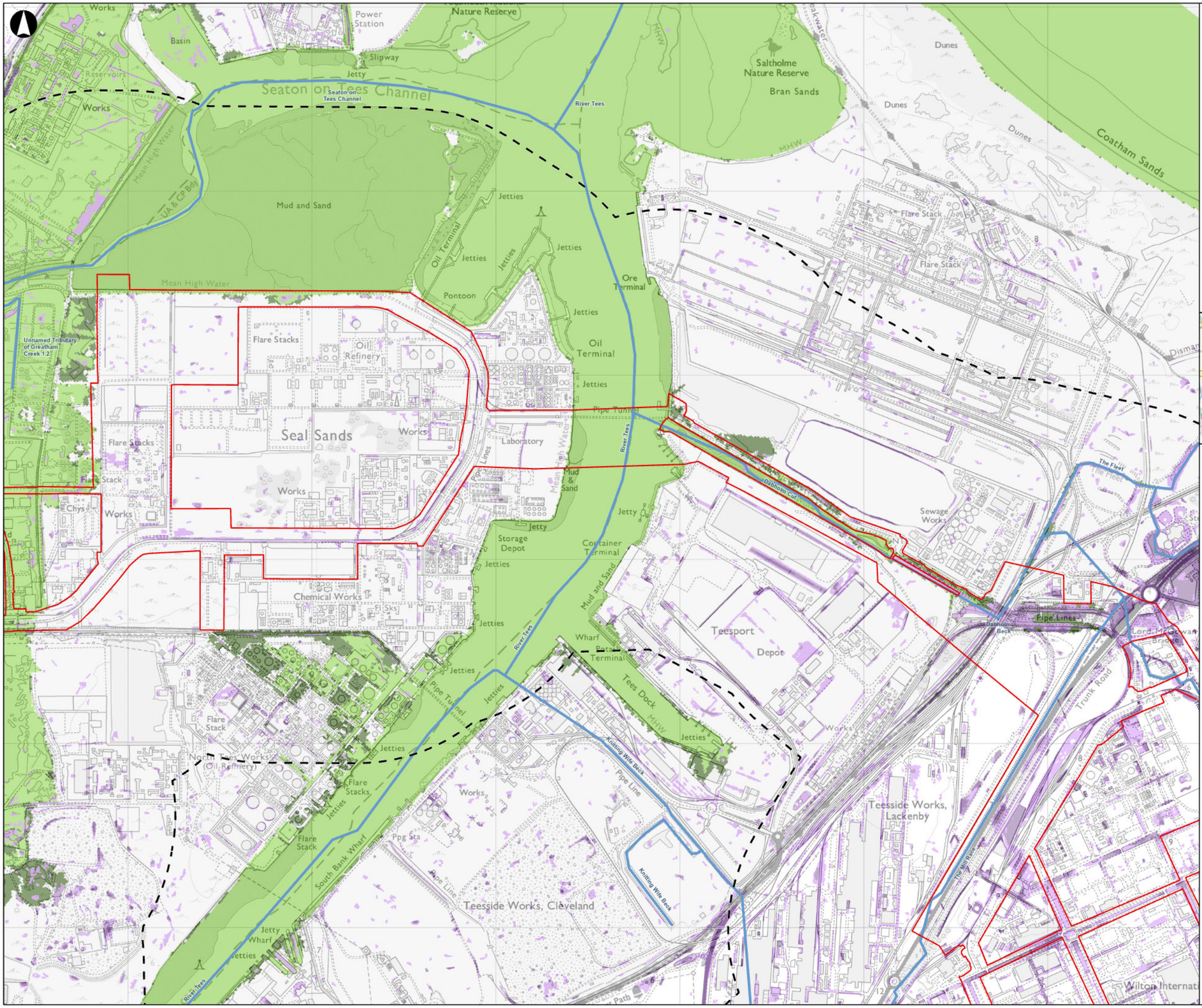
305601-00

Rev

P01

Figure Number

6.14.2



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Drawing Title
Figure 6.14.2 - Hydrological Constraints
Flood Risk

Page Information
Central Section
Sheet 2 of 4

Scale
1:20,000

Role
EWG

Suitability
Issue

Project Number
305601-00

Rev
P01

Figure Number
6.14.2

A3

Indicative Proposed Development Site Boundary

1km Buffer of Site Boundary

Surface Water Features

Named Watercourse

Pluvial Flood Extent Risk

Low - 1 in 1000 year event

Medium - 1 in 100 year event

High - 1 in 30 year event

Fluvial and Coastal Flood Risk

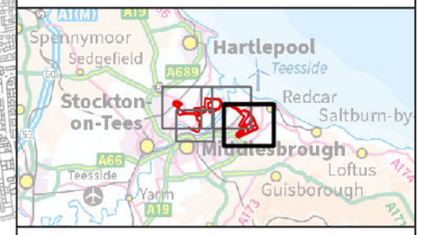
Flood Zone 2

Flood Zone 3

Coordinate System: British National Grid

Metres

0 250 500 1,000



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Client

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Project Name

H2NorthEast

Drawing Title

Figure 6.14.2 - Hydrological Constraints
Flood Risk

Page Information

Eastern Section
Sheet 3 of 4

Scale

1:20,000

Role

EWG

Suitability

Issue

Project Number

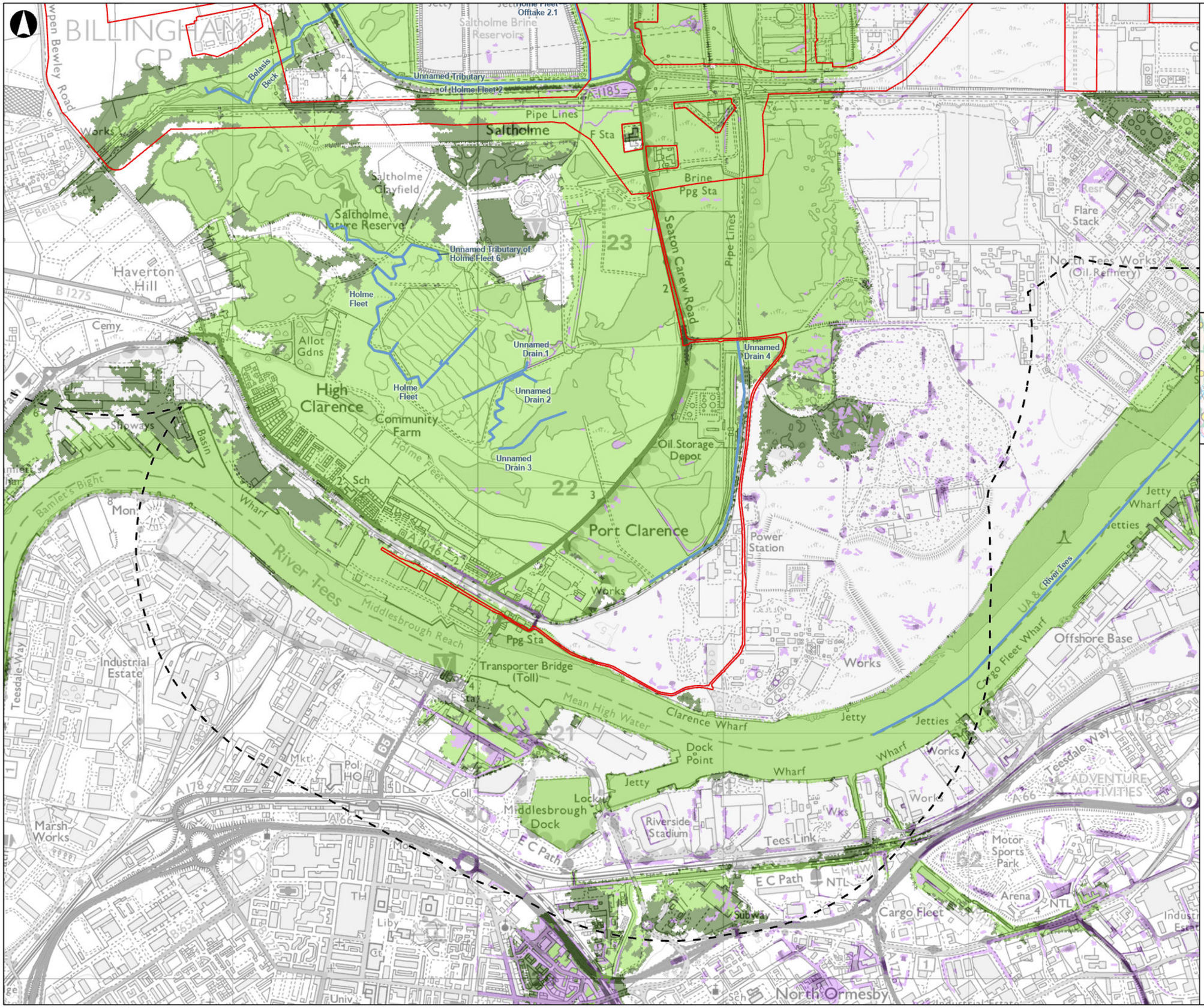
305601-00

Rev

P01

Figure Number

6.14.2



Indicative Proposed Development Site Boundary

1km Buffer of Site Boundary

Surface Water Features

Named Watercourse

Pluvial Flood Extent Risk

Low - 1 in 1000 year event

Medium - 1 in 100 year event

High - 1 in 30 year event

Fluvial and Coastal Flood Risk

Flood Zone 2

Flood Zone 3

A3

Coordinate System: British National Grid

Metres

0 190 380 760

Rev	Date	By	Chkd	Appd	Authd
P04	20/01/25	CWILL	LPAG	BWIL	MAIN

ARUP

12 Wellington Place
Leeds, LS1 4AP
Tel +44 113 242 8498
www.arup.com

Client

H2NorthEast Ltd.

Project Name

H2NorthEast

Drawing Title

Figure 6.14.2 - Hydrological Constraints
Flood Risk

Page Information

Construction Haul Route
Sheet 4 of 4

Scale

1:15,000

Role

EWG

Suitability

Issue

Project Number

305601-00

Rev

P01

Figure Number

6.14.2

B Commitments Register

B.1 Introduction

B.1.1 This Appendix to the Environmental Impact Assessment (EIA) Scoping Report sets out the commitments made by the Applicant for the Proposed Development at this stage of the project. This commitments register has been produced in accordance with the guidance note provided by the Planning Inspectorate[1] ('PINS') and will be updated as the development consent order (DCO) application (herein referred to as the 'Application') progresses.

[1] Planning Inspectorate (2024). Nationally Significant Infrastructure Projects - Guidance: Nationally Significant Infrastructure Projects: Commitments Register. Available at: https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-commitments-register [Accessed 29/01/2024].

Table B.1: Commitments Register (Scoping Stage)

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
General – Management Plan Commitments				
G1	A Framework Construction Environmental Management Plan (CEMP) will be prepared to accompany the Application which will incorporate standard industry best practice, considered as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.	All	Construction	Production of a final CEMP in accordance with Framework CEMP will be secured by DCO requirement. Health and Safety at Work etc. Act (1974)[2] Construction Design and Management (CDM) 2015 Regulations (as amended)[3].
G2	A Decommissioning Plan, inclusive of a Decommissioning Environmental Management Plan (DEMP), will be developed and agreed with the Environment Agency as part of the environmental permitting and site surrender process. The DEMP will consider all potential environmental risks related to the Proposed Development Site and contain guidance on how risks can be eliminated or mitigated.	All	Decommissioning	Production of a DEMP to be secured by DCO requirement.
G3	An Outline Landscape and Biodiversity Management and Enhancement Plan (LBMEP) including measures specific to landscape and biodiversity (including	Biodiversity Climate change resilience Cumulative and combined effects	Construction Operation	Production of a final LBMEP to be prepared in accordance with Outline LBMEP will be secured by DCO requirement.

[2] UK Government (1974) Health and Safety at Work etc. Act
[3] UK Government (2015) The Construction (Design and Management) Regulations 2015

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
	biodiversity net gain (BNG)), will be prepared to accompany the Application. This will incorporate standard industry best practice as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process.	Greenhouse gas emissions Human health Landscape and visual amenity Material assets and waste Socio-economics Water environment		
G4	A Framework Construction Traffic Management Plan (CTMP) will be prepared to accompany the Application, incorporating standard industry best practice as embedded measures, as well as any further mitigation that is deemed required as a result of the EIA process. Construction traffic routing, as well as Public Rights of Way (PRoW) and recreational routes that may be temporarily affected by the Proposed Development will be identified. Where temporary closures and diversions are required, these would be agreed in advance with relevant stakeholders to provide continued access to recreational facilities during construction.	Air quality Cumulative and combined effects Human health Major accidents and disasters Noise and vibration Socio-economics Traffic and transportation	Construction	Production of a final CTMP in accordance with Framework CTMP will be secured by DCO requirement.
G5	A Framework Construction Workers' Management Plan (CWMP) will be prepared to accompany the Application incorporating standard industry best practice as embedded measures, as well as any further mitigation	Air quality Cumulative and combined effects Human health	Construction	Production of a final CWMP in accordance with Framework CWMP will be secured by DCO requirement.

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
	that is deemed required as a result of the EIA process.	Major accidents and disasters Noise and vibration Socio-economics Traffic and transportation		
Construction and Design Commitments				
D1	An Indicative Lighting Strategy will accompany the Application.	Biodiversity Landscape and Visual Amenity Socio-economics	Construction Operation	Final Lighting Strategy, in accordance with Indicative Lighting Strategy, to be secured via DCO requirement.
D2	The hydrogen production facility (HPF) will require an environmental permit, and adherence to the Environmental Permitting (England and Wales) Regulations 2016 will be required so that any impacts of emissions to air, soil, surface and groundwater, to the environment and human health will be minimised and avoided using best available techniques (BAT) as far as reasonably practicable, including through appropriate pollution prevention/ secondary containment measures and surface water management systems. This will include provision of a (or updates to the existing Central Area Transmission System (CATS) Terminal) Site	Air quality Biodiversity Greenhouse Gas Emissions Ground conditions Human health Marine Biodiversity Water environment	Operation Decommissioning	The Environmental Permitting (England and Wales) Regulations 2016 (as amended)[4].

[4] UK Government (2016) The Environmental Permitting (England and Wales) Regulations 2016.

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
	Condition Report/ relevant site protection and monitoring programme arrangements.			
D3	The Proposed Development will be operated in line with appropriate standards and the operator will implement and maintain an Environment Management System (EMS) certified to International Standards Organisation (ISO) 14001[5]. The EMS will outline the requirements and procedures essential for maintaining the Proposed Development Site at the prescribed standard.	All	Operation	The Environmental Permitting (England and Wales) Regulations 2016 (as amended)[4].
D4	The Proposed Development will be designed such that process emissions to air comply with the emission limit value requirements specified in the Industrial Emissions Directive (IED) 2010[6], or, if tighter, the Large Combustion Plant BAT Reference (BREF) document (2017)[7] (LCP BRef), where relevant.	Air quality	Operation	The Environmental Permitting (England and Wales) Regulations 2016 (as amended)[4].
D5	A foundation works risk assessment will be undertaken to allow any piled foundations or penetrative ground improvement works to be appropriately designed and implemented to	Biodiversity Human Health Ground conditions Materials and Waste	Pre-Construction	A piling and penetrative foundation design method statement, informed by risk assessment will be secured by DCO requirement.

[5] International Organisation for Standardisation (n.d) Environmental Management Systems. Available at: https://www.iso.org/standards/popular/iso-14000-family [Accessed 22/01/2025].
[6] European Union (2010) Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
[7] European Commission (2017) Best Available Techniques (BAT) Reference Document for Large Combustion Plants. Available at: https://eippcb.jrc.ec.europa.eu/sites/default/files/2019-11/JRC_107769_LCPBref_2017.pdf [Accessed 22/01/2025].

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
	mitigate the potential for creation of migration pathways.	Water Environment		
D6	The impacts on soils during construction will be mitigated through minimisation of construction footprints within areas of best and most versatile (BMV) soils and sensitive ecological sites, with micro-siting of compounds and laydown areas outside such areas as far as reasonably practicable. Where technically appropriate, pipelines will also be buried in such areas to enable appropriate reinstatement of soils over their footprint.	Biodiversity Greenhouse Gases Ground conditions (best and most versatile agricultural land) Landscape and Visual Amenity	Construction	Measures to avoid, reduce and mitigate likely significant effects on BMV soils will be included in the Framework CEMP, with final CEMP secured by DCO requirement.
D7	Soils will be managed and protected during the construction works in accordance with good practice, including the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009)[8] and relevant British Standard for the use of soil on construction sites, which will be referenced in the CEMP. Soils will be restored following construction. Where possible, soils will be retained in their field/ area of origin. A soil restoration plan and statement will be prepared detailing the restoration approach and aftercare programme that is to be implemented.	Biodiversity Greenhouse Gases Ground conditions (best and most versatile agricultural land) Landscape and Visual Amenity	Construction	Measures to avoid, reduce and mitigate likely significant effects on BMV agricultural land will be included in the Framework CEMP, with final CEMP secured by DCO requirement.

[8] Department for Environment, Food and Rural Affairs (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available at: https://assets.publishing.service.gov.uk/media/5b2264ff40f0b634cfb50650/pb13298-code-of-practice-090910.pdf [Accessed 22/01/2025].

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
D8	Where archaeological features are identified through evaluation, where reasonably practicable, design mitigation will be considered to avoid identified areas of constraint (preservation in situ). Where cultural heritage assets cannot be avoided, archaeological excavations or archaeological monitoring during construction in archaeologically sensitive areas would be undertaken to mitigate against the loss of cultural heritage assets (preservation by record) secured via requirement of the draft DCO.	Cultural heritage	Pre-Application Pre-Construction Construction	Secured by DCO requirement.
D9	Habitats of ecological value will be retained where reasonably practicable. Where it is not reasonably practicable to retain valued habitats in situ, habitat loss or severance will be mitigated for (e.g. development of new hedgerows, watercourses, and grassland, etc).	Biodiversity	Pre-Application Construction	Measures to avoid, reduce and mitigate likely significant effects on habitats of ecological value will be described in the Alternatives chapter of the ES. Habitats required for mitigation will be described in the Outline LBMEP that accompanies the Application. Production of a final LBMEP to be secured by DCO requirement.
D10	A minimum Biodiversity Net Gain (BNG) of 10% in biodiversity units is being targeted. Where it is not possible to achieve BNG within the Order Limits, off-site opportunities will be sought.	Biodiversity Climate Change and Resilience Greenhouse Gases	Pre-Application	Restoration and enhancement of habitats proposed to contribute towards BNG within the Order Limits will be described in the Outline LBMEP that accompanies the Application. The draft DCO requirement will allow flexibility on the quantum of off-site/ on-site BNG to maximise on-site opportunities during

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
				construction, where these arise. Production of a final LBMEP to be secured by DCO requirement.
D11	The design and evolution of the Proposed Development is ongoing and as such the mitigation requirements will be evaluated to reduce any likely significant effects through design, as far as reasonably practicable. Key areas of embedded mitigation being considered include: • Choice of construction and crossing techniques for the Hydrogen Pipeline(s), particularly in more sensitive areas and consideration of maximum working widths for open-cut pipeline and trenchless crossings. • Siting and routing e.g. seeking to avoid or reduce effects on more sensitive landscape features such as woodland, including protected or mature tree specimens within Cowpen Bewley Woodland Park. • Limiting the proximity of the Hydrogen Pipeline(s) to settlement and residential properties. • Working methods e.g. using soil storage as screening where required, sequential phasing to limit the extent of works at any one time and planting to reinstate sections of hedgerow or trees removed during the	Biodiversity Ground conditions Landscape and visual	Pre-Application	Measures to avoid, reduce and mitigate effects on landscape character and visual amenity will be described in the Outline LBMEP that accompanies the Application. Production of a final LBMEP to be secured by DCO requirement.

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
	construction stage of the Proposed Development. • Employing standard good practice construction techniques, such as minimising vegetation clearance, installing tree protection measures around retained trees and hedgerows. • Reinstatement of agricultural land such that there is no long-term change in land use along the Hydrogen Pipeline(s) where agricultural land is affected. • Use of planting to integrate permanent structures e.g. Above Ground Installations (AGI) into the landscape to minimise visual impacts.			
D12	Watercourse crossings will be minimised where possible within the Hydrogen Pipeline design. Any infrastructure within or alongside watercourses will be designed to reduce the potential for significant detrimental impact on flow conveyance and localised or catchment-wide impacts on flood risk; this will include any watercourse diversions, or any culverting advised as a result of the permanent works.	Water environment	Pre-Application	Watercourse crossings required will be described in the ES that accompanies the Application. Production of a final CEMP including Water Management Plan will be secured via DCO requirement.
D13	Sensitive habitats such as wetlands and potential Ground Water Dependent Terrestrial Ecosystems (GWDTE), and existing abstractions will be considered and	Water environment	Pre-Application	Measures to avoid, reduce and mitigate likely significant effects on wetlands and potential GWDTE and

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
	where reasonably practicable, avoided, within the Hydrogen Pipeline design.			existing abstractions will be described in the Alternatives chapter of the ES.
D14	Contractor will segregate waste streams prior to them being taken for recycling or disposal. Waste will be removed from site by a fully licensed waste carrier and taken to permitted waste sites.	Greenhouse Gases Material assets and waste	Construction	Production of a final CEMP including site waste management plan (SWMP) will be secured by DCO requirement.
D15	Contractor to consider procuring materials with recycled content as far as reasonably practicable and consider local sources for aggregate supplies, whenever possible.	Greenhouse Gases Material assets and waste	Construction	Production of a final CEMP including SWMP will be secured by DCO requirement.
D16	All works will be undertaken in accordance with Construction Design and Management 2015 Regulations[3] (CDM) including provision of appropriate pre-construction information to the appointed contractor(s), notification of Construction Works to the Health and Safety Executive (HSE) prior to the commencement of construction and provision of a Health and Safety File for the Applicant/operator following completion of construction works. The appointed construction contractor(s) will use risk assessments, working method statements, operating procedures and apply appropriate personnel training in order to minimise the risk of accidental scenarios occurring during the construction of the Proposed Development.	Major accidents and disasters	Construction	Health and Safety at Work etc. Act (1974)[2]. Construction Design and Management (CDM) 2015 Regulations (as amended)[3]. Production of a final CEMP will be secured by DCO requirement.
D17	A design hazard management plan will be prepared and a number of hazard identification and evaluation assessments	Major accidents and disasters	Operation	Secured through appropriate design during Front End Engineering Design (FEED) studies.

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
	(Hazard Identification (HAZID) and hazard and operability study (HAZOP) reviews) will be conducted on the Proposed Development during the design process.			
D18	Major accident assessments and studies will be prepared over the course of the design development and a Major Accident Prevention Plan (MAPP) will be prepared at the appropriate time once inventories of hazardous materials and plant layout is understood, to inform the application for Control of Major Accident Hazards (COMAH) Regulations[9] licence for the operational HPF.	Major accidents and disasters	Operation	COMAH Regulations 2015.
D19	A COMAH Licence (or variation to the existing CATS Terminal COMAH Licence) from the HSE and an Environmental Permit from the Environment Agency will be required for the operation of the Proposed Development. A Major Accident Hazard (MAH) Pipeline Safety Notification under the Pipeline Safety Regulations[10] will be required, prior to construction of the Hydrogen Pipeline(s).	Major accidents and disasters	Operation	COMAH Regulations 2015 The Environmental Permitting (England and Wales) Regulations 2016 (as amended). Pipeline Safety Regulations 1996.
D20	Temporary impacts on visitor attractions and open space during construction will be avoided, as far as reasonably practicable.	Socio-economics	Pre-Application Construction	Measures to avoid, reduce and mitigate likely significant effects on visitor attractions and open space will

[9] UK Government (2015) The Control of Major Accident Hazards Regulations 2015.
[10] UK Government (1996) The Pipelines Safety Regulations 1996.

Commitment Ref No.	Commitment	Relevant Environmental Topic	Project Phase	Securing Mechanism
				be described in the Alternatives chapter of the ES.
D21	Impacts relating to severance would be reduced through careful siting of construction compounds and lay down areas during ongoing design development, and careful planning of construction activities through consultation with landowners.	Socio-economics	Pre-Application Construction	Contractor facilities will be included in the CEMP which will be secured by DCO requirement.
D22	The potential for the creation of training and apprenticeship opportunities upskilling local unemployed residents during operation will be considered, as far as reasonably practicable.	Socio-economics	Pre-Application	An employment, skills and training plan will be secured via DCO requirement.

C Initial Long List for Cumulative Effects Assessment

C.1 Overview

C.1.1 This appendix should be read in conjunction with Section 5.2: Cumulative and Combined Effects which it informs and accompanies.

Table C.1: Cumulative Effects Assessment Initial Long List

ID	Project Name	Application Reference	Determining Authority	Application Status	Does the project intersect the Proposed Development Site? (Y/N)
Nationally Significant Infrastructure Projects					
NSIP1	The Net Zero Teesside Project	EN010103	Secretary of State	Consent granted	Y
NSIP2	Tees Combined Cycle Power Plant	EN010082	Secretary of State	Consent granted	Y
NSIP3	York Potash Harbour Facilities Order	TR030002	Secretary of State	Consent granted	Y
NSIP4	H2 Teesside	EN070009	Secretary of State	Examination	Y
NSIP5	Byers Gill Solar	EN010139	Secretary of State	Recommendation	N
NSIP6	Lighthouse Green Fuels Project	EN010150	Secretary of State	Pre-application	Y
NSIP7	Teesside Flexible Regas Port	EN040001	Secretary of State	Pre-application	Y
Planning Applications					
RCBC1	The Woodsmith Project: Port Handling Facility & Overland Conveyor	R/2024/0098/ESM	Redcar and Cleveland Borough Council (RCBC)	Awaiting decision	Y
RCBC2	Wilton Hazardous Waste to Energy Process Plant	R/2023/0820/ESM	RCBC	Awaiting decision	Y

ID	Project Name	Application Reference	Determining Authority	Application Status	Does the project intersect the Proposed Development Site? (Y/N)
RCBC3	Battery Energy Storage System (MSFD) on land at Wilton International complex	R/2023/0545/CL	RCBC	Approved with conditions	Y
RCBC4	Tees Valley Lithium Project	R/2022/0773/ESM	RCBC	Approved with conditions	N
RCBC5	HyGreen	R/2024/0271/ESM	RCBC	Awaiting decision	Y
RCBC6	Wilton International Data Centre	R/2023/0404/OOM	RCBC	Approved with conditions	Y
RCBC7	Teesworks - Engineering operations associated with ground remediation and preparation of the site	R/2023/0277/CD	RCBC	Approved with conditions	Y
RCBC8	Net Zero Teesside Site Remediation	R/2021/1048/FFM	RCBC	Approved with conditions	Y
RCBC9	Redcar Bulk Terminal Wharf Redevelopment	R/2023/0830/FFM	RCBC	Approved with conditions	N
RCBC11	Outline planning application for development of up to 464,515 sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class E), heavy goods vehicle (HGV) and car parking and associated infrastructure works (all	R/2020/0821/ESM	RCBC	Approved with conditions	N

ID	Project Name	Application Reference	Determining Authority	Application Status	Does the project intersect the Proposed Development Site? (Y/N)
	matters reserved)				
SBC1	Greenergy Renewable Fuels and Circular Products Facility	23/1019/EIS	Stockton-on-Tees Borough Council (SBC)	Approved with conditions	Y
SBC2	Npower Cogen Limited North South Access Road	22/2528/DEM	SBC	Prior approval for demolition not required	Y
SBC3	Development of a 49.99 megawatt (MW) gas fired electricity generating facility on land adjacent to Saltholme Substation, Billingham	18/2079/FUL	SBC	Approved with conditions	N
SBC4	Land At Clarence Wharf - Scoping opinion request for the construction of a new quay, construction of a level storage area and associated infrastructure works	24/1400/SOR	SBC	Scoping opinion issued – EIA Development	N
SBC5	Energy recovery facility and associated development at Seal Sands, Billingham	22/1525/EIS	SBC	Approved with conditions	Y
SBC6	Cowpen Bewley Landfill Site	20/0583/EIAV	SBC	Approved with conditions	N

ID	Project Name	Application Reference	Determining Authority	Application Status	Does the project intersect the Proposed Development Site? (Y/N)
SBC7	BOC (UK) Limited Carbon Capture Plant - North Tees	21/1545/FUL	SBC	Approved with conditions	N
SBC8	Application for the installation of new and replacement of existing drop board sluice structures on existing ditches and associated infrastructure. | Royal Society for the Protection of Birds (RSPB) Saltholme Seaton Carew Road Port Clarence Middlesbrough TS2 1TU	22/0074/FUL	SBC	Approved with conditions	Y
SBC9	TGPP HV Infrastructure Project	22/1239/FUL	SBC	Approved with conditions	N
SBC10	Breagh Onshore Compression Project	22/0064/FUL	SBC	Approved with conditions	N
SBC11	Macklin Avenue - Industrial Development	23/1490/FUL	SBC	Approved with conditions	N
SBC12	Hazardous Substance consent for modification to conditions 3 and 4 as imposed on application 17/0258/HAZ (change in storage location and conditions for liquified petroleum gas (LPG))	22/1193/HAZ	SBC	Approved with conditions	N

ID	Project Name	Application Reference	Determining Authority	Application Status	Does the project intersect the Proposed Development Site? (Y/N)
SBC13	Navigator Terminals - Installation of 5no. pressurised LPG and 1no. pressurised storage vessels with a new road tanker loading area and associated infrastructure.	22/0339/FUL	SBC	Approved with conditions	N
SBC14	Application for the prior notification of demolition of Acrylonitrile AN6 plant, equipment and structures	20/1894/DEM	SBC	Prior approval for demolition not required	Y
SBC15	Installation and operation of a carbon dioxide storage terminal.	24/1208/FUL	Stockton-on-Tees Borough Council	Approved with conditions	Y
HBC1	Persimmon South West Extension Hartlepool	H/2024/0203	Hartlepool Borough Council (HBC)	Awaiting decision	N
HBC2	Greatham Marsh – Engineering operations and associated works to restore Greatham Beck to its original line and removal of tidal structure	H/2024/0149	HBC	Awaiting decision	N
HBC3	Proposed Residential Development Land at Hillview, Greatham Hartlepool	H/2020/0372	HBC	Approved with conditions	N
HBC4	Greatham Village for Karbon Homes	H/2019/0139	HBC	Approved with conditions	N

ID	Project Name	Application Reference	Determining Authority	Application Status	Does the project intersect the Proposed Development Site? (Y/N)
HBC5	Venator (Greatham) Gas Fired Steam Boilers	H/2019/0055	HBC	Approved with conditions	N
HBC6	Greatham North East Flood Alleviation Scheme	H/2023/0128	HBC	Scoping opinion issued – EIA Development	N
MBC1	Scoping request for a new relief road between the A1046 Portrack Lane/Holme House Road roundabout and the A1032 Newport Bridge approach road	20/2264/SOR 20/0624/SCON	SBC and consultation with Middlesborough Council	Scoping opinion issued – EIA Development	N
Marine Licence Applications					
MLA1	Greatham Marsh Restoration	MLA/2023/00345	Marine Management Organisation (MMO) North East	Licence granted (discharging conditions)	N
MLA2	Middlehaven Dock - Estuary Edges Project	MLA/2024/00327	MMO North East	Licence granted (discharging conditions)	N
MLA3	Northern Gateway Container Terminal	MLA/2020/00079/1	MMO North East	Licence granted (discharging conditions)	N
MLA4	Teesside Gas Port	MLA/2019/00469/1	MMO North East	Licence granted (discharging conditions)	N
MLA5	Tees and Hartlepool Maintenance Dredge Disposal	MLA/2015/00088/6	MMO North East	Licence granted (discharging conditions)	N
MLA6	South Bank Quay - Phase 2	MLA/2020/00507	MMO North East	Licence granted (discharging conditions)	N

ID	Project Name	Application Reference	Determining Authority	Application Status	Does the project intersect the Proposed Development Site? (Y/N)
MLA7	South Bank Quay - Phase 1	MLA/2020/00506/2	MMO North East	Licence granted (discharging conditions)	N

D Construction Dust Assessment Methodology

D.1 Construction Dust Assessment Methodology

D.1.1 This appendix should be read in conjunction with Section 6.1: Air Quality which it informs and accompanies.

D.1.2 An 'impact' is described as a change in pollutant concentrations or dust deposition, while an 'effect' is described as the consequence of an impact. The main air quality impacts that may arise during construction of the Proposed Development are:

- dust deposition, resulting in the soiling of surfaces;
- visible dust plumes;
- elevated PM_{10}/ $PM_{2.5}$ concentrations (particulate matter of 10 or 2.5 micrometres (µm) diameter or less respectively) from demolition and construction activities; and
- an increase in nitrogen dioxide (NO_2) and PM_{10} (including $PM_{2.5}$) concentrations due to exhaust emissions from Non-Road Mobile Machinery (NRMM) and vehicles accessing the Proposed Development Site.

D.1.3 The Institute of Air Quality Management (IAQM) guidance[11] (herein referred to in this Appendix as the 'IAQM guidance') considers the potential for dust emissions from dust-generating activities, such as demolition of existing structures, earthworks, construction of new buildings and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and mud from a site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave a site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on-site, transfer dust and mud onto the public road network.

D.1.4 For each of these dust-generating activities, the guidance considers three separate effects:

- annoyance due to dust soiling;
- harm to ecological receptors; and

[11] Institute of Air Quality Management (2024) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2). Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf [Accessed 22/01/2025].

- risk of health effects due to a significant increase in PM_{10} exposure.

D.1.5 Receptors can be human or ecological and are selected based on their sensitivity to dust soiling and PM_{10} exposure. Sensitive receptors are defined as those properties/ schools/ hospitals that are likely to experience a change in pollutant concentrations and/ or dust nuisance due to the construction of the Proposed Development.

D.1.6 The methodology takes into account the scale at which the effects are likely to be generated (classed as small, medium or large), the levels of background PM_{10} concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of the potential impacts on local air quality as a result of the construction works.

D.1.7 There are five steps in the assessment process described in the IAQM guidance:

D.2 Step 1: Need for assessment

D.2.1 The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 250 m of a site boundary of the scheme (for ecological receptors that is 50 m) and/ or within 50 m of the route(s) to be used by construction vehicles on the public highway and up to 250 m from the site entrance(s).

D.2.2 For specific (high risk) schemes the planning authority may require a dust assessment despite the proposed site falling outside the distances above.

D.3 Step 2: Assess the risk of dust impacts

D.3.1 This step is split into three sections as follows:

- 2A. define the potential dust emission magnitude;
- 2B. define the sensitivity of the area; and
- 2C. define the risk of impacts.

D.3.2 Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria presented in Table D.1.

Table D.1: Dust Emission Magnitude

Small	Medium	Large
Demolition		
• total building volume <12,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <m above ground • demolition during wetter months	• total building volume 12,000-75,000 m^3 • potentially dusty construction material • demolition activities 6-12 m above ground level	• total building volume >75,000 m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >12 m above ground level
Earthworks		
• total site area <18,000 m^2 • soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • formation of bunds <3 m in height	• total site area 18,000 - 110,000 m^2 • moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • formation of bunds 3-6 m in height	• total site area >110,000 m^2 • potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • formation of bunds >6 m in height
Construction		
• total building volume <12,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)	• total building volume 12,000-75,000 m^3 • potentially dusty construction material (e.g. concrete) • on-site concrete batching	• total building volume >75,000 m^3 • on-site concrete batching • sandblasting
Trackout		
• <20 heavy duty vehicle (HDV) (>3.5t) outward movements in any one day • surface material with low potential for dust release • unpaved road length <50 m	• 20 – 50 HDV (>3.5t) outward movements in any one day • moderately dusty surface material (e.g. high clay content) • unpaved road length 50 – 100 m	• >50 HDV (>3.5t) outward movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100 m

D.3.3 The sensitivity of the surrounding area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. Table D.2 to Table D.4 show the criteria for defining the sensitivity of the area to different dust effects.

Table D.2: Sensitivity of the area to dust soiling effects

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 250
High	> 100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table D.3: Sensitivity of the area to human health impacts

Background PM_{10} concentrations (annual mean)	Number of receptors	Distance from the source (m)			
		< 20	**< 50**	**< 100**	**< 250**
High receptor sensitivity					
> 32µg/m³	> 100	High	High	High	Medium
	10 – 100			Medium	Low
	1 - 10		Medium	Low	
28 – 32µg/m³	> 100	High	High	Medium	Low
	10 – 100		Medium	Low	
	1 - 10				
24 – 28µg/m³	> 100	High	Medium	Low	Low
	10 – 100				
	1 - 10	Medium	Low		
< 24µg/m³	> 100	Medium	Low	Low	Low
	10 – 100	Low			
	1 - 10				
Medium receptor sensitivity					
> 32µg/m³	> 10	High	Medium	Low	Low
	1 - 10	Medium	Low		
28 – 32µg/m³	>10	Medium	Low	Low	Low
	1 -10	Low			

Background PM_{10} concentrations (annual mean)	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 250
24 – 28µg/m³	>10	Low	Low	Low	Low
	1 -10				
< 24µg/m³	>10	Low	Low	Low	Low
	1 -10				
Low receptor sensitivity					
–	≤ 1	Low	Low	Low	Low

Table D.4: Sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	< 20	< 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

D.3.4 The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures (Table D.5) and an overall risk for the site derived.

Table D.5: Risk of dust impacts

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site

Sensitivity of area	Dust emission magnitude		
	Large	**Medium**	**Small**
Low	Low risk site	Low risk site	Negligible

D.4 Step 3: Determine the site-specific mitigation

D.4.1 Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

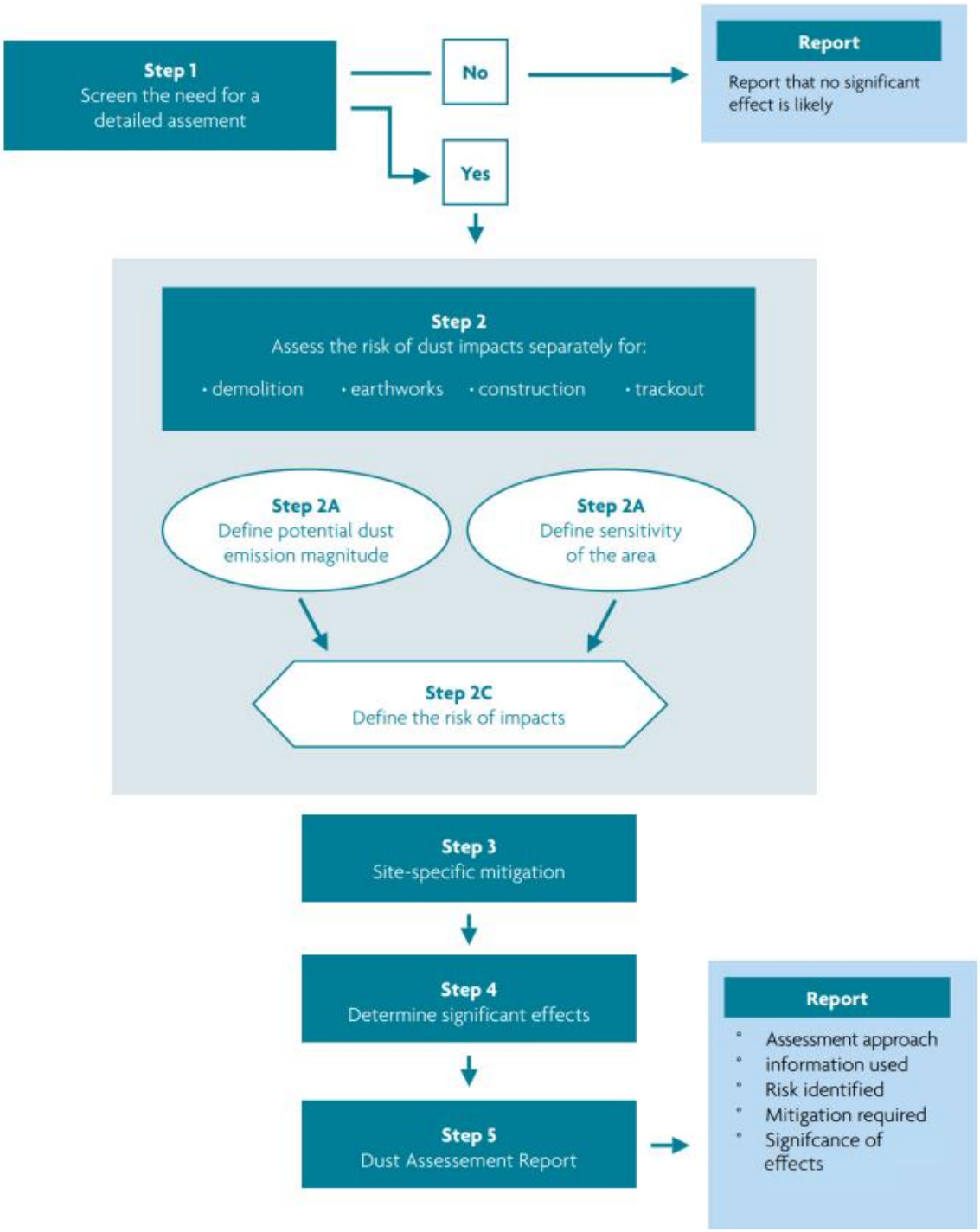
D.5 Step 4: Determine any significant residual effects

D.5.1 Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will be **not significant** in most cases.

D.6 Step 5: Prepare a dust assessment report

D.6.1 The last step of the assessment is the preparation of a Dust Assessment Report. This will form a technical appendix to the Air Quality chapter of the ES.

Picture D.1: IAQM Dust Methodology



E Biodiversity Desk Study Results – Designated Sites

E.1 Overview

E.1.1 This appendix should be read in conjunction with Section 6.2: Biodiversity which it informs and accompanies.

Table E.1. Internationally Important Statutory Designated Sites within 15 km of the Proposed Development Site.

Site Name	Reason for Designation
Teesmouth and Cleveland Coast Special Protection Area (SPA)	The site qualifies under Article 4 of the Birds Directive (2009/147/EC) for the following reasons[12]: The site regularly supports more than 1% of the Great Britain populations of five species listed in Annex I of the EC Birds Directive: • Pied avocet (*Recurvirostra avosetta*); • Sandwich tern (*Thalasseus sandvicensis*); • Common tern (*Sterna hirundo*); • Little tern (*Sternula albifrons*); and • Ruff (*Calidris pugnax*). The site regularly supports more than 1% of the biogeographic population of two regularly occurring migratory species not listed in Annex I of the EC Birds Directive: • Red knot (*Calidris canutus*); and • Common redshank (*Tringa totanus*). The site qualifies under Article 4 of the Birds Directive (2009/147/EC) as it used regularly by over 20,000 waterfowl (waterfowl as defined by the Ramsar Convention) or 20,000 seabirds in any season.
Teesmouth and Cleveland Coast Ramsar	Teesmouth and Cleveland Coast Ramsar site is designated as a wetland of international importance because[13]: The site qualifies under Ramsar criterion 5 as it is regularly used by over 20,000 waterbirds in any season. The site qualifies under criterion 6 as it is regularly used by 1% or more of the biogeographic populations of the following bird species in any season: • Red knot; and • Common redshank.

[12] Natural England (2020) European Site Conservation Objectives for Teesmouth & Cleveland Coast SPA (UK9006061). Available at: https://publications.naturalengland.org.uk/publication/6619918699069440 [Accessed 22/01/2025].
[13] Ramsar Sites Information Service (2004) Northumbria Coast Ramsar Information Sheet. Available at: https://rsis.ramsar.org/ris/1019 [Accessed 22/01/2025].

Site Name	Reason for Designation
North York Moors Special Area of Conservation (SAC)	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I[14]: • Blanket bogs; • European dry heaths; and • Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath).
North York Moors Special Protection Area (SPA)	The site qualifies under article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain population of two species listed in Annex I in any season[15]: • Merlin (*Falco columbarius*); and • European golden plover (*Pluvialis apricaria*).
Northumbria Coast SPA	The site qualifies under Article 4 of the Birds Directive (2009/147/EC) for the following reasons[16]: The site regularly supports more than 1% of the GB populations of two species listed in Annex I of the EC Birds Directive: • Arctic tern (*Sterna paradisaea*); and • Little tern. The site regularly supports more than 1% of the biogeographical population of two regularly occurring migratory species not listed in Annex I of the EC Birds Directive: • Turnstone (*Arenaria interpres*); and • Purple sandpiper (*Calidris maritima*).
Northumbria Coast Ramsar	The site supports internationally important wintering populations of turnstone and purple sandpiper[17].
Durham Coast SAC	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I[18]: • Vegetated sea cliffs of the Atlantic and Baltic coasts.
Castle Eden Dene SAC	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I[19]: • *Taxus baccata* woods of the British Isles. (Yew-dominated woodland).

Table E.2: Nationally Important Statutory Designated Sites within 2 km of the Proposed Development Site

Site Name	Reason for Designation
Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI)	The Teesmouth and Cleveland Coast SSSI is of special interest for the following nationally important features that occur within and are supported by the wider mosaic of coastal and freshwater habitats[20]: • Jurassic geology; • Quaternary geology; • sand dunes; • saltmarshes; • breeding harbour seals (*Phoca vitulina*);

Site Name	Reason for Designation
	• breeding avocet, little tern and common tern; • a diverse assemblage of breeding birds of sand dunes, saltmarsh and lowland open waters and their margins; • non-breeding shelduck (*Tadorna tadorna*), shoveler (*Spatula clypeata*), gadwall (*Mareca strepera*), ringed plover (*Charadrius hiaticula*), knot, ruff, sanderling (*Calidris alba*), purple sandpiper, redshank and Sandwich tern; • an assemblage of more than 20,000 waterbirds during the non-breeding season; and • a diverse assemblage of invertebrates associated with sand dunes.
Teesmouth National Nature Reserve (NNR)	The Teesmouth NNR is designated for[21]: • >20,000 waterbird assemblage; • Avocet (breeding); • Biodiversity action plan (BAP) breeding birds; including waders, grey partridge (Perdix perdix), skylark (*Alauda arvensis*), linnet (*Linaria cannabina*), and reed bunting (*Emberiza schoeniclus*); • Harbour seal; • Invertebrate assemblages; • Knot (non-breeding); • Little tern (breeding); • Lyme grass moth (*Photedes elymi*); • Redshank (non-breeding); • Saltmarsh plant assemblages; • Sand dune plant assemblages;

[14] Natural England (2014) European Site Conservation Objectives for North York Moors SAC (UK0030228). Available at: https://publications.naturalengland.org.uk/publication/6048216608931840 [Accessed 22/01/2025].
[15] Natural England (2014) European Site Conservation Objectives for North York Moors SPA (UK9006161). Available at: https://publications.naturalengland.org.uk/publication/6207512114102272 [Accessed 22/01/2025].
[16] Natural England (2014) European Site Conservation Objectives for Northumbria Coast SPA and pSPA (UK9006131). Available at: https://publications.naturalengland.org.uk/publication/6372874327687168 [Accessed 22/01/2025].
[17] Ramsar Sites Information Service (2004) Northumbria Coast Ramsar Information Sheet. Available at: https://rsis.ramsar.org/ris/1019 [Accessed 22/01/2025].
[18] Natural England (2014) European Site Conservation Objectives for Durham Coast SAC (UK0030140). Available at: https://publications.naturalengland.org.uk/publication/4949450761961472 [Accessed 22/01/2025].
[19] Natural England (2014) European Site Conservation Objectives for Castle Eden Dene SAC (UK0012768). Available at: https://publications.naturalengland.org.uk/publication/5362023844020224 [Accessed 22/01/2025].
[20] Natural England (2018). Designated Site View; Teesmouth and Cleveland Coast SSSI. Available at: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S2000856&SiteName=teesmouth&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= [Accessed 22/01/2025].
[21] Natural England (2023) Designated Sites View; Teesmouth NNR. Available at: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=1006937&SiteName=teesmouth&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= [Accessed 22/01/2025].

Site Name	Reason for Designation
	• Sanderling (non-breeding); • Sandwich tern (post-breeding); • Shelduck (winter); • Tees Lowlands JCA feature; and • World War II defensive structures - Blockhouses, tank traps.
Lovell Hill Ponds SSSI	Lovell Hill Pools is set within an undulating, well-wooded agricultural landscape to the north of the North York Moors. The site supports an outstanding assemblage of dragonflies and damselflies as well as populations of both great crested newt (*Triturus cristatus*) and smooth newt (*Lissotriton vulgaris*). The following species are known to breed at the site: azure damselfly (*Coenagrion puella*), variable damselfly (*Coenagrion pulchellum),* common blue damselfly (*Enallagma cyathigerum*), large red damselfly (*Pyrrhosoma nymphula*), blue-tailed damselfly (*Ischnura elegans*), emerald damselfly (*Lestes sponsa*), southern hawker (*Aeshna cyanea*), common hawker (*Aeshna juncea*), four-spotted chaser (*Libellula quadrimaculata*), ruddy darter (*Sympetrum sanguineum*) and common darter (*Sympetrum striolatum*). Other invertebrates of restricted distribution in north-east England, present on the site, include the dingy skipper butterfly (*Erynnis tages*), a pondskater (*Gerris lateralis*), and a water spider (*Argyroneta aquatica*)[22].
Briarcroft Pasture SSSI	Briarcroft Pasture is nationally important for its areas of species rich unimproved neutral grassland. The relevant National Vegetation Classification (NVC) community is MG5: crested dog's tail (*Cynosurus cristatus*) and common knapweed (*Centaurea nigra*) grassland. Though formerly widespread, such grasslands (along with many of the characteristic species they support) are increasingly rare in the Tees Lowlands Natural Area. This site is one of two remaining examples of this habitat within this Natural Area. The other being Whitton Bridge Pasture SSSI.
Whitton Bridge Pasture SSSI	Whitton Bridge Pasture is nationally important for its areas of species rich unimproved neutral grassland. The relevant NVC community is MG5: crested dog's tail (*Cynosurus cristatus*) and common knapweed (*Centaurea nigra*) grassland. Though formerly widespread, such grasslands (along with many of the characteristic species they support) are increasingly rare in the Tees Lowlands Natural Area. This site is one of two remaining examples of this habitat within this Natural Area. The other being Briarcroft Pasture SSSI.

[22] Natural England (1999) Designated Site View; Lovell Hill Pools SSSI. Available at: https://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S2000387&SiteName=lovell%20hill%20&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= [Accessed 22/01/2025].

Table E.3. Locally Important Statutory Designated Sites within 2 km of the Proposed Development Site

Site Name	Reason for Designation
Cowpen Bewley Woodland Country Park Local Nature Reserve (LNR)	Cowpen Bewley Woodland Country Park LNR is a rural designation managed by Stockton-on-Tees Borough Council (SBC). The 50 hectares (ha) site was reclaimed from former brickworks, landfill and former agricultural land. Although still in the early stages of growth, rapid development has led to the site's large variety of habitats and wildlife. These include grassland, a lake, a series of ponds and a beck flows around the boundary. The abundant wildlife consists of 80 species of bird, waterfowl, toads, newts and dragonflies in and around the ponds and 18 species of butterfly, hares, foxes and small mammals in the grassland[23].
Charlton's Pond LNR	An urban designation managed by SBC. Former clay pit with a two lake complex in mature woodland park, covering an area measures eight ha. Consists of wetlands, amenity grassland and woodland. Part is also managed as a wildlife sanctuary[24].
Seaton Dunes and Common LNR	An urban fringe designation managed by Hartlepool Borough Council (HBC). The site consists of two separate and distinct components, totalling 96.35ha, Seaton Dunes to the east and Seaton Common further inland. The Common is a low lying marsh criss- crossed by a network of creeks and ditches, an ideal habitat for migrant and over wintering wildfowl[25].
Berwick Hills Community Park LNR	An urban fringe designation managed by Middlesborough Borough Council. This former derelict allotment land, covering 9.29ha, has been transformed into wildflower meadows, new woodlands, and ponds which provide a home to frogs, toads and newts. Ormesby Beck meanders through the nature reserve flanked by tall waterlogged reedbeds, which are expanding here. Water vole burrow in the beck banks and feed on waterside plants[26].

[23] Natural England (2023) Designated Sites View; Cowpen Bewley Woodland Country Park LNR. Available at https://designatedsites.naturalengland.org.uk/SiteLNRDetail.aspx?SiteCode=L1008853&SiteName=cowpen&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= [Accessed 22/01/2025].
[24] Natural England (2023) Designated Sites View; Charlton's Pond LNR. Available at: https://designatedsites.naturalengland.org.uk/SiteLNRDetail.aspx?SiteCode=L1009735&SiteName=charlton&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= [Accessed 22/01/2025].
[26] Natural England (2023) Designated Sites View; Berwick Hills Community Park LNR. Available at: https://designatedsites.naturalengland.org.uk/SiteLNRDetail.aspx?SiteCode=L1009179&SiteName=berwick%20&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= [Accessed 22/01/2025].
[26] Natural England (2023) Designated Sites View; Berwick Hills Community Park LNR. Available at: https://designatedsites.naturalengland.org.uk/SiteLNRDetail.aspx?SiteCode=L1009179&SiteName=berwick%20&countyCode=&responsiblePerson=&SeaArea=&IFCAArea= [Accessed 22/01/2025].

Table E.4. Non-Statutory Designated Sites within 2 km of the Proposed Development Site.

Site Name	Reason for Designation
Cowpen Bewley Woodland Park Local Wildlife Site (LWS)	Former brickworks/ landfill. Country park comprising new woodland, grassland, ponds and lakes. The site supports great crested-newt.
Eston Pumping Station LWS	Mosaic of habitats.
Greatham Creek North Bank Saltmarsh LWS	C1 Saltmarsh. Small area of saltmarsh vegetation. Some ornithological interest but not sufficient to merit LWS status on its own. Vegetation is dominated by saltmarsh grass (*Puccinellia sp*.) with a narrow fringe of glasswort (*Salicornia sp*.).
Greatham North West LWS	C1 Saltmarsh designated for saltmarsh vegetation; weeping alkali grass (*Puccinellia distans*), Salicornia sp., salt sandsburry (*Spergularia marina*), sea milkweed (*Lysimachia maritima*), and lapwing (*Vanellus vanellus*).
Greenabella Marsh LWS	Rough grassland with areas of wetland. Contiguous with the Teesmouth and Cleveland Coast SPA and Ramsar. Notable populations of amphibians, common lizard (*Zootoca vivipara*), birds, invertebrates including grayling butterfly (*Hipparchia semele*) and dingy skipper (*Erynnis tages*) have been recorded.
Tot Fenny's Meadow LWS	Only known example of MG4 in Cleveland. Some wetland habitats. At least 3 grasses & 5 herbs from Neutral Grassland LWS criteria. 6 species from Fens & flushes criteria. G1 Neutral grassland E1 Wetlands.
Coatham Marsh LWS	C1 Saltmarsh, C2 Coastal grasslands, E1 flushes, seepages, springs etc. G1 Neutral grasslands, U1 Urban grasslands, V2 Vascular Plants.
Saltern Saltmarsh LWS	Remnants of saltmarsh vegetation in tidal creeks, notably Puccinellia distans, Salicornia sp, Spergularia marina, Glaux maritima. The area supports c3.7% of total SPA bird numbers and is an important site for breeding lapwing. C1 Saltmarsh.
Wilton Woods Complex LWS	W1 Ancient woodland, W2 Broad leaved woodland and replanted ancient woodland.
Phillips Tank Farm Grassland LWS	Areas of industrial grassland with calcareous flora & wetland. Large population of dingy skipper (*Erynnis tages*). At least 4 amphibian species including great crested newt (*Triturus cristatus*) and water vole. The area supports c3.7% of total SPA bird numbers plus breeding lapwing (*Vanellus vanellus*).
Zinc Works Bird Field LWS	An area of reclaimed land. Closely grazed grassland on the coastal migration flyway. Good numbers of wintering and migratory waterbirds & very important for migratory passerines. >0.5% of the national population of passage ring ousels (*Turdus torquatus*) recorded.

Site Name	Reason for Designation
Teessaurus Park LWS	Located on south bank of River Tees and was part of a major reclamation scheme. There are areas of mown amenity grassland and areas of varied grass and herb mix. The herb species include kidney vetch (*Anthyllis vulneraria*), vipers bugloss (*Echium vulgare*), great lettuces (*Lactuca sativa*) and tansy (*Tanacetum vulgare*).
Hartlepool Power Station Grassland and Wetland LWS	Ungrazed grassland with pools and large areas of scrub. The breeding bird community includes stonechat (*Saxicola torquatus*), sedge warbler (*Acrocephalus schoenobaenus*) and grasshopper warbler (*Locustella naevia*). Great crested newt and common lizard present in 2008 and 2009.
Seaton Common LWS	A torch survey in March 2012 counted approximately 3,500 breeding common toads (*Bufo bufo*). Total may be significantly higher than this. Water vole were formerly found in the ditches on Seaton Common.

E.2 Biodiversity Desk Study Results – Protected and Notable Species

E.2.1 Notable Flora

E.2.2 The Environmental Records Information Centre for the Northeast of England (ERIC NE) dataset provided 129 records of protected/ notable floral species, from the last ten years, within 2 km of the Indicative Proposed Development Site[27]. The species are largely associated with neutral grassland, calcareous grassland and coastal habitats. Four of the records were located within the indicative Proposed Development Site; carline thistle (*Carlina vulgaris*), wild strawberry annual beard-grass (*Polypogon monspeliensis*) and Gymnadenia conopsea agg. Carline thistle is listed as Near Threatened, while wild strawberry is on the Red List and Gymnadenia conopsea agg. is an Annex B species from The Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)[28].

E.2.3 Invasive Non-Native Species

E.2.4 Eight records of Invasive Non-Native Species (INNS) listed on Schedule 9 of the Wildlife and Countryside Act (WCA)[29], including Japanese rose (*Rosa*

[27] The indicative Proposed Development Site is used herein as a term, recognising that this was a point in time snapshot and that the indicative order limits are likely to continue to evolve up to the point of submission of the Application.
[28] Convention on International Trade in Endangered Species of Wild Fauna and Flora (2023) Gymnadenia conopsea. Available at: https://cites.org/eng/taxonomy/term/25559 [Accessed 22/01/2025].
[29] UK Government (1981) Wildlife and Countryside Act 1981.

rugosa), wall cotoneaster (*Cotoneaster horizontalis*), Japanese knotweed (*Fallopia japonica*), floating pennywort (*Hydrocotyle ranunculoides*), and Himalayan cotoneaster (*Cotoneaster simonsii*). The most recent record of Japanese knotweed dated from 2022 and was located approximately 1.5 km south of the Indicative Proposed Development Site; whilst the closest record is of Japanese rose dated 9 June 2018, located approximately 390 m north-east of the Indicative Proposed Development Site.

E.2.5 Amphibians

E.2.6 The ERIC NE dataset returned 10,174 records of amphibians within 2 km of the Indicative Proposed Development Site in the last ten years. This included 12 records for common frog (*Rana temporaria*), 10,097 records of common toad (*Bufo bufo*), 58 records of smooth newt (*Lissotriton vulgaris*), and seven records of great crested newt (GCN) (*Triturus cristatus*). The most recent records are for common toad, smooth newt and common frog dated from April to May 2022 located approximately 470 m north-west of the Indicative Proposed Development Site. The closest records are of common frog from 2018 and 2019, located within the Proposed Development Site at Cowpen Bewley Woodland Park.

E.2.7 All amphibians are protected by law in the UK under Schedule 5 of WCA[29]. Common toad and great crested newt are also species of principle importance (SoPI) in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act[30]. GCN are also a species of local importance under the Tees Valley Biodiversity Action Plan (BAP)[31].

E.2.8 Three of the statutory designated sites identified within 15 km of the Indicative Proposed Development Site; Lovell Hill Ponds SSSI, Cowpen Bewley Woodland Country Park LNR, and Berwick Hills Community Park LNR, list amphibian species as a designating feature.

E.2.9 Five non-statutory designated sites within 2 km of the Proposed Development; Cowpen Bewley Woodland Park LWS, Greenabella Marsh LWS, Phillips Tank Farm Grasslands LWS, Hartlepool Power Station Grassland and Wetland LWS and Seaton Common LWS, mention populations of amphibians within their citations. Phillips Tank Farm Grasslands LWS specifically notes a *"large"* population of GCN.

E.2.10 One hundred and five waterbodies were identified within 250 m of the

[30] UK Government (2006) Natural Environment and Rural Communities Act 2006.
[31] Tees Valley Nature Partnership (2012) Tees Valley Biodiversity Action Plan. Available at: https://safe.rbi-umbrella.com/doc/docview/viewer/docN212079E07CE82cc39d996def3517b90b5b7e522f642fa6e582935f9675fc08d6d7e9995b5a1e [Accessed 22/01/2025].

Indicative Proposed Development Site through a review of Ordnance Survey (OS) maps and aerial photography. This distance aligns with GCN movement limits of approximately 250 m, as recommended by conservation guidance[32,33].

E.2.11 GCN prefer freshwater habitats as its crucial for breeding and larval development, so are less likely to occupy brackish waters[34,35]. Seventeen waterbodies were therefore excluded from further consideration based on local knowledge of GCN presence from Industry Nature Conservation Association (INCA) and OS Mastermap data indicating connections to tidal areas such as Greatham Creek or the River Tees Estuary.

E.2.12 An additional 59 waterbodies, isolated by major barriers (roads, industrial development) and standalone artificial waterbodies linked to chemical works and gas processing infrastructure (e.g., chemical works tanks surrounded by hard standing), were also excluded due to ongoing operational use, minimising the likelihood of GCN presence and a lack of habitat connectivity with the Indicative Proposed Development Site.

E.2.13 A total of 29 'suitable' waterbodies were subject to habitat suitability index (HSI) assessment and 25 of these were then sampled for GCN environmental DNA (eDNA) due to good or excellent scores. Only one of the ponds, located in Cowpen Bewley Woodland Park, provided a positive result for GCN eDNA.

E.2.14 Badger

E.2.15 The ERIC NE dataset provided three records of Eurasian badger (*Meles meles*), hereafter referred to as 'badger', from the past ten years within 2 km of the Indicative Proposed Development Site. The closest and most recent records were from 2014, located approximately 1.8 km north-west of the Indicative Proposed Development Site.

E.2.16 Badgers and their setts are protected by law in the UK under the Protection of Badgers Act 1992[36].

E.2.17 None of the statutory and non-statutory designated sites identified within 15

[32] Langton T, Beckett C and Foster J (2001) Great Crested Newt Conservation Handbook. Froglife, Suffolk.
[33] Natural England (2020) Great Crested Newt Method Statement for EPS License Application. Available at: https://www.gov.uk/government/publications/great-crested-newts-apply-for-a-mitigation-licence [Accessed 22/01/2025].
[34] Beebee, T.J.C. and Griffiths, R.A. (2000) Amphibians and Reptiles: A Natural History of the British Herpetofauna.
[35] Sparreboom, M., van Delft, J. J., & Maarschalkerweerd, R. J. (2008) Ponds for the reintroduction of Great Crested Newts: an evaluation of their amphibian and aquatic vegetation communities. Water and Environment Journal, 22(2), 100-107.
[36] UK Government (1992) Protection of Badgers Act 1992.

km and 2 km, respectively, of the Proposed Development Site listed badger as a designating feature.

E.2.18 Bats

E.2.19 The ERIC NE dataset provided 21 records of bat species from the past ten years within 2 km of the Indicative Proposed Development Site, including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), *Myotis* sp., and noctule bat (*Nyctalus noctula*). The closest bat records were three counts of noctule and one common pipistrelle located approximately 480 m south of the Indicative Proposed Development Site at RSPB Saltholme from 20 July 2019. The most recent records were two common pipistrelle approximately 660 m east of the Indicative Proposed Development Site at Kirkleatham from 24 September 2022.

E.2.20 All bat species and their roosts are protected by law in the UK under Schedule 5 of WCA[29]. Soprano pipistrelle are also a SoPI in England under Section 41 of the NERC Act[30]. All bat species, except common pipistrelle are of local importance under the Tees Valley BAP[31].

E.2.21 None of the statutory and non-statutory designated sites identified within 15 km and 2 km, respectively, of the Indicative Proposed Development Site listed bats as a designating feature.

E.2.22 Birds – Breeding

E.2.23 The ERIC NE dataset returned 113,327 records of birds recorded in the spring/ summer months (March-August), from the past ten years, within 2 km of the Indicative Proposed Development Site, comprising 183 different species. Of these, 99 are resident/ summer bird species.

E.2.24 Of these resident/ summer species, 70 are notable and can be summarised as:

- thirty-seven species are legally protected by Schedule 1 of WCA29;
- seven species are qualifying features of the Teesmouth and Cleveland Coast SPA – avocet, common tern, knot, little tern, redshank (*Tringa totanus*), ruff, and sandwich tern;
- two species are qualifying features of the Teesmouth and Cleveland Coast Ramsar – knot and redshank;
- two species are qualifying features of the North York Moors SPA – golden plover and merlin;
- three species are qualifying features of the Northumbria Coast SPA – arctic tern, little tern and turnstone;

- one species is a qualifying feature of the Northumbria Coast Ramsar – turnstone;
- three species are breeding bird qualifying features of the Teesmouth and Cleveland Coast SSSI; avocet, common tern and little tern;
- six species are breeding bird qualifying features of the Teesmouth NNR –avocet, grey partridge, linnet, little tern, reed bunting and skylark (*Alauda arvensis*);
- forty-six species are Birds of Conservation Concern (BoCC) Red listed species[37];
- seventy-one species are BoCC Amber listed species[37];
- thirty-three species are SoPI under the NERC Act[30]; and
- nine species are of local importance in the Tees Valley BAP[31] – barn owl (*Tyto alba*), bittern, grey partridge, little tern, ringed plover, shelduck, swift, tree sparrow, and yellow wagtail.

E.2.25 There are 233 records within the Indicative Proposed Development Site of these resident/ summer bird species. The most recent was a single record of a cuckoo on 24 May 2019 within the Cowpen Bewley Woodland Park. The closest records were for single counts of goldfinch, herring gull, linnet and song thrush, which were located approximately 1.0 km south-west of the Indicative Proposed Development Site at Haverton Hill Road, dated 17 June 2022.

E.2.26 Eleven statutory designated sites identified within 15 km of the Indicative Proposed Development Site list bird species or breeding birds as a designating feature. Five non-statutory designated sites within 2 km of the Indicative Proposed Development Site list bird species or breeding birds within their citations.

E.2.27 Birds - Wintering

E.2.28 The ERIC NE dataset returned 139,153 records of birds recorded in the winter months (October-February), from the past ten years, within 2 km of the Indicative Proposed Development Site, comprising 157 different species. Of these, 106 are resident/ winter bird species.

E.2.29 Of the 106 resident/ winter species, 83 are notable and can be summarised

[37] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021) The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747. Available at: https://www.bto.org/sites/default/files/publications/bocc-5-a5-4pp-single-pages.pdf [Accessed 22/01/2025].

as:

- twenty-five species are legally protected by Schedule 1 of WCA[29];
- four species are qualifying features of the Teesmouth and Cleveland Coast SPA – avocet, knot, redshank, and ruff;
- two species are qualifying features of the Teesmouth and Cleveland Coast Ramsar – knot and redshank;
- two species are qualifying features of the North York Moors SPA – golden plover and merlin;
- one species are qualifying features of the Northumbria Coast SPA and Ramsar – turnstone;
- eight species are breeding bird qualifying features of the Teesmouth and Cleveland Coast SSSI; avocet, gadwall, knot, redshank, ringed plover, ruff, sanderling and shelduck;
- eight species are breeding bird qualifying features of the Teesmouth NNR –avocet, knot, linnet, redshank, reed bunting, sanderling, shelduck, and skylark;
- twenty-seven species are BoCC Red listed species[37];
- fifty-three species are BoCC Amber listed species[37];
- fifteen species are SoPI under the NERC Act[30]; and
- three species are of local importance in the Tees Valley BAP[31] - bittern, ringed plover, and shelduck.

E.2.30 There are 401 records within the Indicative Proposed Development Site of these resident/ winter bird species. The most recent was a single record of a jay on 15 January 2021 within the Cowpen Bewley Woodland Park.

E.2.31 The most recent records within 2 km of the Indicative Proposed Development Site were single counts of barnacle goose (*Anser barnaculus*), black-tailed godwit (*Limosa limosa*), coot (*Fulica atra*), curlew (*Numenius arquata*), golden plover (*Pluvialis apricaria*), great tit (*Parus major*), greenfinch (*Chloris chloris*), greylag goose (*Anser anser*), kestrel (*Falco tinnunculus*), lapwing (*Vanellus vanellus*), mallard (*Anas platyrhynchos*), moorhen (*Gallinula chloropus*), redshank (*Tringa totanus*), ruff (*Calidris pugnax*), shelduck (*Tadorna tadorna*), shoveler (*Anas clypeata*), starling (*Sturnus vulgaris*), teal (*Anas crecca*) and wigeon (*Anas penelope*) with a pair of blue tits (*Cyanistes caeruleus*), gadwall (*Mareca strepera*) and little grebe (*Tachybaptus ruficollis*) approximately 150 m south-west of the Indicative Proposed Development Site at RSPB Saltholme, dated 31 October 2022.

E.2.32 Eleven statutory designated sites identified within 15 km of the Indicative Proposed Development Site list bird species or wintering birds as a

designating feature. Five non-statutory designated sites within 2 km of the Indicative Proposed Development Site list bird species or wintering birds within their citations.

E.2.33 Terrestrial Invertebrates

E.2.34 The ERIC NE dataset returned records of 49,063 notable invertebrate species from within 2 km of the Indicative Proposed Development Site over the last ten years. Twenty-five of these records are located within the Indicative Proposed Development Site; most of which are for butterfly species, dated from 2014 to 2022. This includes small heath (*Coenonympha pamphilus*), grayling (*Hipparchia semele*), dingy skipper (*Erynnis tages*), and wall butterfly (*Lasiommata megera*) as well as the common darter dragonfly (*Sympetrum striolatum*) and cinnabar moth (*Tyria jacobaeae*). The most recent record was a single record of *Norellia spinipes* from 24 December 2022, located approximately 290 m north-west of the Indicative Proposed Development Site within Cowpen Bewley Woodland Park.

E.2.35 The diurnal surveys of the existing CATS Terminal in the summer of 2022 recorded a total of 12 species of butterfly and 15 moth species. Incidental observations of non-Lepidopteran insects recorded 14 species, of which three were beetles, three were flies, four were bees, three damselflies/ dragonflies and one grasshopper[38].

E.2.36 Nocturnal surveys of the existing CATS Terminal recorded a total of 167 species of moth[38]. Of these 167 moth species:

- five are listed as Nationally Scarce;
- eighteen are listed as being local, meaning that they are localised or uncommon across the UK, but not rare; and
- eight are of restricted distribution within the North-East and Yorkshire regions.

E.2.37 The review of historical data since 2008, provided by INCA and its associates for the land at and adjacent to the existing CATS Terminal, found no legally protected species within the past ten years, although many species of conservation significance were identified, as summarised below[39, 40,41].

[38] Ove Arup & Partners Ltd (2022) Invertebrate Survey Results – CATS Terminal. File reference: 286378-ARP-XX-XX--YE-0009.
[39] Woods. R. (2011) Teesside Brownfield Stepping Stones Project, Results of a 2010 Lepidoptera Study; Report to Buglife – the Invertebrate Conservation Trust; INCA.
[40] Woods. R. (2013) The Restoration and Creation of Habitat to Conserve Key BAP Insect Species on Tees Valley Brownfield Sites; INCA.
[41] Woods. R. (2022) Results of a Lepidoptera Study of locations at the CATS Terminal Seal Sands, INCA.

E.2.38 Andrew Grayson, a specialist in the *Diptera* (flies), recorded three species of national conservation concern at the existing CATS Terminal during the spring and summer of 2010[42] and 2013[43]; the solitary wasp (*Nysson trimaculatus*); the mining bee (*Andrena nigriceps*); and the fly (*Thecophora fulvipes*) whose larvae are parasitic upon certain species of mining bees. All three of these species have 'Notable' national status while the solitary wasp is also a SoPI under the NERC Act[30].

E.2.39 Within the same area, from 2008 to 2024, 15 species of butterfly and over 230 species of moth have been recorded. Two of the butterfly species; the dingy skipper (*Erynnis tages*) and grayling (*Hipparchia semele*) are of national conservation concern and the site supports strong populations of them. A further butterfly species of national importance, the small blue (*Cupido minimus*), was introduced to the reedbed area of the Indicative Proposed Development Site in 2019 as part of a re-wilding initiative for this species and has since become established there. All three butterfly species of SoPI under the NERC Act[30] with the dingy skipper and grayling also species of local importance under the Tees Valley BAP[31].

E.2.40 The following uncommon grassland moth species were recorded and are listed with their likely larval foodplant:

- Bordered sallow (*Pyrrhia umbra*) uses common restharrow (*Ononis repens*);
- Eucosma hohenwartiana uses black knapweed (*Centaurea nigra*);
- Lesser treble-bar (*Aplocera efformata*) uses St. John's-wort (*Hypericum perforatum*);
- Small elephant-hawk moth (*Deilephila porcellus*) uses lady's bedstraw (*Galium verum*);
- the gelechiids (*Aproaerema anthyllidella*) uses kidney vetch (*Anthyllis vulneraria*);
- Aproaerema sangiella uses common bird's-foot trefoil (*Lotus corniculatus*);
- Chionodes distinctella uses common bird's-foot trefoil;
- Oxypteryx wilkella uses specialised mosses;
- Depressaria badiella uses common cat's-ear (*Hypochaeris radicata*);
- Pyrausta despicata uses ribwort plantain (*Plantago lanceolata*); and

[42] Grayson. A. (2011) Teesside Brownfield Stepping Stones Project, Invertebrate Survey 2010; A Report to Buglife – the Invertebrate Conservation Trust.
[43] Grayson. A. (2014) Teesside Brownfield Stepping Stones Project, Invertebrate Survey 2013; A Report to Buglife – the Invertebrate Conservation Trust.

- the plume moth (*Oidaematophorus lithodactyla*) uses ploughman's spikenard (*Inula conyza*).

E.2.41 Scarce, dune grassland species were also recorded, including:

- Archer's dart (*Agrotis vestigialis*) uses bedstraws (*Galium sp*.); and
- White colon (*Sideridis turbida*) common restharrow and others.

E.2.42 Outside of data held by INCA there is a record of two specimens of the day-flying moth, the six belted clearwing (*Bembecia ichneumoniformis*) which uses bird's-foot trefoil as a larval foodplant. The moths were attracted to a pheromone lure in open mosaic grassland east of the existing CATS Terminal on 10 July 2022 (D Wainwright, pers.comm.). Despite use of the appropriate lure (API) by INCA in 2023, further evidence of this species during its normal flight period (late June to mid-July) could not be found. This is a significant record of a moth which is rare in northern England.

E.2.43 Four statutory designated sites identified within 2 km of the Indicative Proposed Development Site; Teesmouth and Cleveland Coast SSSI, Lovell Hill Ponds SSSI, Teesmouth NNR, and Cowpen Bewley Woodland Country Park LNR, list invertebrates as a qualifying feature.

E.2.44 Two non-statutory designated sites within 2 km of the Indicative Proposed Development Site; Greenabella Marsh and Phillips Tank Farm Grasslands LWS, also list invertebrates as a designating feature.

E.2.45 Reptiles

E.2.46 The ERIC NE dataset returned 43 records of reptiles within 2 km of the Indicative Proposed Development Site in the previous ten years, including 38 records of common lizard (*Zootoca vivipara*), one record of an undetermined pond turtle species (*Emydidae* sp.), one record of European pond terrapin (*Emys orbicularis*), two records of red-eared terrapin (*Trachemys scripta elegans*) and one record of an undetermined pond slider species (*Trachemys* sp.). The most recent record was a single counts of European pond terrapin in July 2022, located within the Indicative Proposed Development Site at Cowpen Bewley Woodland Park.

E.2.47 Common lizard are also a SoPI under the NERC Act[30] and a species of local importance under the Tees Valley BAP[31].

E.2.48 None of the statutory designated sites identified within 15 km the Indicative Proposed Development Site list reptile species as a designating feature.

E.2.49 Two of the non-statutory designated sites within 2 km of the Indicative Proposed Development Site; Greenabella Marsh LWS and Hartlepool Power Station Grasslands and Wetlands LWS, list reptiles, specially common lizard as a designating feature.

E.2.50 Otter

E.2.51 The ERIC NE dataset returned 13 records of Eurasian otter (*Lutra lutra*), hereafter referred to as 'otter', within 2 km of the Indicative Proposed Development Site in the previous ten years. The most recent records were two counts in November 2019, located approximately 1.8 km north-east of the Indicative Proposed Development Site, within Locke Park.

E.2.52 Otter are a SoPI under the NERC Act[30]. None of the statutory and non-statutory designated sites identified within 15 km and 2 km, respectively, of the Proposed Development Site listed otter as a designating feature.

E.2.53 Water Vole

E.2.54 The ERIC NE dataset returned 7 records of European water vole (*Arvicola amphibius*), hereafter referred to as 'water vole', within 2 km of the Indicative Proposed Development Site in the previous ten years. The most recent records were two counts on 29 May 2019. The first located approximately 260 m north of the Indicative Proposed Development Site, within Holme Crook and the second located approximately 590 m north-east of the Indicative Proposed Development Site, within Cowpen Marsh ditches.

E.2.55 Water vole are also a SoPI under the NERC Act[30] and a species of local importance under the Tees Valley BAP[31].

E.2.56 Two of the statutory designated sites identified within 5 km of the Indicative Proposed Development Site, Berwick Hills Community Park LNR and Greatham Beck LNR, list water vole as a designating feature.

E.2.57 Two of the non-statutory designated sites within 2 km of the indicative Proposed Development; Phillips Tank Farm Grassland LWS and Seaton Common LWS, list water vole as a designating feature.

E.2.58 Other Terrestrial Mammals

E.2.59 The ERIC NE dataset returned 433 records of other terrestrial mammal species within 2 km of the Indicative Proposed Development Site in the previous ten years. This includes 105 records of brown hare (*Lepus europaeus*), 16 records of Eastern grey squirrel (*Sciurus carolinensis*), 12 records of Eurasian common shrew (*Sorex araneus*), seven records of Eurasian pygmy shrew (*Sorex minutus*), two records of Eurasian water shrew (*Neomys fodiens*), 29 records of European rabbit (*Oryctolagus cuniculus*), 12 records of harvest mouse (*Micromys minutus*), 92 records of roe deer (*Capreolus capreolus*), ten records of stoat (*Mustela erminea*), 29 records of weasel (*Mustela nivalis*) and 119 records of West European hedgehog (*Erinaceus europaeus*).

E.2.60 The most recent records were two counts of Eastern grey squirrel in January

2023, located approximately 1.2 km north-east of the Indicative Proposed Development Site.

E.2.61 Brown hare, West European hedgehog and harvest mouse are also a SoPI under the NERC Act[30]. In addition, brown hare and harvest mouse are species of local importance under the Tees Valley BAP[31].

E.2.62 None of the statutory and non-statutory designated sites identified within 15 km and 2 km, respectively, of the Indicative Proposed Development Site listed any of these terrestrial mammals as a designating feature.

F Gazetteer of Cultural Heritage Assets

F.1 Designated Heritage Assets in the Inner Study Area

F.1.1 This appendix should be read in conjunction with Section 6.4: Cultural Heritage which it informs and accompanies.

Table F.1: Designated heritage assets in the inner Study Area

List Entry No.	Asset Name	Asset Description	Designation
1139244	Ivy House	House dated to the 17th century.	Grade II* Listed Building
1139242	Little Neuk Farm Cottage	House dated to the 18th century.	Grade II Listed Building
1139243	Nightingale's Farmhouse and Barn Adjoining	House and barn dating to the 19th century.	Grade II Listed Building
1139245	Barn to West of Ivy House	Barn of 17th or early 18th century date.	Grade II Listed Building
1329832	Village Farm House	House dated c.1700.	Grade II Listed Building
1329833	Hall's Farmhouse	Early 19th century, late Georgian house.	Grade II Listed Building
n/a	Cowpen Bewley Conservation Area	The Cowpen Bewley Conservation Area is centred on the medieval core of the village, a linear settlement focused upon Cowpen Lane. The conservation area boundary also includes a number of fields surrounding the village which contain medieval ridge and furrow earthworks.	Conservation area

F.2 Non-Designated Heritage Assets in the Inner Study Area

Table F.2: Non-designated heritage assets in the inner Study Area

HER No.	Asset Name	Asset Description	Period	Source
n/a (see Event 977; Appendix C.5)	Bronze Age Ditches	A series of ditches which contained Bronze Age pottery were identified during a watching brief at Wilton International complex, undertaken by Cotswold Archaeology in 2018-2019 (Cotswold Archaeology 2019).	Bronze Age	Redcar & Cleveland Historic Environment Record (HER); Cotswold

HER No.	Asset Name	Asset Description	Period	Source
				Archaeology 2019
1458	Cowpen Bewley: Coin Findspot	A silver denarius of Faustina II 127-175 was found by a metal detectorist, who gave the coin to the owner of Manor House Farm, Cowpen Bewley.	Romano-British	Tees Archaeology HER
9068	Saltholme, Cowpen Bewley	Ditches and gullies indicating the presence of a series of enclosures containing Romano-British settlement activity were identified during an archaeological evaluation in 2019 by Archaeological Services Durham University (see Event 1468).	Romano-British	Tees Archaeology HER
9438	Saltholme, Cowpen Bewley	The base of a rotary quern was recovered from a ditch during an excavation and watching brief in 2019 by Archaeological Services Durham University (see Events 1497 and 1498).	Romano-British	Tees Archaeology HER
9439	Saltholme, Cowpen Bewley	Three corn driers were discovered during excavation work in 2019 by Archaeological Services Durham University (see Event 1497).	Romano-British	Tees Archaeology HER
9502	Saltholme, Cowpen Bewley	A trumpet brooch of 1st to 2nd century date was recovered from the top fill of a ditch during excavation work in 2019 by Archaeological Services Durham University (see Event 1497).	Romano-British	Tees Archaeology HER
9523	Saltholme, Cowpen Bewley	A small assemblage of pottery sherds was found during a watching brief in 2019 by Archaeological Services Durham University (see Event 1498). The pottery dates from the 2nd to 4th centuries AD.	Romano-British	Tees Archaeology HER
355	West Coatham	A deserted medieval village, first mentioned in documentary sources from the 12th century, with the inhabitants likely associated with the developing salt industries.	Medieval	Redcar & Cleveland HER
604	Cowpen Bewley	Cowpen Bewley is a medieval village first recorded in 1154 as 'Cupum'. The first element of the place name is taken from the Old English 'cupe', meaning 'a basket or coop'. These 'coops' are thought to relate to fish traps utilised in the nearby marshes. The 'Bewley' element appears in 1678 meaning 'the beautiful place'. The settlement seems to have been involved principally in agriculture, fishing and salt production as evidenced by the numerous salterns that stud the adjacent marshes. The village takes the traditional	Medieval	Tees Archaeology HER

HER No.	Asset Name	Asset Description	Period	Source
		Norman form of two rows of properties lain out on either side of a broad green.		
624	East Of Ivy Court, Cowpen Bewley	A series of three deserted medieval property plots at the eastern end of the southern row of Cowpen Bewley village. The plots have a direct frontage to the village green. There are strong internal boundary banks and a continuous rear boundary bank, and there is evidence for platforms at the front of the plots. The earthworks were surveyed by Cleveland County Archaeology Section in 1982.	Medieval	Tees Archaeology HER
658	Cowpen Bewley	Three fields of ridge and furrow aligned east to west in the northern field and varying from ENE-WSW to NNW-SSE in the southern fields. Ploughed out by 2000, as indicated by satellite imagery.	Medieval	Tees Archaeology HER
1513	North Of Cowpen Bewley	An area of ridge and furrow earthworks to the north of Cowpen Bewley village and south of the railway. The fields are now overlain by various enclosure period and later boundaries. The ridges tend to be broad and gently curving and run east to west or north to south.	Medieval	Tees Archaeology HER
1519	South Of Cowpen Bewley	A complex series of ridge and furrow earthworks in fields lying to the south of Cowpen Bewley medieval village. The ridge and furrow is overlain in parts by enclosure period boundaries of the early 17th century. The ridges tend to be broad and gently curving.	Medieval	Tees Archaeology HER
3612	Three Horse Shoes Barn	A midden noted during topsoil stripping for a development site on plot of medieval property at 3 Horse Shoes Barn, Cowpen Bewley. A spread of bone and shell, up to 5 cm thick, was noted over the western part of the site. A small collection of medieval pottery was collected from the layer. It is possible that the material represents a levelled/raked out midden to the rear of a property on the site.	Medieval	Tees Archaeology HER
3749	West Coatham Marsh	Ovate salt-mound that likely dates to medieval salt extractive industries. No longer extant.	Medieval	Redcar & Cleveland HER

HER No.	Asset Name	Asset Description	Period	Source
3750	West Coatham Marsh	Sub-triangular salt-mound that likely dates to medieval salt extractive industries. No longer extant.	Medieval	Redcar & Cleveland HER
3751	West Coatham Marsh	Large ovate salt-mound that likely dates to medieval salt extractive industries. No longer extant.	Medieval	Redcar & Cleveland HER
3752	West Coatham Marsh	Large ovate salt-mound that likely dates to medieval salt extractive industries. No longer extant.	Medieval	Redcar & Cleveland HER
3754	West Coatham Marsh	Ovate salt-mound that likely dates to medieval salt extractive industries. No longer extant.	Medieval	Redcar & Cleveland HER
1516	West Of Seaton Carew Road	Fragmentary remnants of a ridge and furrow field to the south-west of the Fire Station on Seaton Carew Road. The furrows are relatively straight and oriented in a north to south direction. They have been interpreted as post-medieval in date.	Post-Medieval	Tees Archaeology HER
3461	Ivy House: Coin Findspot	A Charles II copper coin, dated to 1678, was found between the clay bed and the bottom course of bricks of the through passage wall at Ivy House, Cowpen Bewley.	17th Century	Tees Archaeology HER
6280	Wayside, Cowpen Bewley	Wayside lies on the south side of the green in the village of Cowpen Bewley. It is a farmhouse typical of other agricultural buildings in the village and is likely to date from at least the 18th century.	18th Century	Tees Archaeology HER
8262	Cowpen Marsh and Saltholme	This reclamation embankment is following the southern side of Greatham Creek and terminates at Port Clarence. There is a ditch along its western (landward) side, and one on the eastern (seaward) side, with the land labelled 'The Batts' or 'Samphire Batts' on the Ordnance Survey map, and as 'saltgrass' on the Tithe map. The embankment probably corresponds with that described as having been created by Mr Kenderley in about 1740, 'to secure the lands of Saltholme, near the Tees Mouth, from being overflowed by the tide'. The bank was 'about four miles [long] for Saltholme and Billingham Marsh' and secured 600 acres at Saltholme, 300 acres at Billingham and 500 acres at Cowpen.	18th Century	Tees Archaeology HER

HER No.	Asset Name	Asset Description	Period	Source
9353	Orchard Barn, Green View House	An 18th century barn.	18th Century	Tees Archaeology HER
9354	Earl's Nook Farm	An 18th century farm.	18th Century	Tees Archaeology HER
9355	Colman's Nook Farm	An 18th century farm.	18th Century	Tees Archaeology HER
9356	Ashdale Barn	An 18th century barn.	18th Century	Tees Archaeology HER
9357	Manor Farm	An 18th century farm.	18th Century	Tees Archaeology HER
9358	Manor House Farm Cottages	Three 18th century cottages.	18th Century	Tees Archaeology HER
9359	The Thistles	An 18th century house.	18th Century	Tees Archaeology HER
9360	Cowpen Bewley Home Farmstead	An 18th century farm.	18th Century	Tees Archaeology HER
4172	West Hartlepool Railway	The main east to west artery of transport through Stockton was provided by the Clarence Railway opened in 1833. This was extended to Hartlepool in 1839, with the track splitting from the Clarence Line at Billingham Junction. The West Hartlepool line is still in use today.	19th Century	Tees Archaeology HER
4222	Cowpen Gate No. 2	Level crossing of Wolviston Back Lane and the West Hartlepool Railway. A small signal/barrier is shown on the 2nd edition Ordnance Survey map of 1897. The level crossing is still in use.	19th Century	Tees Archaeology HER
4223	Cowpen Bewley: Smithy	A small smithy was formerly built on the village green to the northwest of Three Horse Shoes Public House in Cowpen Bewley. The building is shown on the second edition Ordnance Survey map of 1897, but is no longer extant.	19th Century	Tees Archaeology HER
4301	Allhuse, Cowpen Saltworks	Former saltworks of C. Allhusen. In 1885 four boreholes were put down at the site. This had expanded to 10 by	19th Century	Tees Archaeology HER

HER No.	Asset Name	Asset Description	Period	Source
		1892. The 1899 Ordnance Survey map shows only five wells, so a number must have been abandoned by that date. A map of 1916 shows that the works were 'disused'.		
5602	Normanby Jetty to South Gare	Reclamation wall extending from Normanby Jetty to South Gare across the south bank of the River Tees. This area is now heavily developed.	19th Century	Redcar & Cleveland HER
5716	The Mill Race	Mill Race associated with Town's Farm at Kirkleatham and connects to the Tees to the north. May still survive, shown as a drainage channel on modern mapping.	19th Century	Redcar & Cleveland HER
5908	North Eastern Railway (N.E.R.) (Darlington Section)	Section of the former N.E.R railway, currently utilised by Northern Trains and still in use.	19th Century	Redcar & Cleveland HER
6046	Reclamation Wall	Reclamation wall extending across the River Tees, constructed as a diversion channel in the creation of shipping lanes for the estuary.	19th Century	Redcar & Cleveland HER
9451	Cowpen Bewley School	The school building occupies the south side of the Cowpen Bewley green shown on the 1896 Ordnance Survey map. The building is now a residential property.	19th Century	Tees Archaeology HER
8717	NER Greatham Creek Branch	The Greatham Creek Branch of the NER is shown on a Tees Conservancy Commissioners map of 1906. It extended north-eastwards from Port Clarence, stopping short of Greatham Creek.	20th Century	Tees Archaeology HER
3286	Tees 'B' Battery, Seaton Carew Rd	This ammunition store is the only standing building of the former Tees 'B' anti-aircraft battery (see 6793). It is rectangular in plan and concrete throughout. The main chamber retains some of its paintwork including 'No smoking' signs. The south end of the building has an external store, not accessible from the main part of the structure. In 2008 the building was incorporated into the new Teesside International Nature Reserve complex.	Second World War	Tees Archaeology HER
3287	East Of Seaton Carew Road	This pillbox is a Type 23, approximately 6 m x 3 m in dimension. Its open anti-aircraft gun pit retains its mounting	Second World War	Tees Archaeology HER

HER No.	Asset Name	Asset Description	Period	Source
		column, and the main chamber has three loopholes. The pillbox is visible on aerial photographs taken in 2005.		
3602, 3623, 3628	Bombing Decoy Grangetown ‘	A Second World War bombing decoy at Grangetown that was built to deflect enemy bombing from Royal Air Force Thornaby airfield. This site served as both a 'K-type' daytime decoy (3602) and a 'Q-type' night-time decoy (3623). The 'K-type' decoy consisted of a replica airfield equipped with dummy Blenheim aircraft. It is referenced as being in use from March 1940 to October 1941. The 'Q-type' decoy displayed a series of lights to simulate an active airfield and is referenced as being in operation from June 1940 to August 1942. The site later incorporated a 'QL' and 'QF' decoy (3628) to deflect enemy bombing from factories in Middlesbrough as part of the 'C series' of civil decoys. The 'QL' decoy functioned by displaying lights to resemble working factories. The 'QF' decoy consisted of a series of controlled fires lit during an air raid to replicate a target struck by bombs. It is referenced as being active during 1942 and 1943. By 1972 the site had been developed for industrial use and no features of the Grangetown decoy have survived.	Second World War	Redcar & Cleveland HER
6792	North-West Of Fire Station	Now demolished pillbox which lay to the south of a small beck to the northwest of the Fire Station on the west side of Seaton Carew Road. It is visible on 1972 aerial photographs and appears to be a standard Type 23 with an anti-aircraft gun mounting pit at one end and a machine gun chamber at the other. It is not visible on aerial photographs taken in 2005.	Second World War	Tees Archaeology HER
6793	Tees 'B' Battery, Seaton Carew Road	This anti-aircraft battery lay to the east of Saltholme Farm on the west side of Seaton Carew Road. This was part of the Tees 'B' Battery and was operational by 1940 when it was manned by 311 Battery of 73rd AA Regiment, who had recently been evacuated from France. The site is visible on aerial photographs taken in 1946 and takes the form of a partial circle of buildings with a rectangular structure at the middle. Four gun-emplacements formed a partial	Second World War	Tees Archaeology HER

HER No.	Asset Name	Asset Description	Period	Source
		circuit on the north and east sides. In the northwest quadrant of the circle were two further buildings. To the northeast of the main battery lay an ammunition store (see 3286). To the north of this, and south of the access road to Saltholme Farm, lay a further complex of temporary buildings, probably accommodation, offices etc. The site is visible on aerial photographs taken in 1971, the ancillary buildings to the north having all been dismantled leaving concrete bases behind. The main battery and ammunition store were still present at that time. The site was subsequently cleared, with the exception of the ammunition store which was preserved in 2008 as part of the redevelopment of the area as an International Nature Reserve.		

F.3 Designated Heritage Assets in the Outer Study Area

Table F.3: Designated heritage assets in the outer Study Area

List Entry No.	Asset Name	Asset Description	Designation
n/a	Kirkleatham Conservation Area	Kirkleatham Conservation Area consists of a high-status historic estate village with multiple examples of elite architecture. The architectural, historic, and environmental qualities of Kirkleatham, and the integrity of its wooded parkland setting, were the reasons behind its designation[44].	Conservation area

F.4 Non-Designated Heritage Assets in the Outer Study Area

Table F.4: Non-designated heritage assets in the outer Study Area

HER No.	Asset Name	Asset Description	Period	Source
6263	North of Cowpen Lane	A highly damaged flint core was recovered during an archaeological watching brief North of Cowpen Lane (see Event 474). The core has two platforms and had been used to produce small blades. It was considered to be	Neolithic to Bronze Age	Tees Archaeology HER

[44] Redcar and Cleveland Historic Environment Record

HER No.	Asset Name	Asset Description	Period	Source
		later Neolithic or earlier Bronze Age in date.		
9613	Saltholme, Cowpen Bewley	Ten worked flints including flakes, a pebble core, a flint fragment and four tools. These artefacts were recovered from later deposits, and some showed signs of post-depositional movement.	Bronze Age	Tees Archaeology HER
9437	Saltholme, Cowpen Bewley	Two human burials were found within a stone lined cist during excavation (see Event 1497 and 1498).	Romano-British	Tees Archaeology HER
1515	South of Saltholme, Billingham	This complex of ridge and furrow lies to the south and east of the former Saltholme Farm (4426). The field to the south is irregularly shaped and contains three different paddocks of ridge and furrow. In the southern two thirds of the eastern half of the field, the ridge and furrow runs north to south in a block of approximately 220 m x 90 m. Above this is a smaller paddock, running north-west to south-east, approximately 80 m x 70 m. To the west of these is a further block, running north-east to southwest, approximately 200 m x 140 m. To the east of the former farm is a smaller field containing ridge and furrow, running north to south in a block of approximately 75 m x 300 m.	Medieval	Tees Archaeology HER
3753	West Coatham Marsh	Large elongated ovate salt-mound that likely dates to medieval salt extractive industries. No longer extant.	Medieval	Redcar & Cleveland HER
3755	West Coatham Marsh	Ovate salt-mound that likely dates to medieval salt extractive industries. No longer extant.	Medieval	Redcar & Cleveland HER
3756	West Coatham Marsh	Ovate salt-mound that likely dates to medieval salt extractive industries. No longer extant.	Medieval	Redcar & Cleveland HER
4426	Salt Holme	Salt Holme is recorded in 1338 as 'a large and important farm between Cowpen Marsh and Haverton Hill'. The farm formed part of the estates of the prior of Durham. The farm buildings (circa 19th century) were demolished in the early 1990s. The site is now waste ground and littered with demolition debris and concrete hardstanding.	Medieval	Tees Archaeology HER

HER No.	Asset Name	Asset Description	Period	Source
6819	Low Belasis, Billingham	This is an area of ridge and furrow ploughing surrounding the former farmstead of Low Belasis. The ridges are relatively broad and slightly curving. It is suggested that they form part of a once wider medieval open field system.	Medieval	Tees Archaeology HER
6821	East of Low Belasis, Billingham	This is a fragmentary chunk of ridge and furrow field system. The ridges in the southwest block run from southwest to northeast. Those in the northeast block run northwest to southeast. The ridges are fairly broad in appearance but fairly straight. The ridges are still extant but now lie partly beneath a waterbody.	Medieval	Tees Archaeology HER
6822	East of Low Belasis, Billingham	This is an area of ridge and furrow visible on aerial photographs of 1971 but now partly lying beneath a shallow waterbody. The ridges were fairly broad with slight curvature. They ran in a southwest to northeast direction, with the exception of the southwest corner that ran northwest to southeast.	Medieval	Tees Archaeology HER
8969	Saltholme North and South	A former field boundary and traces of medieval ridge and furrow cultivation recorded during a field survey.	Medieval	Tees Archaeology HER
4048	Issac's / Meggit's Pond	Pond associated with small-scale brickworks at Meggit's Farm.	19th Century	Redcar & Cleveland HER
4091	Cowpen Bewley Brickearth Pit	The first edition Ordnance Survey map of 1858 shows, north of Cowpen and adjacent to the north side of the railway line, at least two rectilinear buildings aligned with the tracks. There are three adjacent irregular ponds. The entire area is shown as stippled suggesting that quarrying has taken place. The second edition Ordnance Survey map of 1897 shows the site with two legends both reading 'Old Clay Pit'. Some of the pits are represented as hachured features and other areas as shaded bodies. There is one unlabelled building, and a terrace named 'Rose Cottage'. The site is now largely backfilled.	19th Century	Tees Archaeology HER
5721	Sand Pits Farm	Sand pits for local extractive industries located at Sandpits Farmstead.	19th Century	Redcar & Cleveland HER

HER No.	Asset Name	Asset Description	Period	Source
5732	Old Tramway	Old Tramway built for the Redcar Ironworks which later connected to the settlement of Dormanstown.	19th Century	Redcar & Cleveland HER
6056	Eighth Buoy Scarp Beacon	A River Tees navigation light not shown on modern mapping.	19th Century	Redcar & Cleveland HER
6820	Low Belasis, Billingham	A 19th century farmstead, demolished by 1971.	19th Century	Tees Archaeology HER
6823	West of Saltholme, Billingham	A field containing ridge and furrow ploughing. The ridges are straight and narrow, suggestive of 19th or 20th century steam ploughing. They run in a north to south orientation. The area is now part of the RSPB Teesside International Nature Reserve. The ridge and furrow is largely removed and replaced with waterbodies.	19th Century	Tees Archaeology HER
9046	Lagonda Road, Cowpen Bewley	A small structure, probably a barn, recorded on 19th century Ordnance Survey maps.	19th Century	Tees Archaeology HER
9084	Cowpen Bewley Brick and Tile Yard	The J. J. Lisle Steam Brickworks was one of two brickworks operating to the north of Cowpen Bewley. Two small sheds and a pond are illustrated adjacent to a brickearth pit (4091). The majority of the site has since been built over by the A1185 road. One of the ponds still survives.	19th Century	Tees Archaeology HER
9621	Greenabella East	The Greenabella seawall was constructed at some point between 1881 and 1898 by the Tees Conservancy Commissioners as part of an extensive programme of land reclamation. It was created as an earthen bank with slag, obtained from the iron works in Middlesbrough and Stockton-on-Tees, set on its river-facing side.	19th Century	Tees Archaeology HER
5266	Cowpen Bewley Road	A concrete World War II LMG/rifle post Type FW/23 pillbox lay on the west side of Cowpen Bewley Road on a former field boundary. It was rectangular in plan with an entrance way in the roof. The pillbox was removed c.2015.	Second World War	Tees Archaeology HER
6093	Seal Sands (1 of 3)	This is the northernmost of a line of three section posts (see also 6094 & 6095) built into a former tidal	Second World War	Tees Archaeology HER

HER No.	Asset Name	Asset Description	Period	Source
		embankment to the south of Greatham Creek. Although now landlocked by subsequent reclamation this would have been the front line of defence in 1940. The section post forms a shallow V-shape with arms of equal length measuring approximately 7 m each. The point of the V faces the sea with loopholes along both arms. The entrances are in-turned on the inside of the V.		
6094	Seal Sands (2 of 3)	This is the middle example of a line of three section posts (see also 6092 & 6095) built into a former tidal embankment to the south of Greatham Creek. Although now landlocked by subsequent reclamation this would have been the front line of defence in 1940. The section post forms a shallow V-shape with arms of equal length measuring approximately 7 m each. The point of the V faces the sea with loopholes along both arms. The entrances are interned on the inside of the V.	Second World War	Tees Archaeology HER
2673	Unknown Obstruction	An undefined Wreck (position approximate) marked on Admiralty Chart 134.	Undated	Redcar & Cleveland HER

F.5 Archaeological Events in the Inner and Outer Study Areas

Table F.5: Archaeological events in the inner and outer Study Area

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
50	The Bull Pens, Cowpen Bewley	An inspection of foundation trenches for a garage on land behind the Bull Pens took place at Cowpen Bewley on the 8th November 2004. The stratigraphy consisted of a rich humic topsoil 600 mm deep, overlying a compact red clay natural. There were no finds or features of archaeological interest.	Watching Brief	2004	Tees Archaeology	Tees Archaeology HER
132	Teesside International Nature Reserve	Desk-based Assessment commissioned to identify archaeological interest within the proposed Teesside International Nature Reserve. The report summarised the evidence for the area available on the Sites and Monuments Record, the National Monuments Record, historic maps and aerial photographs.	Desk-based Assessment	2000	Tees Archaeology	Tees Archaeology HER
306	Little Marsh Farm, Cowpen Bewley	A watching brief conducted following site stripping and part foundation trenching for the rebuilding of Little Marsh Farm. No archaeological features were recorded.	Watching Brief	2006	Tees Archaeology	Tees Archaeology HER
311	Northern Gateway, South Bank	Desk-based assessment undertaken as part of an Environmental Impact Assessment for a new deep-water container facility. No new information was recorded by the study.	Desk-based Assessment	2005	AOC Archaeology Group	Redcar & Cleveland HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
367	Three Horse Shoes Public House, Cowpen Bewley	A watching brief conducted during the excavation of foundations for a new conservatory to the side of the Three Horse Shoes Public House. No finds or features of archaeological interest were recorded.	Watching Brief	2006	Tees Archaeology	Tees Archaeology HER
487	Norsea Pipelines Ltd, Seal Sands	Desk-based assessment prepared as a chapter for an Environmental Impact Assessment submitted in support of an application for extension to an existing petrochemical complex. No direct impacts on the archaeological resource were predicted and no further works recommended.	Desk-based Assessment	2007	RSK Environment	Tees Archaeology HER
517	Little Marsh Farm, Cowpen Bewley	Historic Building Recording survey conducted as a rescue exercise prior to the demolition of a listed grade II building. The project revealed that the gin-gang was constructed sometime between 1839 and 1855. The function of the barn is not immediately apparent however following the later construction of the gin-gang it was probably used for threshing. Its original function may have been to house livestock. There is no precise date known for the barn's construction and alterations; however the building materials suggest a date of the first half of the 18th century.	Historic Building Recording	2001	Tees Archaeology	Tees Archaeology HER
530	Cowpen Bewley to Warden Law	Desk-based Assessment produced in order to inform of the route of a proposed gas pipeline.	Desk-based Assessment	2000	Groundwork Archaeology Ltd.	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		It set out the known archaeological resource with some additional information on former medieval ridge and furrow sites from 1940s aerial photographs.				
620	THOR Cogeneration Plant, Seal Sands	Desk-based assessment considering the impact of the realignment of an overhead line on archaeological deposits. The report considered information from the HER, National Monuments Record (NMR), aerial photographs, historic maps and charts, borehole logs and a site visit. The archaeological potential of the area was considered to be low with much of the land reclaimed from the estuary in the second half of the 20th century.	Desk-based Assessment	2008	Northern Archaeological Associates	Tees Archaeology HER
663	Ivy House, Cowpen Bewley	Dendrochronological analysis of samples from Ivy House, a seventeenth century long house, took place in 1996 on behalf of the Cleveland Building Preservation Trust. The first sequence made up of samples from the lower floor and containing 140 rings could not be dated. The second chronology, made up of samples from the roof timbers, gave a felling date of early summer 1527. This site chronology of 178 years spans the period 1349-1526. A single sample from one of the cruck blades dated 1446-1441.	Dendrochronological Analysis	1996	University of Nottingham	Tees Archaeology HER
664	3 Horse Shoes Barn, Cowpen Bewley	A watching brief conducted during the construction of a new house and large garage within the medieval settlement of Cowpen Bewley.	Watching Brief	1997	Tees Archaeology	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		A spread of bone and shell, up to 50mm in thickness, was noted over the western part of the site. The layer contained medieval pottery and was interpreted as a raked out midden (3612).				
665	East of Ivy Court, Cowpen Bewley	A series of medieval tofts (624) lying at the east end of Cowpen Bewley village (604) were surveyed by Cleveland County Archaeology Section in 1982.	Earthwork survey	1982	Cleveland County Archaeology Section	Tees Archaeology HER
666	Cowpen Bewley	A watching brief conducted during the excavation of an electricity service trench through the medieval settlement of Cowpen Bewley (604). The trench began outside of Coleman's Nook Bungalow on Cowpen Bewley Road and extended north across the Green and through a vacant plot between Village Farm and Orchard House. A short spur of trench extended along the south side of the Green past Coleman's Nook Farm. The trench was 0.5 m wide and 0.8 m in depth. In total 320 m of trenching was observed and recorded. Archaeological finds and features were limited to the post-medieval period. Most of these were levelling layers consisting of building debris or unused brick. These had presumably been deposited to lift hollows within the green in the 18th or 19th century. Foundations of 18th-19th century agricultural buildings were noted on the green to the north of Coleman's Nook Farm and structural evidence was also present on the north side	Watching Brief	1995	Alison Clarke Archaeological Consultant	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		of the green between Village Farm and Orchard House.				
667	Seal Sands to Cowpen Bewley Gas Pipeline	Walkover survey conducted across a potential gas pipeline route including fieldwalking of arable sections using five transects at 10 m intervals and magnetic scanning of non-arable areas. Approximately 5.5 km of pipeline route were covered in 3 days. The report describes a number of archaeological features, but the report and short fieldwork window did not inspire great confidence in the accuracy of the results. For this reason, the anomalies identified have not been given individual HER records.	Walkover; Fieldwalking Survey	1995	Engineering Archaeological Services Ltd.	Tees Archaeology HER
745	River Tees Crossing, Teesside	Desk-based assessment undertaken as part of an ES for a series of proposed overhead line works associated with a realignment across the River Tees. No new information was recorded.	Desk-based Assessment	2010	Atkins	Redcar & Cleveland HER
757	Cowpen Bewley Composting Facility	Desk-based Assessment prepared in support of a planning application for a waste management and composting facility. No archaeological sites of interest were noted. The land had contained ridge and furrow earthworks in the mid-20th century, but these had been ploughed out.	Desk-based Assessment	2010	Archaeological Services, University of Durham	Tees Archaeology HER
821	Rear of Ivy House, Cowpen Bewley	Watching brief conducted during the excavation of the foundations for a garage. No cut features or finds were noted.	Watching Brief	2011	Tees Archaeology	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
822	Rear of Ivy House, Cowpen Bewley	Watching brief conducted during the excavation of foundations for an annexe extending from the rear of Ivy House. The northern arm of the extension exposed the foundations of Ivy House. This consisted of two courses of roughly dressed sandstone (0.3 m in depth), directly overlain with the hand-made brick of the house. A scar was noted in the brick stream course of Ivy House suggesting a previously demolished off-shoot ran on a similar footprint to the new extension (confirmed on historic OS maps 1857 & 1898). The northern fifth of the extension area was heavily disturbed by drainage trenches backfilled with dolomite. A layer of cobbles was noted in situ where not cut by the drains. This was interpreted as a former floor or yard surface. The cobbles and foundations both overlay a natural, sandy, silty clay. The southern area of the foundations was heavily disturbed by 19th century foundations for the former offshoot. These extended to 900 mm in depth in places and all overlay the natural deposits noted in the northern part of the trench. There were no indications of pre-19th century deposits, and it is presumed that these were destroyed in the 19th century with the extension to Ivy House.	Watching Brief	2011	Tees Archaeology	Tees Archaeology HER
870	Greatham North	Desk-based Assessment that set out the cultural heritage of the area with period by period discussions.	Desk-based Assessment	2010	Northern Archaeological Associates	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
881	River Tees Crossing, Teesside	Watching brief during the construction of overhead lines associated with the River Tees Crossing. No archaeological findings recorded.	Watching Brief	2011	Atkins	Redcar & Cleveland HER
977	Wilton International complex	Cultural Heritage chapter for an ES describing the existing cultural heritage baseline as well as the potential impacts of the construction, operation and decommissioning phases of the Mineral Handling Facility and Mineral Transport System Portal at Wilton. Mitigation in the form of a Watching Brief was undertaken by Cotswold Archaeology 2018-2019 which identified Bronze-Age activity (a series of ditches which contained Bronze Age pottery) alongside 19th century to current field systems, and 20th century features (Cotswold Archaeology 2019).	Desk-based Assessment; Watching Brief	2014; 2018-2019	Royal Haskoning DHV	Redcar & Cleveland HER
1001	Dogger Bank, Teesside Offshore	79ha of geomagnetic surveys was conducted along the proposed onshore cable routes and associated infrastructure for the Dogger Bank Offshore Windfarm. No details of the results are provided in the HER entry.	Geophysical Survey	2013	Archaeological Services Durham University	Redcar & Cleveland HER
1034	Tees Valley Lithium	AOC Archaeology Group was commissioned to undertake an archaeological geophysical gradiometer survey to investigate the potential for buried archaeological remains ahead of a proposed development on Land at Wilton, Teesside (NZ 57410 20796), as part	Geophysical Survey	2022	AOC Archaeology Group	Redcar & Cleveland HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		of the Tees Valley Lithium Project. A total of 4ha were surveyed. No trends of a possible archaeological origin were detected within the dataset although circular trends with an unclear provenance were identified. A number of linear trends were identified that correlate to ridge and furrow cultivation identified on early aerial photographs of the site.				
1044	Greatham Creek	Field Survey and desk-based assessment carried out to enhance the Tees Archaeology HER. Greatham Creek was inspected from a boat and from the banks for archaeological features and a number of previously unidentified features were noted. The study reviewed information from the HER, historic maps, historic aerial photographs and other historical sources. It summarised the activity at the creek from the medieval period to the 20th century.	Desk-based Assessment	1999	Tees Archaeology	Tees Archaeology HER
1049	Cowpen Bewley landfill	Desk-based Assessment conducted as part of the assessment of a proposed development site. The assessment included a site walkover survey. No previously unknown sites were recorded.	Desk-based Assessment	2013	AOC Archaeology Group	Tees Archaeology HER
1050	Port Clarence and Greatham South	Desk-based Assessment conducted as part of the EIA for a flood alleviation scheme. The report considered information from the Tees Archaeology HER, and previous desk-based assessments. It summarised the	Desk-based Assessment	2014	The Environment Agency	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		available information, but did not indicate any previously unknown sites.				
1263	East Billingham Transport Corridor	Desk-based Assessment prepared for SBC as part of the EIA of the proposed northern off-line section of the East Billingham Transport Corridor. It considered information from the Tees Archaeology HER and Durham County Record Office including published sources, historic maps and historic aerial photographs, and also geotechnical information. The assessment included a site walkover survey, and a separate aerial photographic interpretation exercise, which identified surviving ridge and furrow within the proposed route. The report made recommendations for palaeo-environmental Investigation, geophysical evaluation, earthwork survey of ridge and furrow and trial trench evaluation. The report provided a summary of the known archaeological resource but did not identify any new archaeological features.	Desk-based Assessment	2009	Arup	Tees Archaeology HER
1345	Norton to Brinefields circuit uprating	Desk-based Assessment produced for the purpose of contributing to the assessment of cultural heritage issues arising from EAEs proposed Scheme 20669 to carry out circuit uprating works on the existing overhead electricity line. Phase 1 was the desk study and Phase 2 was the walkover survey which examined the cultural heritage interest of the tower route	Desk-based Assessment	2011	Entec	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		and investigated the potential effects of the development on identified receptors. As a result, further survey and mitigation measures was proposed.				
1346	Greatham South, Stockton-on-Tees, Teesside	The works comprised the excavation of 33 trial pits excavated across two sites known as Borrow Pit 4 and 5. The trial pits were excavated in order to test the areas for their suitability to be utilised for the extraction of natural geological material to enable the construction of embankments. Borrow Pit 5 was unsuitable due to alluvial deposits. Evidence of two plough furrows and a deposit of burn lime were found in Borrow Pit 4. Although no significant archaeological features were found, peat deposits were noted containing well preserved organic material of potential paleoenvironmental archaeological interest.	Watching Brief	2016	Northern Archaeological Associates	Tees Archaeology HER
1386	Greatham Reservoir Wetlands	Desk-based Assessment summarising the HER and other pertinent records. The results show ground investigations found deposits of peat survive on the site, sealed by alluvium deposits. The report concluded that there was a moderate potential for prehistoric and or medieval archaeology to exist within the site.	Desk-based Assessment	2018	Mott MacDonald	Tees Archaeology HER
1425	Saltholme North	This Desk-based Assessment recognised potential for the following archaeological evidence to survive across the site: extant ridge and furrow cultivation from the medieval period, peat deposits along the proposed	Desk-based Assessment	2018	Archaeological Services Durham University	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		electric connection route where it crosses the Belassis Beck and salt making of medieval date on the eastern side of the site where the proposed access track is within Cowpen Marsh. The report recommended trial trench excavation to establish the nature and extent of the archaeological resource.				
1426	Saltholme N & S	Geophysical survey that did not identify any responses of archaeological interest, apart from probable ridge and furrow cultivation patterns. There were some uncertain trends, but these were probably agricultural or natural in origin. One definite and one conjectural former field boundary were recorded.	Geophysical Survey	2018	SUMO Geophysics Ltd	Tees Archaeology HER
1431	Saltholme South	Desk-based Assessment recognising the potential for the following archaeological evidence to survive across the site: extant ridge and furrow cultivation from the medieval period, peat deposits along the proposed electric connection route where it crosses the Belassis Beck and salt making of medieval date on the eastern side of the site where the proposed access track is within Cowpen Marsh. The report recommended trial trench excavation to establish the nature and extent of the archaeological resource.	Desk-based Assessment	2018	Archaeological Services Durham University	Tees Archaeology HER
1458	Lagonda Road, Cowpen Bewley	Desk-based Assessment conducted on an area of land south of Cowpen Bewley Industrial Estate.	Desk-based Assessment	2019	North East Archaeological Research Ltd	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		A small structure, probably a barn, was recorded on the north boundary on early maps and the tithe apportionments name the field to the south as Barn Field. Fields close to the Study Area have records of medieval ploughing, ridge and furrow.				
1465	Greatham Reservoir Wetlands	Desk-based Assessment presenting an overview of the stages of archaeological investigation including, geophysical survey, lidar interpretation, and test pit monitoring undertaken for the Reservoir Wetlands area at Greatham South, in order to determine the presence and significance of any archaeological deposits that may be affected by the scheme. The proposed scheme aims to create a new wetland habitat, comprising engineering operations to form of a number of depressions, bunds and associated landscaping. No significant archaeological remains were identified within the site boundary.	Desk-based Assessment	2018	Mott MacDonald	Tees Archaeology HER
1466	Greatham South	A watching brief was conducted during the excavation of a series of 23 trial pits across the site. The trial pits were excavated in order to test the areas for their suitability to be utilised for the extraction of natural geological material to enable the construction of the embankments. Borrow Pit 5 was shown to be unsuitable for extraction of geological material due to a sequence of deposits consisting of estuarine	Evaluation	2016	Northern Archaeological Associates	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		alluvial sand towards the east and thick peat in the west. Similarly, peat containing well preserved organic material was observed in the northern part of Borrow Pit 4. Two of the trial pits in Borrow Pit 4 contained evidence of past human activity; a medieval plough furrow and a layer of burnt lime. The latter probably represented the remains of post-medieval soil improvement activities. No significant archaeological features were uncovered during the ground investigations.				
1468	Saltholme, Cowpen Bewley	An archaeological evaluation found deposits comprising ditches and gullies cut into the natural subsoil were present in trenches 5 and 6. These indicate the presence of a series of enclosures containing Romano-British settlement activity over the eastern part of the site. A peat deposit containing some paleoenvironmental information was identified along the length of the proposed electrical connection close to Holme Fleet. Medieval and post-medieval furrows relating to farming also cut the subsoil.	Evaluation	2019	Archaeological Services Durham University	Tees Archaeology HER
1469	Lagonda Road, Cowpen Bewley	Geophysical Survey of 2.5ha. Two potential discrete pit like anomalies were identified that have a relatively strong positive magnetic response within the dataset. These might be of an archaeological origin, although a geological origin cannot be fully ruled out. A number of weak unclear trends, of both linear and curvilinear features, are noted in the	Geophysical Survey	2019	AOC Archaeology Group	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		dataset which may have either an anthropogenic or a natural origin. Also detected were some weak agricultural linear responses that probably relate to conventional ploughing although some may reflect a previous ridge and furrow ploughing regime. Areas of magnetic disturbance, most likely the result of modern activity, were also recorded around the edge of the dataset especially in the north where feedback from an existing industrial unit has been recorded.				
1470	Saltholme, Cowpen Bewley	Geophysical Survey recorded the remains of a probable Romano-British enclosure system, including ditches, tracks and pits, in the eastern part of the surveyed area. It is possible that these remains extend westwards into the un-surveyed ploughed field. Traces of former Ridge and Furrow and a former field boundary were also recorded together with modern services and recent ploughing.	Geophysical Survey	2019	Archaeological Services Durham University	Tees Archaeology HER
1489	Tees Mouth and Estuary	Desk-based Assessment conducted across the three boroughs of Stockton, Hartlepool and Middlesbrough examining the port related heritage assets from Tees Mouth in the north along the length of the River Tees to Thornaby and Stockton on Tees in the south.	Desk-based Assessment	n.d.	Historic England	Tees Archaeology HER
1497	Saltholme, Cowpen Bewley	Four excavation areas were opened across the site, subsequent to the findings of an earlier archaeological evaluation (Event	Excavation	2019	Archaeological Services Durham University	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		1468). The excavation area combined measured 3750 m^2. Evidence of Roman period settlement and agricultural activity was discovered in trenches A, B and C. Features included ditches, post holes, pits and stone lined cists containing two human burials. Three corn dryer kiln flues were present in Area A and B, demonstrating agricultural practices at the time. A rotary quern stone base was found in one ditch fill. A deposit of dark earth overlay the Roman period features in Area A. This may represent a period of abandonment of the site. Elements of ridge and furrow ploughing were recorded cutting into the latter also truncating other archaeological features. A large finds assemblage was recovered during the excavation. A large amount of un-stratified pottery, mostly Roman, although 11 sherds were of medieval date, was recovered. Flints dating to the Bronze Age were found in later deposits. Other finds included animal bone, two jet objects, fired stone and clay, iron, lead and copper alloy objects. Paleoenvironmental samples collected from the site produced an extensive range of information, providing a base for future study.				
1498	Saltholme, Cowpen Bewley	An area was subject to archaeological monitoring subsequent to the discovery of human burials during archaeological excavation on the site (Event 1497).	Watching Brief	2019	Archaeological Services Durham University	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		No further human remains were found however 3 pits were recorded during this work.				
1515	Saltholme Substation	The nine trial trenches excavated found no archaeological features present.	Evaluation	2020	SLR Consulting	Tees Archaeology HER
1547	Land North of Manor House Farm, Cowpen Bewley, Billingham	Monitoring was conducted during ground levelling works and the removal of the remains of a 19th or 20th century field boundary. The area monitored measured approx. 6 m by 25 m removing deposits from 0.3 m to 0.5 m. This involved the removal of a low embanked area contemporary with the former field boundary. No archaeological features or deposits of interest were observed.	Watching Brief	2020	Vindomora Solutions Ltd	Tees Archaeology HER
1555	Saltholme	Archaeological monitoring was conducted during the topsoil strip of two areas on the site. Previous works had found human remains and settlement evidence of Romano-British date. Unstratified finds included animal bone fragments and a horse tooth. A small assemblage of Romano-British pottery, dating from the 2nd century to the late 4th century, was recovered. An undiagnostic lithic was also recovered.	Watching Brief	2020	Green Man Archaeology	Tees Archaeology HER
1584	Land at Cowpen Bewley Ind. Est.	Six trenches were excavated across the site. Post-medieval plough furrows were found in Trench 2. Modern pits were found in Trench	Evaluation	2019	Archaeological Services Durham University	Tees Archaeology HER

Event No.	Event Name	Event Description	Event Type	Date	Organisation	Source
		1 and 2. A possible infilled pond was found in Trench 6.				
1665	Greatham NE Flood Alleviation 2022	Desk-based Assessment report produced ahead of proposals to repair and realign the existing flood defences. The document examined the heritage assets within the immediate vicinity of the development site (inner study area) and 500 m in to the wider landscape. A field survey was conducted, and an additional GPS and photographic survey was undertaken. This recorded the number, location and condition of the surviving anti-glider posts.	Desk-based Assessment	2021-2022	CFA Archaeology Ltd.	Tees Archaeology HER
1687	Billingham, Seal Sands	This Desk-based Assessment covers an area of reclaimed land at Seal Sands purchased by Imperial Chemical Industries (ICI) in the 1960s to develop their plant. The road and further industrial development including that of the oil industry followed in the 1970s and into the 1980s. Non designated heritage assets were considered in a 1 km buffer zone from the centre point of the site, outside this, up to 5 km, designated assets were discussed. The proposed development is all within the industrial setting.	Desk-based Assessment	2023	Heritage Archaeology	Tees Archaeology HER

F.5.1

G Landscape and Visual Amenity Impact Assessment Methodology

G.1 Introduction

G.1.1 This appendix should be read in conjunction with Section 6.7: Landscape and Visual Impact Assessment (LVIA) which it informs and accompanies. This appendix sets out the proposed methodology that will be used to undertake the landscape and visual amenity assessment within the ES.

G.1.2 The methodology will involve the following stages:

- a review of published landscape character assessments (LCA), studies, relevant supporting evidence base documents, aerial photography, mapping and fieldwork to define the baseline and to determine the extent of the Study Area within which there is potential for landscape and visual effects;
- define the landscape and visual receptors and describe the landscape and visual baseline;
- review the design to embed mitigation measures into the Proposed Development to avoid or minimise adverse landscape and visual effects and maximise opportunities for landscape integration and enhancement;
- determine the sensitivity (nature of the receptor) of landscape and visual receptors, by considering the value attached to the landscape or views and susceptibility to change of the receptor;
- assess the magnitude of impact (nature of effect) of the Proposed Development in relation to size, scale, duration and reversibility; and
- assess the significance of effects resulting by considering the relationship between the sensitivity of the receptor and the magnitude of impact and determine which effects are significant.

G.1.3 The following standards and guidance will be used to inform the scope and content of the LVIA, and to assist the identification and mitigation of likely significant effects, as far as reasonably practicable. This builds upon the overarching EIA methodology and guidance presented in Section 5: Environmental Impact Assessment Process of the EIA Scoping Report:

- Guidelines for Landscape and Visual Impact Assessment, third edition (GLVIA3);[45]

[45] Landscape Institute (2024) Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third edition (GLVIA3). Available at: https://www.landscapeinstitute.org/wp-content/uploads/2024/08/LITGN-2024-01-GLVIA3-NC_Aug-2024.pdf [Accessed 22/01/2025].

- An Approach to Landscape Character Assessment[46]; and
- Assessing landscape value outside national designations, Technical Guidance Note (TGN) 02/21[47].

G.2 Landscape

G.2.1 Landscape is defined by the European Landscape Convention as *"an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"*[48] .

G.2.2 GLVIA3[1] defines landscape receptors as *"aspects of the landscape resource that have the potential to be affected by a proposal"*. Landscape receptors have been identified via a review of published landscape character assessments, maps and aerial photography, relevant planning policy and fieldwork surveys.

G.2.3 Landscape character is defined by GLVIA3[1] as *"a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse"*.

G.2.4 Sensitivity of landscape receptors

G.2.5 Paragraph 5.39 of GLVIA3 states that *"landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape"*.

G.2.6 Judging landscape sensitivity is thus a two-part process of:

- Value – relates to the existing landscape and has been determined at the baseline stage in line with paragraph 5.19 of GLVIA3, which states that *"as part of the baseline description the value of the potentially affected landscape should be established"*; and
- Susceptibility to change – which is considered in relation to the Proposed Development.

G.2.7 Value attached to the landscape

G.2.8 Landscape Institute TGN 02/21[47] defines landscape value as *"the relative*

[46] Natural England (2014) An Approach to Landscape Character Assessment. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/691184/landscape-character-assessment.pdf [Accessed 22/01/2025].
[47] Landscape Institute (2021) Assessing landscape value outside national designations, Technical Guidance Note. Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2021/05/tgn-02-21-assessing-landscape-value-outside-national-designations.pdf [Accessed 22/01/2025].
[48] Council of Europe (2000) Council of Europe Landscape Convention as amended by the 2016 Protocol

value or importance attached to different landscapes by society on account of their landscape qualities".

G.2.9 For assessing landscape value outside national designations, Landscape Institute TGN 02/21[47] is the primary source of guidance. The approach to assessing the value attached to the landscape will follow a three-stage process:

- **Stage 1**: identify if the landscape is covered by any landscape designations;
- **Stage 2**: consider each of the factors listed in Table G.1 below which have been developed with reference to Table 1 of TGN 02/21[47] and are pertinent and most important to understanding its value; and
- **Stage 3**: make an assessment the value attached to the landscape and assign value based on a five-point scale, clearly articulating the reasons for these judgements.

Table G.1: Establishing landscape value criteria

Stage 1 – Landscape designations	Stage 2 - Define landscape value factors with reference to TGN 02/21	Criteria	Description
Landscape with statutory status or national policy protection: National Park, Area of Outstanding Natural Beauty (AONB), or World Heritage Sites.	**Natural heritage** - Landscape with clear evidence of ecological, geological, geomorphological or physiographic interest which contribute positively to the landscape.	Very high	A designated landscape with statutory status (National Park or AONB). Valued landscape in the context of National Planning Policy Framework (NPPF) paragraph 187 - 189.
Local landscape designation, such as Special Landscape Area or Area of Great Landscape Value, supported by policy and a detailed evidence base.	**Cultural heritage** - Landscape with clear evidence of archaeological, historical or cultural interest which contribute positively to the landscape. **Landscape condition** - Landscape which is in a good physical state both with regard to individual elements and overall landscape structure. **Associations** - Landscape which is connected with notable	High	A locally designated landscape supported by a detailed evidence base or with other strong indicators of value, which may include other relevant designations such as ancient woodland or conservation areas, with identified quality in the development plan or evidence base. May be considered valued landscape in the context of NPPF paragraph 187 - 189

	people, events and the arts. **Distinctiveness** - Landscape that has a strong sense of identity. **Recreational** - Landscape offering recreational opportunities where experience of landscape is important. **Perceptual (Scenic)** - Landscape that appeals		with strong supporting evidence.
No relevant designations.		Medium	Unlikely to be designated for landscape quality but may exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level.
		Low	Not designated for landscape quality and likely to exhibit few indicators of value which are identified in the development plan or evidence base.
		Very low	A landscape dominated by industry or infrastructure or which is damaged or degraded landscape, not designated for landscape quality and not likely to exhibit indicators of value which are identified in the development plan or evidence base.

G.2.10 Valued landscape

G.2.11 The principle of "valued landscape" in England is supported by the NPPF[49] (Chapter 15). Paragraph 187 requires that planning policies and decisions should contribute to and enhance the natural and local environment by, inter alia, (a) "*protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)*".

G.2.12 According to paragraph A4.2.11 of TGN 02/21[47], a 'valued landscape' is an area identified as having sufficient landscape qualities to elevate it above other more everyday landscapes. There is therefore a high bar for an area

[49] Department for Communities and Local Government (2021) Revised National Planning Policy Framework. Available at: https://www.gov.uk/guidance/national-planning-policy-framework [Accessed 22/01/2025].

to be considered a valued landscape in the context of the NPPF.

G.2.13 Paragraph A4.2.5 of TGN 02/21 states that, "*where a landscape has a statutory status, such as a National Park or AONB, it is self-evident that it is a valued landscape*". Therefore, where such landscapes are present within the Study Area, these will be attributed very high value and recognised as valued landscapes in the context of the NPPF.

G.2.14 A different approach will be taken to determine whether landscapes outside of nationally designated landscapes can be considered valued landscape in the context of the NPPF. Paragraph A4.2.6 of TGN 02/21 states that the interpretation of 'identified quality in the development plan' is not clear and that there are two fundamentally different interpretations that have been adopted by inspectors, which are considered below in more detail:

- it means non-statutory, locally designated landscapes; and
- it means any landscape where there is evidence to justify the identification of a 'valued landscape'. Local designation alone may not be sufficient evidence.

G.2.15 For a landscape without statutory status to be considered valued landscape in the context of the NPPF, it is advised that the landscape is supported by strong evidence. The assessment will therefore consider each of the criteria set out in Table G.1, references in Local Plan policy and evidence base, including whether there are existing local landscape designations in forming an overall judgement. Landscapes with high value may also be considered valued landscape.

G.2.16 Susceptibility of landscape receptors to change

G.2.17 GLVIA3[47] paragraph 5.40 defines the susceptibility to change of landscape receptors as:

G.2.18 "*the ability of the landscape receptor (whether it be overall character or condition of a particular landscape type or area, or an individual element and/or features, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*" (paragraph 5.40).

G.2.19 The features and characteristics which are more or less susceptible to the type of changes proposed will be set out for each landscape receptor. The ES will also contain narrative providing a clear explanation based upon analysis of the landscape receptor and the extent to which it is able to accommodate the type of change arising from the specific proposal. The susceptibility to change will then be categorised with reference to the criteria in Table G.2 below.

Table G.2: Susceptibility of landscape receptors to change

Criteria	Description
Very high	The type of change arising from the specific proposal are very likely to lead to undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.
High	The type of change arising from the specific proposal are likely to lead to undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.
Medium	The type of change arising from the specific proposal may lead to undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.
Low	The type of change arising from the specific proposal are unlikely to lead to undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.
Very low	The type of change arising from the specific proposal are very unlikely to lead to undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.

G.2.20 Combining judgements to define the sensitivity of landscape receptors

G.2.21 The sensitivity of each landscape receptor will be defined by combining professional judgements on the value attached to the landscape and its susceptibility to change and is supported by a clear narrative. Reference will be made to the criteria set out in Table G.3 below.

Table G.3: Sensitivity of landscape receptors criteria

Criteria	Description
Very high	Landscapes with statutory status or national policy protection with very limited ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.
High	Landscapes which may be locally designated or otherwise supported by a detailed evidence base or landscape with other strong indicators of value with limited ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.
Medium	Landscapes which are unlikely to be a designated for landscape quality but may exhibit some indicators of value and which may have some ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.
Low	Not designated for landscape quality and likely to exhibit few indicators of value and likely to accommodate the type of change no or limited undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.

Criteria	Description
Very low	Landscapes of very low value able to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies.

G.2.22 Magnitude of landscape impacts

G.2.23 Paragraph 3.28 of GLVIA3[47] notes that the magnitude is informed by combining considerations relating to the "*scale, extent and duration*" of impacts. This includes the geographical extent of influence, the spatial extent of the impact, the level of integration of new features with existing elements, its duration and degree to which the impact is reversible.

G.2.24 In summarising the magnitude of landscape impacts, reference will be made to the following:

- size and scale – the degree to which key characteristics or features identified in the baseline would change;
- geographical extent – the area over the change would occur; and
- duration and reversibility – the time over which the change would occur and if these changes are reversible, set out on the following scale: short (weeks); medium (months); and long (years).

G.2.25 The criteria set out in Table G.4 will be referred to in determining the magnitude of landscape impacts.

Table G.4: Magnitude of landscape impacts criteria

Magnitude of landscape impacts	Criteria
Very high	Substantial changes to key characteristics across most of the area or to unique and distinctive features at a local level. May be longer term impacts, permanent or reversible.
High	Changes to the character of the landscape across large parts of the area or to distinctive features at a local level. May be longer term impacts, permanent or reversible
Medium	Changes to the character of the landscape across parts of the area or to some existing features at a local level. May be medium term impacts, permanent or reversible.
Low	Slight change to landscape character or landscape features across a small area. May be short to medium term impacts, permanent or reversible.
Very low	Barely perceptible change to the landscape receptor or may impact a limited area or no key characteristics. May be short term impacts, permanent or reversible.

G.2.26 There may be cases where there will be no impacts on a receptor, for example where the design has been changed to avoid such impacts. In such cases this will be recorded as no change.

G.3 Visual amenity

G.3.1 Visual receptors are defined in GLVIA3[47] as *"individuals and/or defined groups of people who have the potential to be affected by a proposal"*.

G.3.2 Initial computer-generated zone of theoretical visibilities (ZTV) have been prepared and these are presented in Figure 6.7.1: ZTV DTM and Figure 6.7.2: Representative Viewpoints (Appendix A). GLVIA3[47] defines as ZTV as *"a map, usually digitally produced, showing areas of land within which a development is theoretically visible*." The purpose of the ZTV is to:

- identify the theoretical extents of visibility of the Proposed Development i.e., areas from which it would not be visible and areas from which it could potentially appear in existing views;
- assist in the identification of the Study Area;
- identify visual receptors likely to be affected by the Proposed Development;
- identify locations that are representative of the views experienced by visual receptors at different locations within the Study Area (representative viewpoints); and
- inform the design, including the extent and type of proposed mitigation.

G.3.3 ZTV have been modelled using the 'Viewshed' tool in ESRI ArcMap GIS Software.

G.3.4 A bare earth ZTV (Figure 6.7.1) was prepared using digital terrain model (DTM) data with a resolution of 1 m resolution. This ZTV represents a worst-case scenario as it does not include features such as existing buildings or vegetation which can screen or filter views.

G.3.5 A further ZTV has been prepared that includes existing buildings and woodland (Figure 6.7.2). This was prepared using digital surface model (DSM) with a resolution of 1 m. This ZTV provides some understanding of potential screening or filtering of views of the Proposed Development, which has been further verified through fieldwork.

G.3.6 For the ZTV, an assumed viewing height of 1.7 m above ground level has been used to simulate the eye level of a person in the middle of the range set out in paragraph 6.11 of GLVIA3 to represent the worst-case scenario.

G.3.7 Visual receptors and representative viewpoints

G.3.8 Visual receptors likely to experience views of the Proposed Development have been identified through interrogation of the ZTV, desktop analysis of maps and Google Earth, and fieldwork surveys. They have subsequently been categorised into the following types:

- residents;

- people working in the area;
- people travelling through the area; and
- people using parks and open spaces.

G.3.9 Where a collection of visual receptors in the same category are likely to experience similar views, they have been grouped. Representative viewpoints have been identified within the ZTV to assist in describing the baseline view and the effects likely to be experienced by visual receptor groups. These representative viewpoints have been selected on the basis that they cover a range of viewing distances, elevations and orientations from locations with different viewing experiences of the Proposed Development. The selection of representative viewpoints has been informed by the following criteria:

- accessibility to the public;
- number and sensitivity of people whose can be affected;
- viewing direction, distance, openness and elevation; and
- nature of the viewing experience.

G.3.10 Photographs taken during fieldwork surveys in February 2024 are included at Figure 6.7.4: Photos from Representative Viewpoints (Appendix A) to help demonstrate the nature of baseline views including the extent of existing screening.

G.3.11 Sensitivity of visual receptors

G.3.12 Paragraph 6.31 of GLVIA3[47] states that *"each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, should be assessed in terms of both their susceptibility to change in views and visual amenity and also the value attached to particular views."* The sensitivity of visual receptors results from a combination of parameters, such as:

- the activity/ occupation/ pastime of the receptors at particular locations;
- the extent to which their attention or interest may be focused on the views; and
- the visual amenity they experience.

G.3.13 Consideration will also be given to the:

- location, focus and orientation;
- features or characteristics of value within the view;
- principal or secondary interests;

- static or kinetic nature of views; and
- duration of the view.

G.3.14 Value attached to views

G.3.15 A three-stage process will be used to determine the value attached to views. This relates to the features and characteristics of the baseline landscape within the view and other indicators of value, for example reference in policy, guide books, literature or art.

- **Stage 1**: identify if the landscape within the view is covered by any relevant policy or designations and note features and characteristics of value with reference to the landscape baseline;
- **Stage 2**: identify if the view is likely to be from a popular visitor location or has historical or cultural importance or associations; and
- **Stage 3**: Determine the value attached to the view with reference to the criteria provided in Table G.5 from a range of very high to very low, using the evidence from stages 1 and 2.

Table G.5: Value attached to views criteria

Stage 3: Criteria	Description
Very high	Views within or across a nationally or internationally designated landscapes and/ or specific views designated in national or regional policy. Views are likely to have few or no detracting features and which may also have strong cultural associations supported by evidence, which could include links to historical events or people, representation in art or literature, for example.
High	Views within or across regionally or locally designated landscapes, other or landscapes with strong indicators of value, or views identified in the development plan or evidence base. Views are likely to have few or no detracting features and may also have some cultural associations supported by strong evidence.
Medium	Views across landscapes which are unlikely to be designated but may exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level. Views may have some detracting features and cultural associations supported by evidence.
Low	Views across landscapes which are not designated for landscape quality and likely to exhibit few indicators of value which are identified in the development plan or evidence base. Views are likely to have some detracting features and lack cultural associations supported by evidence.
Very low	View across landscapes which are neither designated, nor identified in the development plan or evidence base, and without cultural associations. The landscape in the view is in poor condition or notably detracts from the experience of the view.

G.3.16 Susceptibility of visual receptors to change

G.3.17 The sensitivity of visual receptors is also dependent upon their susceptibility to changes in views and the visual amenity they experience at particular locations.

G.3.18 Paragraph 6.32 of GLVIA3[47] explains that "*the susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of:*

a. The occupation or activity of people experiencing the view at particular locations; and

b. The extent to which their attention or interest may therefore be focussed on the views and the visual amenity they experience at particular locations."

G.3.19 GLVIA3[47] notes that visual receptors *"most susceptible to change"*, include residents and visitors engaged in outdoor recreation *"whose attention or interest is likely to be focused on the landscape and on particular views"* (para 6.33).

G.3.20 Table G.6 sets out the criteria that will be referred to in determining the susceptibility of visual receptors to the Proposed Development.

Table G.6: Susceptibility of visual receptors to change

Classification	Description
Very high	Visitors to nationally or internationally designated landscapes, particularly at specific viewpoints or viewing places, where views of the landscape are fundamental to the experience. People engaged in specific activities for enjoyment of dark skies.
High	Residents at home. Visitors to tourist hotspots, heritage assets or other attractions outside of nationally or internationally designated landscapes, particularly at specific viewpoints or viewing places, where views of the landscape are important to the experience. People engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views, for example those using promoted walking and cycling routes. People travelling along promoted scenic routes.
Medium	People engaged in outdoor recreation or travelling along public rights of way or local roads, which are not promoted routes but where an appreciation of the surrounding landscape are relevant to the experience. People working outdoors.
Low	People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape People travelling on major road, rail or other transport routes which are not recognised as scenic routes.
Very low	People working indoors.

G.3.21 Summarising the sensitivity of visual receptors

G.3.22 The sensitivity of visual receptors is based on professional judgement informed by the criteria in Table G.7, considering the value attached to views and susceptibility of visual receptors to the changes proposed.

Table G.7: Sensitivity of visual receptors criteria

Criteria	Description
Very high	Activity where views are fundamental to the experience and are related to landscapes with national or international designation and with few or no detracting features and which may also have strong cultural associations supported by evidence.
High	Activity resulting in a particular interest or appreciation of the view and/ or views within or across regionally or locally designated landscapes, other or landscapes with strong indicators of value, or views identified in the development plan or evidence base with few or no detracting features and may also have some cultural associations supported by strong evidence.
Medium	Activity resulting in a general interest or appreciation of the and/ or a view, likely to exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level.
Low	Activity where interest or appreciation of the view is secondary to the activity or the period of exposure to the view is limited, and/ or views across landscapes which are not designated for landscape quality and likely to exhibit few indicators of value and likely to have some detracting features and lack cultural associations supported by evidence.
Very low	Activity where interest or appreciation of the view is inconsequential to their activity, and/ or across landscapes which are neither designated, nor recognised in policy, and without cultural associations or is in poor condition or notably detracts from the experience of the view.

G.3.23 Magnitude of visual impacts

G.3.24 The magnitude of visual impacts relates to the extent to which the baseline view would change as a result of the Proposed Development. This assessment will be made with reference to the photographs from the representative viewpoints shown on Figure 6.7.4.

G.3.25 Paragraph 3.28 of GLVIA3[47] notes that magnitude is informed by combining considerations relating to the "*scale, extent and duration*" of impacts. This includes the geographical extent of influence, the spatial extent of the impact, the level of integration of new features with existing elements, its duration and degree to which the impact is reversible.

G.3.26 Reference will be made to the following in summarising the magnitude of visual impacts:

- size and scale – loss of existing features or addition of new features;

- geographical extent – where the proposed changes would be visible and to what extent; and
- duration and reversibility – the time over which the change would occur and if these changes are reversible, set out on the following scale: short (weeks); medium (months); and long (years).

G.3.27 The criteria set out in Table G.8 will be referred to in determining the magnitude of visual impacts.

Table G.8: Magnitude of visual impacts criteria

Criteria	Description
Very high	The Proposed Development will result in extensive changes to the character and composition and will become the dominant feature of the landscape within the view. There may be longer term impacts, permanent or reversible.
High	The Proposed Development will change the character and composition of large parts of the landscape within the view. There may be longer term impacts, permanent or reversible.
Medium	The Proposed Development will change the character and composition of discrete parts of the landscape within the view. There may be medium term impacts, permanent or reversible.
Low	The Proposed Development will cause small changes to the character and composition of the landscape within the view. There may be short to medium term impacts, permanent or reversible.
Very low	The development will cause barely perceptible changes in the character and composition of the landscape within view. May be short term impacts, permanent or reversible.

G.3.28 There may be cases where there will be no impacts on a receptor, for example where the design has been changed to avoid such impacts. In such cases this will be recorded as no change.

G.3.29 Significance of landscape and visual effects

G.3.30 Judgements on the sensitivity of each receptor and the magnitude of impact will be combined to establish the significance of effect and whether effects are considered significant in EIA terms. There are important distinctions between these two terms:

- likely significance of effect relates to the level recorded for any effect, with reference to the matrix set out in Table G.9 below; and
- likely significant effects are those which are considered most important in the decision-making process. An effect in the ES will be considered significant in EIA terms if it is of major or moderate significance. All other effects will be categorised as not significant.

G.3.31 Table G.9 will be used to guide judgements on the relationship between the sensitivity of a receptor, the magnitude of impact and the resulting

significance of effect. Where conclusions differ from this guide, a reasoned explanation will be provided in the assessment text.

Table G.9: Determining the likely significance of effects

		Magnitude of impact				
Sensitivity		**Very high**	**High**	**Medium**	**Low**	**Very low**
	Very high	Major	Major	Major or Moderate	Moderate	Moderate or Minor
	High	Major	Major or Moderate	Moderate	Moderate or Minor	Minor
	Medium	Major or Moderate	Moderate	Moderate or Minor	Minor	Minor or Negligible
	Low	Moderate	Moderate or Minor	Minor	Minor or Negligible	Negligible
	Very low	Moderate or Minor	Minor	Minor or Negligible	Negligible	Negligible

G.3.32 The identification of the likely significant effects on landscape and visual receptors will rely on analysis as defined within the scope and the professional judgement of competent experts, and consultation with stakeholders. defines the significance of effect terms.

Table G.10: Descriptions for significance of effects

Significance of effect	Landscape effects	Visual effects
Major beneficial	Effects that result in a considerable improvement of the existing landscape resource. Valued characteristic features would be restored or reintroduced as part of the development.	Effects that result in a substantial improvement in the existing view.
Moderate beneficial	Effects that result in a partial improvement of the existing landscape resource. Valued characteristic features would be largely restored or reintroduced.	Effects that result in a noticeable improvement in the existing view.
Minor beneficial	Effects that result in a slight improvement of the existing landscape resource. Characteristic features would be partially restored.	Effects that result in a limited improvement in the existing view.
Negligible beneficial	Effects that result in a very slight improvement to the existing landscape resource, not uncharacteristic within the receiving landscape.	Effects that result in a barely perceptible improvement in the existing view.
Neutral	Effects which are a balance between adverse and beneficial effects and	Effects that are a balance between adverse and beneficial effects and

Significance of effect	Landscape effects	Visual effects
	are neutral in their consequences for the landscape.	are neutral in their consequences for the view of visual receptors.
Negligible adverse	Effects that result in a very slight deterioration to the existing landscape resource, not uncharacteristic within the receiving landscape.	Effects that result in a barely perceptible deterioration in the existing view.
Minor adverse	Effects that result in a slight deterioration of the existing landscape resource. Characteristic features would be partially lost.	Effects that result in a limited deterioration in the existing view.
Moderate adverse	Effects that result in a partial deterioration of the existing landscape resource. Valued characteristic features would be largely lost.	Effects that result in a noticeable deterioration in the existing view.
Major adverse	Effects that result in a considerable deterioration of the existing landscape resource. Valued characteristic features would be wholly lost.	Effects that result in a substantial deterioration in the existing view.

G.3.33 Whether effects are adverse, beneficial or neutral will be determined by considering the way in which the changes are likely to affect the baseline.

G.3.34 Adverse effects are likely to occur where the Proposed Development introduces new elements or changes which are discordant or intrusive resulting in a deterioration to existing character or valued features of the landscape or of views and visual amenity.

G.3.35 Beneficial effects are likely to occur where the Proposed Development enhances the character of the landscape or existing views.

G.3.36 Paragraphs 5.37 and 6.29 of GLVIA3[47] states that is possible for effects to be neutral in their consequences for the landscape and for visual receptors. Where a judgement of neutral effects has been reached, reference will be made to the contribution of the Proposed Development to the baseline and acknowledging the positive and negative aspects which have been considered.

G.3.37 Where the assessment concludes that there will be no impacts on a receptor, this will be reported as no effect. This may, for example, be a consequence of changes to the design which has avoided impacts on receptors identified at the scoping stage.

G.3.38 Residual effects are those which remain even with embedded or primary mitigation at construction and year 15 of existence and operation and which cannot be further mitigated by design or other measures in this time period.

H Underwater Noise and Vibration

H.1 Overview

H.1.1 This appendix should be read in conjunction with Section 6.8: Marine Biodiversity which it informs and accompanies. In particular, the **assumptions and limitations** relating to working methods set out in Section 6.8: Marine Biodiversity, (paragraph 6.8.62 – 6.8.65) inform this appendix.

H.1.2 Definitions

H.1.3 The works carried out in relation to the Hydrogen Pipeline (east) and Effluent Connection Corridor which would occur within the River Tees (herein referred to as 'River Tees crossing') and works at Greatham Creek to install a new outfall (herein referred to as the 'Wastewater Connection Corridor outfall') (described in Section 3.2) that could occur below mean high water springs (MHWS) are collectively referred to as 'in-river works' in this Appendix.

H.1.4 Underwater noise interfaces with many other aspects and as such, should be considered alongside these; namely:

- marine mammals describes pathways of effect from noise sources on pertinent sensitive marine mammal receptor species;
- fish and shellfish ecology describes pathways of effect from noise sources on pertinent sensitive fish and shellfish receptor species; and
- commercial fisheries describes pathways of effect from noise sources on pertinent sensitive commercial fisheries receptor species.

H.1.5 Legislation and Policy Framework

H.1.6 Legislation, policy, and guidance relevant to underwater noise and vibration includes:

- Marine Strategy Framework Directive 2008/56/EC (MSFD)[50].
- Marine Strategy Regulations 2010[51].
- Marine Environment (Amendment) (EU Exit) Regulations 2018[52].

[50] European Parliament (2008) Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008: establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive).
[51] UK Government (2010) The Marine Strategy Regulations 2010.
[52] UK Government (2018) The Marine Environment (Amendment) (EU Exit) Regulations 2018.

- UK Marine Policy Statement[53].
- North East Inshore and North East Offshore Marine Plan[54].
- Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects (2018)[55].
- Sound Exposure Guidelines for Fishes and Sea Turtles[56].

H.1.7 Study Area

H.1.8 An initial desk-based baseline assessment has been undertaken to gather information on existing underwater noise and vibration conditions to determine the Study Area. For this appendix, this is defined by the 2 km zone of influence (ZoI) over which marine ecological receptors described in Section 6.8: Marine Biodiversity may be impacted by construction activities from the Proposed Development.

H.1.9 The Study Area for marine ecology consists of the River Tees crossing (below MHWS) and the Wastewater Connection Corridor outfall into Greatham Creek. At Greatham Creek, works to install the outfall would, as far as reasonably practicable, be undertaken from landward side to avoid the need for in-river works; however the potential for in-river works cannot yet be ruled out and therefore this is also included in the Study Area on a precautionary basis. Refer to the assumptions and limitations in paragraph 6.8.62 – 6.8.65 (Section 6.8: Marine Biodiversity) for all assumptions that inform this assessment.

H.2 Existing Baseline

H.2.1 A background underwater noise survey was conducted in the River Tees in April 2014. Although this is not contemporary data, it is considered that changes in the intervening period are unlikely to have significantly affected the ambient underwater noise environment in this section of the River Tees and these short-term measurements are considered representative of

[53] UK Government (2011) UK Marine Policy Statement. Available at: https://assets.publishing.service.gov.uk/media/5a795700ed915d042206795b/pb3654-marine-policy-statement-110316.pdf [Accessed 22/01/2025].
[54] UK Government (2021) North East Inshore and North East Offshore Marine Plan. Available at: https://assets.publishing.service.gov.uk/media/60f6f3df8fa8f50c7450ebf1/FINAL_North_East_Marine_Plan__1_.pdf [Accessed 22/01/2025].
[55] Southall, B. et al. (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Available at: https://www.aquaticmammalsjournal.org/article/vol-45-iss-2-southall/ [Accessed 22/01/2025].
[56] Popper, A.N., Hawkins, A.D., Fay, R.R., Mann, D., Bartol, S., Carlson, T., Coombs, S., Ellison, W.T., Gentry, R., Halvorsen, M.B., Løkkeborg, S., Rogers, P., Southall, B.L., Zeddies, D. and Tavolga, W.N. (2014). Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI Accredited Standards Committee S3/SC1 and registered with ANSI. ASA S3/SC1.4 TR-2014. Springer and ASA Press, Cham, Switzerland

indicative underwater noise levels for the purposes of this EIA Scoping Report.

H.2.2 Average background underwater noise levels measured at this location showed a level of 110.6 dB[57] re 1 µPa SPL_{RMS}[58] and generally between 103 dB and 115 dB re 1 µPa SPL_{RMS}. This dataset will capture any noise generated by the existing pipelines and serves as a suitable baseline for the Hydrogen Pipeline and/ or installation of outfall for Wastewater Connection Corridor. The frequency analysis of this data is shown in Picture H.1.

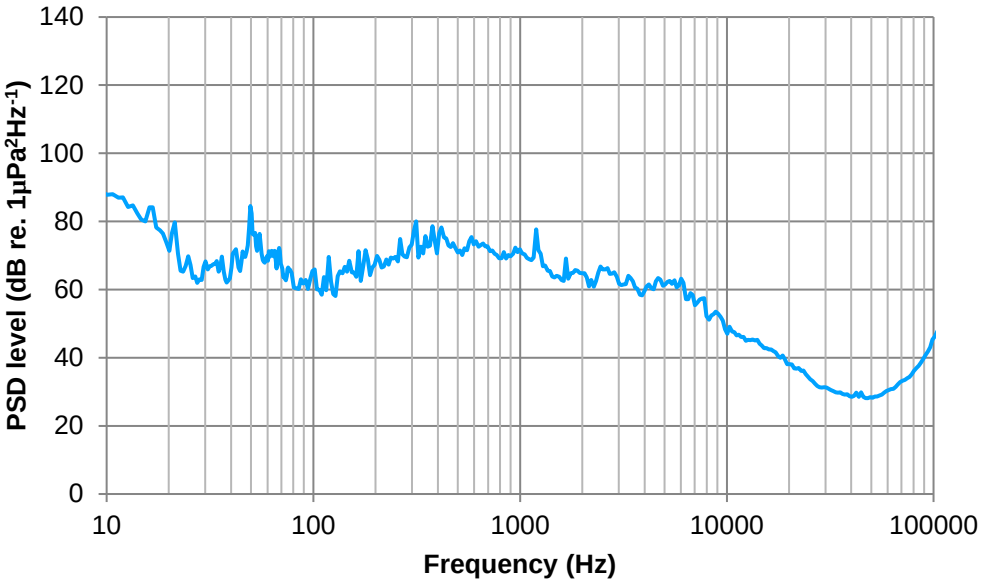
H.2.3 Measurements were also taken at various spot locations from Middlesborough Dock to Tees Mouth and this showed levels ranging from 96.6 dB to 142.3 dB SPL_{RMS}, with the higher levels due to passing and moored vessels.

H.2.4 Increased noise in an environment has the potential to adversely affect aquatic species present in its vicinity. This can range from minor disturbance effects up to injury caused by high level impulsive sources, (not expected to be associated with of the Proposed Development). Details of the anticipated construction methodologies, based upon current information, and the noise that could be generated is considered in Section 6.8: Marine Biodiversity including assumptions. Any machinery is expected to be situated on land, where there will be very limited potential for transmission of noise into the water.

H.2.5 Where any noise is contributed to the water, numerical thresholds are not generally recommended for continuous noise. For fish, a figure of 150 dB SPL_{RMS} is tentatively suggested[59] for the *onset* of behavioural effects. This continuous type of noise has a low likelihood of disturbance to marine mammals with disturbance thresholds generally developed for impulsive noise sources[60]. Other adverse effects, such as the masking of other sound (i.e. blocking the audibility of useful sounds in the environment, such as for hunting or communication, by another noise) are possible.

[57] Decibels are units of sound measurement which express relative differences in sound energy or intensity using a logarithmic scale. In-water decibel values are typically greater than those seen in air.
[58] Sound pressure level which is a measure of the amplitude of a sound – RMS is Root Mean Square and is the typical metric for describing an average noise level such as background noise or continuous machinery noise, similar to L_{eq} in airborne noise.
[59] NOAA Fisheries (2023) National Marine Fisheries Service: Summary of Endangered Species Act Acoustic Thresholds (Marine Mammals, Fishes, and Sea Turtles). Available at: https://www.fisheries.noaa.gov/s3/2023-02/ESA%20all%20species%20threshold%20summary_508_OPR1.pdf [Accessed 22/01/2025].
[60] Whyte K, Russell D, Sparling C, Binnerts B, Hastie G (2020). Estimating the effects of pile driving sounds on seals: Pitfalls and possibilities. The Effects of Noise on Aquatic Life 14:3948-3958

Picture H.1: Frequency analysis of average noise at monitoring location, River Tees



H.3 Potential Impacts

H.3.1 Construction – River Tees crossing

H.3.2 Certain equipment required for construction of the Proposed Development will generate noise. The greatest risk of an underwater noise impact would be in the event that noise generating equipment is operated in the water and therefore leads to direct transmission from the equipment to any receptor species that could be present near to the construction activity. As no in-river works are proposed for the Tees crossing, there is no plausible pathway for this impact to occur.

H.3.3 The Applicant's preferred option is for the installation of a pipeline within an existing tunnel. Any tunnel would be >10 m below the riverbed level. Any works to install the Hydrogen Pipeline/ Effluent Connection Corridor Pipeline within such a tunnel would therefore take place below MHWS, and no in-water works including drilling or piling would be required in the marine environment within the River Tees. On this basis, any noise generating activities that occur within existing tunnels would be significantly attenuated by the ground before reaching the water.

H.3.4 Alternative trenchless crossing methods such as a new horizontal directional drilled (HDD) or microbore tunnel (MBT) crossing also remain under consideration. In the event that such crossings are used, it is anticipated that the locations of entry and exit pits would be above MHWS and no drilling or piling required would be required in the marine environment. The construction of these potential alternative crossing

methods are anticipated to occur a minimum of 30 m depth and as such would be below the riverbed depth (17 m). The potential impact in terms of underwater sound and vibration on marine ecological receptors as a result is anticipated to be very low.

H.3.5 Plant and equipment working within existing tunnels could affect the water generally only via transmission of vibration through the ground or existing structures. As stated in paragraph 6.8.63 (Section 6.8) most plant and equipment would be required at the ends of any tunnel within existing shafts, or in landing compounds either side of the River for HDD/ MBT in the event that this option was required, which it is currently anticipated would be approximately 30 m or more from the river shore line and MHWS. Plant and equipment may include:

- De-watering pumps
  - De-watering of the tunnel will be required. Sump pumps will be used, which will not operate in the water nor output directly to the river.
- Mobile cranes
  - These will be used for pipeline removal and installation of one or more new pipelines in the existing tunnels under consideration. These are anticipated to be 60-80 tonne crawler cranes and will not enter the tunnel.
- Welding, cutting, or grinding equipment
  - These may be used and will be situated at the north and/ or south ends of the tunnel.
- Concrete breaking equipment
  - The necessity for excavator mounted or hand-held breakers is not yet confirmed. Although this represents the greatest risk for noise transmission, the operation of this inside the tunnel is not expected.
- Water jetting or cleaning equipment
  - Equipment that could be required for cleaning or water jetting would operate at the ends of any tunnel. Any effect on any tunnel would be superficial and lead to negligible transfer into the surrounding ground and river.
- Some other vibrating machinery could potentially be used. This is speculative, and the type is not currently known. In the event that such equipment could be used, the distance between the base of any tunnel and the water, and the transmission path between the locations, is expected to be sufficient to minimise any significant noise in the river.

H.3.6 No riverside construction is anticipated. Vessels may be required to deliver

some materials, and these will use existing commercial ports.

H.3.7 The introduction of noise due to the River Tees crossing at a sufficient level to generate adverse behavioural impacts is assessed as very unlikely as noise sources are not proposed in-river. Given that machinery will remain on land, the risk of reaching this level is very low, and noise would dissipate rapidly. The risk of an effect caused by noise that could be deemed significant is therefore considered unlikely, especially where migratory fish are highly motivated to continue.

H.3.8 Construction – Wastewater Connection Corridor outfall

H.3.9 During the construction and installation of the Wastewater Connection Corridor outfall into Greatham Creek, there is the potential for minor in-river works to be undertaken from a pontoon or similar which could be a source of noise and/ or vibration in the unlikely event that working from the landward side for any installation activities is not feasible. On a precautionary basis, for the purposes of this EIA Scoping Report, it is assumed these could include activities that emit some levels of vibration. However, no piling and/ or machinery for dredging is proposed and works would be limited to use of excavators or similar.

H.3.10 Operation

H.3.11 One the River Tees crossing is installed (new Hydrogen and Effluent pipeline), the pipelines following commissioning and testing will commence operation for their intended uses. The pipelines would be a fully enclosed system that does not interact with the marine environment. No underwater noise was detected from the old pipeline during the 2014 survey referenced earlier in this section. Vibration in pipes tends to be limited in design to minimise fatigue, and no significant transference of noise from new pipelines via structural vibration to the water is anticipated.

H.3.12 Similarly, the operation of the Wastewater Connection Corridor outfall will involve discharge of treated water to Greatham Creek and will not involve any noise or vibration sources likely to give rise to impacts.

H.3.13 Decommissioning

H.3.14 Upon the end of the Proposed Development's operational life, the structures and equipment associated with it will be subject to a condition assessment and an assessment undertaken to determine the future potential for any continued operations or the appropriate decommissioning strategy (i.e. cleaning/ leaving in-situ or removal). A separate impact assessment will be undertaken at the time.

H.3.15 Although the specifics of the decommissioning phase are currently unknown, the equipment that may be used is expected to be of the same or similar types as those proposed for the construction phase and no in-river works are anticipated during decommissioning of the River Tees crossing. As the risk of any noise transference into the river is unlikely to be significant, similarly any risk during decommissioning is expected to be very low.

Embedded Mitigation

H.3.16 As no equipment will operate directly in the river under the current assumptions for construction, the risk of any transference of noise is very low and no specific mitigation for underwater noise is deemed to be of benefit.

H.3.17 However, it is recommended that any impulsive noise from concrete breaking, in the event that this is undertaken, should be minimised through use of low vibration machinery as far as reasonably practicable during the removal and installation of pipelines. This would be secured via the CEMP as a requirement of the draft DCO.

H.3.18 For the Wastewater Connection Corridor, low vibration machinery shall be used as far as reasonably practicable during the installation of the outfall in the event that in-river works are required, and the noise or vibration-generating parts of the machinery will not operate in the river.

Description of Likely Significant Effects

H.3.19 There is a potential for impacts in the event that any in-river works are required in Greatham Creek and on this basis, an assessment of underwater noise and vibration is **Scoped In** on a precautionary basis at EIA Scoping Stage. In the event that working methods during design development are able to avoid the need for in-river work, the Applicant would seek to agree with relevant regulators that no likely significant effects are plausible, and no assessment would be presented in the ES. Otherwise, an assessment will be undertaken considering likely working methods and using reasonable worst-case assumptions for works related to the outfall at Greatham Creek.

H.3.20 The risk of any underwater noise transference to the River Tees from construction works on land related to the River Tees crossing, or during operation is not expected. There are no likely significant effects anticipated as a consequence of the Proposed Development and this matter is **Scoped**

Out[61].

H.4 Limitations and Assumptions

H.4.1 Currently no detailed information is available on the exact locations of works, the models of equipment to be employed or its duration of use. However, the general principles have been considered as set out in Section 6.8: Marine Biodiversity.

[61] . If the River Tees crossing construction methods or equipment change during the course of the design development leading up to submission of the ES to include the use of noisy or highly vibrational equipment within the marine environment, this matter would be scoped back in and an assessment of the impact of additional machinery presented as an appendix of the Marine Biodiversity chapter of the ES

I Environmental Sound Survey June 2024

I.1 Introduction

I.1.1 This appendix should be read in conjunction with Section 6.11: Noise and Vibration which it informs and accompanies.

I.1.2 An environmental baseline sound level survey has been undertaken to determine the existing sound climate and character in and around the Proposed Development. This report details the survey methodology and results.

I.1.3 The survey was carried out by noise specialists from Arup, with attended measurements taken on 18 June 2024 and unattended measurements taken between Tuesday 18 June and Monday 24 June 2024.

I.2 Instrumentation

I.2.1 The sound level meters (SLM), microphones and sound pressure level calibrators used by Arup are Class 1 instruments, conforming to BS EN 61672-1:2013. All Arup instrumentation is calibrated annually and has full traceable calibration to national and international standards, which are undertaken by an accredited calibration laboratory. Calibration certificates can be provided upon request.

I.2.2 The SLM was checked for correct calibration before and after each series of measurements. No significant fluctuation in level was noted throughout each survey period.

I.2.3 All instrumentation used to undertake the survey is described in Table I.1below.

Table I.1: Measurement instrumentation

Description	Serial number	Item type
Norsonic 1251	33554	Calibrator
Norsonic 140	1405202	Sound level meter
Norsonic 1209 Preamp	15264	Microphone
Norsonic 1225	151245	Microphone
Rion NL52	00520913	Environmental
Rion NH-25	11760	Microphone
Rion UC-59	21301	Microphone
Rion NC-75	34824364	Calibrator
Norsonic 1251	33554	Calibrator

I.1 Measurement methodology

I.1.1 At each location, the L_{Aeq}, L_{A90}, L_{A10} and L_{Amax} metric parameters were measured and recorded. All broadband measurements were A-weighted and used a fast time constant (0.125s).

I.1.2 At each measurement location, the SLM was mounted on a tripod with the microphone set between 1.2 m to 1.5 m above local ground level. All measurements were taken under acoustically free-field conditions, except where otherwise stated. The appropriate windshield for the SLM was fitted to the microphone throughout to minimise wind-induced noise.

I.1.3 Attended measurements of 15 minutes duration were made at each location, dependent upon conditions at the measurement location. Unattended measurements were also of 15 minutes duration. In each case, the time period was appropriate to provide a good representation of the typical sound climate at each measurement location.

I.2 Measurement results

I.2.1 Attended measurements

I.2.2 The summary tables for each measurement location provide an arithmetic average of the individual measurements during each time period for L_{A90} and L_{A10}, a logarithmic average for L_{Aeq} and a range of the values for LAmax.

Location L1 Dormanstown

Location description:
Meter located at a representative location on Wilton Avenue facing the industrial estate and proposed redline boundary. Meter approx 10 m from residential properties.

Measurement period:
Tue 18/06/2024 14:52
to
Tue 18/06/2024 17:37

Weather conditions:
Wind speed: 5 m/s
Wind direction: SW
Summary: Clear skies with a light breeze.

Environment and observations:
Distant road traffic noise from Trunk Road and West Coatham Lane. Industrial noise is audible although not easily identifiable as there is dense vegetation between meter and industrial area.

Picture I.1: Location L1 Dormanstown

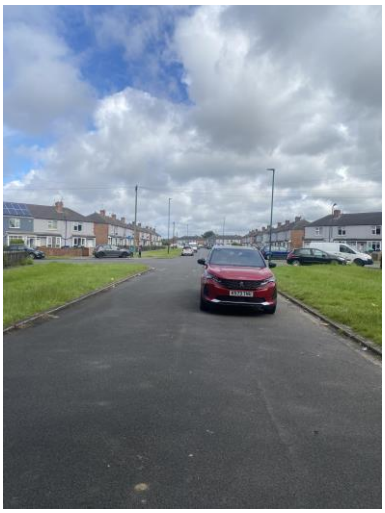


Table I.2: Summary of averaged sound pressure levels at Location L1 Dormanstown

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L_{90}	L_{eq}	L_{10}	L_{max}
Day (07:00-19:00)	44	49	52	58 - 66

Table I.3: Measured sound pressure levels at Location L1 Dormanstown

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
Day							

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
18/06/2024	14:52	00:15:00	44.8	47.6	49.7	58.2	There are general sounds associated with the neighbourhood including people talking, occasional cars passing by, dogs barking and birdsong. Occasionally, rail noise was audible. There is slight contribution from light breeze and vegetation.
18/06/2024	16:31	00:15:00	44.6	49.8	52.8	63.6	As above. There is also more contribution from people noise including children playing in the distance.
18/06/2024	17:22	00:15:00	43.6	49.9	52.8	66.3	As above.

Location L2 Seal Sands

Location description:
Meter located approximately 10m from Seal Sands access road on unused car park.

Measurement period:
Tue 18/06/2024 10:29
to
Tue 18/06/2024 13:39

Weather conditions:
Wind speed: 5m/s
Wind direction: SW
Summary: Clear skies with a light breeze.

Environment and observations:
Industrial noise arising from plant items likely from Lianhetech to the north.

Picture I.2: Location L2 Seal Sands

Table I.4: Summary of averaged sound pressure levels at Location L2 Seal Sands

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L_{90}	L_{eq}	L_{10}	L_{max}
Day (07:00-19:00)	47	59	62	75 - 79

Table I.5: Measured sound pressure levels at Location L2 Seal Sands

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
Day							
18/06/2024	10:29	00:15:00	46.1	57.6	59.9	78.5	Dominant source is industrial noise from industrial estate within Seal Sands. Occasionally HGV on roads contributed to the noise climate.

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
							Industrial noise included broadband distinguishable noise, banging, cars reversing, alarms, drilling.
18/06/2024	12:08	00:15:00	47.2	60.0	62.8	76.2	As above. HGV pass-by recorded about 70dBLAp
18/06/2024	13:24	00:15:00	46.8	60.0	63.5	75.4	As above.

Location L3 Port Clarence

Location description:
Meter located at approximately 50m from A1046, at a location representative of the closest residential properties to the Wilton Group site.

Measurement period:
Tue 18/06/2024 11:00
to
Tue 18/06/2024 14:03

Weather conditions:
Wind speed: 5m/s
Wind direction: SW
Summary: Clear skies with a light breeze

Environment and observations:
Dominant source is road traffic noise from A1046.

Picture I.3: Location L3 Port Clarence

Table I.6: Summary of averaged sound pressure levels at Location L3 Port Clarence

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L_{90}	L_{eq}	L_{10}	L_{max}
Day (07:00-19:00)	45	55	54	64 - 88

Table I.7: Measured sound pressure levels at Location L3 Port Clarence

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
Day							

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
18/06/2024	11:00	00:15:00	44.7	51.2	54.0	63.5	In addition to road traffic noise, there was noise from neighbourhood including people walking by, talking and dogs barking. There was also distant aircraft noise clearly audible. Occasional noise from the Wilton Group site including banging and broadband noise.
18/06/2024	12:32	00:15:00	46.4	57.6	54.9	88.0	As above. Dogs barking audible but not dominant.
18/06/2024	13:48	00:15:00	44.8	53.6	54.4	71.3	As above.

Location L4 Cowpen Bewley

Location description:
Meter located at approximately 1m from Cowpen Lane.

Measurement period:
Tue 18/06/2024 11:32
to
Tue 18/06/2024 14:26

Weather conditions:
Wind speed: 5m/s
Wind direction: SW
Summary: Clear skies with a light breeze.

Environment and observations:
Dominant source is road traffic noise arising from A1185.

Picture I.4: Location L4 Cowpen Bewley

Table I.8: Summary of averaged sound pressure levels at Location L4 Cowpen Bewley

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L_{90}	L_{eq}	L_{10}	L_{max}
Day (07:00-19:00)	43	50	53	61 - 69

Table I.9: Measured sound pressure levels at Location L4 Cowpen Bewley

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
Day							
18/06/2024	11:32	00:15:00	41.9	49.1	52.5	61.1	Dominant source is road traffic noise from A1185 in particular what appeared to be HGV passbys (although not possible to verify due to intervening vegetation). No significant number of car movements on Cowpen Ln. Other sources included birdsong, noise from neighbourhood such as people talking, walking by. No industrial noise was audible at the time of measurement.
18/06/2024	12:54	00:15:00	44.6	51.3	53.5	69.2	As above.
18/06/2024	14:11	00:15:00	43.5	49.7	52.4	65.9	As above.

I.3 Unattended measurements

I.3.1 The summary of $L_{A10,T}$ and $LA_{90,T}$ for the unattended measurements presented in Table I.10 is based on the arithmetic average of the measured noise level for the relevant period. The $L_{Aeq,T}$ is calculated as a logarithmic average for each period and the $L_{Amax,F}$ is presented as a range. Picture 7 presents the results of the survey for all the relevant metrics as a function of time.

Eco1

Location description:
Logger deployed on the compound located to the south of the A1185, and to the north of the entrance to the reserve.

Measurement duration:
Tue 18/06/2024 09:49
to
Mon 24/06/2024 10:49

Logging interval:
00:15:00

Weather conditions:
Clear skies with a light breeze.

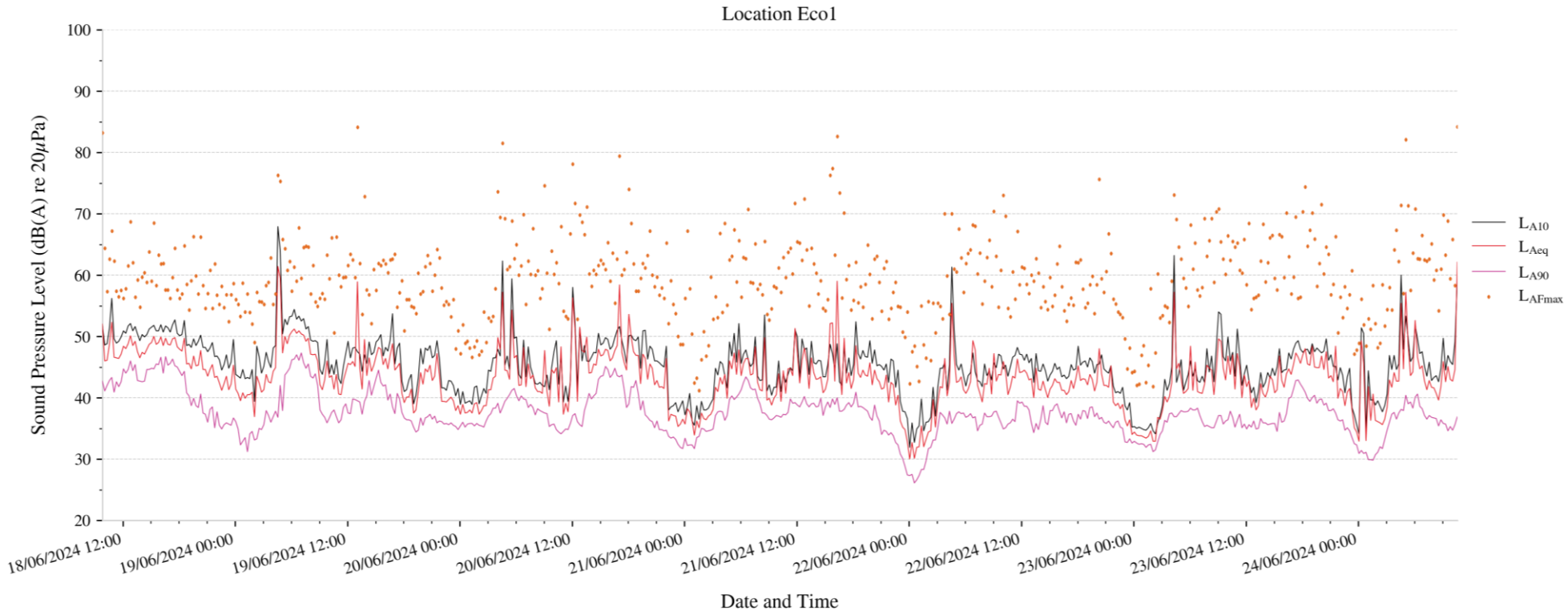
Environment and observations:
Dominant source is road traffic noise arising from A1185. Other sources included birdsong, people chatting as they walked by. No industrial noise was audible.

Picture I.5: Location Eco 1 RSPB Saltholme

Table I.10: Summary for the unattended measurement at Eco1

Time period	$L_{A90,T}$	$L_{Aeq,T}$	$L_{A10,T}$	$L_{Amax,F}$
Day (07:00-19:00)	39	47	47	51 - 84
Evening (19:00-23:00)	37	44	46	51 - 76
Night (23:00-07:00)	36	47	43	41 - 82

Picture I.6: Time history for the unattended measurement at Eco1



J Major Accidents and Disasters – Initial Long List of Risk Events

J.1 Introduction

J.1.1 This appendix should be read in conjunction with Section 6.10: Major Accidents and Disasters, which it informs and accompanies.

J.2 Assessment Methodology

J.2.1 In line with the Institute of Environmental Management and Assessment (IEMA) Primer for Major Accidents and Disasters (MA&D)[62], for the purpose of this assessment a major event is defined as an event that threatens immediate or delayed loss of life or permanent injury and/ or serious long lasting or permanent damage to the environment and requires the use of resources beyond those of the Applicant or its contractors to manage. This could be internal to the Proposed Development (e.g. fire from accidental release of a flammable substance) or an external event that could affect the Proposed Development (e.g. a flood event).

J.2.2 A disaster is defined as a naturally occurring phenomenon such as extreme weather event (e.g. storm, flood, temperature) or ground-related hazard events (e.g. subsidence, landslide, earthquake) with the potential to cause an event or situation that meets the definition of a major event.

J.2.3 Vulnerability refers to 'exposure and resilience' of the Proposed Development to the risk of a major accident and/ or natural disaster in the context of the EIA Regulations[63]. An identified, unplanned event, which is considered relevant to the project and has the potential to be a major accident or natural disaster, subject to assessment of its potential to result in significant adverse effect on an environmental receptor, is referred to as a 'risk event.' In considering the elements of vulnerability, professional judgement has been applied to develop project specific definitions of major events and to determine the overall pre- and post-mitigation consequence rating of each of the major events.

J.2.4 The assessment evaluates the potential for likely significant effects (during construction, operation and decommissioning) of major events following a

[62] Institute of Environmental Management and Assessment (2020) Major Accidents and Disasters in EIA: A Primer. Available at: https://www.iema.net/media/brbdeibt/j27374_iema_major_accidents__disasters_final-1.pdf [Accessed 22/01/2025].
[63] UK Government (2017) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

three-stage approach:

- Stage 1: a long list of all possible major events was developed. This list draws upon a variety of sources, including the UK Government's National Risk Register[64]. Major events with little relevance in the UK are excluded. Stage 1 included an initial review of potential receptors to identify any groups which are not relevant to the assessment.
- Stage 2: a screening exercise was undertaken to review the long list of major events and to consider their relevance to the Proposed Development, and therefore whether they should be included on the project-specific shortlist of events requiring further consideration by topic specialists.

J.3 Stage 1: Initial Long List

J.3.1 MA&D generally fall into three categories:

1. events that could not realistically occur, due to the type of project or its location;
2. events that could realistically occur, but for which the Proposed Development, and associated receptors, are no more vulnerable than any other development; or
3. events that could occur, and to which the Proposed Development is particularly vulnerable, or which the Proposed Development may exacerbate the effects of.

J.3.2 The aim of the screening process was to identify major events which fall into the third category and to then consider, in accordance with the IEMA guidance[64], whether existing design measures or legal requirements, codes and standards are already/ will be in place to adequately control the potential major accident and/ or disaster, and/ or whether effects will be adequately covered/ assessed by another topic scoped into the ES.

J.3.3 The assessment therefore typically focuses on low likelihood but potentially high consequence events.

J.3.4 For each identified major event, the initial long list details the relevance of the major event to the Proposed Development and the potential receptors.

[64] UK Government (2024) Guidance National Risk Register 2023. Available online: https://www.gov.uk/government/publications/national-risk-register-2023 [Accessed 22/01/2025].

Table J.1: Initial Long List of potential major accidents and disasters

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
1	**Construction hazards**		
1.1	General including utility strike/ unexploded ordnance (UXO) etc.	Construction hazards can include the collapse of buildings/ structures and excavations, falls from height and vehicle related accidents, as well as contact with underground utilities (e.g. high voltage transmission cables (overhead and buried)) and contact with UXO. Although these risks exist, it is considered that a number of existing control measures, including employment of routine good site practices, will reduce such risks. A UXO Desk Study and Risk Assessment has been conducted by Zetica for areas which will be covered by Phase 1 of the Proposed Development. This identified a potential risk of unexploded bombs (UXB) from World War II due to a high localised bombing density and potential for overspill to have occurred from practice bombing, combined with the presence of mudflats across the Proposed Development Site during the war that may have resulted in UXB going unnoticed. A Phase 2 Ground Investigation (GI) included an assessment for UXO risk and a watching brief. The Desk Based Assessment will be updated as an appendix to the Ground Conditions chapter of the ES and will consider all relevant risk areas of the Proposed Development Site. On this basis, it is considered that measures to control this risk are already in place and this does not require duplicate assessment in the MA&D chapter of the ES.	No
1.2	Release of ground contamination	Early construction works within the HPF Area could disturb contaminated ground due to the historic industrial use of the Proposed Development Site. If this contamination is accidentally released to the environment this could lead to potential for harm/ damage to designated areas, habitats, or populations of species within the local area. However, this risk of disturbing ground contamination will be assessed in the Ground Conditions chapter of the ES. Any mitigation measures considered necessary, including measures required for the CEMP will be described in that chapter and included in the Framework CEMP that accompanies the Application. No further consideration of MA&D risk is therefore required as this would be a duplicate assessment.	No
2	**Geological disasters**		

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
2.1	Ground stability	The Proposed Development's topography is typically flat or gently undulating land. Historical landslides have not been recorded within the boundary of the Proposed Development and no deep cuts or high embankments are anticipated as part of construction or operation of the Proposed Development. The design of groundworks will take into consideration geotechnical risks and potential ground stability issues within areas where cavities (e.g. around SABIC brinefields) are known. The Teesside area has an insignificant risk of landslides, ground collapse, ground compression or sinkholes. No further consideration of this matter as a MA&D risk is therefore required.	No
2.2	Earthquakes	The National Risk Register[64] states that *"Earthquakes in the UK are rare and an earthquake powerful enough to inflict severe damage is unlikely."* The Proposed Development Site is not located in, or close to an active area of seismic risk according to the British Geological Society (BGS). No further consideration of this matter as a MA&D risk is therefore required.	No
2.3	Volcanic eruptions	The Proposed Development is not in a volcanic area and as such volcanic eruptions are not considered to be a credible risk to the Proposed Development. No further consideration of this matter as a MA&D risk is therefore required.	No
3	**Hydrological disasters**		
3.1	Flooding (fluvial, coastal, pluvial, sewer, groundwater) Flooding (breach of reservoirs)	The Proposed Development Site is adjacent to and crosses the River Tees. The whole of the HPF Area is located within Flood Zone 1 (< 0.1% annual exceedance probability (AEP) of flooding from rivers or the sea) and in an area benefiting from flood defences maintained by the Environment Agency. Parts of the Hydrogen Pipeline, which will be predominantly below ground, are located within Flood Zones 2 (between 0.1% and 1% AEP river flooding and between 0.1% and 0.5% AEP sea flooding) and Flood Zone 3 (1% or greater AEP river flooding and 0.5% or greater AEP sea flooding, i.e. a high probability of flooding without flood defences). The design of the Proposed Development will consider all sources of flood risk, including breach of reservoir risk, and a Flood Risk Assessment, assessing the likely risk and consequences of flooding will be prepared to accompany the Application. This will consider relevant climate change scenarios, as agreed with the Environment Agency. No further consideration of flooding as a MA&D risk is therefore required as this would be a duplicate assessment.	No

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
3.2	Storm surges	The Proposed Development is located within 1.5 km of the North Sea. The Hydrogen Pipeline as it crosses the River Tees will be within either an existing tunnel or alternative HDD/ MBT crossing which would be designed considering hydraulic forces within the River, taking into consideration climate change scenarios. The Wastewater Connection Corridor outfall to Greatham Creek would be designed to take into consideration climate change risks, including storm surges, and be fitted with an appropriately designed tidal non-return valve. The HPF and AGIs along the Hydrogen Pipeline are not considered more vulnerable than the existing infrastructure in the local area. Consequently, this is not considered a MA&D risk that requires further assessment than will already be undertaken in the Water Environment and Climate Change Resilience chapters of the ES.	No
4	**Meteorological disasters**		
4.1	High windspeed	There is a low probability of a hurricane force event occurring in the vicinity of the Proposed Development Site, however major storms or gales may result in damage to infrastructure. High windspeeds are being considered during the engineering design of infrastructure, including tall structures such as the flare stack(s) and the appropriate design standards will be used. Although storms are credible risk events, it is anticipated that the vulnerability to a MA&D event for the Proposed Development would be comparable to that for existing CATS Terminal and existing operational below/above ground pipework operated by the Applicant. Therefore this is not considered a MA&D risk.	No
4.2	Droughts	Droughts are considered a disaster when a sustained lack of rainfall causes a water shortage. This can cause fatalities amongst vulnerable groups, disruption to essential services, environmental damage, and additional pressure on healthcare. The Proposed Development is not considered to be vulnerable to or a potential contributor to drought. Therefore this is not considered a MA&D risk.	No
4.3	Fog	Fog is a common weather condition in the UK, particularly throughout autumn and winter, and can cause severe travel disruption when visibility falls below 50 m over a wide area. In the event that fog affects the construction phase of the Proposed Development, the CEMP and site safety procedures will address which works can (and cannot) safely continue until visibility improves. Fog is therefore not considered as a MA&D risk.	No

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
4.4	Lightning strikes	Lightning strikes have the potential to damage the HPF and above ground infrastructure associated with the Hydrogen Pipeline. Lightning also has the potential to function as an ignition source if damage caused during a storm leads to a loss of containment of flammable gases. Lightning strikes are being considered during the engineering design of infrastructure and the appropriate standards and protection systems will be used. This is therefore not considered a MA&D risk.	No
4.5	Heatwaves	The baseline temperature data for the Proposed Development Site is provided in Section 6.3: Climate Change and Resilience including number of hot days per year (daily maximum temperature higher than 25°C) and predicted increases under the climate change scenario RCP 8.5. In the event of a prolonged period of elevated temperatures, there is the potential for an impact on temperature sensitive equipment such as process cooling systems and electrical switchgear. However, operating temperatures for process plant and equipment are being considered within the engineering design which takes local climatic conditions into consideration. As any residual risks will be reported under the Climate Change Resilience (CCR) chapter of the ES, this is not considered a MA&D risk.	No
4.6	Low (sub-zero) temperatures	The baseline temperature data, including days lower or equal to 0ºC for the Proposed Development Site, is provided in Section 6.3: Climate Change and Resilience including predicted temperature increases under the climate change scenario RCP 8.5. The climate in the north-east of England is typically mild. In the event of extreme, prolonged low temperatures and snowfall, there is the potential for snow loading on buildings and freezing liquids in pipes. Operation of the Proposed Development is unlikely to be disrupted by low temperatures as the engineering design takes local climatic conditions into consideration. As any residual risks will be reported under the CCR chapter of the ES, and this is not considered a MA&D risk.	No

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
4.7	Wildfires	There is potential for scrub, grassland, or woodland fires, especially given the expected increase in temperatures and heatwaves associated with climate change. However, the Proposed Development is considered no more vulnerable than the existing CATS Terminal and industrial infrastructure in the local area to wildfires and therefore this is not considered a MA&D risk. The risk of process fires is a key component of the existing CATS Terminal COMAH Site Safety Report. The CATS Terminal additionally has maintenance processes in place to manage and maintain the surrounding environment including regular grass cutting and vegetation clearance in active process areas and along the existing CATS Pipeline route, therefore wildfires are already covered under other regulatory regimes and regular maintenance activities.	No
4.8	Air quality events	Vehicle emissions can contribute to poor air quality and smog can be induced by weather events (particularly temperature inversions) which 'trap' pollution. An air quality event would likely only occur during construction due to the potential for increased dust deposition and increased exposure to particulate matter and emissions from vehicles. However, these effects would be controlled via the CEMP and in the event that impacts occur, they would only be temporary in nature and reversible. Air quality effects will be assessed within the Air Quality chapter of the ES and no further consideration as a MA&D risk is therefore required as this would be a duplicate assessment.	No
Technological or Manmade Hazards			
5	**Space disasters**		
5.1	Impact events and airburst	The Proposed Development is considered no more vulnerable to impact events than the existing infrastructure in the local vicinity or any other development. This is therefore not considered a MA&D risk.	No
5.2	Solar flare	Solar flares can interrupt radio and other electric communications. Telemetry to allow the remote operation of valves or remote monitoring systems may be installed as part of the Proposed Development. However, the Proposed Development is no more vulnerable that other similar infrastructure in the local area. This is therefore not considered a MA&D risk.	No
6	**Transport**		

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
6.1	Road accidents	During construction of the Proposed Development there will be an increased number of HGV and plant equipment on the local road network which may increase the risk of accidents. This will be assessed in the Traffic and Transport chapter of the ES, including cumulative effects with other committed development. No further consideration of road transport accidents during construction as a MA&D risk is therefore required as this would be a duplicate assessment. The operation of the Proposed Development is not expected to result in a significant increase in traffic flows. Collisions/ accidents involving road tankers delivering hazardous materials to the Proposed Development Site could theoretically result in a loss of containment of hazardous materials. However, losses in containment of these materials are controlled by regulations for the carriage of dangerous goods, including an emergency response plan in case of release of material. This is therefore not considered a MA&D risk. Any sections of pipeline that require a road crossing will be buried and constructed to good engineering practice and the relevant standards, and as such are unlikely to be impacted during a road traffic accident. This is therefore not considered a MA&D risk.	No
6.2	Rail accidents	The proposed pipeline route requires a crossing of the Tees Valley Line railway line within the Hydrogen Pipeline (east) and the Durham Valley Coastline in the Hydrogen Pipeline (west) in the vicinity of Cowpen Bewley. Trenchless crossing techniques will be used during construction so as to not impact ongoing use of any operational rail line. There will be close liaison and agreement with the railway operator(s) before construction works commence near and under any rail line in relation to protection of apparatus. The pipelines in the vicinity of rail crossings will be designed considering potential vibration impacts from passing rail traffic. Pipeline integrity will be considered within the engineering design to prevent any risks arising from a rail incident. Siting of above ground sections of pipeline and AGI in relation to rail apparatus will consider the risk of accidents/ derailment. This is therefore not considered a MA&D risk.	No

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
6.3	Aircraft disasters	Teesside Airport is 17.5 km south-west of the HPF Area. The Proposed Development is considered no more vulnerable to aircraft disasters than any other development in the local area and is therefore not considered a MA&D risk. Any permanent structures that require to be charted in order to meet aviation safety will be and this would be secured via a requirement of the DCO. The Civil Aviation Authority (CAA) and NATS will be consulted on the Proposed Development to review any requirements for aviation lighting on the stack(s) and to enable the Proposed Development to be charted in future, if this was required. Should infrastructure or cranes be required during construction that require aviation warning lighting, appropriate guidance in relation to lighting would be adhered to reduce the risk to aircraft as 'standard' practice. This is therefore not considered a M&AD risk.	No
6.4	Maritime disasters	The preferred option for the Hydrogen Pipeline (east) crossing of the River Tees will be using an existing tunnel or alternatively, a new MBT/ HDD crossing would be constructed beneath the Tees which will therefore not interfere with, or otherwise impact, the ongoing use of the river or local ports including Teesport. No maritime risk from an MA&D perspective is therefore likely.	No
7	**Engineering accidents/ failures**		
7.1	Bridge collapse or failure	Bridge works are not proposed as part of the Proposed Development and therefore are not considered a MA&D risk.	No
7.2	Tunnel collapse or failure	Design of the preferred Tees Crossing is ongoing and taking into consideration the structural integrity of existing tunnels which contain other operational pipelines which service the surrounding industrial and commercial land-uses. The risk of tunnel collapse and working methods to reduce the risk of such an event to as low as reasonably practicable (ALARP) is therefore a key design objective. Once installed, during the operational phase of the Proposed Development, the Hydrogen Pipeline is considered no more vulnerable than other existing pipelines within existing tunnels to the risk of tunnel collapse, and this is therefore not considered a credible MA&D risk.	No
7.3	Dam failure	There are no dams in the Study Area and this risk requires no further consideration.	No

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
7.4	Flood defence failure	The Environment Agency maintained flood defences have recently been upgraded and additional upgrades to these defences at Greatham Creek are proposed (refer to Section 5.2: Cumulative and Combined Effects). Therefore, the likelihood of a failure of these modern flood defences is low, given that their design will consider recent/ up to date meteorological data, standards and climate change projections. The Flood Risk Assessment that accompanies the Application will assess any residual risk in relation to flood defence breach. This therefore requires no further consideration as a MA&D risk as this would be a duplicate assessment.	No
7.5	Mast and tower collapse	The monitoring and maintenance of any radiocommunication and telecommunication masts in the Study Area is not within the control of the Applicant and the Proposed Development is not considered any more vulnerable to mast/ tower collapse that other existing development in the area.	No
7.6	Building failure	The Proposed Development does not involve any demolition of buildings. This is therefore not considered a MA&D risk.	No
7.7	Utilities failure – Electricity and gas	Electrical failure may be caused by supply issues or disruption to infrastructure caused by severe weather. Responsibility for repair would fall to the District Network Operator (DNO) (Northern PowerGrid). The existing CATS Terminal site safety systems consider the need for continuity of electrical supply and make provision for back-up supplies to allow continued operation of this critical national infrastructure. The Proposed Development Site will utilise its own separate power connection, however the existing safety procedures used within the CATS Terminal will also be implemented within the Proposed Development Site and therefore this is not considered a MA&D risk. During operation, the process equipment and instrumentation will be designed to fail to a safe condition. In an emergency event where all power is lost, any containerised gas will be flared in order to safely release. This is therefore not considered a MA&D risk.	No

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
7.8	Utilities failure – Water, effluent and sewage	During construction, water demand will be relatively low, and any failures can be resolved by tankering in water supplies if required. Similarly, temporary portable sewage systems can be used during construction if required. During commissioning and operation of the Proposed Development, disruption to water supplies and effluent disposal may impact on normal operations, however this is unlikely to result in an adverse impact on the environment. The existing CATS Terminal Site contains firewater storage systems which may be extended for the Proposed Development. Alternatively, the Proposed Development may utilise new dedicated additional firewater storage systems. This would provide continuity of firefighting capability in the event of water supply failure. The design of the Effluent Connection Corridor is being undertaken considering the interface with Bran Sands Water Treatment Works (the receiving treatment plant) and method statements will be agreed with Northumbrian Water covering any abnormal events (e.g. utilities failure at Bran Sands) prior to commercial operation of the Proposed Development, including Effluent Connection Pipeline. In any event where the Proposed Development Site experience a loss of water supply or effluent connection, a controlled plant shutdown would occur as a safety procedure. As the appropriate safety systems will be installed and considered throughout engineering design, this is not considered a MA&D risk.	No
7.9	Nuclear accident	Hartlepool Nuclear Power Station is approximately 1.7 km north of the Proposed Development Site. Nuclear sites are designed, built, and operated so that the chance of accidental releases of radiological material in the UK is extremely low. However, as the Proposed Development Site is located within the consultation zone, as a precautionary measure, t*his is considered a credible potential MA&D risk that is scoped into the MA&D ES chapter.* The Office of Nuclear Regulation (ONR) will be consulted during the course of the Application regarding potential risks to/ from the Proposed Development. Any mitigation measures advised by the ONR will be integrated into the Proposed Development and reported in the MA&D chapter as evidence that any risk is reduced to ALARP.	Yes MA&D1
8	**Operational process hazards**		

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
8.1	Fire	Accidental release of flammable substances, failure of the Hydrogen Pipelines or failure of the HPF could result in a fire, if ignited, and potentially cause harm to people and other sensitive receptors within the vicinity of the fire. The existing CATS Terminal has stringent procedures in place regarding ignition sources and fire risk due to the presence of on-site fuel inventories and storage, given that any fire risk presents a high consequence scenario. The Proposed Development will be treated in the same way, and it is expected that an integrated management system may be applied from a COMAH perspective (i.e. the Site Safety Report may cover both the existing CATS Terminal and the HPF). It is anticipated that the Proposed Development Site will be a top tier COMAH site and will be managed as such in accordance with COMAH and HSE legislation. The ES will assess both the vulnerability of the Proposed Development to fire and describe measures proposed to reduce to ALARP its potential as an ignition source for other industrial facilities. *This is a credible MA&D risk that is scoped into the MA&D ES chapter.*	Yes MA&D2
8.2	Explosion	Accidental release of flammable substances could result in an explosion, if the gas or substance accumulates, prior to ignition. This could result in harm to people, property, or other sensitive receptors within the vicinity of the explosion. *This is a credible MA&D risk that is scoped into the MA&D ES chapter.* As per 8.1 above, the ES will assess both the vulnerability of the Proposed Development to explosions from other industrial sites/ sources and describe measures proposed to reduce to ALARP explosion risk to other industrial facilities and receptors.	Yes **MA&D3**
8.3	Pollution of watercourses	A release of pollutants into nearby sensitive watercourses (subject to statutory designations) could result in an adverse impact on the local environment during operation of the Proposed Development. However as described in Section 6.14: Water Environment, the Proposed Development requires an Environmental Permit for its operation, requiring Best Available Techniques (BAT) to be in place in relation to prevention of pollution of water. Use of standard control measures through the Permit would avoid any elevated risk of spillages or leaks occurring. Risk of pollution of watercourses will be assessed in the Water Environment ES chapter and therefore this is not considered a MA&D risk as this would be a duplicate assessment.	No

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
8.4	Domino event	A major event occurring at a site which is part of the Teesside cluster of major hazard sites could escalate and cause an impact at the Proposed Development Site. Similarly, a major event at the Proposed Development Site could have a knock-on impact on neighbouring facilities. *This is a credible MA&D risk that is scoped into the MA&D ES chapter.* It is a requirement of the COMAH Regulations that neighbouring upper tier sites should review and update their Emergency Plans and Safety Reports to take into consideration potential impact of domino sites and this would be undertaken for the Proposed Development. Further detail on measures to reduce this risk to ALARP will be set out in the MA&D chapter of the ES.	Yes MA&D4
8.5	Toxic and / or asphyxiant gas release	The release of toxic gas or CO_2 could result in harm to workers/ visitors on site. The risk to people (including workers on adjacent sites) off-site would be reduced due to the anticipated dispersal and dilution of any release and given the distance (around 1.7 km) to the nearest residential property, although members of the public could occur on PRoW or other recreation/ amenity areas in closer proximity (Refer to Figure 6.12.1: Socio-economic baseline). *This is a credible MA&D risk that is scoped into the MA&D ES chapter.*	Yes MA&D5
9	**Societal Hazards**		
9.1	Malicious attacks	Malicious attacks include but are not limited to intentional violence to people, property, or infrastructure; arson or other methods of destruction; cyber-attacks; chemical, biological, or nuclear attacks; and terrorism. The Proposed Development is not considered to be more vulnerable to attack than other sites with similar infrastructure both in the local area and elsewhere in the UK including the existing CATS Terminal. Security measures will be included in the design of the Proposed Development. This is therefore not considered a MA&D risk.	No
10	**Decommissioning**		

Major Event		Basis of Decision to Scope In/Out of Short List	Include in Short List?
10.1	Decommissioning Activities	No additional decommissioning hazards have been identified that are not covered in the construction and operation risk events above. Proposals to decommission the Proposed Development are described in Section 3.8 of the EIA Scoping Report and include a commitment to a Decommissioning Plan, inclusive of a DEMP, which would be developed and agreed with the Environment Agency as part of the Environmental Permitting and site surrender process, considering all potential environmental risks on the Proposed Development Site. The DEMP would contain guidance on how risks can be eliminated or mitigated, taking into consideration the status and risks associated with infrastructure at that point in time. In addition to the Environmental Permitting Regulations, decommissioning will be undertaken considering relevant safety legislation including COMAH Regulations 2015, the CDM Regulations 2015, the Health and Safety at Work Act 1974 and the Management of Health and Safety at Work Regulations 1999 (or subsequent replacement legislation). Details of the decommissioning will be included in the DEMP to control the risk of a MA&D risk event to ALARP.	No

J.3.5 Based on the initial assessment presented in Table J.1 the following potential major event types have been selected for further consideration in the shortlist:

- MA&D1 - Nuclear accident;
- MA&D2 - Fire;
- MA&D3 - Explosions;
- MA&D4 - Domino events; and
- MA&D5 - Toxic and/ or asphyxiant gas.

J.4 Baseline Data on COMAH Sites

J.4.1 Those COMAH sites within an indicative 5 km of the HPF Area of the Proposed Development Site are summarised in Table J.2.

Table J.2: COMAH sites within an indicative 5 km of the HPF Area

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	COMAH Tier	Approximate distance and direction from Proposed Development Site (excluding construction haul road)
HPF Area					
1	CATS Wood Group PSN Limited	Chemicals manufacture/ production and/or disposal	Flammable liquids and gases	Upper	Within Proposed Development Site/ adjacent to HPF Area.
2	Px TGPP Limited Teesside Gas Processing Plant	Other activity	Fire/ explosion Flammable – gas, aerosol, liquid Gases under pressure Toxic to aquatic life	Upper	Immediately west of HPF Area
3	Venator Materials UK Limited Hartlepool	Chemicals manufacture/ production and/or disposal	Toxic	Upper	750 m north of HPF Area
4	Hartlepool Nuclear Power Station EDF Energy Nuclear Generation Limited	Power generation, supply and distribution	Flammable liquids and gases Hazardous to the aquatic environment Oxidising gases Toxic	Lower	1.2 km north of HPF Area
5	Natara Global Limited Hartlepool	Chemical installations - storage/warehousing Production of basic organic chemicals	Flammable liquids and gases Hazardous to the aquatic environment Other hazards (which fall into Category O1 - O3 in Schedule 1 Part 1 of the	Lower	1.7 km north of HPF Area

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	COMAH Tier	Approximate distance and direction from Proposed Development Site (excluding construction haul road)
			COMAH Regulations 2015) Other health hazards (named carcinogen) Toxic		
6	Exwold Technology Limited Hartlepool	Chemicals manufacture/ production and/or disposal	Hazardous to the aquatic environment	Upper	2.3 km north of HPF Area
7	Qualitech Environmental Services Limited Hartlepool	Chemical installations - storage/warehousing	Flammable liquids and gases Toxic	Lower	2.5 km north-west of HPF Area
Hydrogen Pipeline(s)					
8	Conoco Philips Teesside Operator Limited Seal Sands Terminal	Petrochemical/ Oil Refineries	Flammable liquids and gases	Upper	Immediately adjacent to Hydrogen Pipeline (east)
9	Ensus UK Limited Wilton	Petrochemicals/ oil refineries	Petroleum products and alternative fuels	Upper	Immediately adjacent to Hydrogen Pipeline (east)
10	Exolum Seal Sands Limited North Terminal - Middlesbrough	Chemical installations – storage/warehousing Fuel storage/distribution	Flammable liquids and gases Hazardous to the aquatic environment Petroleum products and alternative fuels Toxic	Upper	Immediately east of Hydrogen Pipeline (east)
11	Fine Organics Limited (Lianhetec) Seal Sands	Chemicals manufacture/production and/or disposal - general (not otherwise specified in the list)	Dangerous substances/mixtures that react adversely with water	Upper	Immediately north of Hydrogen Pipeline (east)

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	COMAH Tier	Approximate distance and direction from Proposed Development Site (excluding construction haul road)
		Production and storage of pesticides, biocides, fungicides, herbicides Production of basic organic chemicals Production of pharmaceuticals (intermediates and/or finished products) Waste storage, treatment and disposal	Flammable liquids and gases Hazardous to the aquatic environment Other hazards (which fall into Category O1 - O3 in Schedule 1 Part 1 of the COMAH Regulations 2015) Other health hazards (named carcinogen) Oxidising liquids and/or solids Petroleum products and alternative fuels Pyrophoric liquids and/or solids Self-reactive substances and mixtures and organic peroxides Toxic		
12	Huntsman Polyurethanes (UK) Limited Polyurethanes Area	Production of basic organic chemicals	Flammable liquids and gases Hazardous to the aquatic environment	Upper	Immediately adjacent to Hydrogen Pipeline (east)
13	Navigator Terminals Seal Sands Limited Stockton on Tees	Chemical installations – distribution Chemical installations – storage/ warehousing	Flammable liquids and gases Hazardous to the aquatic environment	Upper	Immediately adjacent to Hydrogen Pipeline (east)

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	COMAH Tier	Approximate distance and direction from Proposed Development Site (excluding construction haul road)
		Fuel storage/ distribution	Petroleum products and alternative fuels Toxic		
14	SABIC UK Petrochemicals Limited Olefins	Petrochemical/ oil refineries	Flammable liquids and gases Hazardous to the aquatic environment Other health hazards (named carcinogen) Self-reactive substances and mixtures and organic peroxides Toxic	Upper	Immediately adjacent to Hydrogen Pipeline (east)
15	SABIC UK Petrochemicals Limited North Tees	Petrochemical/oil refineries	Flammable liquids and gases Hazardous to the aquatic environment Other health hazards (names carcinogen) Toxic	Upper	700m south (HPF Area/ Hydrogen Pipeline (east))
16	BOC Limited Middlesborough	Chemicals manufacture/ production and/or disposal Fuel storage/ distribution	Flammable liquids and gases Oxidising gases Oxidising liquids and/or solids	Upper	750 m south-west of Hydrogen Pipeline (east)
17	Navigator Terminal North Tees Limited North Tees Road Rail Terminal	Fuel storage/ distribution	Flammable liquids and gases Hazardous to the aquatic environment	Upper	750 m south of Hydrogen Pipeline (east)

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	COMAH Tier	Approximate distance and direction from Proposed Development Site (excluding construction haul road)
			Petroleum products and alternative fuels Toxic		
18	Air Products (BR) Limited Middlesborough	Chemicals manufacture/ production and/or disposal	Flammable liquids and gases Oxidising gases	Lower	1km south-east of Hydrogen Pipeline (west)
19	CF Fertilisers UK Limited Billingham	Chemical installations – distribution Chemical installations – storage/ warehousing Chemicals manufacture/ production and/or disposal Production and/or storage of fertilizers Water and sewage collection, supply treatment	Dangerous substance/ mixtures that react adversely with water Flammable liquids and gases Hazardous to the aquatic environment Oxidising liquids and/or solids Toxic	Upper	1.2 km south-west of Hydrogen Pipeline (west)
20	CF Fertilisers UK Limited North Tees	Chemical installations – distribution Chemical installations – storage/ warehousing	Flammable liquids and gases Hazardous to the aquatic environment Toxic	Upper	1.2 km south-west of Hydrogen Pipeline (west)
21	Chemoxy International Limited Middlesborough	Chemical manufacture/ production and/or disposal	Flammable liquids and gases Hazardous to the aquatic environment Toxic	Upper	1.2 km south-west of Hydrogen Pipeline (west)
22	SNF Oil and Gas Limited Billingham	Chemical installations – storage/warehousing Chemical manufacture/	Flammable liquids and gases	Upper	1.2 km south-west of Hydrogen Pipeline (west)

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	COMAH Tier	Approximate distance and direction from Proposed Development Site (excluding construction haul road)
		production and/or disposal Production of basic organic chemicals	Hazardous to the aquatic environment Oxidising liquids and/or solids Toxic		
23	Tees Valley Net Zero Limited	Chemical installations – distribution Chemical installations – storage/ warehousing Chemicals manufacture/ production and/or disposal Fuel storage/ distribution Power generation, supply and distribution Production of inorganic chemicals	Flammable liquids and gases Oxidising gases	Lower	1.3 km north of Hydrogen Pipeline (east)
24	Calor Gas Limited Port Clarence	Fuel storage/ distribution	Flammable liquids and gases	Upper	1.6 km south-east of Hydrogen Pipeline (west)
25	Industrial Chemicals Limited Port Clarence Works	Chemical installations – storage/warehousing Chemicals manufacture/ production and/or disposal	Hazardous to the aquatic environment Petroleum products and alternative fuels	Upper	2 km south of Hydrogen Pipeline (west)
26	MP Storage and Blending Limited Middlesborough	Chemical installations - distribution Chemical installations - storage/warehousing	Flammable liquids and gases Hazardous to the aquatic environment Petroleum products and alternative fuels	Lower	2.8 km south of Hydrogen Pipeline (west)

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	COMAH Tier	Approximate distance and direction from Proposed Development Site (excluding construction haul road)
			Toxic		
27	Univar Solutions UK Limited Cargo Fleet Middlesborough	Chemical installations - distribution Chemical installations - storage/warehousing Chemicals manufacture/production and/or disposal - general (not otherwise specified in the list	Flammable liquids and gases Hazardous to the aquatic environment Oxidising liquids and/or solids Toxic	Upper	2.8 km south of Hydrogen Pipeline (west)

J.4.2 In addition to the search centred on the HPF Area presented Table J.2, additional searches for COMAH sites within around 5 km of the Hydrogen Pipeline (east) and Hydrogen Pipeline (west) terminal points has also been undertaken and the results are presented in Table J.3. Where COMAH sites are already listed in Table J.2. these are not duplicated.

Table J.3: COMAH sites within an indicative 5 km of the Hydrogen Pipeline (east) and (west) eastern and western extent

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	Tier	Approximate distance and direction from Proposed Development Site
Hydrogen Pipeline (west)					
1	CF Fertilisers UK Limited Portrack	Chemical installations - distribution Chemical installations - storage/warehousing Chemicals manufacture/production and/or disposal - general (not otherwise specified in the list) Production and/or storage of fertilizers	Oxidising liquids and/or solids Toxic	Upper	1.6 km south-west of Hydrogen Pipeline (west)

ID	Operator and Site Name	Industry	Hazard Classification of Relevant Dangerous Substance	Tier	Approximate distance and direction from Proposed Development Site
2	Exolum Riverside Limited Riverside – Billingham	Chemical installations - storage/warehousing Fuel storage/distribution	Flammable liquids and gases Hazardous to the aquatic environment Petroleum products and alternative fuels Toxic	Upper	2.4 km south-west of Hydrogen Pipeline (west)
3	Origin UK Operations Limited Stockton-on-Tees (Portrack Site)	Production and/or storage of fertilizers	Other hazard phrase applies	Lower	2.4 km south-west of Hydrogen Pipeline (west)
Hydrogen Pipeline (east)					
No additional COMAH sites not listed in Table J.2.					