European Union
European Regional Development Fund



A30 Chiverton to Carland Cross

Environmental Impact Assessment Scoping Report

Project Control Framework Stage 3

August 2017
Highways England

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highways england

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Highways England

Temple Quay House, 2 Temple Quay, Bristol, BS1 6PN

WSP

The Forum, Barnfield Road, Exeter EX1 1QR, United Kingdom
T +44 (0)1392 229700

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
P01	26/05/17	Luke Jiggins	Amy Hallam	Amy Hallam	First Draft
P02	16/06/17	Luke Jiggins	Amy Hallam	Ursula Stevenson	Second Draft
P03	25/07/17	Luke Jiggins	Amy Hallam	Amy Hallam	Final

The A30 Chiverton to Carland Cross Improvement scheme is part of the Department for Transport Road Investment Programme, being delivered by Highways England, and is receiving a funding contribution of up to £8m from the European Regional Development Fund to support the development phase of the scheme.

Content

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Executive Summary

ES.1 This document supports a request for an Environmental Impact Assessment Scoping Opinion from the Planning Inspectorate for the development of the A30 between Chiverton and Carland Cross, Cornwall. The A30 is a Nationally Significant Infrastructure Project and as such an Environmental Impact Assessment is required as part of a Development Consent Order application under the Planning Act 2008.

ES.2 The A30 is being developed by Highways England as the statutory highway authority, in conjunction with the Department for Transport. In 2014, the Government published its first road investment strategy which covers the period 2015 – 2020. The road investment strategy sets out the vision for the strategic road network and includes a commitment to improve the A30 between Chiverton and Carland Cross. Delivery of the scheme is estimated at £291.4m, part funded by a contribution from the European Regional Development Fund.

ES.3 The A30 forms part of the national strategic road network running east-west across Cornwall, linking the county to Exeter, the M5 and beyond. The current A30 layout possesses sections of narrow carriageway, unsuitable bends and gradients for high speed traffic, locations with poor forward visibility, and limited overtaking places with slow moving agricultural vehicles a regular occurrence. Coupled with increasing traffic levels this has contributed to congestion, unreliable journey times, queuing at the multiple route junctions effecting local routes. The main objectives for the development of the A30 between Chiverton and Carland Cross therefore aim to:

- Improve local connectivity across the Cornish peninsula;
- Improve highway reliability and effectiveness; and contribute to improved road safety;
- Improve journey times and journey quality;
- Contribute to environmental improvements - in terms of noise, air quality and greenhouse gases, and historic assets; and
- Facilitate and support planned residential and commercial development.

ES.4 In doing so the scheme will contribute to economic growth of the Cornish region by:

- Improving the capacity and performance of the strategic road network;
- Facilitating local economic growth and jobs;
- Providing more reliable, efficient and resilient access to and from west Cornwall and the Isles of Scilly;
- Making the region more attractive for inward investment; and
- Supporting the projected levels of commercial and residential growth to 2031.

ES.5 The Environmental Impact Assessment will be completed by technical specialists using best practice and following appropriate guidance. Early feasibility work and

consultation with major stakeholders has determined that key aspects of the Environmental Impact Assessment are likely to be:

- Air Quality;
- Landscape and Visual Effect;
- Noise and Vibration;
- Ecology and Nature Conservation;
- Cultural Heritage;
- Geology and Soils;
- Road Drainage and Water Environment;
- People and Communities, including health;
- Materials; and
- Climate Change.

ES.6 This Report to inform Scoping outlines all of the receptors that will be considered during the EIA and the planned approach to characterising the existing environment, assessing potential impacts associated with A30 development and necessary mitigation measures.

ES.7 Consultation is already underway and will be ongoing with stakeholders throughout the Environmental Impact Assessment and Development Consent Order application process. Both WSP and Highways England are committed to engaging with the community and other stakeholders, and working alongside them to deliver a project of the best possible quality.

ES.8 Section 5 of this Scoping Report provides an outline of the undertaken and planned consultation associated with the project.

1. Introduction

1.1 Introduction to the Preferred Option

1.1.1.1 This Scoping Report has been prepared in accordance with Section 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. It is submitted by WSP on behalf of Highways England to request a Scoping Opinion in respect of the A30 Chiverton to Carland Cross construction scheme.

1.1.1.2 The proposed scheme comprises the construction of 12.7km of 'expressway compatible' dual carriageway between Chiverton Cross roundabout and Carland Cross junction on the A30. The existing Chiverton Cross and Carland Cross roundabouts are to be replaced with grade separated junctions to provide connections to the local highway network.

1.1.1.3 To accommodate the new dual carriageway, the existing A30 will be retained to provide a local route. It will connect to a number of minor side roads leading to and from Truro to the south of the A30, and to and from Perranporth and Newquay to the north.

1.1.1.4 The proposed scheme will consist of the following;

- 70mph high quality dual carriageway to current standards;
- New grade-separated junctions at Chiverton and Carland Cross;
- New bridge at Chybucca taking the B3284 over the new dual carriageway, with west-facing slip-roads connecting to the new dual carriageway;
- The existing B3284 will be realigned and extended to run parallel to the new dual carriageway adjoin the new bridge at Chybucca.
- Six other crossing points where local roads cross the new road using under or over bridges; and
- Retention of the existing A30 for local traffic and non-motorised users.

1.2 Location of the Preferred Option

1.2.1 Site

1.2.1.1 The A30 is a main route from London to Land's End and is particularly important as one of two trunk roads connecting Devon and Cornwall, past numerous other settlements including Okehampton, Launceston, Bodmin, Redruth and Hayle. The A30 Chiverton to Carland Cross section lies north west of Truro and provides businesses and residents in this corridor with access to the wider Strategic Road Network (SRN), predominantly the M5 and A38.

1.2.2 Surrounding Area

1.2.2.1 The surrounding landscape is largely agricultural. The existing route is flanked by grass verges, trees, hedgerows, as well as isolated and small groups of residential dwellings, farms and other businesses and renewable energy installations.

1.2.3 Key Designations

1.2.3.1 There are no statutory designated sites within the scheme area, but there are a number within 1km including:

- Cornwall and West Devon Mining Landscape World Heritage Site;
- Chyverton Park statutory Registered Park and Garden;
- Newlyn Downs Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI); and
- Carrick Heaths SSSI.

1.2.3.2 There are also a number of Scheduled Monuments (barrows) and listed buildings and other structures (milestones) adjacent to the road (see Figure 1.1).

1.3 Environmental Impact Assessment (EIA)

1.3.1.1 The determination of whether a project requires EIA under the EIA Directive 2014/52/EU and the subsequent notification requirements in accordance with the Infrastructure Planning (EIA) Regulations 2017 is known as 'Screening'.

1.3.1.2 Environmental Impact Assessment is mandatory for the named project, on the basis of the relevant thresholds within Annex I of Directive 2011/92/EU as amended by Directive 2014/52/EU. Specifically, that a mandatory EIA is require for "all projects listed in Annex I are considered as having significant effects on the environment and require an EIA (e.g. motorways and express roads)".

1.3.1.3 The Infrastructure Planning (EIA) Regulations 2017, Descriptions of development for the purposes of the definition of "Schedule 1 development" Regulation 2(1), Paragraph 7 states:

(c) Construction of a new road of four or more lanes, or realignment and/or widening of an existing road of two lanes or less so as to provide four or more lanes, where such new road, or realigned and/or widened section of road would be 10 kilometres or more in a continuous length."

1.3.1.4 An EIA Screening exercise has been completed for the scheme. It was identified that the scheme falls under Schedule 1 and EIA is therefore mandatory. Therefore, EIA will be undertaken for the scheme and an Environmental Statement (ES) will be prepared.

1.3.1.5 The purpose of this report is to set out the proposed scope of the EIA. A Scoping Opinion is being sought from the Secretary of State to confirm that the scope of the assessment is appropriate.

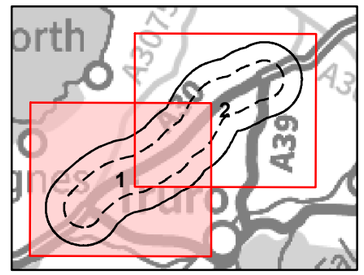
1.3.1.6 Chapter 2 of the Scoping Report provides a summary of the legislative and policy framework that will influence the EIA. Chapter 3 provides a description of the Nationally Significant Infrastructure Project (NSIP). Chapter 4 describes the alternatives considered in the assessment to date. Chapter 5 provides an overview of the consultation carried out previously and to be carried out in the future.

N

ID	Scheduled Ancient Monument
1	The Four Burrows
2	The Three Burrows
3	Bowl barrow 125m south of St Peter's Church at Three Burrows
4	Bowl barrow 100m south west of Callestick Vean
5	Bowl barrow 425m south west of Higher Callestick Farm
6	Bell barrow 520m west of Pendown
7	Trevalsa Cross 350m north west of Trerice
8	Hillfort 250m south west of Tresawsen
9	Bowl barrow 130m south east of Penglaze
10	Warren's Barrow
11	Bowl barrow 500m north west of Higher Ennis Farm
12	Two bowl barrows 290m and 375m north of Higher Ennis Farm
13	Prehistoric long barrow and four round barrows 580m and 750m south west of Mitchell Farm
14	Round barrow cemetery 420m north east of Higher Ennis Farm

Carnkief Pond SSSI
Carnkief Pond CWS
Carnjief Pond CWS
Leigh & Brickmoor Plantation CWS
Ventongimps Moor CWT
Ventongimps Moor SSSI
Carrick Heaths SSSI
Chyverton Reserve CWT
Polvenna Wood CWS
Callestick Vean CWS
Park Hoskyn CWS
Park Hoskyn - The Hayman Reserve CWT
Silverwell Moor CWS
Allet Bog CWS
Allet Bog Reserve CWT
Five Acres Reserve CWT
Two Burrows Reserve CWT
Bishops Wood CWS
Gwarnick Wood
St.Clement Forest
Carnhot CWS

1km Study Area
2km Study Area
Listed buildings
Tree Protection Order
Scheduled Monuments
World Heritage Site - Cornwall and West Devon Mining Landscape
Registered Parks and Gardens (Chyverton Park - Grade II)
Ancient Woodland
Site of Special Scientific Interest
Special Area of Conservation
County Wildlife Site
Cornwall Wildlife Trust Reserve
Rivers
Waterbodies
Noise Important Areas
Historical Landfill
Authorised Landfill
Byway open to all traffic
Bridleways
Footpaths
Definative Map Modification Orders
NCN Link Route (32)
National Cycle Route (32)
Access Land



Rev	Date	Description	By	Chk	App

Kings Orchard,
1 Queen Street, Bristol
BS2 0HQ
Tel: 44-(0)117-930-6200

Client: highways england driving forward

Site/Project:
A30 CHIVERTON TO CARLAND CROSS

Title:
ENVIRONMENTAL CONSTRAINTS PLAN
PAGE 1 OF 2

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Date: 10/07/2017	Scale: 1:30,000	A3	Sheet:

Project Number:	Drawing Number:	Revision:
3514274A-HHE	FIGURE 1.1	

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Login: DeSouzaJ
Plot Date: 10/07/2017

N

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Newlyn Downs SSSI & SAC

Carn Moor CWS

Carrick Heaths SSSI

Benny Mill Valley CWS

Goonwinnow CWS

Carland Moor CWS

Boswiddle CWS

Trenerry Wood CWS

Carnkief Pond SSSI

Carnjief Pond CWS

Carnkief Pond CWS

Leligh & Brickmoor Plantation CWS

Ventongimps Moor CWT

Chyverton Reserve CWT

Polvenna Wood CWS

Callestick Vean CWS

Allet Bog CWS

Allet Bog Reserve CWT

Five Acres Reserve CWT

Two Burrows Reserve CWT

Treworgan Quarry & Lower Tolcarne CWS

Bishops Wood CWS

St.Clement Forest

Gwarnick Wood

1km Study Area
2km Study Area
Listed buildings
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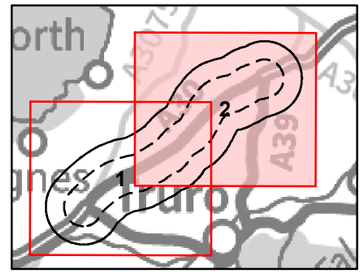

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Project Number:	Drawing Number:	Revision:
3514274A-HHE	FIGURE 1.1	

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Plot Date: 10/07/2017

Chapter 6 summarises those topics to be scoped in and out of the assessment. Chapter 7 sets out the proposed assessment methods for each topic. Chapter 8 describes the method for the assessment of cumulative effects.

1.4 The Promoter

1.4.1.1 Highways England is promoting the A30 Chiverton to Carland Cross Scheme. Highways England is the government company charged with operating, maintaining and improving England's motorways and major A roads on behalf of the Department for Transport. Formerly the Highways Agency, it became a government company in April 2015.

1.4.1.2 Highways England are responsible for motorways and major (trunk) roads in England. Their road network totals around 4,300 miles. Whilst this represents only 2 per cent of all roads in England by length, these roads carry a third of all traffic by mileage and two thirds of all heavy goods traffic.

1.5 The Designer

1.5.1.1 Arup were appointed by Highways England to prepare the application for Development Consent for the preferred route, including the ES.

1.5.1.2 WSP has undertaken the initial phase of design, and in particular identifying the preferred route for the scheme, between July 2015 and June 2017.

1.5.1.3 The ES will include evidence of competent expertise in undertaking the EIA.

2. Legislation

2.1 Relevant Environmental Legislation

2.1.1.1 The following is a list of legislation that will be considered in the decision making process for the scheme and will inform the EIA. This list is not exhaustive.

- Planning Act 2008;
- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017;
- Planning (Listed Buildings and Conservation Area) Act 1990;
- National Parks and Access to Countryside Act 1949;
- Climate Change Act 2008;
- The Natural Environment and Rural Communities Act 2006;
- Conservation of Habitats and Species Regulations 2010;
- Protection of Badgers Act (1992);
- Environmental Protection Act 1990;
- Environment Act 1995;
- Countryside and Rights of Way Act 2000;
- The National Parks and Access to the Countryside Act 1949;
- Water Framework Directive (Council Directive 2000/60/EC) (as amended);
- Air Quality Directives (Council Directive 2008/50/EC);
- The Wildlife and Countryside Act 1981 (as amended);
- Equality Act 2010;
- Water Resources Act 1991 (SI 57) (as amended by the Water Act 2003);
- Flood and Water Management Act 2010;
- Land Drainage Act 1991;
- Environmental Permitting Regulations 2016;
- The Control of Pollution (Amendment) Act 1989;
- Waste Minimisation Act 1998;
- The Waste and Emissions Trading Act 2003;
- The Clean Neighbourhoods and Environment Act 2005;
- The UK Biodiversity Action Plan (UK BAP) 1994 (as amended);
- The UK Post-2010 Biodiversity Framework (2012);
- Air Quality Standards Regulations 2010; and
- The Noise Insulation Regulations 1988 (as amended).

2.2 National Planning Policy

2.2.1.1 The following is a list of national planning policy sources which will be taken into account in the EIA.

- National Policy Statement for National Networks (NN NPS) (Department for Transport 2014);
- National Planning Policy Framework (NPPF) (Communities and Local Government 2012);
- National Planning Practice Guidance (PPG) (available online).

2.3 Local Planning Policy

2.3.1.1 The following is a list of relevant local planning policy which will be taken into account in the EIA.

2.3.2 Cornwall's Development Plan

- **The Cornwall Local Plan Strategic Polices 2010-2030 (adopted 2016)** The overarching planning policy framework for the whole of Cornwall for the period up to 2030.
- **Cornwall Local Plan Strategic Policies 2010-2030: Community Network Areas Sections** Act as a local focus for debate and engagement and provide the basis for the place based element of Cornwall's policy framework. The scheme is within both PP6 Truro and Roseland and PP7 St Agnes and Perranporth Community Network Areas.
- **The Truro and Kenwyn Neighbourhood Development Plan** Relevant to development management decisions in the Truro and Kenwyn Neighbourhood Plan Area, in which part of the scheme is based.

2.3.3 Cornwall Council Guidance and Supplementary Planning Documents

- Cornwall's Design Guide (2013);
- Cornwall's Biodiversity Volume 1: Audits and Priorities 1996;
- Cornwall's Biodiversity Volume 2: Action Plans 1996;
- Cornwall's Biodiversity Volume 3: Action Plans 2004;
- Biodiversity and Geological Conservation Planning Good Practice Guidance for Cornwall;
- Cornwall and Isles of Scilly Landscape Character Study 2007;
- British native trees and shrubs and their status in Cornwall;

2.4 Other Policy, Guidance And Data Sources

2.4.1.1 The following list includes other relevant policy and guidance documents that will inform the EIA.

- National Infrastructure Plan 2014;
- The Natural Choice: securing the value of nature (Natural Environment White Paper, "NEWP") (Defra 2011);
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services (Natural England 2011);
- Noise Policy Statement for England (Department for Environment, Food and Rural Affairs 2010);
- Noise Action Plan: Roads (Including Major Roads) (Defra 2014);
- Environmental Noise (England) Regulations 2006, as amended;
- The National Adaptation Programme. Making the country resilient to a changing climate (Department for Environment, Food and Rural Affairs "Defra" 2013);
- UK Climate Change Risk Assessment (Defra 2017);

- Climate Resilient Infrastructure: Preparing for a Changing Climate (Defra 2011);
- The Carbon Plan: Delivering our low carbon future (Department of Energy and Climate Change 2011);
- Interim Advice Note (IAN) 195/16 Cycle Traffic and the Strategic Road Network;
- Guidelines for Landscape and Visual Impact Assessment (3rd Edition, Landscape Institute and Institute of Environmental Assessment and Management 2013);
- Handbook for Cycle Friendly Design (Sustrans 2014);
- Technical Standards for the design, maintenance and operation of Sustainable Drainage Systems (Defra)

3. Description of the Project

3.1 Background to the Preferred Option

3.1.1.1 In December 2014, the Department for Transport (DfT) published the Road Investment Strategy (RIS) for 2015-2020. The RIS sets out the list of schemes that are to be developed by Highways England over the period from 2015-2020, and includes the A30 Chiverton to Carland Cross scheme. The South West Peninsula Strategy Evidence Report (April 2014) identified the following problems with the route between Chiverton and Carland Cross:

- A journey time reliability of 41% westbound and 52% eastbound in the summer months (worse than the national average of 61%).
- Capacity issues at Chiverton, Chybucca and Carland Cross.
- Parts of the route will reach their design life by 2021.
- Limited use of technology.
- Vulnerable road users use the route e.g. National Cycle Route 32 crosses the A30 west of Carland Cross and the A30 is part of the Land's End to John O'Groats route.
- 22,716 new dwellings and 11,241 new jobs are planned for Cornwall by 2031, including locally in Truro and Threemilestone.

3.1.1.2 Possible solutions for schemes named in the RIS were identified by Highways England after collating evidence on network performance issues and from local stakeholders. Following an options assessment, a recommended solution emerged for which an outline and strategic business case was made.

3.1.1.3 The list of possible solutions was then developed building on the previous options assessment and strategic business case. This included further assessment identifying that a full dual carriageway standard route (either on-line or off-line) would be the only option that would fully address the scheme objectives out of a possible 11 options considered, including improvements to bus and rail services.

3.1.1.4 Four main options were developed further from those 11 options. One was based on the former preferred route withdrawn in 2005 and using some sections of the existing A30. Three alternative, mainly off-line, routes preserving the existing road as a local route were also developed in 2015 and 2016.

3.1.1.5 During October and December 2016, the public and other stakeholders were consulted on a single mainly off-line alignment, which included a variation around Chybucca. Details of public consultation and how the views of the public and other stakeholders have been accounted for in the development of the scheme will be described in the Consultation Report to be submitted with the application for Development Consent.

3.1.1.6 Following this, in 2017, the alignment and junction designs were revisited in a series of multi-disciplinary workshops involving environmental specialists, highways engineers, town planners and transport planners; all working on behalf

of or for Highways England. Ongoing account was also taken of feedback from the public and other stakeholders, such as Historic England, Natural England and Cornwall Council.

3.1.1.7 In June 2017, a preferred route and site for the two junctions at Chiverton Cross and Carland Cross, as well as an area of land to be protected from further development in order that the scheme can be delivered, was identified. The scheme will be further assessed and the design refined to inform the EIA, at the end of which an application for Development Consent will be submitted to the Planning Inspectorate for examination.

3.2 Reasons for Choosing the Preferred Option

3.2.1.1 The reasoning for the preferred option is set out below and is split into route locations for clarity. The main alignment was designed to minimise the impacts of farm holdings where possible and avoid impacts on statutorily protected assets such as Scheduled Monuments.

3.2.1.2 At Chiverton Cross, a single gyratory grade-separated junction east of the existing junction was chosen out of three possible options for the following reasons:

- Increased capacity on the gyratory junction.
- The location at Chiverton is limited by the presence of businesses and dwellings. The proposed location of the junction (east) allows for the larger gyratory (additional 6100m² of carriageway and sidewalks);
- Properties to the south (e.g. Roscarnick Farm) may experience a decrease in noise levels due to increased distance from the A30 and landscaping which may provide some screening effects;
- The proposed route would an additional £3m than the consultation base estimate of £114.8m. However, the recouped benefits for the increased size would be £3.6m.

3.2.1.3 Two options for the route alignment at Chybucca were considered and the alignment to the south of Callestick Vean was chosen for the following reasons:

- In regard to noise and vibration there is likely to be a beneficial effect at Callestick Vean as the A30 will be further from the property than the northern route.
- The route limits the disruption to the existing field pattern.
- Disruption to private access would be minimised with the online route.

3.2.1.4 Three possible options for the alignment at Marazanvose were considered and the southern option closest to the existing carriageway was chosen for the following reasons:

- The preferred route to the south would move the carriageway further from the Chyverton Registered Park and Garden, reducing the impact on landscape and the historic setting.

- The preferred route would require between 6200 and 17500m² less carriageway and side roads compared with the consultation and northern options. This reduction in hardstanding reduces the overall land take required by up to 31,100m².
- The chosen option would avoid Marazanvose hamlet becoming an island in between the new and old A30 carriageways.

3.2.1.5 An additional crossing point at Trevalso was added following public consultation for the following reasons:

- Sight decrease in pollutant exposure at Henver Cottage and Henver Lane House due to increased distance to the roadside.
- The addition of the underpass, which lies near to bat maternity roosts, is likely to be of benefit at this location; a large number of lesser and greater horseshoe bats have been recorded in this area. The crossing point may provide additional mitigation in this area.
- This option creates no adverse harm to designated heritage assets.
- No Public Rights of Way (PRoW) or open access land will be affected by the crossing.

3.2.1.6 The layout of the junction at Carland Cross was chosen for the following reasons:

- The route alignment bisects the remnant section of heath to the south of the current A30. This option allows reconnection of an ancient barrow landscape at Warrens Barrow, currently severed by the existing A30.
- The layout would receive additional cost benefits of £3.8m.
- The alternative route would result in reduced earthwork requirements.
- No PRoW or areas of open access land are impacted.

3.3 Project Objectives

3.3.1.1 The 'Client Scheme Requirements', which sets out the parameters of the scheme, contains a number of Transport Objectives. These were developed from consideration of the national objectives of Department of Transport (DfT) and Highways England, Cornwall Council's transport objectives, and the constraints on the current A30. The transport objectives for the scheme are:

- to contribute to regeneration and sustainable economic growth
- to support employment & residential development opportunities;
- to improve the safety, operation & efficiency of the transport network;
- to improve network reliability and reduce journey times;
- to deliver capacity enhancements to the Strategic Road Network;
- to support the use of sustainable modes of transport;
- to deliver better environmental outcomes; and
- to improve local and strategic connectivity.

3.4 Description of the Preferred Option

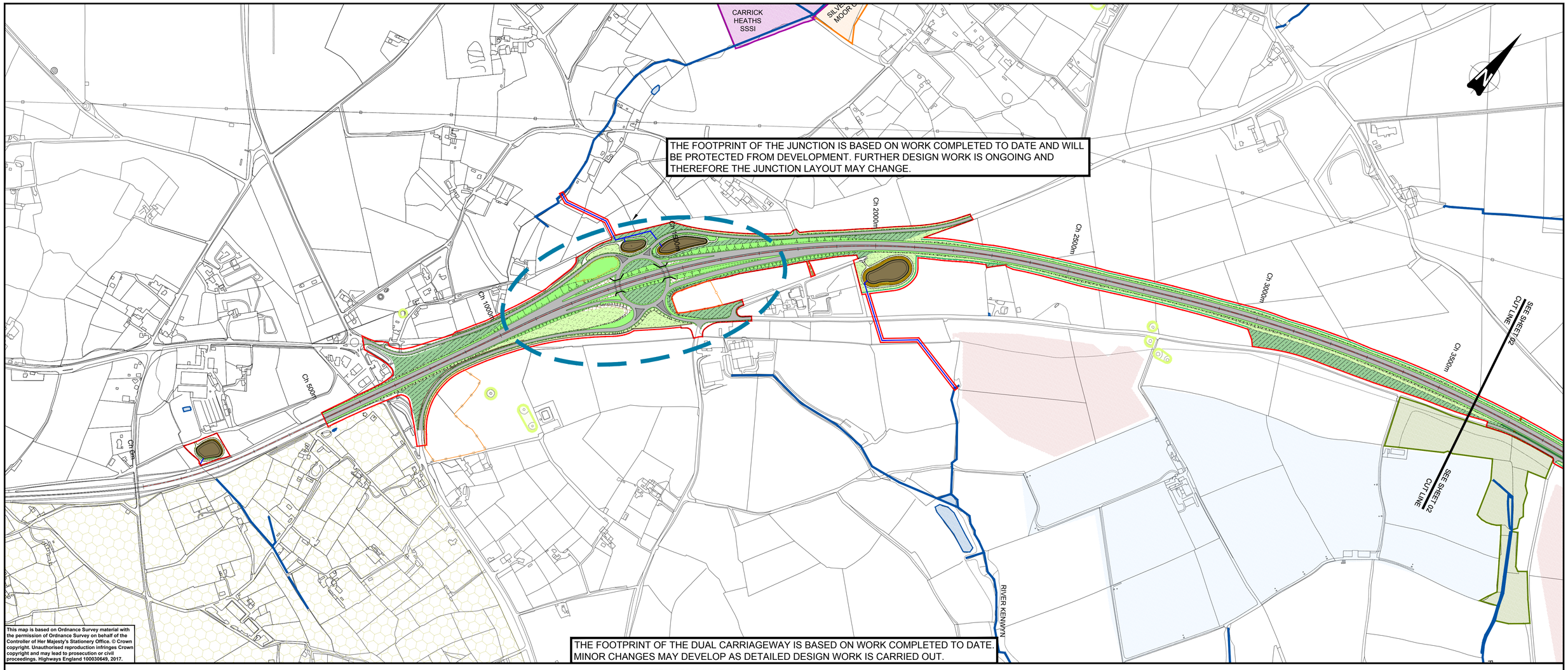
3.4.1.1 The scheme between Chiverton and Carland Cross junctions (the end points of the scheme) is 12.9km in length (see Figures 3.1 to 3.4). It comprises the following main features:

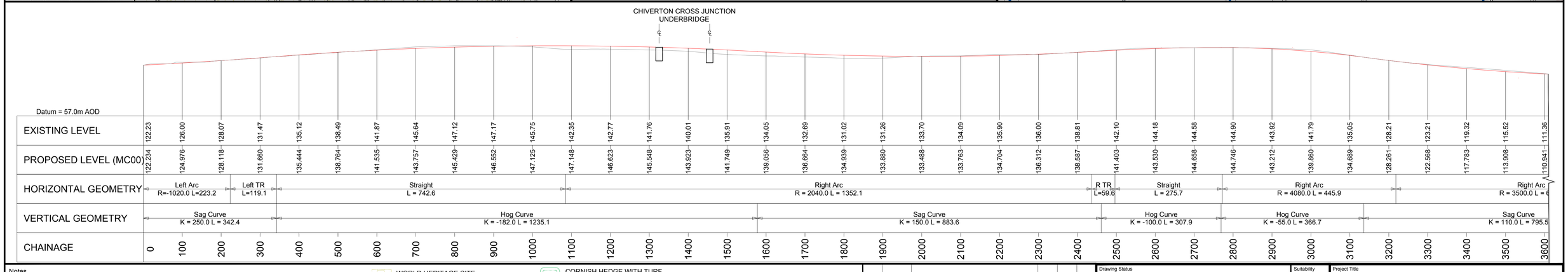
- 70mph high quality dual carriageway to current standards;
- Connection to existing Scorrier Bypass immediately west of the existing Chiverton Cross roundabout
- Chiverton Cross - grade separated junction, offset from the existing location to minimise disruption to the road user during construction
- Chiverton to Chybucca - route is aligned as close to the existing A30 as geometric and other constraints permit
- Chybucca - new partial grade-separated junction with bridge taking the B3284 over the new dual carriageway and west-facing slip-roads only providing access onto the dual carriageway from local routes. (The forecast flows to and from the local roads to the east are insufficient to justify east-facing slip-roads)
- Chybucca – Twobarrows Bridge - route aligned as close to the existing A30 as geometric and other constraints permit. The existing B3284 will be realigned and extended to run parallel to the new dual carriageway adjoin the new bridge at Chybucca
- Twobarrows Bridge – online section utilising the existing bridge
- Carland Cross – grade separated compact junction with dumb-bell roundabouts, re-using the existing roundabout to the south
- Connection to the existing Mitchell Bypass approximately 500m east of existing roundabout
- Six other crossing points where local roads cross the new road using under or over bridges
- Retention of the existing A30 for local traffic and non-motorised users
- Local improvements to side roads in order to facilitate access to isolated properties.

3.4.2 Dimensions and Elevations Impacts

3.4.2.1 Where appropriate noise bunding will be required. A 2m exclusion zone will be required. The following structures will be required along the length of the scheme.

- Chiverton Cross, Underbridge A (Prestressed beam structure on concrete faced reinforced soil abutments with piled bank seats), Chainage 1330, Width 31m, Length 18m and Headroom 5.3m.
- Chiverton Cross Underbridge B (Prestressed beam structure on concrete faced reinforced soil abutments with piled bank seats), Chainage 1450, Width 31m, Length 18m and Height Headroom 5.3m.
- Chybucca Overbridge (Composite semi integral structure on piled bank seats) Chainage 4830, Width 11m, Length 33m and Headroom 5.3m.
- resawen Underbridge (Precast concrete portal structure) Chainage 6000, Width 31m, Length 10m and Headroom 5.3m.





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Rev.	Date	Description	By	Chk'd	App'd
P01	27/07/17	FIRST ISSUE	AW	AH	TH

Drawing Status: SUITABLE FOR STAGE APPROVAL
Suitability: S4

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EX1 1QR
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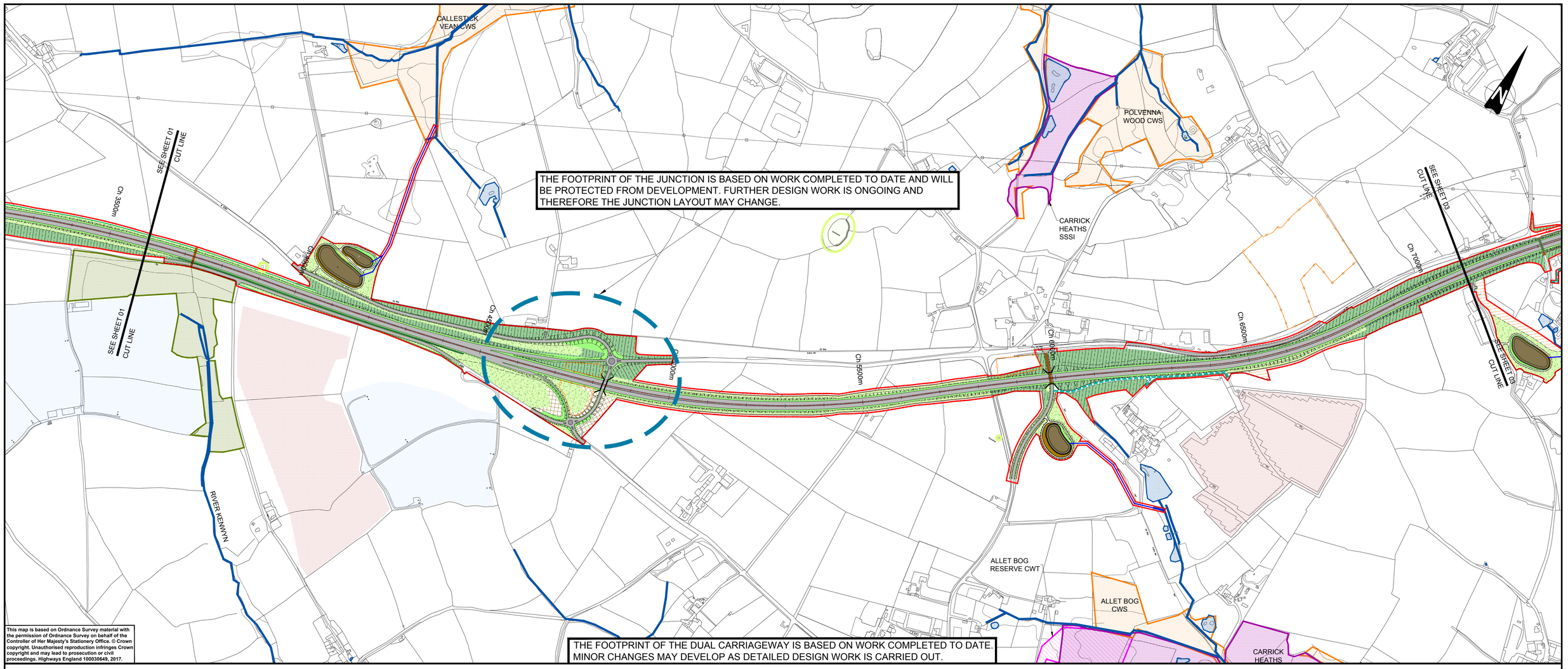
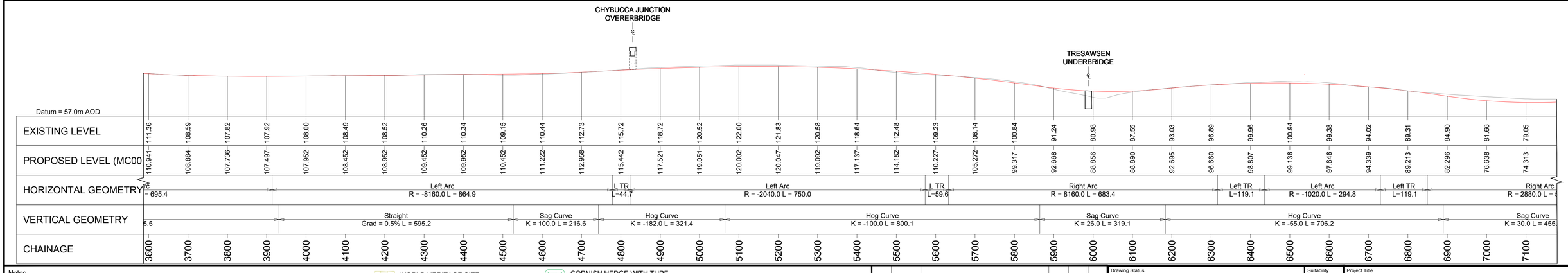
Drawing Title: SITE LOCATION PLAN
FIGURE 3.1
SHEET 1 OF 4

Scale	Drawn	Checked	Approved	Authorised
HS: 1:5000 VS: 1:2000	AW	AH	TH	---
Original Size	Date	Date	Date	Date
A1	27/07/17	27/07/17	27/07/17	---

Drawing Number: Project HA551502 | Originator WSP | Volume GEN | Location 0000 | Type DR | Role Z | Number 00140
Project Ref. No.
Revision: P01





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P01	27/07/17	FIRST ISSUE	AW	AH	TH

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FIGURE 3.2
SHEET 2 OF 4

Scale	Drawn	Checked	Approved	Authorised
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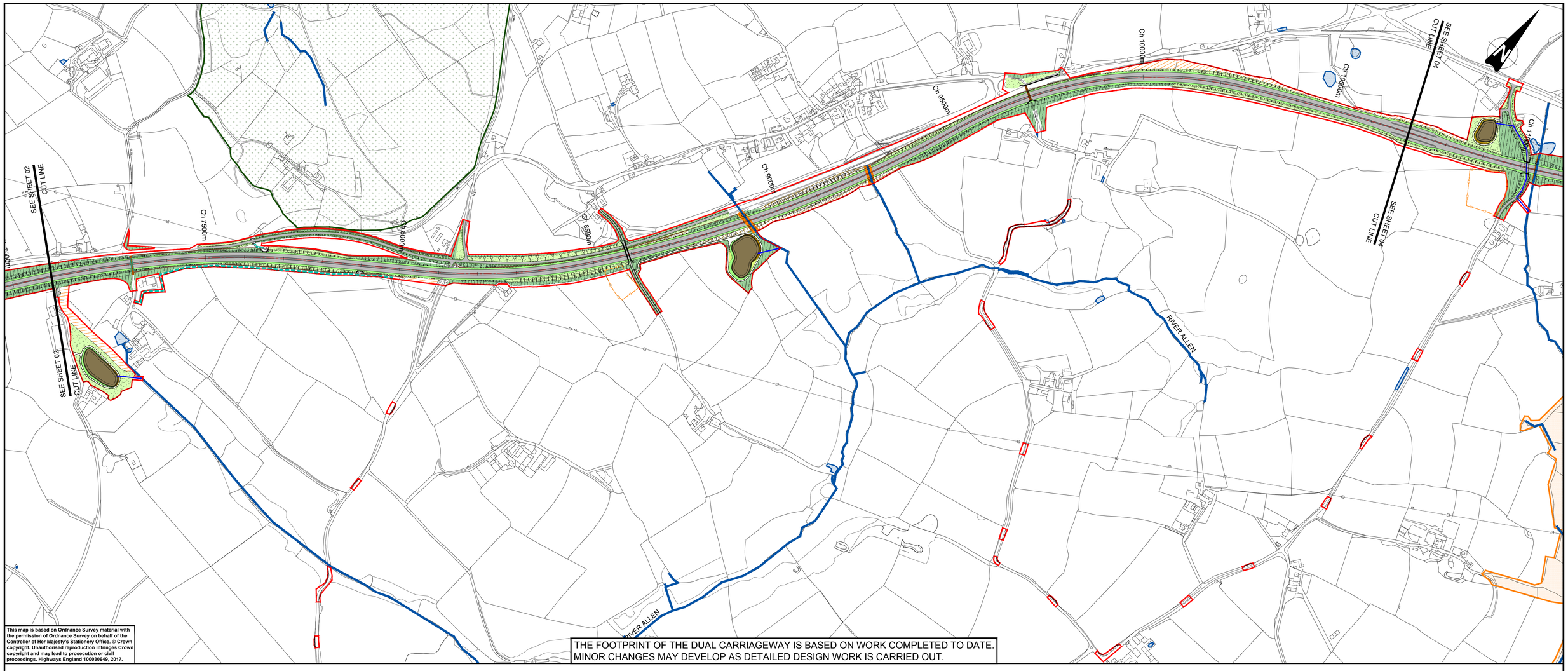
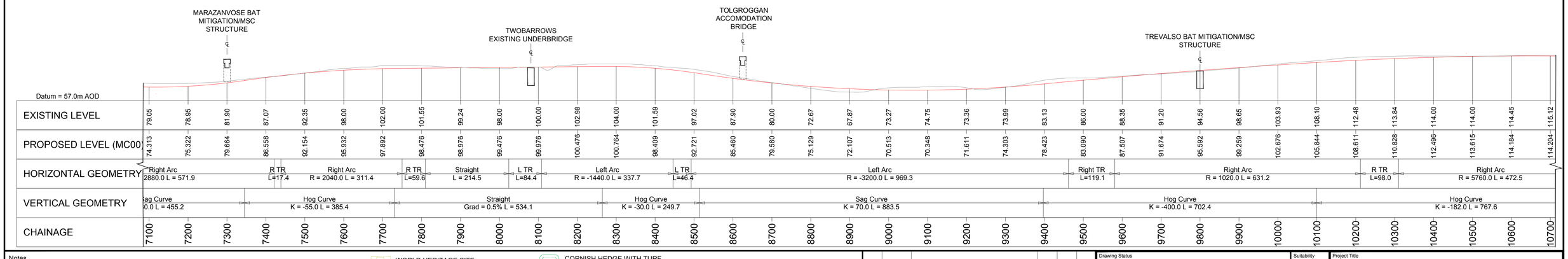
Original Size	Date	Date	Date	Date
A1	27/07/17	27/07/17	27/07/17	---

Drawing Number				Project Ref. No.
Project	Originator	Volume		
HA551502	WSP	GEN		
0000	DR	Z	00141	Revision
Location	Type	Role	Number	P01



THE FOOTPRINT OF THE DUAL CARRIAGEWAY IS BASED ON WORK COMPLETED TO DATE. MINOR CHANGES MAY DEVELOP AS DETAILED DESIGN WORK IS CARRIED OUT.



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Rev.	Date	Description	By	Chk'd	App'd
P02	01/08/17	AMENDED DRAWING FOLLOWING ARUP COMMENT	AW	AH	TH
P01	27/07/17	FIRST ISSUE	AW	AH	TH

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Drawing Title: SITE LOCATION PLAN
FIGURE 3.3
SHEET 3 OF 4

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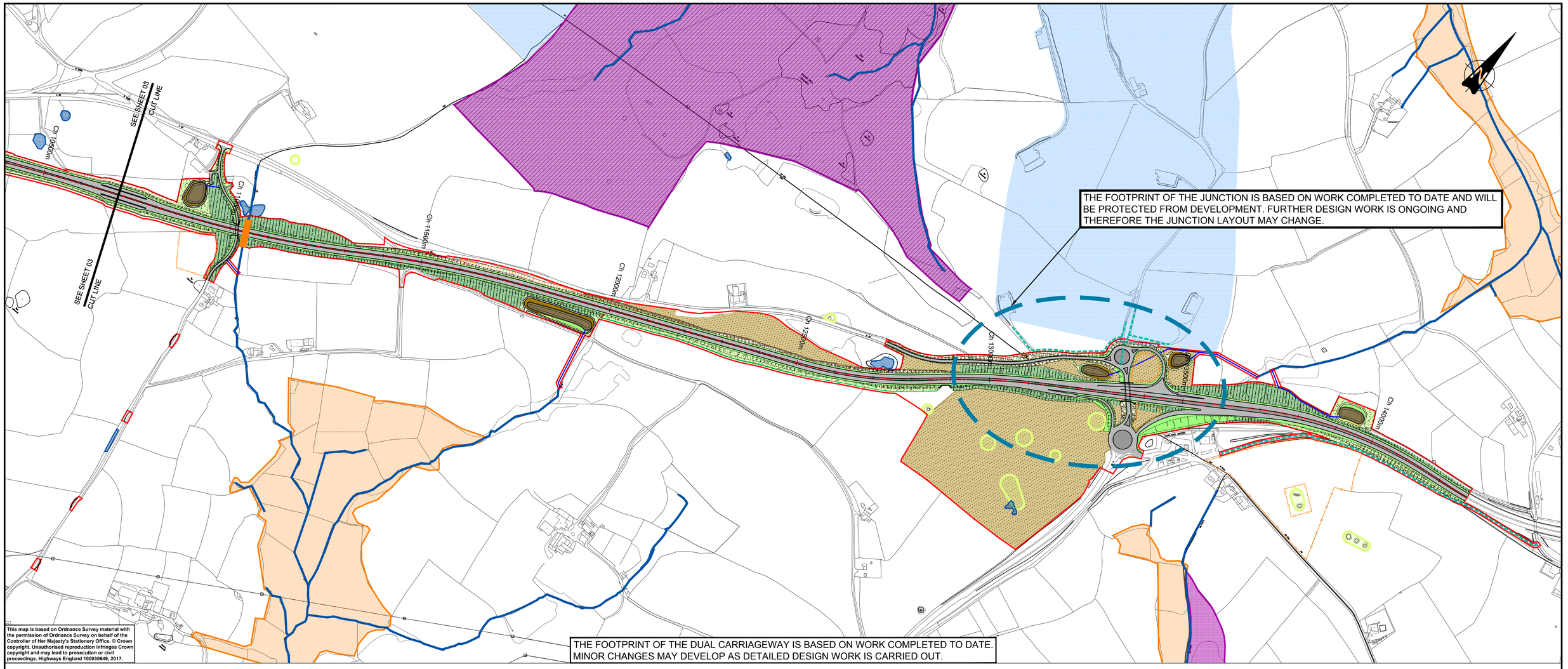
Original Size	Date	Date	Date	Date
A1	01/08/17	01/08/17	01/08/17	---

Drawing Number: Project HA551502 | Originator WSP | Volume GEN | Location 0000 | Type DR | Role Z | Number 00142
Project Ref. No.
Revision: P02



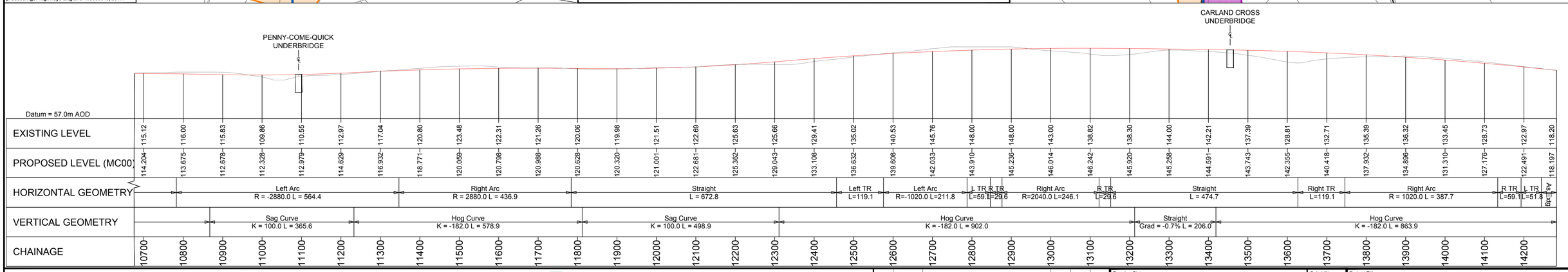


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FIGURE 3.4
SHEET 4 OF 4

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A1	27/07/17	27/07/17	27/07/17	---

Drawing Number: Project HA551502 | Originator WSP | Volume GEN | Location 0000 | Type DR | Role Z | Number 00143
Project Ref. No.:
Revision: P01

- Twobarrows, Existing Underbridge in situ concrete structure to be re used with some minor modification, Chainage 8200, Width 34.4m, Length 9.5m and Headroom 5.3m.
- Tolgroggan Acommadation Overbridge (Composite 2 span semi integral structure on piled bank seats) Chainage 8580, Width 7m, Length 60m and Headroom 5.3m.
- Penny-Come-Quick Underbridge (Prestressed beam structure on concrete faced reinforced soil abutments with piled bank seats), Chainage 10970, Width 34m, Length 10m and Headroom 5.3m
- Carland Cross Underbridge (Precast concrete portal structure with precast head walls) Chainage 13360, Width 50m, Length 15m and Headroom 5.3m.

4. Alternatives Assessment

4.1 Options Assessment Process

4.1.1.1 As described in Chapter 3, prior to public consultation a number of mainly offline solutions to achieve the Client Scheme Requirements was considered. During public consultation in October 2016, two alternatives were presented to the public and other stakeholders for comment.

4.1.1.2 Following public consultation, a number of options for each element of the scheme were identified to address concerns raised during the consultation. The process of assessment of the various scheme options was formed of the following stages:

- Prior to option selection workshop:

1. Each alternative for each element of the schemes was developed so that there was like-for-like comparison in terms of scale, quantum, purpose, etc.
2. Each project discipline reviewed each element and summarised the assessed impacts, such that the likely impacts and effects of each element were understood.
3. From analysis of each discipline summary assessment of each option, key risk areas were identified for sharing with the workshop group. The National Policy Statement for National Networks weighting for each generic impact assessed was assigned to the described impact for each discrete alternative.

- At the option selection workshop:

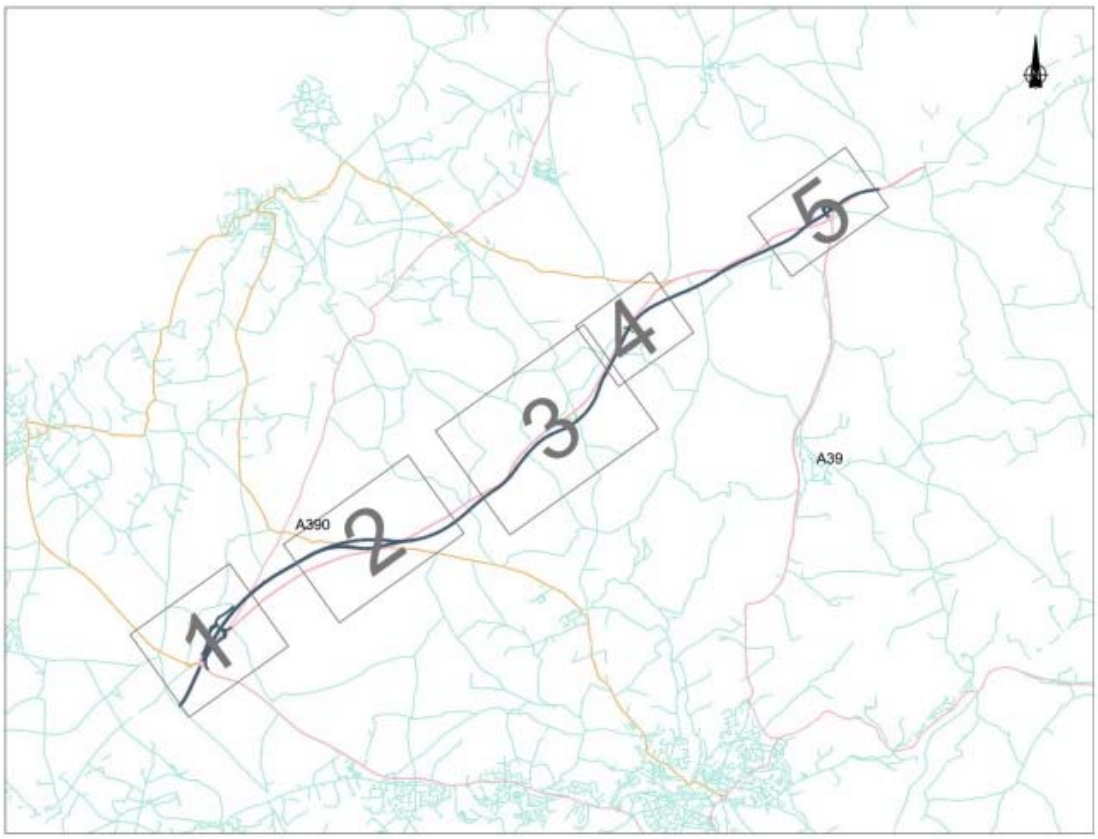
4. The workshop participants reviewed drawings of each assessed alternative and the assessment undertaken. The summarised significant impacts for each alternative were described by relevant specialists to ensure a common understanding of all salient issues.
5. When all salient issues were listed for each alternative, a pairwise comparison was undertaken i.e. two alternatives were compared; advantages and disadvantages were listed; and conclusions reached on which alternative to take forward for comparison with any further option. This pairwise comparison process was repeated until a preferred option emerged.

4.1.1.3 Following the workshops, those options that were 'carried forward', as identified in Table 4.1 below, were then subject to a further information gathering event for key stakeholders prior to preferred route selection.

Table 4.1
List of alternatives

Location (ref Figure 4.1 below)	Options	Rejected or carried Forward
1. Chiverton	At Grade Throughabout (Hamburger)	Discarded
	At Grade Gyratory	Discarded
	Dumbell closer to existing roundabout – Location A	Discarded
	Gyratory at consultation location – Location B	Carried forward
	Gyratory – Location C (between Locations A and B)	Discarded
	NMU provision for the above	Carried forward (Opportunity)
2. Chybucca	More southerly realignment at Chybucca with online section	Carried forward
	Reduce separation between the existing A30 and the proposed dual carriageway.	Carried forward
3. Marazanvose:	Alignment initially south of existing A30 with online sections to reduce severance in Nancarrow	Carried forward
	Alignment moved north of Marazanvose	Carried forward
	Alignment and side road moved north of Marazanvose	Carried forward
	Northern option, old A30 to south of D2AP (similar to Buildability Workshop Alt 3.)	Discarded
	New junctions either side of Zelah i.e. at Boxheater or Penny-come-Quick and provide all movements at Twobarrows	Discarded
	Alignment south of Boswellick Farm extending beyond Penny-come-Quick – a major off-line southern alternative.	Discarded
4. Trevalso	Underbridge to retain connection to the existing A30	Carried forward (Opportunity)
5. Carland Cross	Northern link for existing A30 to remove proposed bridge and existing A30 to allow existing barrows group to be re-connected	Carried forward

4.1.1.4 The locations of these alternatives are shown in Figure 4.1 below.



4.1.1.5 Table 4.2 provides a summary of the reasons why those alternatives described in Table 4.1 were discarded where relevant.

Table 4.2
The reasons for discarding alternatives

Options	Reason discarded
Chiverton	
Public Consultation Layout	Properties to the north likely to experience increase in noise due to elevated junction, proximity of roundabout and increased traffic speeds. The location of the junction would result in limited space due to residential and commercial services would restrict the junction size to the extent capacity would be insufficient. Limited capacity for future growth.

	This option offers no additional beneficial advantage to the heritage assets or the landscape setting of either St Peters Church or the Three Barrow when compared with other options.
At Grade Throughabout (Hamburger)	Not grade separated and thus not compliant with RIS. Would reach capacity before design year and would lead to extensive queuing on all approaches. Unacceptable to Cornwall Council.
At Grade Gyratory	Not grade separated and thus not compliant with RIS. Would reach capacity before design year and would lead to extensive queuing on all approaches. Unacceptable to Cornwall Council.
Dumbell closer to existing roundabout	A gyratory layout at this location was considered a more efficient use of the constrained space available.
Gyratory closer to existing roundabout	The location of the junction would result in limited space due to residential and commercial services would restrict the junction size to the extent capacity would be insufficient. This option offers no additional beneficial advantage to the heritage assets or the landscape setting of either St Peters Church or the Three Barrow when compared with other options. Between four and five times less buildable when compared to the other options. The cost of Option A is estimated at £5.98m above that of the original consultation route.
Chybucca	
Route north of Callestick Vean	There would be negligible change on noise levels at Callestick Vean compared to the beneficial change predicted at from the preferred route. The consultation layout provides no additional beneficial traits over that of proposed route in terms of air quality, NMUs, traffic capacity, land access and farm severance.
Marazanvose	
Northern option, old A30 to south of new dual carriageway	An additional five fields and three landowners would be affected when compared with the preferred route. The route would also create isolated parcels of land, remote from their original farms, although access can be maintained to these severed pieces of fields. Impact on Chyverton cross country equestrian venue. Major impact on Ranger Barn smallholding and a privately held pasture field. The realignment would cause an increase in exposure at Hill House with regards to air quality. The road alignment is immediately adjacent to Chyverton Registered Park and Garden creating adverse impacts on the setting of the garden

	and the listed lodge buildings, both through loss of tranquillity and alterations to the permeability of the landscape. There is an expected increase in noise level at Hill House due to decrease in horizontal separation between road and receptor. The cost of this option is assessed to be £0.4m above that of the preferred alignment. The layout provides no additional beneficial traits over that of proposed route in terms of ecology, traffic capacity, open land access or value for money.
Northern Option (cul de sac)	An additional six fields and three landowners would be affected when compared with the preferred route. Option would also create isolated parcels of land, remote from their original farms, although access can be maintained to these severed pieces of fields. Impact on Chyverton cross country equestrian venue. Major impact on Ranger Barn smallholding and a privately held pasture field. The road alignment is immediately adjacent to Chyverton Registered Park and Garden creating adverse impacts on the setting of the garden and the listed lodge buildings, both through loss of tranquillity and alterations to the permeability of the landscape. The option would server PRoW 314/67/1. The option provides no additional beneficial traits over that of preferred route in terms of ecology, traffic capacity, open land access or value for money.
New junctions either side of Zelah	The provision of intermediate junctions is contrary to the scheme objectives, as it would result in local traffic using the proposed dual carriageway.
Alignment south of Boswellick Farm	This alignment significantly widened the route corridor, increased severance to agricultural land and would require the crossing of several steep sided wooded valleys over the River Allen and its tributaries.
Trevalso	
Public consultation layout with no crossing	The Consultation layout (with no crossing) has severe impacts on access to Trevalso Farm creating a long detour (3 miles) for lorries and agricultural vehicles accessing the A30 and fields to the north of the A30. The consultation layout provides no additional beneficial traits over that of preferred route in terms of noise, air quality, the historic environment, value for money, land use or PRoWs.
Carland Cross	
Public consultation layout of grade separated junction retaining section of A30 south of Warren's Barrow	The public consultation layout provides no additional beneficial traits over that of preferred route in terms of air quality, value for money, buildability, land use or noise and vibration.

5. Consultation

5.1 Previous Consultation

5.1.1.1 A non-statutory scoping exercise was undertaken in advance of preparing the Environmental Study Report (ESR) which was prepared to assess and compare the options and has informed the choice of topic areas for the EIA.

5.1.1.2 It was undertaken in accordance with the DMRB Volume 11 Environmental Assessment and in particular Part 4 HA 204/08 (Scoping of EIAs) and Part 6 HD48/08 (Reporting of EIAs).

5.1.1.3 The Scoping Report was subject to consultation with the Statutory Environmental Bodies (Historic England, Natural England and the Environment Agency) and other stakeholders e.g. Cornwall Council, Cornwall Wildlife Trust, in December 2015 and January 2016. The table in Appendix A sets out the comments received which have been taken into account in preparing this EIA Scoping Report.

5.2 Proposed Consultation

5.2.1.1 This Scoping Report is submitted to the Planning Inspectorate and will then be subject to consultation which will be fed into the Scoping Opinion.

5.2.1.2 A Preliminary Environmental Information Report (PEIR) will be published during the statutory consultation period in Autumn 2017 which will present information to the public and stakeholders to comment on. The ES will then be submitted as part of the application for Development Consent in 2018 at which point there will also be a further opportunity for comment on the EIA.

6. Topics and Elements of Topics to be Scoped In and Out

6.1 Topics to be Scoped In

6.1.1.1 A 'simple' assessment in accordance with DMRB has been carried out for each of the topics where DMRB has differentiates between 'simple' and 'detailed'. The results of the assessment are presented in the Environmental Study Report for PCF Stage 2.

6.1.1.2 Table 6.1 provides an overview of all the topics to be scoped into the assessment and the reasons for this decision.

Table 6.1: Topics Scoped in to the Assessment

Topic	Justification
Air Quality including Health	The route realignment (>5m) and the predicted change in traffic flows as a result of the scheme (>1000AADT) meet the DMRB criteria for detailed assessment. In addition, the nearby presence of significant ecological sites (Newlyn Downs SAC/SSSI and Carrick Heaths SSSI) and the Truro AQMA represent sensitivities which need to be addressed. This chapter will also assess impacts on human health.
Cultural Heritage	A detailed assessment is proposed due to the potential for significant effects on several designated assets including Scheduled Monuments and Listed Buildings.
Ecology and Nature Conservation	Detailed assessment is appropriate because potential significant effects have been identified for the Scheme, particularly relating to habitat loss and fragmentation affecting bat populations.
Landscape and Visual Effects	A Detailed Assessment will be undertaken for landscape effects because of the quality of the landscape resource, and for visual effects due to the high sensitivity of receptors in the vicinity of the scheme.
Noise and Vibration including Health	The threshold values contained in DMRB (HD213/11) (Section 3.5) will be exceeded at some NSRs and therefore a 'Detailed Level' assessment is required. This chapter will also assess impacts on human health.
People and Communities, including Health	A detailed level of assessment for People and Communities will be undertaken, as prescribed for Stage 3 assessments within each of the DMRB Volume 11 Chapters 6, 8 and 9. Detailed assessment is appropriate because potential significant effects on People and Communities have been identified for the Scheme.
Road Drainage and the Water Environment	The assessment of potential effects to surface water features, groundwater features and flood risk will be undertaken in accordance with DMRB Volume 11, Section 3, Part 10 (HD 45/09) using methods A, C and D described in Chapter 7 due to the likelihood of significant effects on these receptors.
Geology and Soils	It is recommended that a simple assessment is undertaken in accordance with DMRB guidance.
Materials	According to IAN 153/11, for projects such as this with an estimated cost greater than £300,000, it is assumed that the potential does exist for impacts to occur. Therefore, a Detailed level assessment is required.
Climate Change	There is currently no guidance in DMRB on assessment of climate change. However, it is assumed that the Scheme will have an impact on the causes of climate change and therefore it is scoped in to the EIA.

6.2 Major Accidents and Disasters

6.2.1.1 The Infrastructure Planning (EIA) Regulations 2017, transposing the European Directive 2014/52/EU, have introduced the requirement for '*expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development'* (Regulation 5(4)) to be assessed within EIAs.

6.2.1.2 For the Proposed Scheme, a separate chapter assessing the potential impacts of major accidents and disasters during the construction and operation phase is not required for the following reasons:

- The Proposed Scheme is not considered to have high vulnerability to major accidents or disasters. Whilst the legislation is not explicit, the language of the revised Infrastructure Planning Regulations 2017 is aimed towards hazardous industries or operations (those with a 'high vulnerability' to major accidents).
- The design, construction and operation of the Proposed Scheme must comply with legal requirements, codes and standards, such as:
  - Health and Safety at Work etc. Act 1974 (HSWA);
  - The Management of Health and Safety at Work Regulations (1999);
  - Construction (Design and Management) (CDM) 2015 Regulations;
  - The Workplace (Health, Safety and Welfare) Regulations 1992;
  - Design Manual for Roads and Bridges (DMRB);
  - IAN 191/16, Safety Governance for Highways England.
- The term major accidents and disasters refers to events both within and external to the Proposed Scheme that have the potential to cause significant harm to the environment (including but not limited to populations, biodiversity, land, soil, water, air, material assets, cultural heritage).

6.2.1.3 A high level screening exercise has been undertaken to identify any such events, their potential to cause significant harm, and whether these events are covered by existing chapters within the EIA. The impact of any unplanned events (accidents or disasters) has been considered against the current baseline conditions. The volume and type of traffic using the Proposed Scheme will not change significantly from that using the current road alignment, and therefore it is reasonable to conclude that there is no general increase in risk.

6.2.1.4 The Stage 2 Economic Assessment Report assesses the impact on accidents of the Proposed Scheme using COBALT software, in line with WebTAG Unit A4.1. This calculates the number of accidents within the assessment area for the 'with' and 'without' scheme scenarios, and can therefore determine accident reductions. The results of the Accident Assessment show that the scheme would provide benefits in terms of accident savings in all growth scenarios and that the scheme meets the safety target set in the scheme objectives.

6.2.1.5 Notwithstanding this conclusion, the following specific issues have been reviewed:

- The potential for construction-related accidents, causing harm to construction workers, are not within the scope of the EIA, unless these could also cause harm to an environmental receptor including members of the public beyond the

boundaries of the construction site. Existing legislation around safe working practices and CDM will ensure that such risks are mitigated appropriately without the need for further assessment.

- The potential for extreme weather events, combined with the presence of the Proposed Scheme (for example, the proposed scheme affecting flood patterns) will be adequately assessed within the Road Drainage and the Water Environment chapter, the separate Flood Risk Assessment (FRA) and the Climate Change chapter, without the need for further assessment.
- The potential for other external hazards to impact the scheme, such as earthquakes, landslides, mine collapse or sinkholes, will, where relevant, be covered within the design requirements of the DMRB and the Geology and Soils chapter and will not require further assessment.
- Accidental spillage of contaminants such as hydrocarbons and their subsequent release into the drainage system will be considered in the Road Drainage and the Water Environment chapter.
- The potential for an external source of hazards to interact with the Proposed Scheme has been considered in the specific context of the nearby Newlyn Downs Explosive Depot, a registered COMAH site. As the Proposed Scheme is further away from the Newlyn Downs site than the existing scheme, it can be judged that the potential for interaction between the two sites is less than currently exists, and hence no increase in risk to any environmental receptors due to the presence of the Proposed Scheme is likely to occur.
- The potential for major traffic accidents will be considered again and reported in the Stage 3 Economic Assessment Report, which will look at the number of accidents and the impact that the new scheme would have on these.
- The safety of the Proposed Scheme will be evaluated through a Road Safety Audit, which will be undertaken during design, at the end of construction and post-construction, to identify road safety problems and to suggest measures to eliminate or mitigate any concerns.

6.2.1.6 In summary, the independent assessment of the likely significant environmental effects arising from the vulnerability of the Proposed Scheme to major accident and/or natural disaster is scoped out of this EIA. As justified above, major accidents and disasters will be sufficiently addressed within the scheme design and relevant discipline chapters.

7. Scope of the Assessment

7.1 Introduction

7.1.1.1 The following chapter describes the methodology to be used within the EIA for each topic chapter, including the identification of a study area. Each section also includes a description of the baseline data collected to date and the potential effects identified. The methodology follows the requirements of the Design Manual for Roads and Bridges (DMRB) Volume 11 with guidance on environmental mitigation provided in Volume 10. New and emerging guidance not yet incorporated into the DMRB is included in IANs.

7.1.1.2 Since the scheme is a Nationally Significant Infrastructure Project (NSIP) it will require a Development Consent Order (DCO) from the Secretary of State. The methodology and level of information is therefore also informed by what is stipulated in the National Networks National Policy Statement (NN NPS), which provides planning guidance for scheme promoters.

7.2 Air Quality

7.2.1 Study Area

7.2.1.1 The study area for the assessment of operational air quality impacts from the scheme will include all properties and designated sites within 200m of affected roads as defined in DMRB. Affected roads are those which meet any of the following criteria:

- Road alignment will change by 5m or more; or
- Daily traffic flows will change by 1000 AADT or more; or
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
- Daily average speed will change by 10km/hr or more; or
- Peak hour speed will change by 20km/hr or more.

7.2.1.2 Affected roads will be determined on the basis of the final traffic model for the scheme and will include the A30 route itself, along with major roads extending south into Truro and routes north towards Goonhavern. The study area will also include the A390 and B3284 extending into the Truro AQMA to the south. The impacts of changes in traffic will decrease with distance from the scheme as traffic disperses into unaltered sections of the road network, and become negligible beyond the study area.

7.2.1.3 The study area for the assessment of construction activities has been determined with reference to the following criteria:

- Areas within 350m of the boundary of the site for human receptors and 50m for ecological receptors (Institute of Air Quality Management (IAQM) Dust Guidance, 2014). This will include dust generating activities within the red line boundary of the scheme, including any compound locations;

- Areas within 50m of construction traffic routes and within 500m of the boundary of any construction compounds (IAQM Dust Guidance, 2014);
- Areas within 200m of routes on the local road network where a significant change in traffic (either in terms of traffic flow, speed or composition) is expected as a result of the construction of the scheme (DMRB, 2007).

7.2.2 Baseline Information

7.2.2.1 The pollutant concentration at any location has two components, namely a contribution from the local (modelled) sources and a contribution from more distant sources. Background pollutant concentrations for this assessment i.e. those resulting from distant sources and pollutant transport, have been taken directly from the mapped data published by Defra. The data have been provided by Defra as hindcasts and predictions for all years from 2010 to 2030.

7.2.2.2 The background pollutant concentrations are currently well within the air quality objectives for the protection of human health for all pollutants. These concentrations are forecast to decrease over time as a result of a predicted overall reduction in emissions from all emission sources from all sectors, both in the UK and mainland Europe.

7.2.2.3 These data, with the contribution of local roads (i.e. those included in the dispersion model) removed to avoid the double counting of emission sources, will be used as background pollutant concentrations in the assessment.

7.2.2.4 Cornwall Council undertakes nitrogen dioxide diffusion tube monitoring across the County. The nearest diffusion tube sites to the scheme are those in Truro and those to the east of Redruth. The diffusion tube monitoring forms an essential part of local air quality management, demonstrating the level and distribution of air pollution in the area.

7.2.2.5 Air quality across Cornwall is generally good with very few exceedances of the UK objective values for concentrations of air pollutants. The dominant source of local air pollutants is road traffic. Roadside concentrations of nitrogen dioxide are, in some areas of Cornwall, elevated. Cornwall Council has declared five Air Quality Management Areas (AQMAs) in locations at which one or more of the objectives for ambient air quality, as set out in the UK Air Quality Strategy, are not being met. Each of the AQMAs in Cornwall has been declared as a result of the monitored exceedance of annual mean nitrogen dioxide at the roadside in more built up areas.

7.2.2.6 The nearest AQMA to the scheme is the Truro AQMA approximately 1km south of the Chiverton Cross junction. The AQMA was declared as a result of roadside exceedences of the annual mean objective for nitrogen dioxide. Also in the vicinity of the scheme is the area encompassing the Camborne, Pool and Redruth AQMA, approximately 5km to the south west of the scheme. In this AQMA Roadside concentrations of nitrogen dioxide exceed the annual mean objective for nitrogen dioxide.

7.2.2.7 Annual mean nitrogen dioxide concentrations exceed the UK objective at six monitored locations in the Truro AQMA, with the highest values recorded near Highertown to the west of Truro town centre. This is a heavily trafficked stretch of road which is on an incline and through which a local bus route runs. The presence of bus stops, and thereby idling buses, and the gradient of the road, both serve to increase pollutant concentrations at the road side along with the high volume of traffic using the route. Pollutant concentrations at other locations across Truro are lower and do not exceed the UK objectives.

7.2.2.8 In addition to the monitoring undertaken by Cornwall Council, a site-specific diffusion tube monitoring survey has been undertaken. The survey consisted of eight nitrogen dioxide diffusion tubes located near sites of relevant exposure for the UK objectives. In addition, two linear transects each consisting of five NO_x diffusion tubes were deployed to determine baseline NO_x concentrations at the Newlyn Downs SAC/SSSI.

7.2.3 Value of environmental resources and receptors

7.2.3.1 The resources and receptors potentially affected by the air quality impacts arising from the proposed scheme include both ecological resources and receptors at locations relevant to the assessment of impacts on human health.

7.2.3.2 UK air quality regulations make clear that exceedances of the air quality objectives set for the protection of human health should be assessed at locations which are situated outside buildings and where members of the public are likely to be regularly present. Further LAQM technical guidance TG (16) states that the assessment of air quality should focus on locations at which members of the public area likely to be exposed for a period of time appropriate to the averaging period of the objective. For example, air quality objectives with an annual mean averaging period apply at the facades of residential properties, schools, hospitals, care homes etc. Hourly objectives may also apply where members of the public might reasonably be expected to spend one hour or more e.g. busy shopping streets.

7.2.3.3 The majority of the route to be affected by the scheme is surrounded by sparsely populated, largely agricultural land. Isolated residences are scattered along the length of the scheme along with a few residential areas with more dense population. All residential receptors are considered to be of high and equal value.

7.2.3.4 DMRB guidance specifies the nature conservation designations that are relevant resources for air quality impact assessment to be SACs, Special Protection Areas (SPAs) and SSSIs. DMRB also contains criteria for the assessment of the impact of air pollutants on ecological receptors, requiring assessment of naturally designated sites within 200m of roads affected by the scheme. Two such designated sites may fall within these criteria, as shall be determined on inspection of the final set of traffic data:

- Newlyn Downs SAC/SSSI; and

- Carrick Heaths SSSI.

7.2.3.5 Each of these areas is considered to include priority habitats of notable significance to both national and European wide conservation objectives.

7.2.4 Potential effects, including monitoring and mitigation measures

7.2.4.1 The scheme has the potential to affect air quality during both construction works along the route and in the operation of the completed scheme.

7.2.4.2 The main potential effects of the scheme are:

- Dust and particulate emissions during earthworks and construction works;
- Change in vehicle exhaust emissions associated with construction related traffic (e.g. construction vehicles themselves and any route diversions and traffic management measures during construction); and
- Changes in vehicle emissions on the local road network as a result of changes to traffic flow, speeds, composition and route alignment in the future operation of the completed scheme.

7.2.4.3 Emission of dust and particulate matter from construction activities has the potential to affect human health (causing respiratory disease and other long term health effects) and to affect ecology (through soil acidification and the smother of vegetation).

7.2.4.4 In order to minimise any risk from construction dust impacts, a number of standard mitigation measures should be implemented in order to ensure that good construction practices are followed. Suggested measures include:

- Site Management
  - Records of dust and air quality complaints to be kept, including the likely causes and measures to reduce impacts if appropriate;
  - Keep site perimeter, fences etc. clean.
- Site Planning
  - Consideration of weather conditions;
  - Consideration of dust generating potential of material to be excavated prior to the commencement of works;
  - Plan site layout to maximise the distance from plant and stockpiles etc. to sensitive receptors;
  - Dusty materials should be removed from site as soon as possible.
- Construction Traffic
  - Loads entering and leaving the site with dust generating potential should be covered and wheel washing facilities made available;
  - No idling of vehicles;
  - Vehicles to comply with site speed limits (15mph on hard surfaces, 10mph on unconsolidated surfaces);
  - Water assisted sweeping of local roads to be undertaken if material tracked out of site;

  - Install hard surfacing as soon as practicable on site and ensure that they are maintained in good condition.
- Site Activities
  - Exposed soils should be re-vegetated as soon as practicable. Near residential properties or sensitive ecosystems (<50m), use hessian and mulches etc. where not possible to revegetate or cover with topsoil;
  - Minimise dust generating activities, particularly near residential receptors or sensitive ecosystems during prolonged dry, dusty weather unless damping or other suppressants are used;
  - Ensure an adequate water supply to site and use water as dust suppressant where applicable;
  - Ensure any site machinery is well maintained and in 'full working order';
  - Ensure equipment for cleaning spills etc. available at all times;
  - Sand and aggregates should be stored away from sensitive receptors and screened or shielded. Similarly, concrete batching should take place away from receptors.

7.2.4.5 Emissions of oxides of nitrogen, particulate matter and other pollutants from road traffic associated with both the construction and operational phases of the scheme have the potential to affect human health (through species toxicity and respiratory disease) and to affect ecology (through acidification of soils and water sources and eutrophication as a result of over exposure to nitrogen species). These impacts are largely mitigated through scheme design and route alignment where possible, or through traffic management measures to control the flow of traffic. Site-specific measures can also be introduced in order to mitigate the potential impacts to ecological sites and should be determined in liaison with the ecology team assessing the scheme.

7.2.5 Proposal level and scope of assessment

7.2.5.1 A 'detailed' level assessment, incorporating a site-specific monitoring survey and including detailed numerical dispersion modelling of pollutants from traffic will be undertaken for this scheme. This is as a result of the route realignment (>5m) and the predicted change in traffic flows as a result of the scheme (>1000AADT) which meet the DMRB criteria for detailed assessment. In addition, the presence of significant ecological sites (Newlyn Downs SAC/SSSI and Carrick Heaths SSSI) and the Truro AQMA represent sensitivities which need to be addressed explicitly through detailed assessment.

7.2.6 Proposed methodology including significance

7.2.6.1 Since this is a nationally significant road scheme the level and detail of the applicants' assessment is set out in Paragraphs 5.6-5.9 of the NN NPS.

7.2.6.2 NN NPS Paragraph 5.6 states that where the impacts of the project (both on and off-scheme) are likely to have significant air quality effects in relation to meeting

EIA requirements or affect the UK's ability to comply with the Air Quality Directive, the applicant should undertake an assessment of the impacts of the proposed project as part of the ES.

7.2.6.3 Whilst the ability for the UK to comply with the Air Quality Directive is unlikely to be affected as a result of the scheme, there may be significant impacts as a result of nitrogen deposition on the nearby Newlyn Downs SAC.

7.2.6.4 In accordance with NN NPS Paragraph 5.7 the Environmental Statement will therefore describe:

- existing air quality levels;
- forecasts of air quality at the time of opening, assuming that the scheme is not built (the future baseline) and taking account of the impact of the scheme; an
- any significant air quality effects, their mitigation and any residual effects, distinguishing between the construction and operation stages and taking account of the impact of road traffic generated by the project.

7.2.6.5 In accordance with NN NPS Paragraph 5.8, use will be made of Defra's future national projections of air quality, which is based on evidence of future emissions, traffic and vehicle fleet. It will also include more detailed modelling to demonstrate local impacts.

7.2.6.6 The monitoring of existing air quality has been undertaken using TG(16) methodology for the placement and analysis of diffusion tubes. Nitrogen dioxide was monitored at eight sites along the route to allow a complete evaluation of existing air quality for the length of the scheme and to aid in the verification of the dispersion model. Both oxides of nitrogen and nitrogen dioxide were monitored at two sites, where transects of five NO_x/NO_2 diffusion tubes were located at incremental distances from the roadside to determine the trend in pollutant concentrations with displacement.

7.2.6.7 The detailed assessment will consider potential impacts from both the construction and operational phases of the scheme.

7.2.6.8 The assessment of direct construction impacts i.e. from earthworks, on-site plant and stockpiling etc. will be undertaken as a qualitative desk study and will include:

- Identification of on-site construction activities with dust creation potential;
- Identification of sensitive receptors within 350m of construction activities within the scheme footprint; and
- Identification of other potential emission sources e.g. trackout, construction vehicle movements, plant exhaust emissions and local traffic etc.

7.2.6.9 The qualitative assessment of construction dust-related impacts will be undertaken in line with the IAQM construction dust guidance. This is a risk-based approach designed to identify the scale and significance of potential adverse effects arising from construction activities and to determine appropriate mitigation measures for the site. Sensitive receptors in the vicinity of the scheme area grouped according

to their proximity to potential dust generating activities and an evaluation of the activities themselves (considering the scale, frequency and nature of the works) is undertaken.

7.2.6.10 These data are then combined for an assessment of the overall potential risk of loss of amenity, dust soiling, ecological impacts and health effects as a result of the works. If the assessment indicates a high risk of impacts to sensitive receptors as a result of construction activities, a further quantitative assessment may be undertaken and receptor specific mitigation measures may be proposed.

7.2.6.11 The assessment of operational impacts from traffic changes on the local road network as a result of the scheme will be undertaken using the ADMS-Roads dispersion model to calculate the change in pollutant concentration at specific sensitive receptor locations. These locations will include both human (e.g. residences, schools etc.) and ecological (the designated sites detailed in Section 7.4). The model will be verified against both data collected by Cornwall Council in the Truro AQMA and the site-specific data collected for the scheme. The significance of changes in pollutant concentrations will be assessed according to HA IAN174/13.

7.2.6.12 Traffic data to be input into the model will include, as a minimum, AM peak, PM peak, inter-peak and outer-peak flows, vehicle speeds and percentage of HGVs from which will be derived pollutant emission rates for each road link for each hour of the year. Vehicle emissions will be taken from HA IAN 185/15 and three recent years (2016, 2015, 2014) of meteorological data representative of the site will be used to account for annual variability in ambient conditions. .

7.2.6.13 In order to account for the uncertainty in forecast vehicle emission rates and the real world performance of vehicles, the gap analysis methodology set out in HA IAN 170/12 will be used as a correction to future year concentrations.

7.2.6.14 The methodology set out in HA IAN 175/13 will be used to assess the potential implications of the scheme for EU limit value compliance in conjunction with Defra Pollution Climate Mapping model. End-user emissions will be considered as part of the whole lifecycle consideration of the Scheme's carbon emissions.

7.2.6.15 The regional impact of changes in vehicle emissions as a result of the scheme will be assessed in accordance with HA207/07, including the assessment of the change in regional CO2 emissions.

7.2.7 Assumptions and limitations

7.2.7.1 There is some inherent uncertainty in the forecasting of both vehicle movements and vehicle emissions in future years. This uncertainty can be addressed and minimised through verification of the model against monitored roadside data and through the gap analysis methodology detailed in HA IAN 170/12.

7.2.8 Summary

7.2.8.1 The proposed scheme has the potential to affect air quality during both construction and operational phases. During the construction phase, effects can include dust soiling, loss of amenity, impacts to human health and ecosystems as a result of dust and particulate matter emissions from earthworks, construction works, and construction plant and machinery. In the operational phase of the scheme, the changes in vehicle emissions as a result of alterations in traffic composition, flows and speeds, as well as changes in route alignment, have the potential to affect ambient pollutant concentrations at both human and ecological receptors.

7.2.8.2 Baseline air quality will be assessed with reference to background air quality data published by Defra, local air quality monitoring undertaken by Cornwall Council and a site specific monitoring survey. The survey comprised eight nitrogen dioxide diffusion tubes and two transects of NOx diffusion tubes at ecological sites along the route.

7.2.8.3 The assessment of impacts from construction dust will be undertaken as a qualitative desk study in which the scale and significance of potential effects from construction activities is evaluated. This is assessed on the basis of the magnitude and frequency of potential dust emission and the number, proximity and sensitivity of nearby receptors. Mitigation measures including site management, scheduling and dust monitoring will be proposed where appropriate.

7.2.8.4 The assessment of the operational impacts of the scheme will be undertaken using detailed dispersion modelling across the study area and extending into the Truro AQMA to the south. Detailed traffic data including AM peak, PM peak, inter-peak and outer-peak flows, vehicle speeds and percentage of HGVs will be used in conjunction with emissions data from HA IAN185/15 to derive vehicle emission rates. The model will be verified using monitored diffusion tube data and the methodology set out in HA IAN 170/12 will be used to address the uncertainty in forecast vehicle emissions. The significance of changes in pollutant concentrations will be assessed according to HA IAN174/13.

7.3 Cultural Heritage

7.3.1 Study Area

7.3.1.1 The assessment has focused on the proposed scheme option, although historic information for the immediate surrounding area (300m either side of the centre line, hereafter known as the ‘inner study area’) was considered in order to provide an essential contextual background and assess the potential for previously unknown archaeological remains. A second wider study area of 1km was applied for the settings of heritage assets. These study areas were selected using professional judgement based on the likely impacts predicted.

7.3.2 Baseline Information

7.3.2.1 Cultural heritage comprises World Heritage Sites, Scheduled Monuments, Listed Buildings (Grades I, II* and II), Registered Parks and Gardens (all grades), Battlefields, Conservation Areas, locally listed buildings and structures, sub-surface archaeological remains and earthworks. For the ease of presentation in this document, cultural heritage features are referred to as heritage assets.

7.3.2.2 A search of the Historic Environment Record (HER), maintained by Cornwall Council (CC), was undertaken to identify the heritage assets.

7.3.2.3 A total of 146 heritage assets were identified within the 1km study area (source: CC HER):

- 1 World Heritage Site – Gwennap Mining District within the Cornish Mining World Heritage Site;
- 14 Scheduled Monuments;
- 2 Grade II* Listed Buildings;
- 39 Grade II Listed Buildings;
- 1 Registered Park and Garden – Chyverton Park; and
- 89 non-designated assets.

7.3.2.4 Statutory designated assets within, or on the periphery of, the 1km study area are presented in Table 7.1 below. Non-designated assets within the 300m study area are presented in Table 7.2.

Table 7.1
Designated heritage assets within the 1km Study Area

HER Ref Number	National Ref	Name	Designation	Sensitivity	Historic Period
N/A	1215	Gwennap Mining District	World Heritage Site	International	Industrial
DCO1032	1020758	Round barrow cemetery 420m northeast of Higher Ennis Farm	Scheduled Monument	National	Bronze Age
DCO893	1016054	The Four Burrows	Scheduled Monument	National	Bronze Age
DCO1036	1017350	Prehistoric long barrow and four round barrows 580m and 750m southwest of Mitchell Farm	Scheduled Monument	National	Prehistoric
DCO895	1016056	The Three Burrows	Scheduled Monument	National	Bronze Age
DCO896	1016057	Bowl barrow 125m south of St Peter's Church at Three Burrows	Scheduled Monument	National	Bronze Age
DCO925	1016445	Hillfort 250m southwest of Tresawsen	Scheduled Monument	National	Prehistoric
DCO1031	1017050	Two bowl barrows 290m and 375m north of Higher Ennis Farm	Scheduled Monument	National	Bronze Age

HER Ref Number	National Ref	Name	Designation	Sensitivity	Historic Period
DCO912	1016106	Bell barrow 520m west of Pendown	Scheduled Monument	National	Bronze Age
DCO926	1016887	Bowl barrow 130m southeast of Penglaze	Scheduled Monument	National	Bronze Age
DCO911	1016105	Bowl barrow 425m southwest of Higher Callestick Farm	Scheduled Monument	National	Bronze Age
DCO780	1016290	Trevalsa Cross 350m northwest of Trerice	Scheduled Monument	National	Medieval
DCO927	1016888	Warren's Barrow	Scheduled Monument	National	Prehistoric
DCO909	1016103	Bowl barrow 100m south west of Callestick Vean	Scheduled Monument	National	Bronze Age
DCO1030	1017049	Bowl barrow 500m northwest of Higher Ennis Farm	Scheduled Monument	National	Bronze Age
DCO4396	1136641	Shirley Farmhouse	Grade II Listed	National	Industrial
DCO5509	1312561	Stables at approximately 30 metres southwest of Chyverton House	Grade II Listed	National	Post-medieval to Industrial
DCO4237	1141580	Guide Post at SW803515	Grade II Listed	National	Industrial
DCO5619	1328682	Lower Ventongimps Farmhouse, including front gardens walls, gate-piers and gate	Grade II Listed	National	Industrial
DCO15001	1394842	Milestone approx. 458m southwest of Journey's End A30.	Grade II Listed	National	Industrial
DCO4212	1141555	Ventongimps Villa	Grade II Listed	National	Industrial
DCO4138	1141481	Church of Saint Peter	Grade II Listed	National	Industrial
DCO4208	1141551	Chyverton House	Grade II* Listed	National	Post-medieval to Industrial
DCO5625	1328688	Highlands	Grade II Listed	National	Post-medieval to modern
DCO3901	1140954	Primrose Farmhouse	Grade II Listed	National	Industrial
DCO4402	1136696	Milestone at SW808502	Grade II Listed	National	Industrial
DCO5617	1328680	Bridge at approximately 150 metres east of Chyverton House	Grade II* Listed	National	Industrial
DCO4137	1141480	Milestone at SW847536	Grade II Listed	National	Post-medieval to Industrial
DCO5654	1328716	Milestone on High Road against wall of Zelah Lane Chapel	Grade II Listed	National	Industrial
DCO5642	1328704	Tresawen Farmhouse	Grade II Listed	National	Post-medieval to Modern

HER Ref Number	National Ref	Name	Designation	Sensitivity	Historic Period
DCO4401	1136693	Guide Stone at SW 821529	Grade II Listed	National	Post-medieval to Industrial
DCO4423	1137011	Milestone at SW797502	Grade II Listed	National	Post-medieval to Industrial
DCO4235	1141578	Batters Engine House	Grade II Listed	National	Industrial
DCO4130	1141473	Milestone on Zelah Hill	Grade II Listed	National	Industrial
DCO4209	1141552	Chyverton Home Farmhouse	Grade II Listed	National	Industrial
DCO4406	1136747	Mine buildings at approximately 400 metres east-northeast of Batters Engine House	Grade II Listed	National	Industrial
DCO4408	1136763	Milestone at SW706479	Grade II Listed	National	Post-medieval to Industrial
DCO3869	1140922	Boundary Stone at SW778487	Grade II Listed	National	Industrial
DCO4397	1136671	Rose Cottage	Grade II Listed	National	Post-medieval to Modern
DCO4392	1136631	Milestone at SW 786492	Grade II Listed	National	Post-medieval to Industrial
DCO4435	1137226	Milestone at SW738472	Grade II Listed	National	Industrial
DCO4415	1136926	Lodge at approximately 700 metres east-southeast of Chyverton House, including associated and adjoining walls and gate-piers	Grade II Listed	National	Industrial
DCO4139	1141482	Schoolroom immediately east of Church of St Peter	Grade II Listed	National	industrial
DCO5778	1328983	Milestone at SW 753466	Grade II Listed	National	Industrial
DCO3871	1140924	Milestone at SW 783487	Grade II Listed	National	Industrial
DCO4389	1136610	Nancarrow Farmhouse, and attached wall	Grade II Listed	National	Industrial
DCO4211	1141554	Higher Ventongimps	Grade II Listed	National	Post-medieval to modern
DCO5506	1312530	Cartshed approximately 50 metres southwest of Lower Ventongimps Farmhouse	Grade II Listed	National	Industrial
DCO4386	1136600	Boundary Stone at SW 773486	Grade II Listed	National	Industrial
DCO4384	1136597	Wayside Cross at SW817518	Grade II Listed	National	Late Medieval

HER Ref Number	National Ref	Name	Designation	Sensitivity	Historic Period
DCO3870	1140923	Milestone at SW 771486	Grade II Listed	National	Post-medieval to Industrial
DCO5611	1328674	Milestone at SW767488	Grade II Listed	National	Industrial
DCO15002	1394843	Milestone approx 253m southwest of Carland Cross A30	Grade II Listed	National	Industrial
DCO4129	1141472	Zelah Chapel, and forecourt	Grade II Listed	National	Industrial
DCO5767	1328972	Milestone at SW 741465	Grade II Listed	National	Post-medieval to Industrial
DCO5657	1328719	Vicarage	Grade II Listed	National	Industrial
DCO26	1000512	Chyverton Registered Park and Garden	Grade II	National	Industrial to Modern

Table 7.2
Non-designated heritage assets within the 300m Study Area

HER Ref.	Name	Description	Sensitivity	Historical Period
MCO12755	Great South Chiverton	mine commenced operations in 1864.	Regional	Industrial
MCO12436	Polstain	mine inferred from place name evidence	Regional	Medieval
MCO13549	Boswellick	settlement first recorded in 1201	Local	Early Medieval
MCO11748	Tolgroggan	settlement first recorded in 1298	Local	Medieval
MCO14868	Henver	I settlement first recorded in 1280	Local	Medieval
MCO12755	West Cargoll	Mine, only spoil heaps remain	Local	Industrial
MCO11188	Higher Ventongimps	manor house destroyed by fire in 1872.	Local	Medieval
MCO11732	Nancarrow	settlement first recorded in 1201	Local	Medieval
MCO11903	Burra Burra	Mine worked for tin, copper and zinc from the mid-19th Century	International	Industrial
MCO16419	Polstain	settlement	Local	Medieval
MCO15622	Marazanvose	settlement, Medieval market	Local	Medieval
MCO13728	Caralsa	settlement	Local	Medieval

HER Ref.	Name	Description	Sensitivity	Historical Period
MCO11910	Callestock And Perran Wheal Virgin	Mine	Regional	Industrial
MCO19213	Carland Cross	Bronze Age hut circle	Local	Prehistoric
MCO17810	Trevalso	settlement first recorded in 1310	Local	Early Medieval
MCO21486	Carland	An earthwork with a single bank was noted by the Victoria County History	Local	Undated
MCO32388	Honeycombe	Iron Age/ Romano-British round, defined by a curvilinear field hedge on the western side, with a faint cropmark visible on aerial photographs on its eastern side.	Regional	Prehistoric
MCO2332	Carland Cross	Bronze Age barrow	Local	Prehistoric
MCO17688	Tresawsen	settlement first recorded in 1301, Medieval settlement	Local	Early Medieval
MCO18428	Zelah	settlement first recorded in 1311	Local	Medieval
MCO25228	Marazanvose	Undated dyke (defence) inferred from place name	Local	Undated
MCO2320	Cargoll	Bronze Age barrow	Regional	Prehistoric
MCO1919	Four Burrows	Bronze Age barrow cemetery	Regional	Prehistoric
MCO2325	Carland Cross	Bronze Age barrow one of a group of eight just to the west of Carland Cross	Regional	Prehistoric
MCO2400	Carvinack	Bronze Age barrow	Regional	Prehistoric
MCO21305	Polstain	Undated enclosure, Undated field system visible as ploughed out banks	Local	Undated
MCO32373	Ennis	A rectangular ditched enclosure, 34m by 27m	Local	Undated
MCO2603	Four Burrows	Bronze Age barrow	Regional	Prehistoric
MCO2399	Carvinack	Bronze Age barrow	Regional	Prehistoric
MCO2398	Carvinack	Bronze Age barrow	Negligible	Prehistoric
MCO32370	Newlyn Downs	Bronze Age barrow	Regional	Prehistoric
MCO32377	Newlyn Downs	Undated enclosure approximately 33m by 10m, is visible as a plough-levelled earthwork	Local	Undated
MCO32149	Newlyn Downs	Bronze Age barrow	Regional	Prehistoric
MCO31923	Tresawsen	remains of ridge and furrow	Local	Medieval
MCO34824	Chiverton	Iron Age / Romano-British round multivallate enclosure visible as a series of cropmark ditches	Local	Prehistoric

HER Ref.	Name	Description	Sensitivity	Historical Period
MCO34825	Chiverton	Iron Age / Romano-British round partially visible as an indistinct low earth bank	Local	Prehistoric
MCO3173	Nanteague	Bronze Age barrow	Regional	Prehistoric
MCO31919	Hillview Farm	Bronze Age barrow	Regional	Prehistoric
MCO28603	Tresawsen	leper hospital	Local	Medieval
MCO34826	Chiverton	Bronze Age/ Romano-British round	Regional	Prehistoric
MCO34799	Three Burrows	Bronze Age barrow	Regional	Prehistoric
MCO31908	Roscarnick Farm	mine shaft,	Local	Post-medieval
MCO32363	Penny Come Quick	Cropmarks of an undated rectilinear banked enclosure	Uncertain	Undated
MCO31884	Hartley Farm	field system	Local	Post-medieval
MCO3188	Newlyn Downs	Bronze Age barrow	Regional	Prehistoric
MCO31922	Ventonlea	trackway	Local	Early Medieval
MCO31921	Ventonlea	Two ditched enclosures with associated pits and field boundaries are visible as cropmarks on vertical aerial photographs.	Regional	Prehistoric
MCO31920	Chybucca	Medieval field system	Local	Medieval
MCO32371	Newlyn Downs	Undated pits of uncertain date or function, but may be Post-medieval mineral extractive pits.	Uncertain	Undated
MCO31940	Four Burrows	Bronze Age barrow	Regional	Prehistoric
MCO3559	Three Burrows	Bronze Age barrow	Regional	Prehistoric
MCO3558	Three Burrows	Bronze Age barrow	Regional	Prehistoric
MCO31937	Silverdene	Medieval trackway,	Local	Medieval
MCO31938	Fourburrow	field system visible as earthworks and cropmarks	Local	Post-medieval
MCO32340	Zelah Lane	Non-conformist chapel	Local	Industrial
MCO34801	Three Burrows	Bronze Age barrow	Regional	Prehistoric
MCO32374	Wheal Ennis	mine	Regional	Post-medieval
MCO32375	Ennis	Undated field system visible as cropmarks	Local	Undated
MCO32376	Carland	pits flanked on two sides by spoil or may be military features relating to WWII. They are of uncertain date or function.	Local	Post-medieval

HER Ref.	Name	Description	Sensitivity	Historical Period
MCO32362	Sixty Acres	Undated enclosure, visible as faint cropmarks, 53m by 30m	Uncertain	Undated
MCO3763	Tresawsen	Bronze Age barrow	Regional	Prehistoric
MCO32407	Creegmeor Farm	military camp	Local	Modern
MCO34797	Three Burrows	Bronze Age barrow	Regional	Prehistoric
MCO3560	Three Burrows	Bronze Age barrow	Regional	Prehistoric
MCO39938	South Cargoll	mine	Regional	Post-medieval
MCO42673	Mitchell	The site of a surface Royal Observer Corps reporting post and an underground nuclear post. Nothing survives.	Negligible	Modern
MCO40746	Four Burrows	Mesolithic and Neolithic artefact scatter found in plough soil	Local	Prehistoric
MCO3923	Two Barrows Hill	Site of two barrows on Two Barrows Hill to the south-west of Zelah. Both barrows were destroyed c1840.	Negligible	Prehistoric
MCO41882	Four Burrows	Mesolithic and Neolithic lithic scatter Dispersed scatter of flint artefacts, some unusually large and in good condition.	Local	Prehistoric
MCO45869	Zelah	Modern mission church	Local	Modern
MCO5575	Nancarrow	Medieval cross inferred from field name	Local	Medieval
MCO52571	Perran	Toll house no longer extant	Local	Industrial
MCO6269	Zelah Hill	Medieval cross now thought to be nothing more than a granite gatepost.	Negligible	Medieval
MCO53060	Zelah	School	Local	Industrial
MCO7850	Chiverton	Iron Age/ Romano-British round	Local	Prehistoric
MCO8928	Zelah Hill	Iron Age/ Romano-British round visible as cropmark defined by a wide bank with an outer ditch	Local	Prehistoric
MCO8042	Henver	Iron Age/ Romano British round inferred from field name	Local	Prehistoric
MCO8543	Tolcroggan	Iron Age/ Romano British round appears as cropmarks on aerial photos	Local	Prehistoric
MCO7128	Ventonteage	holy well. Location uncertain	Local	Medieval
MCO6268	Zelah	Site of cross inferred from field name	Local	Medieval
MCO6850	Zelah	Prehistoric lithic scatter,	Local	Prehistoric

HER Ref.	Name	Description	Sensitivity	Historical Period
MCO7828	Castle Close	Iron Age/ Romano-British round	Local	Prehistoric
MCO9018	Chiverton Arms	Blacksmiths workshop	Local	Industrial
MCO9447	Zelah	Blacksmiths workshop – probably demolished	Local	Industrial
MCO5914	Three Burrows	cross, early medieval boundary stone	Local	Early Medieval
MCO31905	Three Burrows	field system, Ditched field boundaries were visible as cropmarks	Local	Post-medieval
MCO56103	Chiverton Cross	well discovered during works next to Chiverton Cross roundabout.	Local	Post-medieval

7.3.2.5 The HER also maintains a list of sites and areas relating to mining activity including 'Mining Activity Sett boundary'. A 'Sett' is the legal boundary within which a mine could extract minerals. These areas often contain evidence of the former mining activity which have been included here to allow the assessment of the potential physical impacts on the mining remains, which may also inform the potential impact of the scheme on the wider setting of the World Heritage Site.

7.3.2.6 A Setting Assessment has been undertaken which suggests the potential for harm to a number of designated assets along the proposed scheme prior to any scheme of mitigation. The construction of a new junction at Chiverton has the potential to impact on the setting of a group of three Grade II Listed Buildings. Although there may be some harm to the setting of a group of prehistoric Scheduled Monuments at Carland Cross, this impact is likely to be off-set by routing the road to the north of the assets effectively reuniting the barrow group. Impacts to the setting of the Grade II listed Nancarrow Farmhouse are also likely.

7.3.2.7 Additionally, there is the potential for direct physical harm to both a Scheduled Monument and a Grade II listed milestone.

7.3.2.8 A Watching Brief carried out during a scheme of Geotechnical Ground Investigation works (CAU 2017 - report pending) recorded a number of prehistoric microliths. A programme of geophysical survey (GSB 2017 - report pending) is currently being undertaken and will be used to inform the subsequent investigative evaluation trial trenching and to update the predicted level of harm to the buried archaeological resource.

7.3.3 Value of environmental resources and receptors

7.3.3.1 The value of the heritage assets is categorised according to DMRB Volume 11, Chapter 3, Part 2, paragraph 5.30.

7.3.4 Potential effects, including monitoring and mitigation measures

7.3.4.1 Any works that necessitate intrusive groundworks have the potential to have an adverse physical impact upon heritage assets that survive within the footprint of the proposed scheme or the junction options. Potential disturbance will be caused during the widening of existing roads or the creation of new offline sections in addition to any service trenches and drainage features, topsoil stripping for compounds, the excavation of attenuation ponds and landscaping features for example.

7.3.4.2 Preliminary archaeological investigations are being undertaken for land take within the scheme to establish the nature, extent and survival of any previously unrecorded buried archaeological remains. This comprises an ongoing geophysical survey (GSB 2017) to be followed by a programme of archaeological trial trench evaluation. The results of this investigation can be used to devise a suitable programme of mitigation where applicable. Investigation and subsequent mitigation measures will be devised in consultation with the Senior Development Officer (Historic Environment) at Cornwall Council and Historic England.

7.3.4.3 Impacts on settings may occur where new infrastructure is present in key views from, towards, through and across an asset, especially where the proposed scheme creates changes to the skyline. Other impacts on setting can arise from the introduction of movement, noise, vibration, light and dynamism caused by the proposed scheme. Impacts to setting may occur where new sections of road cause physical divisions between previously related heritage assets causing a loss of identifiable relationship, or where there are impacts on key features of an asset, such as the loss of boundaries of the miners' smallholdings within the World Heritage Site.

7.3.4.4 Historic England (2015) guidelines for mitigation of the impact of a development on the setting of a heritage asset suggest that in the first instance impacts are best mitigated for either by relocation of the development or changes to its design. Where relocation of the development is not possible, good design alone may be capable of reducing the harm. Enhancement should be considered where possible and may be achieved through a number of actions including, but not limited to: restoring historic views or introducing new views that add to the experience of an asset; improving public access to an asset or its setting; and, removing or replacing a detrimental feature with a new and more harmonious one. A detailed assessment will be undertaken, as presented in DMRB guidance (Vol 11, Chapter 3, Part 2, Chapter 5), which considers the setting in greater depth and is aligned with an historic landscape development that can be utilised to provide appropriate suggestions for mitigation to impacts on setting where it is relevant.

7.3.4.5 Once design details have become sufficiently detailed an assessment of the impact on historic hedgerows will be undertaken. Those subject to impacts should be recorded appropriately and a programme of archaeological monitoring undertaken during the removal. A programme of translocation will be considered where this is appropriate within the landscape. Hedgerows that are considered to

relate to the miners smallholdings that are associated with the World Heritage Site should be avoided.

7.3.4.6 Following the construction phase there is considered to be no residual effect to buried archaeology and earthworks. Residual effects to the setting of heritage assets may occur in the operational phase where it has not been possible to design out such impacts and no appropriate mitigation could be implemented.

7.3.5 Proposal level and scope of assessment

7.3.5.1 The proposed level of assessment is detailed in accordance with DMRB Volume 11, Section 3, Part 2. A detailed assessment is proposed due to the potential for significant effects on several designated assets. In particular, the Scheduled Monuments at Carland Cross and the group of Listed Buildings at Chiverton.

7.3.6 Proposed methodology including significance

7.3.6.1 Since there may be significant effects on cultural heritage is likely Paragraphs 5.126 and 5.127 of the NN NPS set out the required content of assessment. It should include an assessment of any likely significant heritage impacts and describe these in the Environmental Statement.

7.3.6.2 The significance of any heritage assets affected should also be described including any contribution made by their setting. The NN NPS is clear that the detail should be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant Historic Environment Record should have been consulted and the heritage assets assessed

7.3.6.3 As the scheme area is of archaeological significance, in accordance with NN NPS Paragraph 5.127, a desk-based assessment has been undertaken based on the proposed scheme corridor. This will be utilised, in conjunction with the archaeological investigation results, in order to provide a baseline assessment for the preferred scheme option.

Magnitude of Impact

7.3.6.4 An assessment of the cultural heritage significance of heritage assets should identify the potential impact of proposed or predicted changes on the significance of the asset and the opportunities for reducing that impact. Policy 129 of NPPF states that this evidence should be taken into account when considering the impact of a proposal.

7.3.6.5 The level of harm to cultural heritage significance, or the magnitude of impact as assessed by DMRB, is the basis of assessing the significance of impact or the harm. In order to assess the level of harm from potential impacts on built heritage or buried archaeological remains present, consideration will been afforded to:

- Assessing in detail any impact and the significance of the effects arising from the proposed development;
- Reviewing the evidence for past impacts that may have affected the heritage assets or their settings;
- Key impacts are defined as those that would potentially harm the cultural heritage significance of the heritage asset and so consideration is afforded to the heritage values of the assets

7.3.6.6 The level of harm is often difficult to define. However, substantial harm is taken to be 'total loss of significance of a heritage asset' (NPPF 2012, paragraph 133) which implies loss of the asset, loss of its heritage values and/or its setting. Furthermore, NPPF Planning Policy Guidance (revised 2014) states that 'even minor works have the potential to cause substantial harm.' It goes on to state 'It is the degree of harm to the assets significance that is to be assessed rather than the scale of the development'. Consequently, this provides a baseline for varying levels of harm with less than substantial harm being harm, slight harm, or negligible, as defined in Table 7.3 below.

Table 7.3
Criteria Used to Determine Level of Harm showing equivalent level of magnitude (Impact)

Level of Harm	Description
Substantial harm (Major)*:	
Complete destruction of the asset or its setting (ie total loss of significance); change to the asset or its setting resulting in loss to significance which fundamentally changes our ability to understand and appreciate the resource. Minor works which adversely impact on heritage values which are intrinsic to the significance of the asset/setting have the potential to cause substantial harm.	
Less than substantial harm (Moderate to negligible):	
Harm (Moderate)	Change to the asset or setting (some loss of significance) resulting in an appreciable change in ability to understand and appreciate the resource. Some heritage interest remains unaffected.
Slight harm (Minor)	Change to the asset or setting (some loss of significance) resulting in a slight change in ability to understand and appreciate the resource. Overall, the heritage interests remain unaffected.
Significance of effect, Negligible	Negligible change or no material changes to the asset or setting. No real change in our ability to understand and appreciate the resource. The heritage interests remain unaffected.

***as taken from NPPF Para 132**

Significance of the Impact

7.3.6.7 The interaction of the potential scale of harm (Table 7.3) and the value of the heritage asset produce the impact significance. This may be calculated by using the matrix shown in the Table 7.4 below, which is included to allow an objective assessment to be presented.

Table 7.4 Impact Significance Matrix						
	Level of harm (magnitude of the impact)					
VALUE		No Change	Negligible	Slight harm (minor)	Harm (moderate)	Substantial harm (major)
	Very High	Neutral	Slight	Moderate/ large	Large/very large	Very large
	High	Neutral	Slight	Slight/moderate	Moderate/large	Large/very large
	Medium	Neutral	Neutral/slight	Slight	Moderate	Moderate/large
	Low	Neutral	Neutral/slight	Neutral/slight	Slight	Slight/moderate
	Negligible	Neutral	Neutral/slight	Neutral/slight	Neutral/slight	Slight
		Significance of Effect				

Taken from DMRB, Volume 11, Section 3, Part 2.

Settings Assessment

7.3.6.8 The setting assessment should follow current Historic England guidance as detailed in: The Setting of Heritage Assets – Historic Environment Good Practice Advice in Planning Note 3, 2015.

7.3.7 Assessment of Cultural Heritage significance

7.3.7.1 Cultural heritage significance is defined in Annex 2 of the NPPF as 'The value of a heritage asset to this and future generations because of its heritage interest'. The NPPF is clear that 'heritage interest' may be archaeological, architectural, artistic or historic and that significance derives not only from an assets physical presence, but also from its setting. The NPPF definitions for the heritage value are provided in Table 7.5 below.

Table 7.5 Definition of NPPF Heritage Values	
Criteria	**Definition**
Archaeological Interest	There will be archaeological interest in a heritage asset if it holds, or potentially may hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.
Architectural Interest	To be of special architectural interest a building must be of importance in its architectural design, decoration or craftsmanship; special interest may also apply to nationally important examples of particular building types and techniques (eg buildings displaying technological innovation or virtuosity) and significant plan forms.

Criteria	Definition
Artistic Interest	Interest in the design and general aesthetics of a place. It can arise from conscious design or fortuitously from the way the place has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skill, like sculpture
Historic Interest	To be of special historic interest a building must illustrate important aspects of the nation's social, economic, cultural, or military history and/or have close historical associations with nationally important people. There should normally be some quality of interest in the physical fabric of the building itself to justify the statutory protection afforded by listing.

7.3.7.2 Through the application of the values it is possible to define what it is that gives significance to a heritage asset and therefore warrants protection. The proposed development area and its immediate environs encompass layers of archaeological and historical development, which may be valued for different reasons by different people, all of which should be taken into account in determining the overall significance.

7.3.7.3 The statement of significance is applied where it is considered that the proposed development will cause harm to the significance of the asset, and therefore will be completed upon selection of a preferred scheme option.

7.3.8 Assumptions and limitations

7.3.8.1 The potential impacts identified to date are based upon a number of potential route options and should be updated accordingly once a single preferred option selection has been made.

7.3.8.2 Until completion of the investigative fieldwork the level of impact to buried archaeology and earthworks can only be assessed for the known resource. The level of impact will be revised further to the completion of non-intrusive and intrusive archaeological survey, due to be completed in September 2017.

7.3.9 Summary

7.3.9.1 There is the potential for significant impacts on the setting of several listed buildings, including the group of assets located at the Church of St Peter near Chiverton Cross, including the church (LB1141481), Vicarage (LB1328719), and the Schoolroom (LB114182), which are all Grade II listed. The proposed new junction may be visible from the setting of the assets, making it the dominant feature in the, currently rural, view. There may be an increase in both noise and vibration as the road would be slightly closer and any necessity for lighting on the junction would also create changes to the setting. Similar impacts are likely to occur on the Grade II listed farmhouse at Nancarrow.

7.3.9.2 Although the scheme may cause some harm to the setting of the designated assets at Carland Cross, this is likely to be off-set by re-routing the road to the north and

reuniting the barrow group. Further assessment will be undertaken once design details are finalised.

7.3.9.3 There may be a slight beneficial effect on some assets, such as Grade II listed Rose Cottage and Shirley Farmhouse, and Grade II Registered Chyverton Park, as the road would be moved slightly further from them, increasing the sense of tranquillity in the setting.

7.3.9.4 Due to the significant number of known assets along the length of the scheme, there is particularly high potential for previously unrecorded assets to be present and from the prehistoric period in particular. There is also a moderate potential for early to late medieval remains and post-medieval remains particularly those associated with the mining industry.

7.3.9.5 Any works that necessitate intrusive groundworks have the potential to have an adverse physical impact upon heritage assets that survive within the footprint of the proposed scheme or the junction options. Potential disturbance will be caused during the widening of existing roads or the creation of new offline sections in addition to any service trenches, topsoil stripping for compounds and landscaping features for example.

7.3.9.6 Any impact on assets that may be present is likely to be major adverse (i.e. the loss of the asset) and given that the value ranges from negligible to international, the greatest significance of effect could be Very Large adverse.

7.4 Biodiversity

7.4.1 Study Area

7.4.1.1 The baseline for the Scheme is to be determined and appraised through a combination of desk-based studies and field surveys for particular protected and notable habitats and species.

7.4.1.2 The area used for the desk-based study (study area) and field surveys (survey area) is to be established in consideration of the Scheme footprint and the likely zone of influence (ZoI) of associated impacts (the Scheme is defined in Chapter 3 of this EIA Scoping Report and shown on Figure 3.1 to 3.4). These study and survey areas are determined as follows:

- Desk study of European designated sites: Special Protection Areas (SPAs), potential SPAs (pSPAs), SACs, candidate SACs (cSACs), potential SACs (pSACs) and Ramsar sites within 2 km of the Scheme, extended accordingly where there are potential hydrological connections present and up to 30 km where bats are a qualifying feature of a SAC, cSAC or pSAC;
- Desk study of statutorily designated sites, including National Nature Reserves (NNRs), Local Nature Reserves (LNRs) and Sites of Special Scientific Interest (SSSIs) and non-statutorily designated sites including Local Wildlife Sites

(LWSs) and Cornwall Roadside Verge Inventory (CRVI) within 2 km of the Scheme;
- Desk study records of protected and notable species up to 2 km from the project site (extended to 10 km for bats and 30 km for SACs where bats are a qualifying feature); and
- Extended Phase 1 Habitat Verification Survey within a 500 m corridor of the Scheme (250 m either side).

7.4.1.3 The Study Areas associated with individual habitat and protected species surveys undertaken up to and including the 2016 survey season are detailed below.

7.4.1.4 Additional habitats and protected, notable and invasive species surveys will continue throughout 2017. These will also be required within individually defined survey areas, as detailed below.

7.4.2 Baseline Information

7.4.2.1 Existing baseline knowledge of the Scheme has been derived from ecological assessment work undertaken in 2003 to 2005 by Hyder Consulting Ltd. as part of the options assessment, including:

- A30 Carland Cross to Chiverton Cross: Stage 1 Environmental Assessment Report Hyder Consulting, November 2003;
- A30 Carland Cross to Chiverton Cross: Stage 2 Environmental Assessment Scoping Report Hyder Consulting, February 2004;
- A30 Carland Cross to Chiverton: Stage 2 Environmental Assessment Report Hyder Consulting, April 2004;
- A30 Carland Cross to Chiverton Cross: Technical Appraisal Report Hyder Consulting, May 2004;
- A30 Carland Cross to Chiverton Cross: Scheme Assessment Report Hyder Consulting, October 2004;
- A30 Carland Cross to Chiverton Cross: Environmental Statement Scoping Report Hyder Consulting, December 2004; and
- A30 Carland Cross to Chiverton Cross: Stage 3 Ecological Baseline Report Hyder Consulting, June 2005.

7.4.2.2 In addition, the baseline draws on more recent survey and option appraisal work carried out in the period 2015 to date.

7.4.2.3 The following is a summary of the baseline information gathered.

Designated Sites

European Designated Sites

7.4.2.4 There is one European site designated under the Habitats Directive (Council Directive 92/43/EEC) within the 2 km search areas. This is Newlyn Downs SAC which is located at its closest 111.5 m to the north of the Scheme (refer to Figure 1.1). The site is designated for Annex 1 habitats European dry heath and Temperate Atlantic wet heath with Dorset heath (*Erica ciliaris*) and cross-leaved heath (*Erica tetralix*).

7.4.2.5 The Scheme is not located upstream or downstream of any other European sites designated in part or wholly for water features and further, there are no SAC's designated for bat interest within the 30 km search area of the proposed route.

7.4.2.6 In accordance with DMRB Volume 11, Section 4, Part 1, further assessment regarding the implications of the Scheme on Newlyn Downs SAC is required.

Other Designated Sites

7.4.2.7 Newlyn Downs SSSI, Carrick Heaths SSSI, Carnkief Ponds SSSI and Ventongimps SSSI are located within 2 km of the proposed Scheme route.

7.4.2.8 Five fragments of Carrick Heath SSSI are also present along the Scheme route to both the north and south of the carriageway. In common with Newlyn Downs SSSI/SAC, Carrick Heaths SSSI is designated for supporting elements of temperate Atlantic wet heaths with Dorset heath and cross-leaved heath. Ventongimps SSSI and Carnkief Pond SSSI are designated for their habitat mosaics and heathland and wetland invertebrate communities.

7.4.2.9 There are 15 non-statutory locally-designated County Wildlife Sites (CWSs) within the 2 km search areas (refer to Figure 1.1). CWS are designated for their presence of habitats or species of local or regional importance by local authorities. This will include species and habitats that are identified as of Principal Importance or previously identified under the Biodiversity Action Plans (BAPs).

7.4.2.10 With the exception of Newlyn Downs SSSI (which is assessed as per the SAC), all other designated sites are located at a distance greater than 250 m from the Scheme.

Priority and Notable Habitats

7.4.2.11 There are three Cornwall Roadside Verge Inventory (CRVI) sites along the route of the Scheme and in close proximity (within c. 50 m) (refer to Figure 1.1).

7.4.2.12 In addition there will be direct impacts on CRVI Site BS316, which contains notable plant species, Dorset heath.

7.4.2.13 Analysis of the MAGIC website identified five habitats within the search area potentially qualifying as Priority Habitats under the NERC Act. These are purple moor grass and rush pasture, deciduous woodland, good quality semi-improved grassland, lowland heathland and lowland fen. These Priority Habitats are largely associated with the designated sites described above and only two were located adjacent to the Scheme, refer to Figure 1.1.

Other Habitats

7.4.2.14 A Phase 1 Habitat Verification Survey was carried out in August 2015 in accordance with the standard JNCC survey methodology[1]. The survey was largely carried out from PRoW and highways, with the aid of binoculars, due to access constraints at the time. The survey covered a 500 m buffer along the proposed Scheme route (i.e. 250 m either side).

7.4.2.15 The survey indicated that the footprint of the Scheme predominately comprised arable land. However, a large number of notable field boundaries were identified within the footprint, including species-rich hedgerows and Cornish hedge banks. In addition, discrete areas of more notable woodland and grassland habitat were identified. The results of the survey are shown on Figure 7.1.

Protected/Notable Species Receptors

7.4.2.16 The Habitat Verification Survey and desk study identified signs of, or potential for, the presence of protected and notable species.

7.4.2.17 According to the potential identified, detailed ecological survey and assessment work for the following ecological receptors has been completed:

- Aquatic Scoping Survey;
- Wintering/Breeding Bird Surveys;
- Dormouse (*Muscardinus avellanarius*) Survey; and
- Initial Bat Activity, Preliminary Roost Assessments and Crossing-Point Surveys.

7.4.2.18 Further survey work to inform the preferred Scheme will be required during 2017 for:

- Badgers (*Meles meles*);
- Additional Bat Activity, Roost Assessments and Emergence Surveys and Additional Crossing Point Surveys;
- Otters (*Lutra lutra*);
- Barn Owl (*Tyto alba*) Survey;
- Nightjar (*Caprimulgus europaeus*) Survey;
- Reptiles;
- Additional Dormouse (Muscardinus avellanarius) Survey;

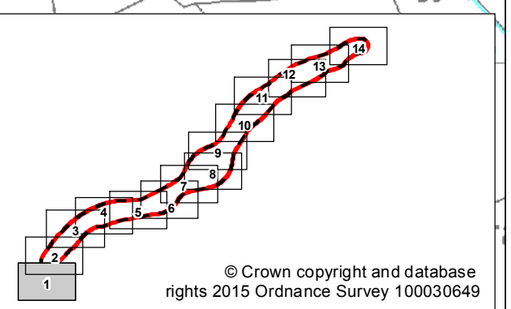
[1] Joint Nature Conservation Committee (2010). *Handbook for Phase I Habitat Survey: A technique for environmental audit*. Joint Nature Conservation Committee, Peterborough.

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall

No acces. Survey completed via aerial and will require further ground truthing



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Metres

Rev	Date	Description	By	Chk	App

Notes:

WSP | PARSONS BRINCKERHOFF
Kings Orchard,
1 Queen Street, Bristol
BS2 0HQ
Tel: 44-(0)117-930-6200

Client: WSP

Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
PAGE 1 OF 14

Drawn: JSdS		Checked: JSdS	
Designed: UD		Approved: UD	
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Project Number: 3514274A-HHE		Drawing Number: FIGURE 7. 1	Revision:

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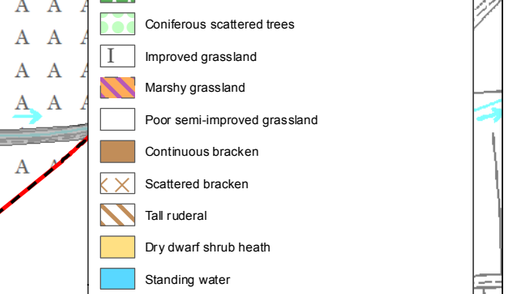
Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing



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Rev	Date	Description	By	Chk	App

Notes:

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Kings Orchard,
1 Queen Street, Bristol
BS2 0HQ
Tel: 44-(0)117-930-6200

Client: WSP

Project: A30 CHIVERTON TO CARLAND CROSS

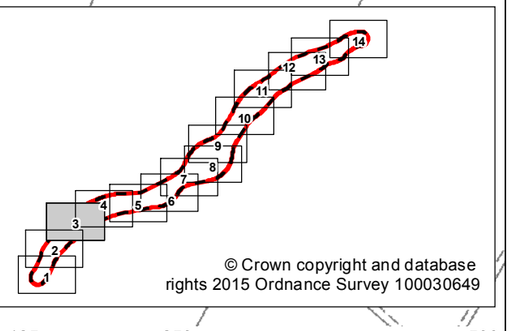
Title: SURVEY AREA
PAGE 2 OF 14

Drawn: JSdS		Checked: JSdS	
Designed: UD		Approved: UD	
Date: 28/11/2016	Scale: 1:5,000	A3	Sheet:
Project Number: 3514274A-HHE		Drawing Number: FIGURE 7.1	Revision:

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing



0 125 250 500
Metres

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Client: WSP

Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
PAGE 3 OF 14

Drawn: JSdS		Checked: JSdS	
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Date: 28/11/2016	Scale: 1:5,000 A3	Sheet:	
Project Number: 3514274A-HHE		Drawing Number: FIGURE 7.1	Revision:

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Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

113m
108m
Saw Mill
Miorybottom Farm
B3284
A3075
Pendale Farm
109m
Pendown
Collects
Issues
Vean
Shaft (dis)
Wheal Vi (dis)
Shafts (dis)
Callestick Vean
TN16
TN17
TN1
TN6
TN7
TN8
North Plantation
Collects
144m
Four Burrows
Wind Turbines
Four Burrows Wind Farm
Wind Turbines
Fourburrow
Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing

0 125 250 500
Metres

Rev	Date	Description	By	Chk	App

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Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
PAGE 4 OF 14

Drawn: JSdS		Checked: JSdS	
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Project Number: 3514274A-HHE		Drawing Number: FIGURE 7.1	Revision:

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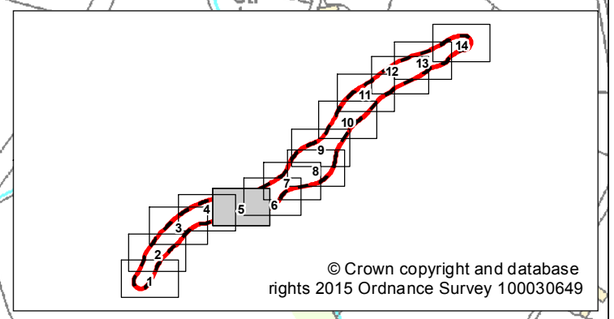
Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing

Callestick Vean
Collects
Path
Track
Shaft (dis)
Wheal Virgin (dis)
Shafts (dis)
Issues
Creegmeor Farm
Callestick Vean
North Plantation
Collects
Wind Turbines
Four Burrows Wind Farm
Wind Turbines
Hillview Farm
Chybucca
Garvinack Brake
B3284
A30
122m
109m
91m
TN6
TN7
TN8
TN16
TN17



0 125 250 500
Metres

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Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
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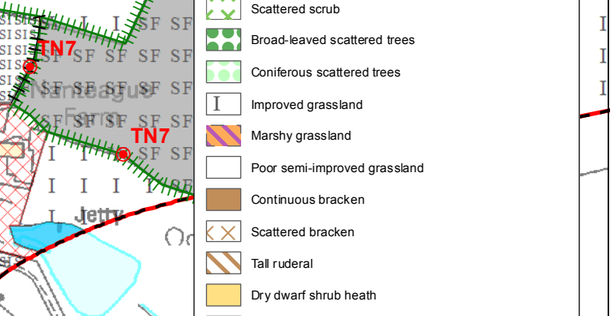
Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing



0 125 250 500
Metres

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Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
PAGE 6 OF 14

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Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

Lower Ventongimps
Issues
Track
Colls
Tip (dis)
Great South Chiverton Mine (disused)
Collects
Tresawsen
81m
88m
Ventonlea
Tresawsen Cottage
Little Tresawsen
Cumulus
Footbridge
Shaft (dis)
Little Nanteague
Jetty
Path
A30
Marazanvose Farm

TN1 TN2 TN7 TN8 TN12 TN13 TN14 TN15 TN19 TN20

- Broad-leaved woodland
- Broad-leaved plantation
- Semi-natural Coniferous woodland
- Mixed semi-natural woodland
- Scattered broad-leaved tree
- Coniferous scattered tree
- Dense scrub
- Scattered scrub
- Broad-leaved scattered trees
- Coniferous scattered trees
- Improved grassland
- Marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Scattered bracken
- Tall ruderal
- Dry dwarf shrub heath
- Standing water
- Arable
- Amenity grassland
- Introduced shrub
- Bare ground
- Buildings and Hard standing
- Solar farm
- Running water
- Native species-rich intact hedge
- Earth bank
- Native species-rich hedge with trees
- Species-poor intact hedge
- Species-poor defunct hedge
- Species-poor hedge with trees
- Fence
- Wall
- No acces. Survey completed via aerial and will require further ground truthing

0 125 250 500
Metres

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Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
PAGE 7 OF 14

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Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
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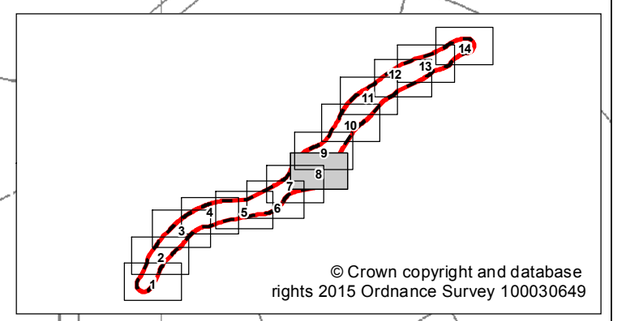
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing



0 125 250 500
Metres

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Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
PAGE 8 OF 14

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Project Number: 3514274A-HHE		Drawing Number: FIGURE 7.1	Revision:

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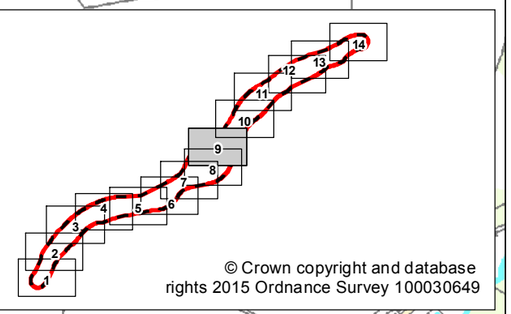
Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing



0 125 250 500
Metres

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Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
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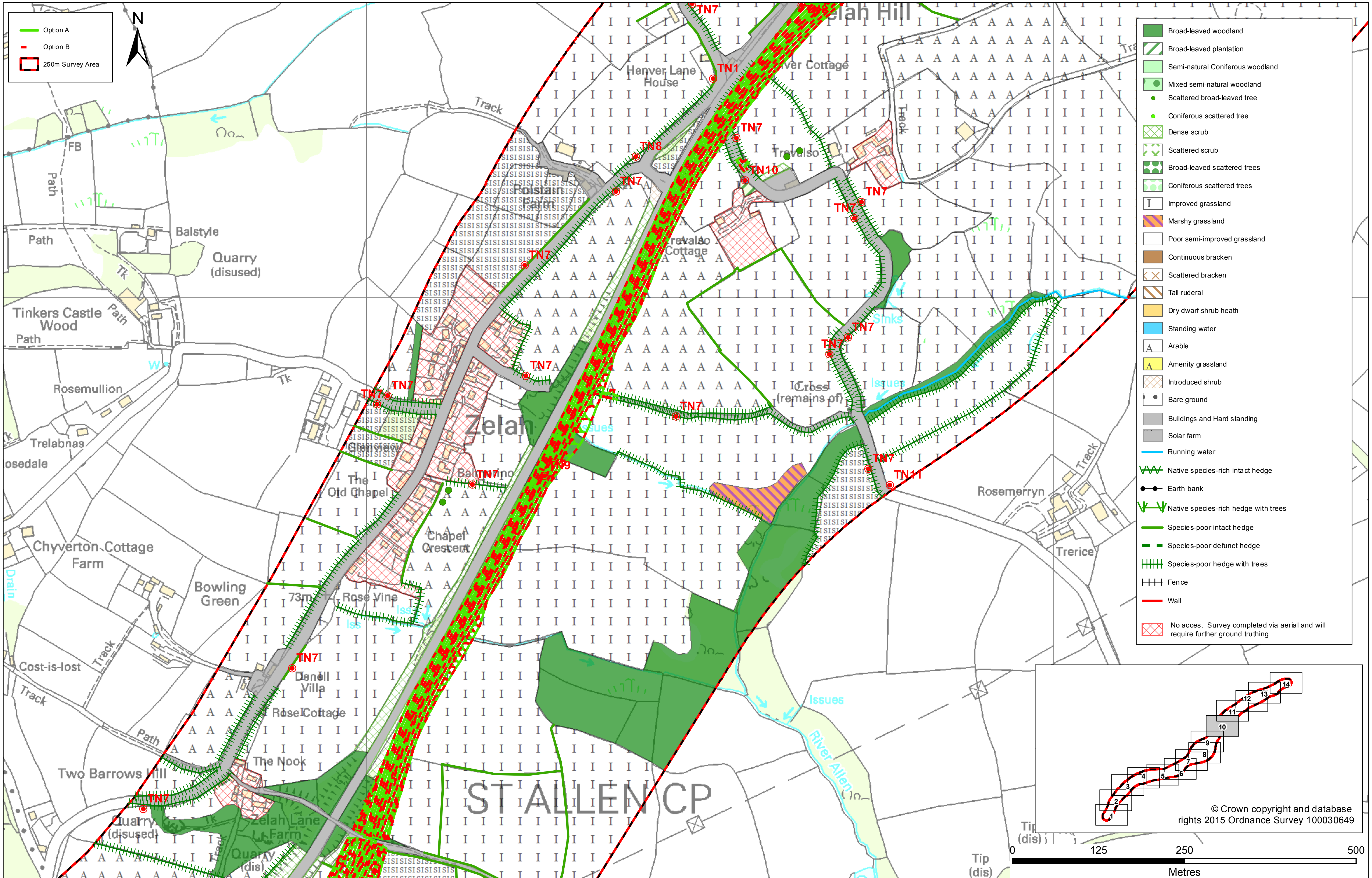
Login: DeSouzaJ
Plot Date: 28/11/2016



Option A
Option B
250m Survey Area
N
Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing
Zelah
ST ALLEN CP
Henver Lane House
Polstain Farm
Trevalso Cottage
Cross (remains of)
Balstyle
Quarry (disused)
Tinkers Castle Wood
Rosemullion
Trelabnas
Chyverton Cottage Farm
Bowling Green
Cost-is-lost
Two Barrows Hill
The Old Chapel
Chapel Crescent
Rose Vine
Derell Villa
Rose Cottage
The Nook
Zelah Lane Farm
Rosemerryn
Trerice
River Allen
TN1
TN7
TN8
TN9
TN10
TN11
0
125
250
500
Metres
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Login: DeSouzaJ
Plot Date: 28/11/2016

Rev	Date	Description	By	Chk	App

Notes:

WSP PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen Street, Bristol
BS2 0HQ
Tel: 44-(0)117-930-6200

Client: WSP

Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
PAGE 10 OF 14

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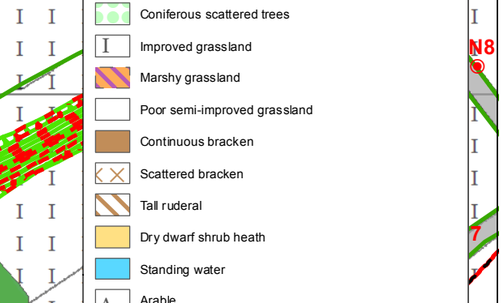
Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing



0 125 250 500
Metres

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Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
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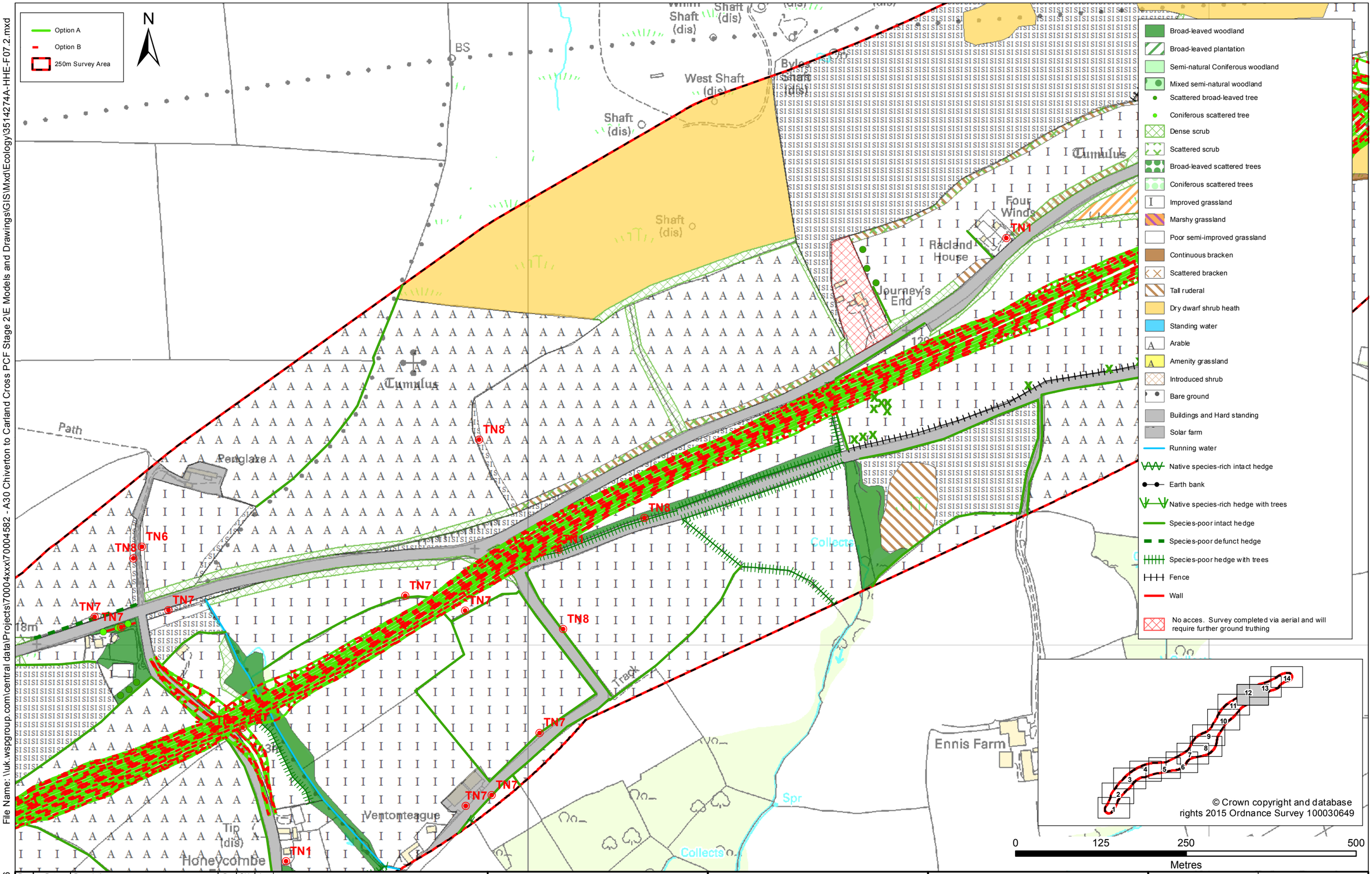

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Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
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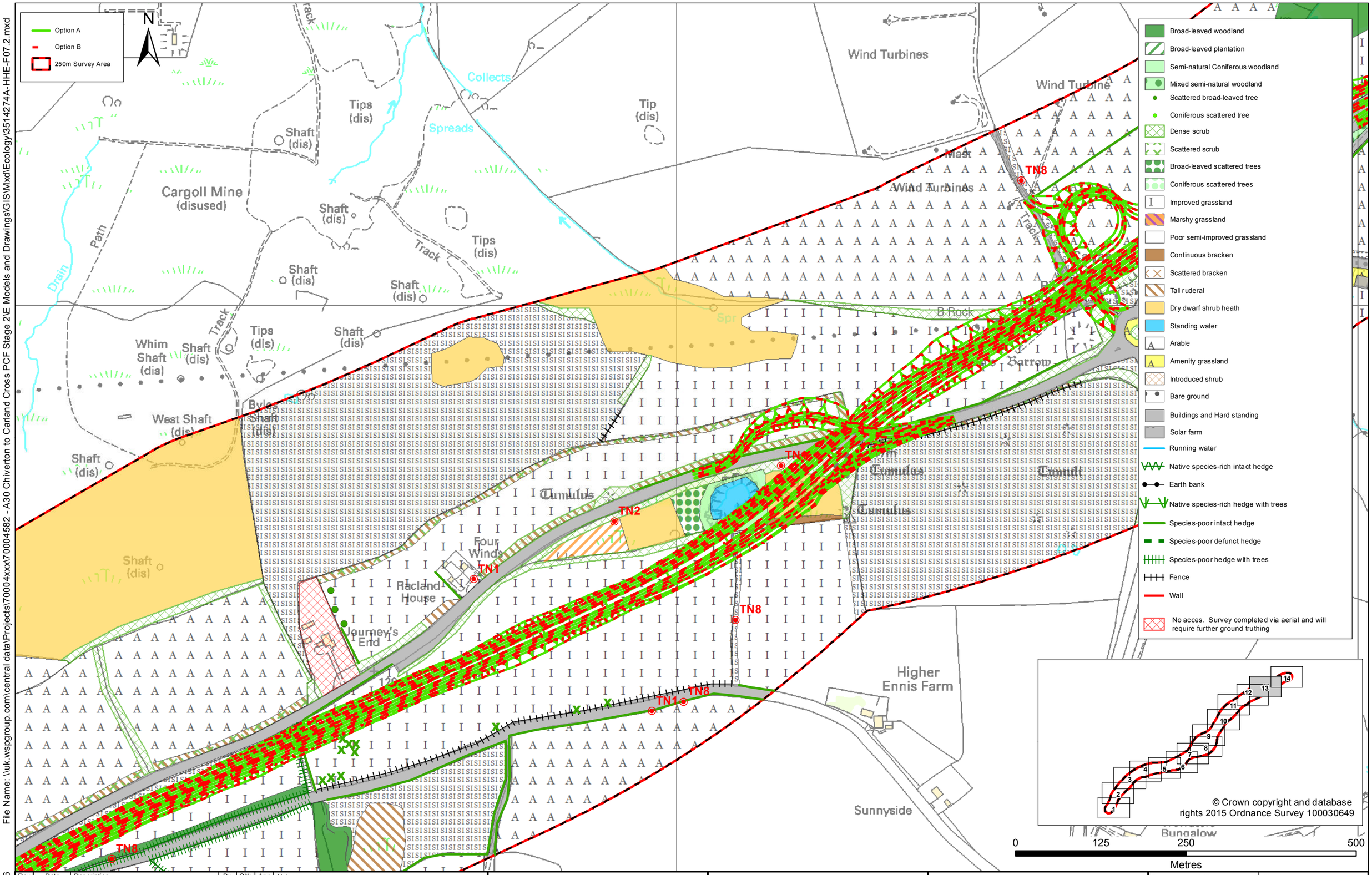
Project Number: 3514274A-HHE		Drawing Number: FIGURE 7.1	Revision:



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Title: SURVEY AREA
PAGE 13 OF 14

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Login: DeSouzaJ
Plot Date: 28/11/2016

Option A
Option B
250m Survey Area

N

Broad-leaved woodland
Broad-leaved plantation
Semi-natural Coniferous woodland
Mixed semi-natural woodland
Scattered broad-leaved tree
Coniferous scattered tree
Dense scrub
Scattered scrub
Broad-leaved scattered trees
Coniferous scattered trees
Improved grassland
Marshy grassland
Poor semi-improved grassland
Continuous bracken
Scattered bracken
Tall ruderal
Dry dwarf shrub heath
Standing water
Arable
Amenity grassland
Introduced shrub
Bare ground
Buildings and Hard standing
Solar farm
Running water
Native species-rich intact hedge
Earth bank
Native species-rich hedge with trees
Species-poor intact hedge
Species-poor defunct hedge
Species-poor hedge with trees
Fence
Wall
No acces. Survey completed via aerial and will require further ground truthing

TN7
TN8
TN9
93m
Wind Turbines
Wind Turbine
Mast
Track
South Nancemeer
Grove Farm
MITCHELL LANE
West Nancemeer
The Willows
Sewage Works
Treventon Farm
Mitchell Farm
Tumuli
Tumulus
B Rock
Barrow
Spr

0 125 250 500
Metres

Rev	Date	Description	By	Chk	App

Notes:

WSP | PARSONS BRINCKERHOFF
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1 Queen Street, Bristol
BS2 0HQ
Tel: 44-(0)117-930-6200

Client: WSP

Project: A30 CHIVERTON TO CARLAND CROSS

Title: SURVEY AREA
PAGE 14 OF 14

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Login: DeSouzaJ
Plot Date: 28/11/2016

- Habitats (National Vegetation Classification Surveys, Hedgerow Surveys);
- Terrestrial and Aquatic Invertebrates; and
- Fish Surveys.

7.4.2.19 Specific surveys for water vole (*Arvicola amphibius*), great crested newt (*Triturus cristatus*) and white-clawed crayfish (*Austropotamobius pallipes*) were not completed due to the geographical location of the Scheme and absence of records for these species within the relevant ZoI from the Scheme[2].

7.4.2.20 Furthermore, specific surveys for Species of Principal Importance[3] have not been completed for the Scheme. The results of surveys completed for protected species of all relevant species groups, desk data, and mitigation proposals for the Scheme will address the requirement for due regard of such species.

7.4.2.21 Table 7.6 below provides a summary of the existing baseline knowledge.

Table 7.6
Existing Baseline Summary

Receptor	Status of Survey	Summary of Baseline Data
Breeding Birds	Survey complete	The desk data identified a wide variety of birds within the search area. The surveys identified different compositions dependent upon the habitats. Arable and pastoral farmland areas were noted as being important for skylark (*Alauda arvensis*) and meadow pipit (*Anthus pratensis*), along with yellowhammer (*Emberiza citrinella*) and linnet (*Carduelis cannabina*) in hedgerows. The arable land was also noted as important staging posts for migrants such as wheatear (*Oenanthe oenanthe*). Similar species were noted within the heathland areas and common passerines were recorded in the residential areas.
Wintering Birds	Survey complete	The desk study data identified a wide variety of wintering birds within the search area including redwing (*Turdus iliacus*) and fieldfare (*Turdus pilaris*). The survey data identified a large

[2] Great crested newts are considered absent from Cornwall. Water voles are currently only present within a release site in the Bude catchment in Cornwall; White clawed crayfish are only present within a release site outside of the Scheme's ZoI as supported by the survey data collected to date (the Environment Agency, Cornwall Council and Cornwall Wildlife Trust have provided non-statutory consultation responses on the ecological scope for the Scheme).

[3] As listed under Section 41 of the Natural Environment and Rural Communities Act (2006)

Receptor	Status of Survey	Summary of Baseline Data
		number of redwing and fieldfare using the survey area along with smaller groups of golden plover (*Pluvialis apricaria*) and lapwing (*Vanellus vanellus*). Additionally large numbers of gulls and large flocks of small passerines including skylark, meadow pipit, chaffinch (*Fringilla coelebs*), linnet and starling (*Sturnus vulgaris*) were recorded within farmland fields.
Barn owls	Survey not carried out to date, data extrapolated from desk study and incidental records	The desk study identified a large number of barn owl records within the search area, despite many of these being classified; some were identified as roost/nest sites within close proximity (< 50 m) to the site. Incidental records for barn owls have been identified at the eastern end of the site, including pellets and artificial nest boxes. Personal communication with landowners has also indicated that barn owls are present within the middle of the site.
Badger	Survey partially complete, to be completed by beginning of June, and data extrapolated from desk study	The desk data returned a high number of badger records within the search area, including two setts. Previous survey reports indicate the presence of badgers across the site and a number of setts were identified. The partially complete 2017 survey indicates a high level of activity, particularly at the eastern end of the Scheme, with the presence of setts, latrines, mammal tracks and footprints.

Receptor	Status of Survey	Summary of Baseline Data
Bats	Survey partially complete, to be completed by September, and data extrapolated from desk study	The desk study data identified a large number of bat records from 12 different species including barbastelle (*Barbastella barbastellus*), lesser horseshoe (*Rhinolophus hipposideros*) and greater horseshoe (*Rhinolophus ferrumequinium*) bats. Previous surveys identified the presence of summer and hibernation roosts. The survey results to date have identified a number of buildings and trees with high, medium and low potential for bat roost sites. Preliminary emergence surveys have indicated a minimum of 11 roosts sites, including four likely maternity roosts for common pipistelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), lesser horseshoe, natterers (*Myotis nattereri*), brown long-eared (*Plecotus auritus*) and myotis species. High quality foraging and commuting habitat was considered to be present within the survey area throughout the site, with preliminary surveys identifying nine species of bat using the habitat to be bisected by the scheme. The activity levels varied across the site, with hotspots at Marazanvose, and Trevalso. Crossing point surveys indicate a total of 13 potential commuting features such as hedgerows with particular activity concentrations at Nanteague, Nancarrow and Trevalso Farms.
Otter	Survey partially complete, to be completed by end of July, and data extrapolated from desk study	The desk study returned nine records of otter within the 2 km search area, inclusive of four road kills along the current A30. Due to known presence in the area and the nature of the watershed and small streams in the area, survey effort is to be focussed towards breeding sites at ponds within 500 m and resting sites within 250 m. Initial breeding pond surveys carried out identified two areas of potential for breeding, but no confirmed breeding sites.
Dormice	Survey partially complete, to be completed by the end of September	The survey carried out in 2016, resulted in no conclusive evidence. No desk study records were returned and further survey through the 2017 survey season is underway.

Receptor	Status of Survey	Summary of Baseline Data
Reptiles	Survey partially complete, to be completed by the end of June	The survey is underway, with refugia being placed out in April. The desk study data identified the presence of all four common reptile species, along with the common amphibian species within the search area. To date, small numbers of all four common reptile species have been recorded within the survey area.
Aquatic Invertebrates and Fish	Survey not carried out to date, data extrapolated from desk study. Further surveys in targeted locations are being completed during the 2017 survey season.	The survey is being carried out through the appropriate seasons. Desk study data identified the presence of notable species such as eel and bullhead. Previous assessment of the Scheme site identified substantial spawning populations of Sea Trout (*Salmo salar*) and Brown Trout (*Salmo trutta*) as well as important nursery habitat for these species associated with the watercourses within proximity to the options. In addition, Lampreys (*Lampetra* spp.) have been recorded within watercourses in the surrounding area.
Terrestrial Invertebrates	Survey not carried out to date, data extrapolated from desk study. Further surveys in targeted locations are being completed during the 2017 survey season.	The desk study identified a number of notable invertebrate species such as the silver studded blue butterfly (Plebejus argus) within the search area; the areas of heathland and designated sites along the length of the Scheme are considered likely to support notable invertebrate assemblages.
Habitats (National Vegetation Classification)	Survey partially complete, data extrapolated from desk study data and Phase 1 Habitat Survey. Woodland and heathland NVC complete.	The desk study identified a number of priority habitats including woodland and heathland, including the presence of Dorset heath. Surveys are to be completed on woodland, heathland and grassland communities.
Hedgerows	Survey not carried out to date, data extrapolated from desk study and Phase 1 Habitat Survey	Hedgerow surveys have not been carried out to date, however the desk study and Phase 1 have identified potentially important hedgerows across the site. A number of the hedgerows are identified as Cornish hedges, and are of significant age, length and species composition.

7.4.3 Value of environmental resources and receptors

7.4.3.1 The value of sites, populations of species, species assemblages and habitats will be evaluated with reference to: their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations); and their legal status.

7.4.3.2 IAN 130/10 provides supplementary guidance further to that described within DMRB Volume 11 Section 2, Part 5 on the determination of resource value and sensitivity (summarised in Table 7.7 below).

Table 7.7
Environmental Value (Sensitivity) Descriptors for Nature Conservation Summarised from IAN 130/10

Value (sensitivity)	Typical descriptors
International	E.g. an internationally important site, e.g. SPA, SAC or Ramsar site (or a site considered worthy of such designation). A regularly occurring population of an internationally important species, where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • the population forms a critical part of a wider population at this scale; or • the species is at a critical phase of its life cycle at this scale.
National	E.g. a nationally designated site, e.g. SSSI, National Nature Reserve (NNR) or a site considered worthy of such designation. Areas listed as Ancient Woodland; priority BAP/Section 41 (NERC Act) habitat. A regularly occurring or resident populations of species which may be considered at an International, European, UK or National level where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • the population forms a critical part of a wider population at this scale; or • the species is at a critical phase of its life cycle at this scale.

Value (sensitivity)	Typical descriptors
Regional	E.g. areas of priority UK BAP / HABAP habitat; of regional value in the appropriate Natural Area Profile (or equivalent). Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key/priority species listed within the HABAP where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • the population forms a critical part of a wider population; or • the species is at a critical phase of its life cycle.
County	E.g. sites designated in the county or unitary authority area context (or considered worthy of such designation). Areas of key/priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent). Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: • the loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area; or • the population forms a critical part of a wider population; or • the species is at a critical phase of its life cycle.
Local	E.g. designated sites including: Local Nature Reserves (LNRs) designated in the local context . Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

7.4.3.3 This guidance will be used in the valuation of resources for the scheme.

7.4.3.4 Based on current baseline knowledge of the study area, Table 7.8 below defines the likely valuation of the ecological resources and receptors identified as present in the study area based on the above guidance.

Table 7.8 Initial Valuation of ecological Receptors	
Receptor	**Resource Valuation**
Newlyn Downs SAC	International
SSSIs within 2 km	National
CWS within 2 km	County
CRVI within 2 km	County
Habitats within Scheme Footprint	Up to Local
Bats	County-Regional
Breeding Birds	Local-County
Wintering Birds	Local-County

7.4.3.5 This is a preliminary assessment of value, which will reviewed and refined if required, subject to data gathering of existing records and further field surveys and consultation.

7.4.4 Potential effects, including monitoring and mitigation measures

7.4.4.1 Chapter 1 describes aspects of the proposed development including horizontal and vertical alignment, earthworks, structures, signage and lighting, which could have an impact on the surrounding ecological receptors.

7.4.4.2 The potential impacts anticipated as having the potential to arise without mitigation during construction and operation, include:

Construction

- Permanent and temporary land-take within the proposed Scheme footprint;
- Permanent manipulation of habitats, e.g. landscaping and 'tidying-up' of areas not within the footprint, felling of trees for Health and Safety reasons;
- Temporary storage of construction materials within / adjacent to ecological resources with associated land contamination and compaction;
- Habitat fragmentation;
- Direct mortality during site clearance and construction;
- Direct and indirect disturbance from construction activities including visual, noise, vibration and lighting; and

- Pollution caused by use of hazardous materials and incidental release of dust, chemicals, fuels or waste materials.

Operation

- Direct mortality during operational use;
- Displacement, species loss and isolation;
- Increase in barrier effect due to presence of significant area of hard standing;
- Direct disturbance from operational use visual, noise, vibration and lighting; and
- Pollution caused by runoff and air deposition.

7.4.5 Proposal level and scope of assessment

7.4.5.1 Since there may be significant effects on biodiversity, in accordance with NN NPS Paragraph 5.22, the Environmental Statement will clearly set out any likely significant effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species, and on habitats and other species identified as being of principal importance for the conservation of biodiversity.

7.4.5.2 The ES will also consider the full range of potential impacts on ecosystems and inform opportunities for enhancement. NN NPS Paragraph 5.23, requires applicants to show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.

7.4.5.3 The assessment will be at the detailed level and reported in accordance with DMRB Volume 11 Section 2, Part 5 and IAN 130/10. Detailed assessment is appropriate because potential significant effects have been identified for the Scheme, which are above value and magnitude thresholds that are likely to be considered to preclude such assessment.

7.4.5.4 The scope of further assessment work has been determined based upon current baseline knowledge of the study area and a review of current best practice survey guidance, and nature conservation legislation and policy frameworks (as described in Chapter 2).

7.4.5.5 To ensure that subsequent detailed ecological assessment work is based on up-to-date baseline information, surveys will be undertaken at an appropriate time of year for the following receptors using appropriate methods.

Badger

7.4.5.6 Badger surveys will be undertaken in April-May 2017 in accordance with: Harris S, Cresswell P and Jefferies D (1989), Surveying Badgers, Mammal Society.

7.4.5.7 A badger survey will be carried out up to 250m either side of the proposed alignment. The survey will focus on identifying evidence indicating the presence of badger. Where evidence is identified, it may be necessary to extend the survey area (e.g. to locate a sett where a path indicates use by badger).

7.4.5.8 Dependent on the results obtained, it may be necessary to complete additional assessment in autumn 2017 to establish the status of setts and territories within the area surrounding the Scheme.

Bats

7.4.5.9 Bat roosting surveys of buildings and trees, activity surveys and crossing-point surveys will be completed between April and September 2017 in accordance with best practice guidance:

- Berthinussen & Altringham (2015) 'Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure'; and
- Collins. J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3 rd edn.). The Bat Conservation Trust, London.

Otter

7.4.5.10 Desk study information was gathered during the Phase 1 Habitat Verification survey in addition to road traffic incident reports from the Environment Agency. This was used to help identify hotspots for activity and potential breeding sites.

7.4.5.11 Surveys will be completed during 2017 along watercourses and within waterbodies to identify signs of otters and locations where otters may cross the new Scheme. In addition, surveys up to 500 m from the Scheme will be carried out where considered necessary to identify areas potentially used as natal dens, holts and resting sites.

7.4.5.12 Depending on the results of the initial survey, additional monitoring may be required during 2017 to establish the actual use of potential breeding and resting sites.

Barn owl

7.4.5.13 Barn owl surveys will be undertaken in accordance with the methodology set out in Barn Owl Trust (2010), Survey techniques, Leaflet no. 8, The Barn Owl Trust, Ashburton, Devon; and Shawyer (2011), Barn Owl Survey Methodology and Techniques for use in Ecological Assessment.

7.4.5.14 A habitat suitability assessment will be completed in July and August 2017. Farm buildings within 500 m of the route alignment will be surveyed by a licensed ecologist to assess their potential to support roosting and nesting barn owl. This will comprise an external ground based inspection and, where practical, an internal inspection of suitable buildings.

Habitats

7.4.5.15 National Vegetation Classification surveys in accordance with Rodwell, J.S. (1991) *British Plant Communities*. will be completed in the period May-September 2017 where habitats within 100 m of the Scheme fulfil any of the following criteria:

- Statutory and non-statutory nature conservation site designated for botanical features;
- Contains or was likely to contain Habitats of Principal Importance[4];
- Contained Ancient Woodland Inventory (AWI) woodland or likely to contain ancient woodland.

7.4.5.16 All hedgerows within 100 m of the Scheme and fulfilling the following criteria will be subject to further hedgerow surveys during June 2017 in accordance with Defra (2007). *Hedgerow Survey Handbook*:

- Continuous[5] hedgerows of, or exceeding, 20 metres; and
- Continuous hedgerow of less than 20 metres and, at each end, meets (whether by intersection or junction) another hedgerow.

Reptiles

7.4.5.17 Given the location of the Scheme, it was considered that the habitats present were suitable to support only the four common reptile species: adder (*Vipera berus*); grass snake (*Natrix natrix*); slow worm (*Anguis fragilis*); and common lizard (*Zootoca vivipara*).

7.4.5.18 Potential reptile habitat areas (including high, medium, low suitability areas) within a 100 m from the Scheme were initially identified via aerial photography as well as existing desk study data and information from the Phase 1 Habitat Verification Survey.

7.4.5.19 Medium and high-quality habitat will be subject to presence or likely absence surveys in May and June 2017 in accordance with standard methodology detailed in Froglife (1999) *Reptile survey; an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Depending on the results of the presence/absence survey, it may be necessary to undertake more detailed population size-class surveys in September 2017 to inform mitigation design.

Terrestrial Invertebrates

7.4.5.20 A targeted survey will be completed in the period May-September 2017 to focus primarily on terrestrial invertebrate assemblages occurring within heathland and woodland Habitats of Principal Importance. However, other habitats including wet grassland, semi-improved grassland and other habitats of potential invertebrate

[4] As listed under Section 41 of the Natural Environment and Rural Communities Act (2006)

[5] For the purposes of ascertaining the length of any hedgerow, any gaps do not exceed 20 metres

conservation value will also be considered for value to notable invertebrate assemblages in an initial scoping study completed in May 2017.

7.4.5.21 The methodology will be in accordance with those outlined in NERR005 (Drake *et al*., 2007), a manual produced by Natural England, which sets out standard approaches to invertebrate survey and analytical techniques for the purposes of conservation evaluation. The method aims to ensure a robust analysis of key invertebrate assemblages within the specified areas.

Aquatic Invertebrates and Fish

7.4.5.22 There are four river reaches, which would be intersected by the Scheme. Fully quantitative population surveys will be undertaken for fish (during summer 2017) and macro-invertebrates (spring, summer and autumn 2017) in order to establish baseline population data and to ascertain the presence or absence of conservation species at each site. Using a precautionary approach, the 14 watercourses indirectly impacted upon will also be semi-quantitatively surveyed in order to obtain basic fish and macro-invertebrate baseline data. Electric-fishing surveys will be undertaken following the standard EA guidelines (Beaumont *et al.,* 2002) and macro-invertebrates will be sampled in accordance with EA Operational Instruction 018_08.

7.4.6 Proposed methodology including significance

EIA

7.4.6.1 The ecological assessment will be undertaken using the Guidance for Ecological Impact Assessment in the United Kingdom Second Edition (CIEEM 2016) and Highways England standards, including IAN Ecology and Nature Conservation: Criteria for Impact Assessment (IAN 130/10) which supplements the earlier DMRB chapter in Volume 11, Section 3, Part 4 (dated 1993).

7.4.6.2 IAN 130/10 provides a methodology for the consideration of significance of effects (for those receptors identified as requiring detailed assessment). Potential impacts will be characterised through the:

- Probability of occurrence: certain, probable, unlikely;
- Complexity: whether direct, indirect, cumulative;
- Extent: area measures and percentage of total loss;
- Size: description of level of severity of influence;
- Duration: permanent or temporary in ecological terms;
- Timing and frequency: important seasonal and/or life-cycle constraints and any relationship with frequency considered; and as being
- Reversible or not reversible; and/or
- Positive (beneficial) or negative (adverse).

7.4.6.3 Significance of effects will be deduced from assessing the value of the receptors against any residual impact (taking into account mitigation). In line with the guidelines set out within the DMRB, significance will be addressed as neutral, slight, moderate, large or very large (refer to Table 7.9).

Table 7.9
Significance of Effects (Summarised from IAN 130/10)

Significance category	Typical descriptors
Very large	An impact on one or more receptor(s) of international, European, UK or national value
Large	An impact on one or more receptor(s) of regional value
Moderate	An impact on one or more receptor(s) of county value
Slight	An impact on one or more receptor(s) of local value
Neutral	No significant impacts on key nature conservation receptors

Habitats Regulations Assessment

7.4.6.4 Habitats Regulations Assessment (HRA) will be undertaken for the Newlyn Downs SAC in accordance with the four stage process, as set out in Volume 11 of the DMRB and IAN 141/11 and summarised below:

- Stage 1 (Screening): to identify the likely significant effects of a project upon the integrity of a European Site, either alone or in combination with other plans and projects, and consider whether the impacts are likely to be significant;
- Stage 2: to ascertain the effect on site integrity, either alone or in combination with other plans and projects, by assessing the effects of the plan or project on the conservation objectives of any European Site. Where there are adverse effects, an assessment of mitigation options is carried out to determine adverse effect on the integrity of the site. If these mitigation options cannot avoid adverse effects then development consent can only be given if stages 3 and 4 are followed;
- Stage 3: to examine alternative solutions to achieve the objectives of the project where adverse effects are identified; and
- Stage 4: where no alternative solution exists and where adverse impacts remain. The process to assess whether the development is necessary for imperative reasons of over-riding public interest (IROPI) and, if so, the potential compensatory measures needed to maintain the overall coherence of the site or integrity of the European site network.

7.4.6.5 Based on the current baseline knowledge of the study area and initial assessments completed regarding changes to air quality, and water quality and flow, it is anticipated that the assessment of likely significant effects will be addressed through a HRA Stage 1 (Screening) report. The outcome of this will, however, be discussed with Natural England.

7.4.7 Assumptions and limitations

7.4.7.1 During the identification and assessment of options to determine the preferred route, a 'Simple' level assessment was carried out. Previous assessment of route options has identified that potentially moderate to large adverse ecological impacts could arise as a result of the project.

7.4.7.2 A 'Detailed' level assessment will be carried out for the preferred option in the EIA in accordance with DMRB Volume 11, Section 3, Part 4, Paragraph 7.9 onwards. Detailed design of mitigation will be an outcome of the iterative design and assessment process. The detailed design of elements of the project, including heights of embankments and extent of cuttings, will be available to inform the EIA detailed mitigation.

7.4.7.3 The assessment is currently based on indicative scheme layout drawings. To date, no significant limitations have been identified in the surveys completed.

7.4.8 Summary

7.4.8.1 The area used for the desk-based study (study area) and field surveys (survey area) is established in consideration of the Scheme footprint and its likely significant ecological effects and in accordance with standard best-practice guidance.

7.4.8.2 The baseline has identified a number of notable habitat and species receptors within the Scheme's zone of influence, including designated sites, notable habitats and protected species. Further surveys will be completed during 2017 to establish the baseline.

7.4.8.3 Once the baseline has been established, the ecological assessment will be undertaken using the Guidance for Ecological Impact Assessment in the United Kingdom (CIEEM 2016) and Highways England standards. These include IAN Ecology and Nature Conservation: Criteria for Impact Assessment (IAN 130/10) which supplements the earlier DMRB chapter in Volume 11, Section 3, Part 4 (dated 1993).

7.4.8.4 In addition, a Habitats Regulations Assessment will be undertaken in accordance with DMRB IAN 141/11 for Newlyn Downs SAC, located within approximately 115 m of the Scheme.

7.5 Landscape and Visual Effects

7.5.1 Study Area

7.5.1.1 The study area for landscape and visual effects will be as described in IAN 135/10 with a starting point of 2km. The study area for visual effects will be the area from which the project could be visible. The Zone of Visual Influence (ZVI) will show the area of land from which there could be a view of any part of the proposed project including structures, embankments, signs, lighting, and traffic (up to 4m high for HGVs).

7.5.1.2 The study area for landscape effects will cover the proposed scheme area and the wider landscape context within which the project may influence landscape character. In this case the study area for effects on landscape character is also the extent of the area from which the project is potentially visible; the ZVI.

7.5.2 Baseline Information

7.5.2.1 The desk based study was carried out during the identification of options. This was reviewed during the assessment of those options and a site survey undertaken in March 2016. A site visit was carried out in August 2016 to review key visual receptors to be considered in that assessment.

7.5.2.2 The study area and wider landscape comprises an open plateau incised with shallow river valleys resulting in a gently undulating topography. The wider area generally has an open windswept character combined with extensive views, predominantly to the north and out to the coast.

7.5.2.3 Land cover is largely a mix of pasture and arable land, with woodland generally confined to stream valleys. There is, however, a notable area of woodland within the study area within the grounds of Chyverton House (Chyverton Park Grade II Registered Park and Garden) to the north of the A30, west of the settlement of Zelah. Despite the general lack of woodland, the landscape has a well-treed feel due to numerous mature hedges which tend to restrict widespread visibility.

7.5.2.4 The landscape is organised within medium to large scale broadly rectilinear fields, as well as small-scale rectangular field pattern defined by Cornish hedges.

7.5.2.5 The landscape is sparsely populated with dispersed settlement comprising farmsteads and small nucleated villages. Many settlements are located along the ridge of higher ground where some have been bypassed by the A30 road, as at Zelah. The busy A30 exerts an influence over the landscape, tending to reduce tranquillity within adjacent areas.

7.5.2.6 It is generally an uncluttered landscape although windfarms are prominent at Four Burrows, Chybucca and Carland Cross, and solar farms at Four Burrows and Nanteague near Marazanvose. In addition, a series of electricity pylons and

overhead lines cross the landscape roughly east to west, passing over the A30 at Marazanvose.

7.5.2.7 The A30 is a historic routeway of regional significance connecting Exeter with Penzance. The Cornwall and Isles of Scilly Landscape Character Study (CISLCS) (2007) describes how this section of the route follows a spinal ridge and dates back into prehistory. The area was a focus for prehistoric activity and contains extensive clusters of Bronze Age barrows. A number of the barrows are designated as Scheduled Monuments (SM) with examples along the ridge, including near Carland Cross ('Two Bowl Barrows' and 'Warren's Barrow'), and at the western end of the study area at Two Burrows, Three Burrows, Four Burrows and Chiverton Cross (including 'The Three Burrows').

7.5.2.8 The existing A30 route and the study area lie entirely within Natural England's National Character Area (NCA) 152. Cornish Killas, which forms the main body of the Cornish landmass. The open character of this landscape and the general lack of tree cover allow long views across a rolling landscape of Cornish hedge-bounded fields and out to sea. All of the main transport links (the A30, A38 and A39 roads, and the mainline railway) between Cornwall and the rest of England in part run through the Cornish Killas NCA.

7.5.2.9 The study area lies within the CISLCS landscape character area No.CA14 Newlyn Downs. Within the study area there are four Landscape Description Units (LDU), which describe the landscape at a finer grain. At EIA stage the assessment of the value of the landscape will include this scale of description.

7.5.3 Value of environmental resources and receptors

Landscape

7.5.3.1 Open Access land, designated under the Countryside and Rights of Way Act 2000, lies approximately 150m from the northern edge of the road, and adjacent to the southern edge of the road, between Newlyn Downs and Carland Cross. There is a significant area of Lowland Heathland at Newlyn Downs, which extends over most of the Open Access land, and is an SAC.

7.5.3.2 Chyverton House, near Zelah, is designated as a Registered Park and Garden (i.e. is included on Historic England's 'Register of Historic Parks and Gardens'). It lies within 0.15 km at its closest point to the northern boundary of the existing A30.

7.5.3.3 Several Scheduled Monuments, most notable are those at Four Burrows and Carland Cross, are in hill-top locations and prominent in local views.

7.5.3.4 Part of the Cornwall and West Devon Mining Landscape World Heritage Site lies in the western part of the study area.

7.5.3.5 There are no National Trails or long distance recreational trails within the study area, although an extensive network of public footpaths exists in the north-western part of the study area around Callestick and Chyverton.

7.5.3.6 The St Agnes section of the Cornwall Area of Outstanding Natural Beauty (AONB) lies approximately 5 km north west of the A30 at Chiverton Cross. Significant landscape and visual effects are not anticipated on this area of the AONB, but will be included within the study for completeness.

7.5.3.7 The landscapes and features protected by statutory designations described above have a high sensitivity and would be least able to accommodate change of the nature proposed.

7.5.3.8 The landscape of the study area contains distinctive elements and features that make a positive contribution to its character and sense of place. Most notable are the pattern of field enclosure and the species-rich hedges which form a rural mixed farmland of considerable historic importance. It has a strong sense of history which is evident from the field pattern and traditional Cornish hedges, as well as the numerous Bronze Age barrows and prehistoric defended or enclosed farmsteads. This is further enhanced by the use of the Cornish language in place names e.g. Zelah and Marazanvose.

7.5.3.9 The open, windswept landscape character combined with extensive views, both inland and out to the coast to the north, has high sensitivity to change. These inherent qualities are susceptible to change from new built development and woodland planting which would alter the visual characteristics of the landscape. Overall the landscape is a receptor that is considered to have a high sensitivity.

Visual

7.5.3.10 High sensitivity visual receptors within the study area include people occupying residential properties, visitors to holiday accommodation and event venues, users of PRoW, and those using recreational facilities for the enjoyment of the countryside.

7.5.3.11 The existing A30 is visible from a number of properties at varying distances and orientations to the road. They include properties within the settlements of Three Burrows, Little Tresawsen, Zelah and Marazanvose. Individual properties include;

- Roscarnick Farm;
- Trevissome;
- Fourburrow Farm;
- Pendale Farm;
- Callestick Vean, south and north properties;
- Creegmeor Farm;
- Hillview Farm;
- Nanteague Farm;
- Nancarrow;
- Hill House;

- Boswellick
- Polstain Farm;
- Henver Cottages;
- Trevalso and Trevalso Cottage
- Zelah Hill Cottage
- Mount Pleasant;
- Penglaze;
- Journey's End;
- Racland House
- Four Winds;
- Higher Ennis Farm; and
- Rosehill Farm

7.5.4 Potential effects, including monitoring and mitigation measures

7.5.4.1 IAN 135/10 states that a Detailed Landscape and Visual Impact Assessment is required where there is the potential for significant landscape and visual effects.

7.5.4.2 Chapter 3 describes aspects of the proposed development including horizontal and vertical alignment, earthworks, structures, signage and lighting, which could have an impact on the surrounding landscape and visual receptors. Key impacts predicted to arise at operation are as follows;

- New dual carriageway, grade separated junctions, associated highway infrastructure and traffic;
- Loss of vegetation cover including pasture, arable, lowland heath, scrub, Cornish hedges and trees;
- Loss of features; Cornish hedges and land mark trees;
- Disruption of field pattern;
- Changes to local landscape character;
- Changes impacting on the composition of views;
- Lighting at Chiverton and Carland Cross junctions.

7.5.4.3 There could be potential adverse effects on landscape character and elements.

7.5.4.4 There could be potential adverse effects on the visual amenity of local residents in properties within the ZVI and walkers on open access land at Newlyn Downs.

7.5.4.5 The Cultural Heritage chapter will cover the setting and significance of the WHS and other heritage assets, while the LVIA chapter will cover both historic landscape characterisation within the landscape assessment, and the visual amenity of people enjoying or visiting heritage assets within the visual assessment.

7.5.4.6 The principal objective of mitigation is to integrate the scheme into the local landscape in order to minimise adverse landscape and visual impacts. Mitigation as an outcome of the iterative assessment and design process includes a number of general principles and aims to respect, maintain, and enhance local landscape character and distinctiveness.

7.5.4.7 The first principle of the landscape design would be to retain and protect as much of the existing vegetation as possible. The second principle would be to carry out new planting for landscape and visual mitigation and to replace any vegetation lost to construction of the preferred option.

7.5.4.8 Design would include construction of new Cornish hedges for landscape integration and to maintain local character and heritage. If appropriate, Cornish hedges would also provide a screening function and higher hedges (approximately 1.8m high) also used for noise attenuation.

7.5.4.9 Landscape integration would include natural regeneration and recreation of lowland heath in the eastern area of the scheme.

7.5.4.10 Opportunities for landscape enhancement or improvement through the management of any retained areas of vegetation would also be considered.

7.5.4.11 In addition, earthworks would be designed, where possible, to help integration into the gently undulating topography of the study area. Any proposed embankments and cuttings should be graded to respect existing local landform and avoid disruption of major topographical features. Engineered embankments would be designed to replicate natural landform with 'S' shaped profiles, 'landform replication', where practical.

7.5.4.12 The construction scheme would respect, maintain, and enhance local landscape character and distinctiveness.

7.5.4.13 Design proposals will reflect local design characteristics and use local materials.

7.5.4.14 Planting will utilise native plant species of local provenance where available and seek to bring biodiversity benefits. Planting will be in locally characteristic patterns, not on a regular grid.

7.5.4.15 There will be a number of drainage attenuation features within the improvement scheme which offer the potential for some landscape enhancement through the creation of a range of habitats.

7.5.5 Proposal level and scope of assessment

7.5.5.1 A Detailed Assessment will be undertaken as there is the potential for significant landscape and visual effects, as advised in DMRB Volume 11 Section 2 Part 1 and IAN 135/10. A Detailed Assessment will be undertaken for landscape effects because of the quality of the landscape resource, and for visual effects due to the high sensitivity of receptors in the vicinity of the scheme. Landscape and visual effects will be assessed separately. Mitigation will be addressed as an intrinsic part of the assessment process and the design amended accordingly, where possible, to reduce landscape and visual impacts.

7.5.5.2 At Stage 3 further consultations will be undertaken with Cornwall Council landscape officer, Natural England and Historic England, as well as the wider public during S42, 47 and 48 consultation.

7.5.5.3 The temporal scope of the assessment is based on the following timescales;

- 2017 will be the baseline year;
- 2020 to 2022 will be the construction phase of the project;
- 2022 will be the opening year when the project is in operation; and
- 2037 will be the 'design' year, 15 years after opening.

7.5.5.4 The assessment will use the following scenarios;

- During the construction period, assuming a maximum visibility or maximum perceived change situation (i.e. when construction activity is at its peak for any given view), and noting how long that period would be likely to last;
- A winter's day in the year that the project would open to traffic or be fully operational (i.e. with noise and visual screens and mounds in place but before any planted mitigation has begun to take effect). This is usually a reflection of the operationally non-fully mitigated and maximum visibility scenario;
- A summer's day in the fifteenth year after opening (i.e. when any planting mitigation measures can be assumed to be substantially effective). This is usually a reflection of the near fully mitigated scenario under normal conditions.

7.5.5.5 Landscape and visual impacts will be considered booth in terms of day-time and night-time effects.

7.5.6 Proposed methodology including significance

7.5.6.1 As there may be significant landscape and visual effects as a result of the scheme NN NPS Paragraphs 5.144-5.148 will apply.

7.5.6.2 The landscape assessment will be described in the ES relevant landscape character assessment and associated studies, as a means of assessing landscape and take account of any relevant policies based on the assessments in local development documents in Cornwall.

7.5.6.3 The assessment will also include any significant effects during construction of the project and the significant effects of the completed development and its operation on landscape components and landscape character (including historic landscape characterisation).

7.5.6.4 It will also include the visibility and conspicuousness of the project during construction, and of the presence and operation of the project and potential impacts on views and visual amenity and light pollution effects, including on local amenity, tranquillity, and nature conservation.

7.5.6.5 Being a road scheme, the assessment will be undertaken using the following guidance:

- IAN 135/10 Landscape and Visual Effects Assessment, Highways Agency 2010; and
- Guidelines for Landscape and Visual Impact Assessment (3rd Edition) published jointly by The Landscape Institute and Institute of Environmental Management and Assessment, 2013.

7.5.6.6 In summary the **Landscape** assessment will follow the following process;

- Baseline; including an assessment of the value of the landscape, both of character areas, characteristics, features and elements;
- Assess sensitivity of landscape with reference to its capacity to accommodate change arising from the project;
- Develop mitigation to reduce potential adverse effects;
- Evaluate significance of landscape effects; and
- Report residual landscape effects.

7.5.6.7 In summary the **Visual** assessment will follow the following process;

- Baseline; identification of visual receptors and their sensitivity to change;
- Assess magnitude of visual impacts with reference to scheme design, including bridges, approach roads, cuttings and embankments, drainage, signage, lighting, scale of change, nature of change;
- Develop mitigation to reduce potential adverse effects;
- Evaluate significance of visual effects; and
- Report residual visual effects for each receptor.

7.5.6.8 Receptor sensitivity, magnitude of impact and evaluation of the significance of landscape and visual effects has been categorised using typical criteria tables from IAN 135/10 (Refer to Table 7.10 to 7.14).

Table 7.10 Landscape and Visual Sensitivity		
Sensitivity	**Landscape – Typical Criteria**	**Visual – Typical Criteria**
High	Landscapes which by nature of their character would be unable to accommodate change of the type proposed. Typically these would be: Of high quality with distinctive elements and features making a positive contribution to character and sense of place Likely to be designated, but the aspects which underpin such value may also be present outside designated areas, especially at the local scale Areas of special recognised value through use, perception or historic and cultural associations Likely to contain features and elements that are rare and could not be replaced.	Residential properties Users of Public Rights of Way or other recreational trails (e.g. National Trails, footpaths, bridleways etc.) Users of recreational facilities where the purpose of that recreation is enjoyment of the countryside (e.g. Country Parks, National Trust or other access land etc.).
Medium	Landscapes which by nature of their character would be able to partly accommodate change of the type proposed. Typically these would be: Comprised of commonplace elements and features creating generally unremarkable character but with some sense of place Locally designated, or their value may be expressed through non-statutory local publications Containing some features of value through use, perception or historic and cultural associations Likely to contain some features and elements that could not be replaced.	Outdoor workers Users of scenic roads, railways or waterways or users of designated tourist routes Schools and other institutional buildings, and their outdoor areas.
Low	Landscapes which by nature of their character would be able to accommodate change of the type proposed. Typically these would be: Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct landscape character with little or no sense of place Not designated Containing few, if any, features of value through use, perception or historic and cultural associations Likely to contain few, if any, features and elements that could not be replaced.	Indoor workers Users of main roads (e.g. trunk roads) or passengers in public transport on main arterial routes Users of recreational facilities where the purpose of that recreation is not related to the view (e.g. sports facilities).

Table 7.11
Magnitude of Landscape Impact and Typical Descriptors

Magnitude of impact	Typical Criteria Descriptor
Major Adverse	Total loss or large scale damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic conspicuous features and elements.
Moderate Adverse	Partial loss or noticeable damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
Minor Adverse	Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
Negligible Adverse	Barely noticeable loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
No Change	No noticeable loss, damage or alteration to character or features or elements.
Negligible Beneficial	Barely noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Minor Beneficial	Slight improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Moderate Beneficial	Partial or noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic elements.
Major beneficial	Large scale improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.

Table 7.12
Magnitude of Visual Impact and Typical Descriptors

Magnitude of impact	Typical Criteria Descriptor
Major	The scheme, or a part of it, would become the dominant feature or focal point of the view
Moderate	The scheme, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor
Minor	The scheme, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view
Negligible	Only a small part of the scheme would be discernible, or it is at such a distance that it would form a barely noticeable feature or element of the view
No Change	No part of the scheme, or work or activity associated with it, is discernible

Table 7.13
Significance of Effect Categories

Landscape/ Visual Receptor Sensitivity	Magnitude of Impact				
	No Change	**Negligible**	**Minor**	**Moderate**	**Major**
High	Neutral	Slight	Slight/Moderate	Moderate/ Large	Large
Medium	Neutral	Neutral/Slight	Slight	Moderate	Moderate/ Large
Low	Neutral	Neutral/Slight	Neutral/Slight	Slight	Slight/ Moderate

Table 7.14 Typical Descriptors of the Significance of Visual Effect Categories	
Score	**Comment**
Large beneficial (positive effect)	**Landscape and townscape: The project would:** **Enhance the character (including quality and value) of the landscape.** **Enable the restoration of characteristic features and elements lost as a result of changes from inappropriate management or development.** **Enable a sense of place to be enhanced.** **Visual:** **The project would lead to a major improvement in a view from a highly sensitive receptor.**
Moderate beneficial (positive effect)	**Landscape and townscape: The project would:** **Improve the character (including quality and value) of the landscape;** **Enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from inappropriate management or development.** **Enable a sense of place to be restored.** **Visual:** **The proposals would cause obvious improvement to a view from a moderately sensitive receptor, or perceptible improvement to a view from a more sensitive receptor.**
Slight beneficial (positive effect)	**Landscape and townscape: The project would:** **Complement the character (including quality and value) of the landscape.** **Maintain or enhance characteristic features and elements.** **Enable some sense of place to be restored.** **Visual:** **The project would cause limited improvement to a view from a receptor of medium sensitivity, or would cause greater improvement to a view from a receptor of low sensitivity.**
Neutral effect	**Landscape and townscape: The project would:** **Maintain the character (including quality and value) of the landscape.** **Blend in with characteristic features and elements.** **Enable a sense of place to be retained.** **Visual:** **No perceptible change in the view.**
Slight adverse (negative effect)	**Landscape and townscape: The project would:** **Not quite fit the character (including quality and value) of the landscape;** **Be at variance with characteristic features and elements.** **Detract from a sense of place.** **Visual:** **The project would cause limited deterioration to a view from a receptor of medium sensitivity, or cause greater deterioration to a view from a receptor of low sensitivity.**
Moderate adverse (negative effect)	**Landscape and townscape: The project would:** **Conflict with the character (including quality and value) of the landscape;** **Have an adverse impact on characteristic features or elements** **Diminish a sense of place.**

	Visual: **The project would cause obvious deterioration to a view from a moderately sensitive receptor, or perceptible damage to a view from a more sensitive receptor.**
Large adverse (negative effect)	**Landscape and townscape: The project would:** **Be at considerable variance with the character (including quality and value) of the landscape.** **Degrade or diminish the integrity of a range of characteristic features and elements.** **Damage a sense of place.** **Visual:** **The project would cause major deterioration to a view from a highly sensitive receptor, and would constitute a major discordant element in the view.**

7.5.6.9 The significant adverse landscape and visual effects remaining after mitigation at the design year (15 years after opening), the 'residual effects', will be summarised at the end of the assessment.

7.5.6.10 The landscape and visual effects that fall within the categories of moderate or large are deemed to be significant.

7.5.7 Assumptions and limitations

7.5.7.1 During the identification of options, a 'Simple' level assessment was carried out.in accordance with advice in DMRB Volume 11 Section 2 Part 1. During the assessment of those options, the landscape assessment was still at a high level as the options were refined and subject to public consultation. The Environmental Study Report (ESR) identified that potentially moderate to large adverse landscape and visual impacts could arise as a result of the project.

7.5.7.2 A 'Detailed' level assessment will be carried out for the preferred option in the EIA. Detailed design of the mitigation will be an outcome of the iterative design and assessment process. The detailed design of elements of the project, including heights of embankments and extent of cuttings, will be available at during the EIA process which will inform detailed mitigation.

7.5.8 Summary

7.5.8.1 The assessment will be undertaken in accordance with IAN 135/10. The assessment will cover landscape and visual factors including value of landscape, sensitivity of landscape and visual receptors, magnitude of potential impacts and mitigation to reduce adverse effects.

7.6 Noise and Vibration

7.6.1 Study Area

7.6.1.1 The study area for the construction assessment comprises noise-sensitive receptors (NSRs) within 300m from the proposed works. At distances over 300m, other factors such as meteorological effects, have increasing influence and construction noise level predictions are not considered robust (BS 5228-1:2009+A1:2014, Annex F, F.2.2.2 and F.2.2.3).

7.6.1.2 The study area for the operational phase is based upon on the guidance presented in Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7 (HD213/11) Annex 1, A1.11. The description of the study area in DMRB is presented below:

- The start and end points of the physical works associated with the scheme will be identified;
- The existing routes that are being by-passed or improved, and any proposed new routes, between the start and end points will be identified;
- A 1 km boundary from the carriageway edge of the routes defined above will be defined; and
- A 600m boundary from the carriageway edge around each of the routes identified in (2) and also 600m from any other affected route within the boundary defined in (3) will be identified. An affected route is where there is a possibility of a change of 1dB(A) or more.

7.6.1.3 The study area for the assessment of vibration traffic nuisance is defined as being within 40m of any roads identified in the study area described above (DMRB, Annex 1, A1.35).

7.6.2 Baseline Information

7.6.2.1 The immediate surroundings of the site include mainly rural areas with NSRs along the A30 and at the furthest extent of the proposed scheme (Chiverton and Carland Cross). The study area is primarily rural agricultural land and residential dwellings, with a scattering of industry, commercial and community facilities (such as churches, schools and recreational areas) receptors.

7.6.2.2 Baseline noise monitoring has not been yet undertaken. It is anticipated that the noise climate will be dominated by road traffic noise arising from the A30.

7.6.2.3 Using the Highways England database, it has been identified there are six NIAs along the existing A30 and in the immediate vicinity of the site. NIAs have been identified as locations where the top 1% of the population that are exposed to the highest noise levels is located. The NIAs are:

- ID 3254 – A390 Chiverton Cross
- ID 13097 – A30 Fourburrow Farm House
- ID 3291 – A30 Marazanvose

- ID 3292 – A30 Zelah Hill/Henver Lane
- ID 3293 – A30 Mount Pleasant
- ID 3294 – A30 Journey's End

7.6.2.4 Where required, a mitigation strategy will be prepared to ensure that any adverse impact at these receptors and within the NIAs is mitigated as far as reasonably possible. A combination of noise barriers and earth bunds, and low noise road surface will be considered.

7.6.3 Value of environmental resources and receptors

7.6.3.1 There is currently no guidance within DMRB to enable a value to be placed on a 'resource' i.e. an NSR. For the purpose of this assessment, residential receptors (dwellings) and other non-residential receptors, such as schools, churches and public amenity spaces within the study area will be considered as having a high value due to their sensitivity.

7.6.4 Potential effects, including monitoring and mitigation measures

7.6.4.1 The potential noise effects that may arise from the proposed scheme are temporary construction noise and vibration impact, and permanent increases in road traffic noise. These permanent increases may result from greater free flowing traffic due to the change from a single carriage to dual carriage road, and changes of alignment where the distance of the road to sensitive receptors is reduced.

7.6.4.2 There are a number NSRs which would potentially experience an adverse noise impact during the construction and operation of the scheme such as:

- St. Peters Church, Chiverton Cross.
- Sliversprings, Chiverton Cross
- Nanteague Farm, Marzanvose
- Hill House
- Honeycombe Farm

7.6.4.3 It is also anticipated that a small number of residential properties (one or two) will have to be demolished as part of the scheme.

7.6.4.4 There is also the potential for a beneficial impact (i.e. a decrease in noise levels) at locations where there is an increase in the distance between source and receptor. For example at Lower Tresawean, Treffy Cottage (Marazanvose) and Four Winds (Carland Cross) where the proposed road runs south of the existing A30.

7.6.4.5 A mitigation strategy will be developed to minimise any residual noise and vibration impacts during construction and these will be set out in a Construction Environmental Management Plan (CEMP). This will include a requirement on the Contractor to apply Best Practicable Means (BPMs). It is anticipated that a combination of BPMs and temporary noise barriers has the potential to achieve a

noise attenuation of between 10 and 15 decibels (dB) at the closest receptors during construction.

7.6.4.6 Mitigation measures will be considered as appropriate to minimise any noise impact arising from the operation of the proposed scheme. Noise barriers and low noise road surface will be considered. However, it should be noted that mitigation measures will need to be informed by other constraints relating to ecology, engineering and landscape.

7.6.4.7 In accordance with Infrastructure Planning (EIA) Regulations 2017, the Handover Environmental Management Plan (HEMP) may contain a requirement for noise monitoring to be undertaken once the scheme is open to traffic.. If required, The methodology will be agreed with the Environmental Health Officer (EHO) at Cornwall Council including appropriate actions to be taken depending on the results of the monitoring.

7.6.5 Proposal level and scope of assessment

7.6.5.1 A baseline noise survey will be undertaken to establish existing noise levels at receptors likely to be impacted by the scheme and to broadly verify the noise modelled results. The methodology used during the survey will be agreed with the EHO at Cornwall Council. It will follow the procedures contained in BS 7445-1:2003 and BS 7445-2:1991 'Description and Measurement of Environmental Noise, and the Calculation of Road Traffic Noise (CRTN) 1988 Section III 'The Measurement Method'. The survey will comprise a combination of short-term attended and long-term unattended measurements within the study area, with the number and exact locations to be agreed with the EHO at Cornwall Council.

7.6.5.2 In preparing this scoping report, reference has been made to the NN NPS, Section 5 (DfT, 2014). The NN NPS sets out the requirements for the noise assessment including identification of NSRs, characterisation of the existing noise environment, prediction of short-term (construction) and long-term (operational) noise impacts, assessment of the predicted changes and mitigation measures to be employed using best available techniques (BAT).

7.6.5.3 The likely noise and vibration impacts arising from the construction phase of the proposed scheme will be assessed in accordance with BS 5228 -1 and 2 (2009+A1 2014). The significance of noise impacts during the construction phase will be assessed based on the 'ABC' method described in BS 5228. This method bases the construction noise impact assessment upon the baseline ambient noise levels. Assessment categories of threshold values are detailed in Table 7.15. This method presents the threshold of potentially significant effects at dwellings due to construction noise.

Table 7.15
Assessment Category and Threshold Value for Construction Noise

Evaluation Period	Assessment Category (dB LAeq)		
	A	B	C
Night-time (23:00-07:00)	45	50	55
Evening and Weekends*	55	60	65
Daytime (07:00-19:00)	65	70	75
* 19:00-23:00 weekdays, 13:00-23:00 Saturdays and 07:00-23:00 Sundays.			
Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.			
Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values.			
Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.			
The Category (A, B or C) is to be determined separately for each time period and the lowest noise category is then used throughout the 24-hour cycle, e.g. a site which is category A by day and category B or C in the evening and night will be treated as category A for day, evening and night.			

7.6.5.4 Where the construction noise level exceeds the thresholds for the appropriate category, then the significance of the impact is determined as follows:

- Negligible (<1dB);
- Low (1-3dB);
- Medium (3-5dB);
- High (5-10dB);

7.6.5.5 Using the threshold values described in Table 7.15, the construction noise assessment will also take into consideration the specific factors associated with the proposed scheme including the number of receptors affected, and the duration and character of the predicted impact to determine the significance of the impact.

7.6.5.6 Vibration from construction operations has the potential to lead to damage to nearby buildings. This will be assessed based on the criteria with BS 5228-2 and detailed in Table 7.16 below.

Table 7.16
Construction Vibration Limits

Receptor	Continuous - Peak Particle Velocity (mms-1)	Intermittent - Peak Particle Velocity (mms-1)
Listed and/or weak structures	5	2.5
Residential buildings	10	5
Industrial and commercial buildings	20	10

7.6.5.7 The initial assessment of options for the proposed scheme showed that the threshold values contained in DMRB (HD213/11) (Section 3.5) will be exceeded at some NSRs and therefore a 'Detailed Level' assessment is required. These threshold values are:

- A permanent change in magnitude of 1 dB $L_{A10,18hr}$ in the short term (i.e. year of opening); and/or
- A permanent change in magnitude if 3 dB L $L_{A10,18hr}$ in the long term (15 years after project opening)

7.6.5.8 The methodology for assessment will follow the guidance set out in DMRB. Predicted noise levels at identified NSRs will be calculated for the following scenarios:

- Current year (i.e. year of baseline noise surveys);
- Do-minimum baseline year (i.e. year of opening of project to traffic);
- Do-something baseline year;
- Do-minimum future year (i.e. 15 years after opening of project to traffic); and
- Do-something year future year.

7.6.5.9 Predicted night-time noise levels for the above scenarios will also be calculated as the assessment of options indicated that there was the potential for the threshold values for long term impact (Section 6.6.5.8) to be exceeded during the night-time (23:00 – 07:00). NSRs will potentially be exposed to a noise level greater than 55 dB $L_{night,outside}$.

7.6.5.10 Using the predicted noise levels for the scenarios described above, the following comparisons will be carried out to assess the potential permanent noise impact of the scheme as required by DMRB. Noise contour maps will also be provided for these scenarios:

- Do-minimum in the baseline and future years (long-term);

- Baseline year in the Do-minimum and the Do-something (short-term);
- Baseline year in the Do-minimum and the future year Do-something (long-term);
- Night-time Do-minimum in the baseline and future years (long-term); and
- Night-time Baseline year in the Do-minimum and the future year Do-something (long-term).

7.6.5.11 The potential impact of the proposed scheme will be assessed using the criteria in Table 7.17. The classification of magnitude of change will be used to assess both increases and decreases in predicted noise levels where appropriate.

Table 7.17: DMRB Classification of Magnitude of Noise Impacts

Magnitude of Impact	Noise Change, dB $L_{A10, 18h}$	
	Short-term Impact	Long-term Impact
No Change	0	0
Negligible	0.1 - 0.9	0.1 - 2.9
Minor	1 - 2.9	3 - 4.9
Moderate	3 - 4.9	5 - 5.9
Major	5+	10+

7.6.5.12 DMRB does not contain a method for determining the significance of changes in magnitude of noise. The Noise Policy Statements for England (NPSE) sets out the Government's approach for effective management of noise within the context of sustainable development. The accompanying explanatory note introduces the concepts behind observed effect levels in relation to noise policy, and the phrases "Significant adverse" and "adverse" in describing the related impacts:

NOEL – No Observed Effect Level

"This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise."

LOAEL – Lowest Observed Adverse Effect Level

"This is the level above which adverse effects on health and quality of life can be detected."

SOAEL – Significant Observed Adverse Effect Level

"This is the level above which significant adverse effects on health and quality of life occur."

7.6.5.13 The NPSE Explanatory note also states that these relevant descriptors do not have a single objective measure associated with them. As such, additional guidance is required along with relevant context in sufficiently assessing any related noise impact.

7.6.5.14 The following criteria has been developed to assess the significant of impact associated with the proposed scheme:

- LOAEL – noise levels between 55 dB and 63 dB $L_{Aeq\ 8hr}$ AND increase greater than 3dB
- SOAEL- noise level between 68 dB and 76 dB $L_{A10,18hr}$ AND increase greater than 1dB
- UAEL (Unacceptable Adverse Effect Level) – noise levels greater than 76 dB $L_{A10,18hr}$ AND increase greater than 1 dB.

7.6.5.15 For the LOAEL threshold described above, the change in noise levels as a result of the scheme (i.e. between the do-minimum and do-something scenarios in the same year) must exceed 3 dB. This is line with the DMRB classification of magnitude for a moderate impact in the short-term. For the SOAEL and UAEL thresholds, the change in noise level must exceed 1 dB which is line with the DMRB classification of magnitude for a minor impact in the short-term. This reflects the sensitivity of receptors already exposed to high noise levels. A change of 1 dB is the smallest that is considered perceptible. This threshold of change (1 dB) would also apply to any impacts at NIAs.

7.6.5.16 A noise nuisance and airborne traffic vibration nuisance assessment will be carried out in accordance with the approach described in DMRB (Annex 1, A1.29 - A.1.36). This will include the following comparisons:

- Do-minimum in the baseline and future years (long-term)
- Baseline year in the Do-minimum and the future year Do-something (long-term)

7.6.5.17 DMRB does not require an assessment of nuisance at night to be carried out.

7.6.5.18 An assessment of eligibility for sound insulation measures under the Noise Insulation Regulations 1975 (as amended 1988) will be carried out to identify residential dwellings that potential qualify under the Regulations.

7.6.6 Assumptions and limitations

7.6.6.1 Where available, information from the construction team and any appointed contractors at the time of assessment will be used to establish a detailed list of

plant and activities to be used during construction works. Typical noise levels for construction plant items presented in BS 5228 will be used to complete the assessment where information is not available from the construction team. These will be agreed with Highways England and the EHO at Cornwall Council.

7.6.6.2 The assessment of operational noise impacts will be based on the traffic data provided by the Designer. The traffic data in the form on Average Annual Weekday Traffic (AAWT) for the 18 hour period (06:00 – 00:00) with percentage HGV will be used. Traffic speeds for roads in the study area (provided by the Transport Team) will be calculated in accordance with IAN 185/15 for speed-banding (Section 5).

7.6.6.3 Night-time noise impacts will be assessed using hourly traffic data where available, referred to as 'Method 1' in the TRL Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping'. Where this data is not available, either Method 2 or Method 3 will be used as recommended in DMRB HD213/11 (para 3.26).

7.6.7 Summary

7.6.7.1 A baseline noise survey will be undertaken to establish existing noise levels at receptors likely to be impacted by the scheme and to validate the noise model used to predict future road traffic noise levels.

7.6.7.2 The assessment of potential temporary noise and construction impacts will be carried out in accordance with BS 5228 -1 and 2 (2009+A1 2014).

7.6.7.3 The assessment of potential permanent noise and vibration impacts will be carried out in accordance with DMRB (HD213/11).

7.7 People and Communities

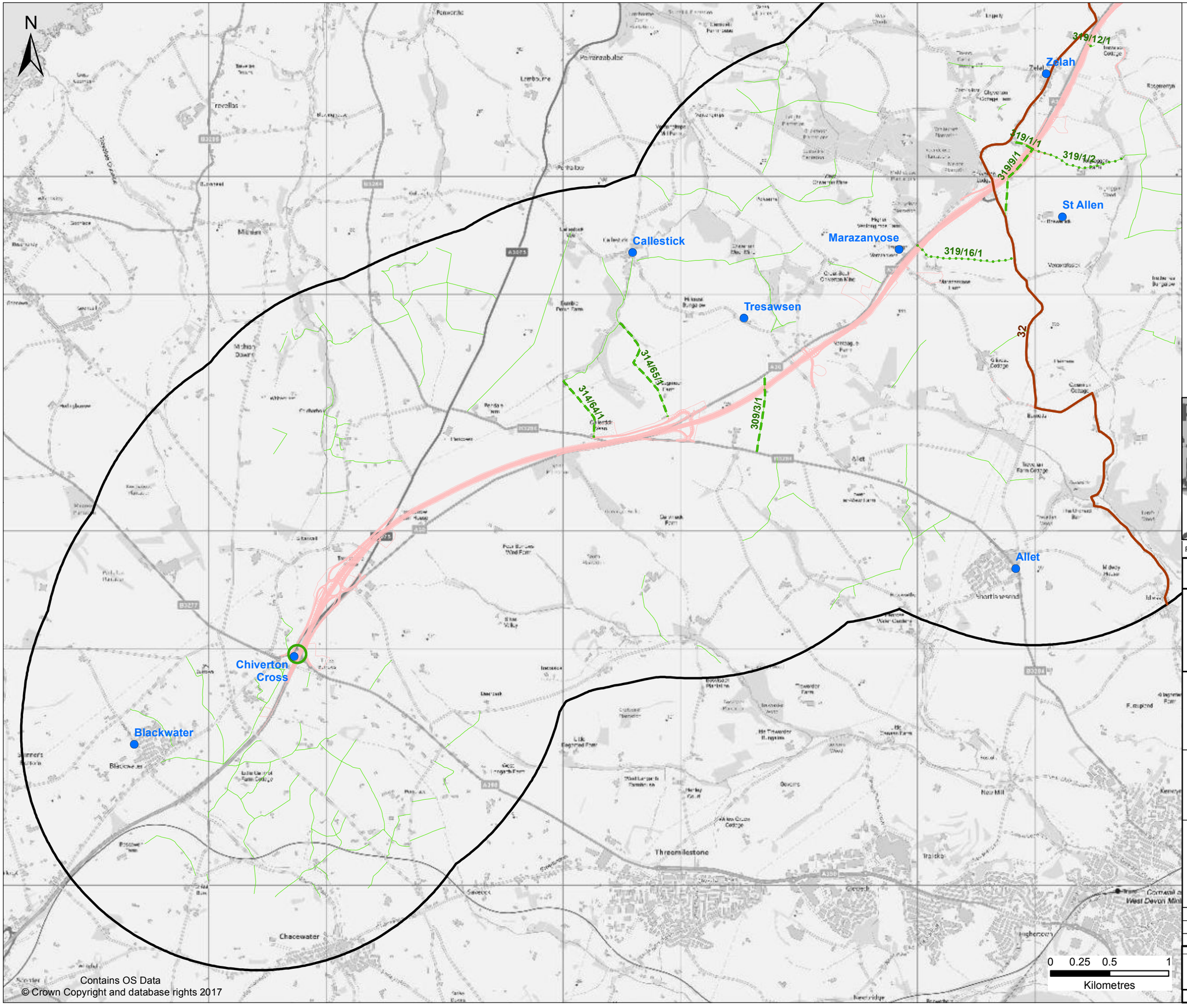
7.7.1 Study Area

7.7.1.1 Study areas for People and Communities are shown on Figure 7.2, and outlined below.

Effects on All Travellers

Motorised Travellers

7.7.1.2 The study area for both views from the road and driver stress is from the A30 between Chiverton and Carland Cross, in compliance with DMRB guidance within Volume 11, Section 3, Part 9.



Development Land, Land Use and Private Property Study Area

Tourism and Recreation Study Area

Community Hub

Cycle route

Public Rights of Way

Bridleway

Footpath

Non-Motorised User Routes

Rev	Date	Description	By	Chk	App

WSP | PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen Street, Bristol
BS2 0HQ
Tel: 44-(0)117-930-6200

Client: highways england driving forward

Site/Project:
A30 CHIVERTON TO CARLAND CROSS

Title:
PEOPLE & COMMUNITIES STUDY AREAS

Drawn: JSdS		Checked: SC	
Designed: SC		Approved: AH	
Date: 12/07/2017	Scale: 1:30,000	A3	Sheet:
Project Number: 70004582		Drawing Number: FIGURE 7.2	Revision:

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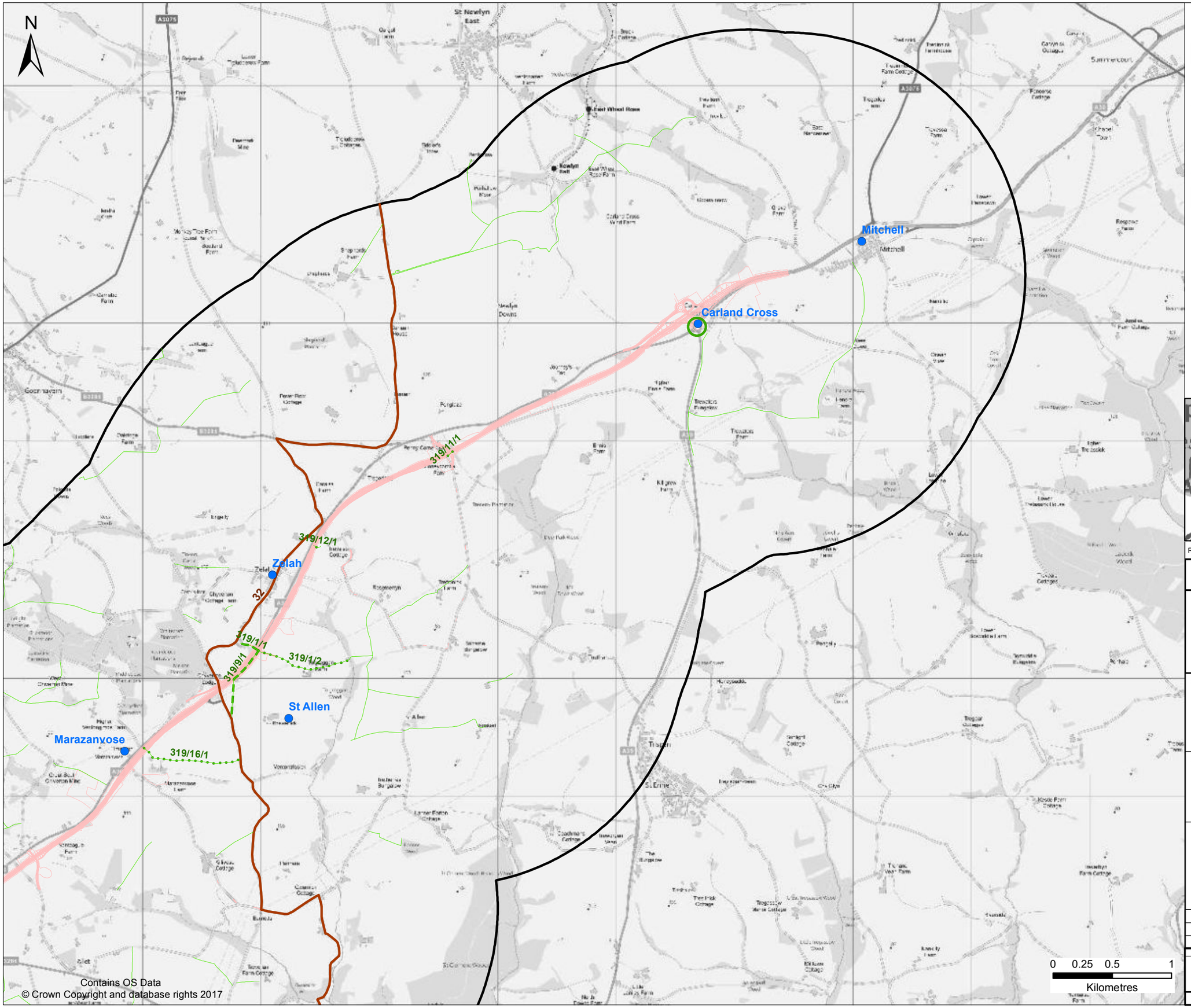
Plot Date: 12/07/2017



Development Land, Land Use and Private Property Study Area

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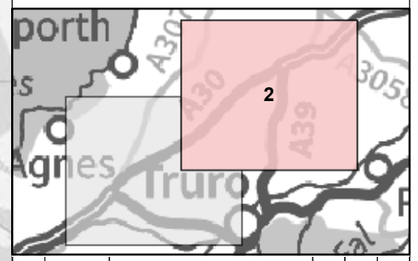

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Login: DeSouzaJ
Plot Date: 12/07/2017

Non-Motorised Users (NMU)

7.7.1.3 The assessment of effects on pedestrians, equestrians and cyclists (NMUs) considers the impact of the route options on local journeys made by people on the local PRoW network.

7.7.1.4 The study area for the assessment of impact on NMU's includes those PRoW and NMU routes directly affected by the proposed scheme and any feeder PRoWs between likely destinations, as described in DMRB guidance within Volume 11, Section 3, Part 8. The following have been considered:

- Journey lengths, times and local travel plans;
- Amenity; and
- Physical fitness.

Effects on Communities

Community Severance

7.7.1.5 Community severance is defined as the separation of residents from facilities and services that they use within their community, in this case as a result of the proposed scheme.

7.7.1.6 The study area for 'community severance' will be extended to include communities that may potentially be directly affected by the proposed scheme, for example, through severance, as described in DMRB guidance within Volume 11, Section 3, Part 8.

Tourism and Recreation

7.7.1.7 The study area for tourism and recreation facilities includes any facilities accessed from the A30 (between Chiverton and Carland Cross) and those within the land corridor of the preferred route. There is no specific guidance for the assessment of tourism and recreation. Therefore, the study area has been determined using professional judgement based on knowledge of the location.

Housing

7.7.1.8 Housing will be reviewed according to the relevant Community Network Areas referred to by the Cornwall Local Plan, in this case Truro and Roseland, and St Agnes and Perranporth.

Land Use

7.7.1.9 The study area for 'private assets' (including private assets, agricultural land and community assets, as defined under the following headings) consists of the land parcels required to accommodate the proposed development, as described in DMRB guidance within Volume 11, Section 3, Part 6.

Private Assets and Demolition of Private Property

7.7.1.10 Private Property is land outside the existing highways boundary that does not accommodate public open space or any other community facility or asset. It can be residential or commercial and industrial land. The study area consists of any private property that is directly affected by the preferred route, as described in DMRB guidance within Volume 11, Section 3, Part 6.

Community Land

7.7.1.11 Community land is any area of public open space and other facilities such as schools, hospitals, libraries and recreation facilities relied upon for community health and well-being. The study area consists of any community land that is directly affected by route options, as described in DMRB guidance within Volume 11, Section 3, Part 6.

Development Land

7.7.1.12 Development land is land designated within the Development Plan for particular development purposes, or for which planning permission has been granted or is pending. Cornwall Council will be consulted to identify committed developments and proposed growth. The study area consists of any development land that is directly affected by the preferred route, as described in DMRB guidance within Volume 11, Section 3, Part 6.

Agricultural Land

7.7.1.13 Agricultural land has been classified by the Ministry for Agriculture, Fisheries and Food (MAFF), now the Department for Environment, Food and Rural Affairs (DEFRA), by grade according to the extent to which chemical and physical characteristics impose long term limitations on agricultural use for food production. In accordance with DMRB guidance, only land potentially falling within Agricultural Land Classification (ALC) grades 1, 2 and 3a, are considered to be Best and Most Versatile (BMV) land. BMV land is best suited to adapting to the changing needs of agriculture and maintaining the competitiveness of UK agriculture against international competitors. The study area consists of any agricultural land that is directly affected by the preferred route, as described in DMRB guidance within Volume 11, Section 3, Part 6.

Effects on People

Local Economy

7.7.1.14 Publicly available data has been gathered for the relevant Lower Super Output Areas (LSOA) and for Cornwall's unitary authority boundary, according to which data sets are publicly available. A LSOA is defined as a geographical area with a minimum population of 1,000 and a maximum of 3,000, with a minimum of 400 households and a maximum of 1,200.

7.7.1.15 There are five LSOAs which are directly impacted by the scheme:

- Trispen, Zelah and Mitchell (Cornwall 032A);
- Chacewater (Cornwall 047D);
- Shortlanesend and Kenwyn Rural (Cornwall 047E);
- Goonhavern and Rose (Cornwall 033A); and
- Bolingey and Callestick (Cornwall 033C).

Social Profile

7.7.1.16 Publicly available data has been gathered for Cornwall, according to the data sets published from the 2011 Census.

Health Profile

7.7.1.17 Publicly available data has been gathered for Cornwall according to the data sets within the published Public Health England Health Profile and available Office National Statistics (ONS) data sets. Information will also be drawn from other topic assessments where applicable.

7.7.2 Baseline Information

Effects on All Travellers

Motorised Travellers

Views From The Road

7.7.2.1 Guidance within DMRB Volume 11, Section 3, Part 9 sets out the criteria for Views from the Road. These are outlined in Table 7.18 below.

Table 7.18: DMRB Criteria for Views from the Road

DMRB "View" Category	Description
No View	Road in deep cutting or contained by earth mounds, environmental barriers or adjacent structures.
Restricted View	Frequent cuttings or structures blocking the view
Intermittent View	Road generally at ground level but with shallow cuttings or barriers at intervals
Open View	View extending over many miles, or only restricted by existing landscape features.

7.7.2.2 From west to east of the existing A30, the current views from the road (obtained from both desk study and field visit) are as follows:

- South of Chiverton Cross junction, the road traverses at a higher elevation in comparison with the surrounding landscape, and views of the road ahead are

over long distances providing the driver with a positive experience (open view);
- South of Marazanvose, the A30 traverses undulating topography. Views from either side are intermittent, and restricted by hedgerows and vegetation, but are occasionally over long distances and provide the driver with a positive experience (intermittent view);
- At Zelah, the A30 descends into a valley, where the views to either side are restricted by high hedges, where the road travels within a cutting, or by bunds to either side of the bypass (restricted view);
- At Carland Cross, the A30 travels along a ridge, with long distance views both to the north and south. Views along this section are only occasionally interrupted by existing hedgerows, and isolated dwellings (open view); and
- In general, the view from the road for MT on the existing A30 provides a positive experience, with occasional long distance views over the surrounding agricultural landscape.

Driver Stress

7.7.2.3 The A30 provides the main road connection between Cornwall and the rest of the UK. It experiences a high volume of traffic, particularly in the summer months during the tourist season.

7.7.2.4 The A30 also provides a key part of the connection between the villages and towns which are located within 5km of the proposed Scheme, including Truro, Redruth, Perranporth, Goonhaven, St Agnes, Shortlandsend, Threemilestone and Mounthawk.

7.7.2.5 Truro is the centre of civil administration in Cornwall. The existing junctions on the A30 at Carland Cross and Chiverton Cross provide a connection for Truro traffic moving south, further into Cornwall and north to the rest of England.

7.7.2.6 Apart from the existing roundabouts between the A30 and the A39 at Carland Cross, and the A390 and A3075 at Chiverton Cross, there are three at grade junctions with B roads, including with the B3284 at Cybucca, the B3285 at Zelah Hill, and thirteen junctions with minor roads.

7.7.2.7 There are also numerous connections to the A30 from farm tracks, entrances to isolated dwellings, or businesses located adjacent to the A30. The frequency of these junctions and the speed of traffic could be perceived as a potential hazard by travellers moving along the A30, or entering it from the access points.

Non-Motorised Users

Amenity and Journey Length

7.7.2.8 There are several PRoW, including Bridleways, Footpaths and the National Cycle Network, which are adjacent to or intersect with the sections of the existing road.

They will be considered within the assessment, as well as land through which the proposed scheme traverses between Chiverton Cross and Carland Cross.

7.7.2.9 To inform the People and Communities assessment and proposed scheme design, a physical condition survey of PRoW within the footprint of the proposed scheme was undertaken on 11 and 12 July 2016. The PRoW Condition Assessment will be included in the ES.

7.7.2.10 The following PRoW would be affected by the proposed scheme (see Figure 1.1):

- Bridleway 314/65/1 (approximate chainage 4700m) goes north from the existing A30 on the track leading to Creegmeor Farm. There is no visible signage, on the northern edge of the A30 at this point. In theory it would be possible to cross from the entrance to the bridleway to the entrance of the B3284, south of the A30. However, due to the speed of the traffic on this section of road, it is considered that this is provides an unsuitable location for equestrian users to cross the road. The level of use, as informed by the PRoW Condition Assessment, is assumed to be low;
- Bridleway 309/3/1 (approximate chainage 5600m) goes south from the existing A30 to the B2384. There are no visible crossing points, signage, or gaps in the hedge on the southern edge of the A30 at this point. Due to the speed of the traffic on this section of road, it is considered that this is provides an unsuitable location for equestrian users to cross the road. In addition, there are no significant settlements that the bridleway connects. The level of use, as informed by the PRoW Condition Assessment, is assumed to be very low;
- Footpath 319/16/1 (approximate chainage 7300m) goes south west from the A30 at Marazanvose and east at Nancarrow Farm. In theory, this footpath could be used to access the minor road on the north side of the A30. However, the entrance to the footpath is not signed, and access across the A30 is considered to be unsafe. It does not provide a clear connection between any significant communities or services. The level of use, as informed by the PRoW Condition Assessment, is assumed to be low;
- National Cycle Network - Route 32: The Cornish Way is crossed west of Boswellick (approximate chainage 8100m). It then goes north and crosses the existing A30 at Chiverton Lodge to then follow Henver Lane, and the B3285, where it joins with an unnamed section of the National Cycle Network. This spur from Route 32 travels along a short section of the A30 (approximate chainage 10600m to 11000m), before following the road south past Honeycombe Farm. The proposed scheme crosses the unnamed section north of Honeycombe Farm;
- Footpath 319/1/2 (approximate chainage 8650m) joins with the existing A30 and Bridleways 319/1/1 and 319/9/1 opposite Zelah Lane Farm. The level of use, as informed by the PRoW Condition Assessment, is assumed to be low;
- Bridleway 319/1/1 (approximate chainage 8650m), which goes east from Henver Lane at Zelah Lane Farm, to cross the existing A30 via an overbridge. It is possible for both pedestrians and equestrian users to cross the A30 at this point. The level of use, as informed by the PRoW Condition Assessment, is assumed to be medium;

- Bridleway 319/9/1 (approximate chainage 8100m - 86250m) joins with Footpath 319/1/2 and Bridleway 319/1/1 south of the existing A30, south of Zelah at the overbridge. 319/9/1 joins at its southern end to an unclassified road with national speed limit. Although not pedestrianised, it is possible that users may use this section of road to link to Footpath 319/16/1. The level of use, as informed by the PRoW Condition Assessment, is assumed to be low;
- Footpath 319/11/1 (approximate chainage 11000m) is crossed by the proposed scheme south of the existing A30 at Penny-Come-Quick. This is shown as a small length of footpath on the definitive map which does not link to the A30 and does not appear to provide any through access, or link to any other PRoWs. The level of use, as informed by the PRoW Condition Assessment, is assumed to be very low; and
- Footpath 319/12/1 (approximate chainage 9750m) lies east of the A30 adjacent to Trevalso Cottage. This is shown as a small length of footpath on the definitive map which should in theory link to the A30 but in reality does not actually appear to provide any through access, or link to any other PRoWs. The level of use, as informed by the PRoW Condition Assessment, is assumed to be very low.
- Bridleway 314/64/1 (approximate chainage 4000m) goes north from the B2384 from Callestick Vean. The route would lie at the southern end of the PRoW. In theory, it would be possible to cross from the entrance to the bridleway to the entrance of the B3284, south of the A30 using the central reservation. However, due to the speed of the traffic on this section of road, it is considered that this provides an unsafe location for equestrian users to cross the road. The level of use, as informed by the PRoW Condition Assessment, is assumed to be low.

7.7.2.11 There is also a path which crosses the existing A30 from the southern end of Church Lane in Zelah, which is not designated on the Definitive Map[6]. There is currently a gated access on the north side and steps on the southern side, neither of which are suitable for users other than pedestrians. There is no designated pedestrian crossing at this location.

7.7.2.12 Byways 321/14/2 and 314/1/1 are not directly crossed and affected by the proposed scheme, but are located in the immediate vicinity. They are located in close proximity (approximately 75m and 65m respectively) to the roundabouts at either end of the proposed scheme where it will join with the existing A30. Although not directly impacted by the proposed scheme, these byways have been considered within this assessment.

7.7.2.13 Although not designated as PRoWs, there are pavements and roadside paths at both the Chiverton Cross and Carland Cross roundabaouts. These act as a safe means for NMUs to cross, particularly at Chiverton Cross where there is a desire

[6] https://map.cornwall.gov.uk/website/ccmap/?zoomlevel=4&xcoord=175294&ycoord=48546&wsName=ccmap&layerName=Public%20Rights%20of%20Way
May 2017

line from residential properties to the east to the Chiverton Arms to the west of the existing A30.

Effects on Communities

Community Severance

7.7.2.14 The existing A30 is single carriageway for the length of the proposed scheme. However, the road is too busy to be safely crossed by NMUs. There are scattered residential dwellings located adjacent to this section of the A30 and several villages, these, include Blackwater, Zelah and Tresawen. Information on effects on communities has been gathered through desk study, and supported by observations made during the site visit carried out in July 2016. Community facilities identified within the study area are shown on Figure 7.3.

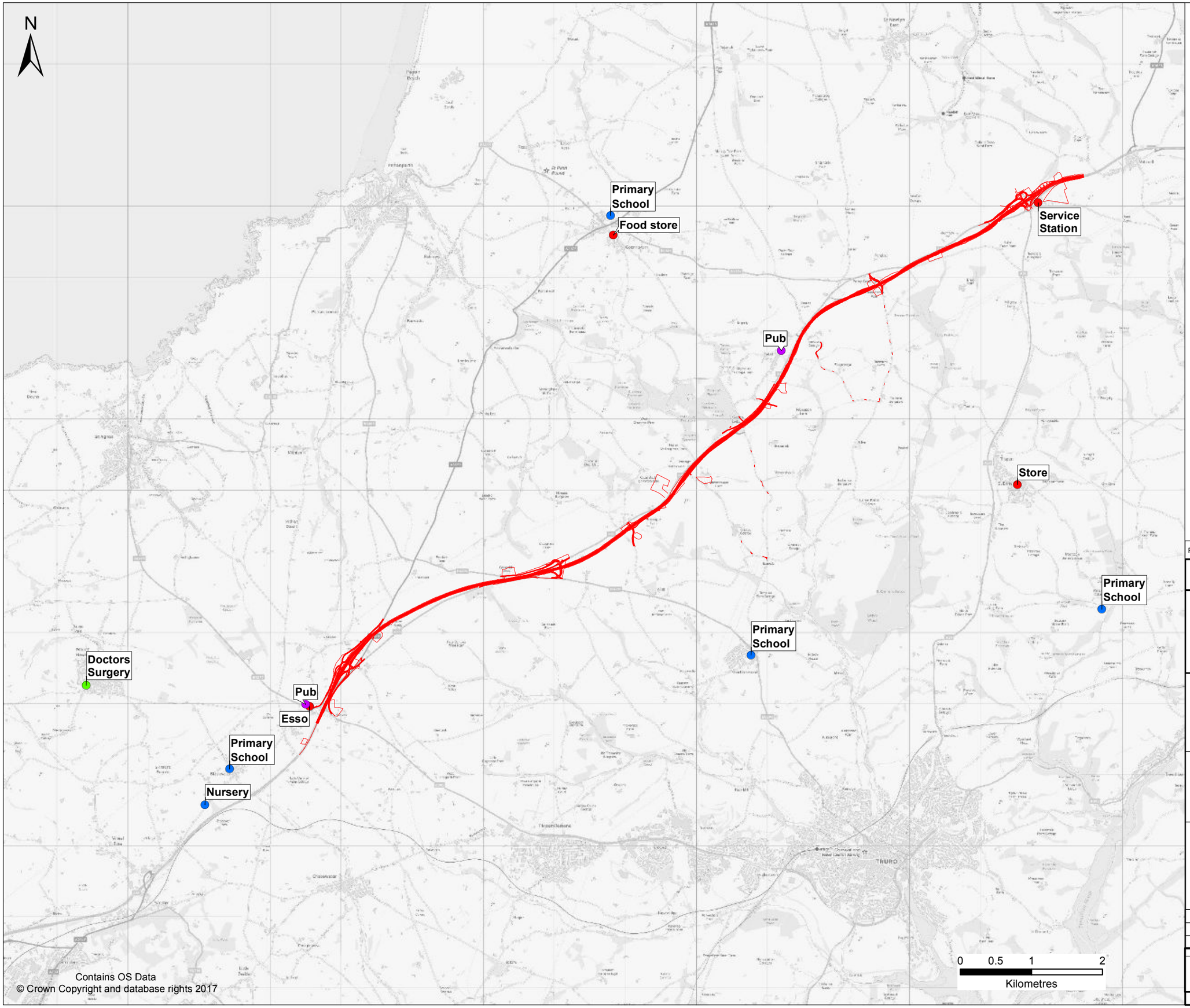
7.7.2.15 The Settlement Strategy Update (2012) uses a sustainable matrix to categorise settlements, with the proposed categories shown below:

- Category A – identified as the strategically significant towns in Cornwall, and are the main employment and service centres;
- Category B – identified as market and coastal towns that are locally significant and contain a good range of housing, employment, and community facilities and services;
- Category C – identified as small towns and villages that meet local needs for some services and facilities and employment;
- Category D – smaller settlements that perform an important role in their local areas, i.e. 'rural service centres';
- Category E – those settlements that do not meet the criteria for category D but are considered important in their immediate local area and contain a primary school or general store;
- Category F – those settlements that that do not meet the criteria for category E but contain a travel to work bus or rail service and either a general store or a meeting place.

7.7.2.16 Blackwater is the largest of the three settlements identified above. Blackwater is described in the Settlement Strategy Update (2012) as a Category E Settlement and is considered important to its immediate local area in terms of the services and facilities provided within the settlement. These include a nursery, a primary school, sports facilities and public houses (Cornwall Council, 2014, Settlement Profiles – Blackwater).

7.7.2.17 Zelah is considered to be a Category F Settlement, and has a limited number of services and facilities, including a recreation ground, farm shop, a doctor's surgery, and a public house.

7.7.2.18 Tresawen is not classified within the Settlement Profiles. It is a small hamlet consisting of less than ten houses, with no services and facilities.



Proposed scheme

Community Facilities

- Education
- Food Store
- Medical
- Public House

Rev	Date	Description	By	Chk	App

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A30 CHIVERTON TO CARLAND CROSS

Title:
COMMUNITY FACILITIES

Drawn: JSdS		Checked: SH	
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Date: 11/07/2017	Scale: 1:50,000	A3	Sheet:
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70004582	FIGURE 7.3		

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Login: DeSouzaJ
Plot Date: 11/07/2017

7.7.2.19 There are no dedicated pedestrian or roundabout crossings on the A30. The crossing points for both NMUs and motorised traffic are predominantly at the existing road crossings. Residents' access to services and facilities is currently both dependent upon access to the A30, but is also effectively severed by the road.

7.7.2.20 The road provides a key part of the connections between larger settlements which are within 5km of the proposed Scheme, including Truro, Redruth, Perranporth, Goonhaven, St Agnes, Shortlandsend, Threemilestone and Mounthawk.

7.7.2.21 Truro and St Agnes are also connected by the B3284, which crosses the A30 at a segregated junction at Chybucca. Perranporth and Goonhaven are also connected to the A30 at Zelah via the B3285.

Tourism and Recreation

7.7.2.22 There are a number of tourist and recreational facilities located within the study area and which can be accessed by the existing A30. These include:

- Camping and caravanning sites - Trevarth Holiday Park (approximately 430m south west of the Chiverton Cross roundabout), Summer Valley Touring Park (approximately 1km south east of Allet, accessed from the B3284), Chiverton Caravan and Touring Park (approximately 430m south west of the Chiverton Cross roundabout) and Marazan Farm Campsite (approximately 420m south east of the existing A30 at Marazanvose);
- Accommodation – Plume of Feathers (approximately 1.3km north east of the Carland Cross roundabout, in Mitchell), Goonwinnow Farm (approximately 1km north of the Carland Cross roundabout), Pure Cornwall Ltd (approximately 900m noth east of the Chiverton Cross roundabout, between the A3075 and the A30), Fair View Farm (approximately 1.2km south east of the A30 in Allet, accessed from the B3284), 5 Pipers Court (approximately 1.4km north east of the Carland Cross roundabout, in Mitchell), Little Callestock Farm and Callestock Courtyard Cottages (approximately 1.1km north west of the A30 at Zelah);
- Equestrian centres – Colraine E C (approximately 1.4km north of the A30 at Callestick Vean), Chiverton Riding Centre (approximately 500m north west of the Chiverton Cross roundabout) and Chyverton Park (approximately 800m north west of the A30 at Marazanvose);
- Recreational facilities – Healey's Cornish Cider Farm (approximately 1.7km north of the A30 at Callestick Vean), Llama Lland (1.6km south east of the A30 at Marazanvose); and
- Public houses and restaurants – Callestick Farm Tearoom (approximately 1.7km north of the A30 at Callestick Vean), Nancarrow Farm 9200m east of the A30 at Marazanvose), The Hawkins Arms (150m west of the A30 at Zelah, accessed from Henver Lane) and the Chiverton Arms (300m east of the Chiverton Cross roundabout).

Housing

7.7.2.23 In the Cornwall Local Plan, the Community Neighbourhood Area (CNA) of St Agnes and Perranporth, under which part of the Scheme falls, aims to develop 1,100 dwellings before 2030, of which 490 had already been completed at the time of writing the Strategic Policies Document in 2014. The remaining section falls under the CNA of Truro and Roseland, which aims to develop 3,900 dwellings before 2030.

Community Land

7.7.2.24 There are no allotments, playgrounds, sports pitches, or formal open spaces which are located along the length of the proposed scheme.

7.7.2.25 There are areas of land which are designated under the Countryside and Rights of Way Act (2000) as Open Access land. The area comprises much of Newlyn Downs and is located 250m north west of Carland Cross junction. There is also a smaller section of open access land located around a quarry immediately adjacent and to the south of the A30 approximately 250m west of Carland Cross junction. Part of this southern area is within the land take of the scheme.

Development Land

7.7.2.26 There are no development allocations within the Cornwall Local Plan which would be directly affected by the proposed scheme. There are no current planning applications within the footprint of the scheme.

Demolition of Private Property

7.7.2.27 The proposed scheme may require the acquisition of private property north of B3284, at an approximate chainage of 5600m, which are known to be part of a shooting range. In addition, a house and outbuildings at Marazan Farm Campsite would be required to be demolished, as well as a barn in Nancarrow Farm. The barn has planning permission for conversion to a one bedroom house. No other private property, other than agricultural land (which will be dealt with by an Agricultural Impact Assessment), is required for the proposed scheme.

Agricultural Land

7.7.2.28 The area of the scheme is identified on Defra's ALC maps as Grade 3. The ALC maps, upon which the assessment is based, were created from surveys undertaken by DEFRA between 1989 and 1999. A detailed survey of the soils within the scheme corridor was undertaken by Reading Agricultural Consultants in April 2017. It identified approximately 47 ha of Grade 2 land, 32 ha of Grade 3a land, 28 ha of Grade 3b land and the rest of the area as Grade 5 land. Therefore, soils in the majority of the study area have been assigned a sensitivity of High.

7.7.2.29 The proposed scheme passes through at least 80 fields, as shown on OS base mapping. At least 36 fields are bisected, potentially resulting in small parcels of land that cannot be accessed or utilised effectively. BMV agricultural land take for the scheme is likely to be more than 20ha, and therefore it is likely that a detailed agricultural assessment will be required.

Effects on People

7.7.2.30 Baseline information for Effects on People has been compiled through desk study from publicly available data sources.

Local Economy

Deprivation

7.7.2.31 The Indices of Multiple Deprivation (IMD) use a combination of information relating to income, employment, education, health, skills and training, barriers to housing and services and crime to create an overall score of deprivation. As a lower score indicates greater deprivation the most deprived area is indicated by a rank of 1. The scores of the relevant LSOAs which are affected by the route options are detailed in Table 7.19. The scores for all LSOA in the district provide an average for which the district is given a rank.

Table 7.19:
Indices of Multiple Deprivation Scores for relevant LSOA

LSOA	Index of Multiple Deprivation 2015
Cornwall 032A	27.915
Cornwall 033A	20.032
Cornwall 033C	22.206
Cornwall 047D	23.082
Cornwall 047E	19.127

7.7.2.32 In 2015, Cornwall had a rank of 95 out of 326 local authorities in England for average IMD score. This was an increase in ranking from 2010, when Cornwall was ranked at 110, suggesting that the level of deprivation in Cornwall has increased during this period.

Employment

7.7.2.33 Employment statistics for Cornwall show that the numbers of economically active, economically active unemployed and unemployed are lower than the national average. The number of economically inactive residents is higher than both the average for the South West and for England.

Table 7.20
Employment Statistics for Cornwall, South West and England

	Cornwall	South West	England
Residents Aged 16-74	388,858	3,856,715	38,881,374
Economically Active	246,790 (63.5%)	2,584,579 (66.9%)	25,480,287 (65.5%)
Economically Active - Unemployed	12,694 (3.3%)	126,208 (3.3%)	1,702,847 (4.4%)
Economically Inactive	129,374 (33.3%)	1,145,928 (29.7%)	11,698,240 (30.1%)
Unemployed	12,518 (3.2%)	123,907 (3.2%)	1,732,146 (4.4%)

7.7.2.34 The key industries of the district are wholesale and retail trade and repair of motor vehicles (16.8% of employed residents), human health and social work (13.5%), education (9.7%), accommodation and food services (9.2%), and construction (8.6%).

7.7.2.35 The Cornwall Local Plan details within the CNA profiles that employment land has been identified within both Truro and St Agnes and Perranporth, but these locations are focussed towards the town centres and are not found on the A30 corridor. Neighbourhood Plans are in development to provide further details of proposals within these areas.

Social Profile

7.7.2.36 Table 7.21 outlines a number of statistics which indicate the social profile of Cornwall. These show that there are lower numbers of children than seen regionally and nationally. The majority of people are White British and the majority of people identify as Christians. There are higher numbers of the population than seen regionally or nationally, who describe their day to day activities as limited by health issues.

Table 7.21:
Social Profile Statistics for Cornwall, the South West and England from 2011 Census

	Cornwall	South West	England
All Persons Aged 0-15	16.8%	17.6%	18.9%
All Persons 65 and over	21.6%	23.6%	19.8%
Ethnicity	White British (95.7%), White Irish (0.4%), White Traveller (0.1%), Other White (2.0%), Mixed (0.8%), Asian British (0.7%), Black or Black British (0.7%), Other Ethnic Group (0.1%)	White British (91.8%), White Irish (0.5%), %), White Traveller (0.1%), Other White (3.0%), Mixed (1.4%), Asian British (1.9%), Black or Black British (1.0%), Other Ethnic Group (0.3%)	White British (79.8%), White Irish (1.0%), %), White Traveller (0.1%), Other White (4.6%), Mixed (2.2%), Asian British (7.7%), Black or Black British (3.4%), Other Ethnic Group (0.6%)
Long-Term Health Problem / Disability	Day to day activities limited a lot (10%), Day to day activities limited a little (11.4%), Day to day activities not limited (78.6%)	Day to day activities limited a lot (8.2%), Day to day activities limited a little (10.1%), Day to day activities not limited (81.7%)	Day to day activities limited a lot (8.3%), Day to day activities limited a little (9.3%), Day to day activities not limited (82.4%)
Religion	Christian (59.8%), Buddhist (0.3%), Hindu (0.1%), Jewish (0.1%), Muslim (0.1%), Sikh (0.02%), Other (0.6%), No religion (30.3%), Not stated (8.5%)	Christian (60.4%), Buddhist (0.3%), Hindu (0.3%), Jewish (0.1%), Muslim (0.9%), Sikh (0.1%), Other (0.5.%), No religion (29.3%), Not stated (7.8%)	Christian (59.3%), Buddhist (0.4%), Hindu (1.5%), Jewish (0.5%), Muslim (5%), Sikh (0.8%), Other (0.4%), No religion (24.7%), Not stated (7.1%)

Health Profile

7.7.2.37 The Public Health England Health Profile for Cornwall in 2014 summarises that:

- The health of people in Cornwall is varied compared with the England average. Deprivation is lower than average. However, about 18.1% (16,200) children live in poverty. Life expectancy for women is higher than the England average;
- Life expectancy is 4.3 years lower for men and 3.9 years lower for women in the most deprived areas of Cornwall than in the least deprived areas;
- In Year 6, 16.3% (697) of children are classified as obese, better than the average for England. The rate of alcohol- specific hospital stays among those under 18 was 53.8*, worse than the average for England. This represents 55

stays per year. Levels of smoking in pregnant women at time of delivery are worse than the England average; and

- In 2012, 25.4% of adults are classified as obese. The rate of alcohol related harm hospital stays was 660*, worse than the average for England. This represents 3,623 stays per year. The rate of self-harm hospital stays was 238.0*, worse than the average for England. This represents 1,222 stays per year. The rate of smoking related deaths was 281*, better than the average for England. This represents 1,016 deaths per year. Estimated levels of adult excess weight are worse than the England average. Rates of sexually transmitted infections and TB are better than average. The rate of new cases of malignant melanoma is worse than average. Rates of statutory homelessness, long term unemployment, drug misuse, early deaths from cardiovascular diseases and early deaths from cancer are better than average.

7.7.2.38 The priorities in Cornwall for addressing healthcare detailed within this publication include reducing smoking, physical inactivity, unhealthy diets, excess alcohol and lack of social connections.

7.7.2.39 There is an Air Quality Management Area within Truro, known as the Truro AQMA (see Section 7.2.2.6).

7.7.3 Value of environmental resources and receptors

Effects on All Travellers

7.7.3.1 The sensitivity of Views from the Road are categorised within Section 7.7.1.

7.7.3.2 Although it is not possible to assess route uncertainty, it is thought due to the level of frustration experienced by MTs, the level of Driver Stress experienced is high.

7.7.3.3 Sensitivity (level of use) for affected PRoWs is outlined within Section 7.7.1.

Effect on Communities

7.7.3.4 There is currently no guidance within DMRB to enable a value to be placed on private land and community land, other than identifying landtake, purpose and in the case of community land, potential user numbers. A qualitative assessment to establish the value of resources based on professional judgement and experience of the assessor in carrying out such assessments will be carried out in the absence of specific guidance of potential effects on people and communities. Desk-based research will be carried out and will include a review of publicly available data. Any economic effects experienced by the loss of private property will be dealt with within the economic appraisal for the project. Any environmental effects associated with loss of private property will be dealt with by the relevant topic assessment.

7.7.3.5 Sensitivity of agricultural land cannot be determined until a detailed assessment is carried out, determining whether BMV land is required. Until such time as this is

determined, all land take will be assumed to be BMV land and therefore of high sensitivity.

7.7.4 Potential effects, including monitoring and mitigation measures

Effects on All Travellers

Motorised Travellers

7.7.4.1 The scheme will aim to improve the experience of MTs using the route and connecting roads. The following mitigation and enhancement measures will contribute to an improved experience for MTs:

7.7.4.2 Where overriding landscape or design constraints do not restrict this, the View from the Road for MTs should not be further obstructed by new structure(s), and open views of the surrounding countryside should be retained.

7.7.4.3 The delays currently experienced by MTs using the A30 and connecting roads are expected to lead to frustration, and should be reduced. The best performing options will result in a reduction in driver stress associated with delays.

7.7.4.4 Signage and layout should be clear to understand and avoid creating Route Uncertainty. Any diversions or closures undertaken during construction should be clearly advertised, and any diversionary routes should not lead to uncertainty.

7.7.4.5 The design should include safety measures to reduce fear of accidents.

7.7.4.6 These issues should be addressed at the subsequent phase of design.

Non-Motorised Users

7.7.4.7 The scheme should aim to accommodate NMUs, and either retain or improve the existing access arrangements. For example, the existing footpaths should be retained and where crossed by the route, provided with proper means of access to prevent severance. Any diversionary works or closure of NMU routes should be undertaken following proper consultation with affected groups or individuals, and the required consent obtained.

7.7.4.8 Use of best practice design with regards to the safety of NMUs, including lighting, will improve the amenity of users of the footpaths in the surrounding areas. Additionally, landscaping that can provide screening of the road where possible and reduce noise level for the wider network of PRoW will also improve amenity for users.

7.7.4.9 Existing types of access to PRoW should be retained, for example, by not introducing new barriers such as stiles, which may restrict certain users.

Effects on Communities

Community Severance

7.7.4.10 Existing footpaths should be retained, and where crossed by the route, provided with proper means of access to prevent severance.

7.7.4.11 Existing roads should be incorporated into the scheme, allowing for crossing points within the design.

Tourism and Recreation

7.7.4.12 Use of best practice construction methods during construction will reduce disruption to users of facilities within the vicinity of the scheme.

Housing

7.7.4.13 The preferred design solution should be designed with future development in mind and look to minimise private land take where possible.

Community Land

7.7.4.14 There is no Common Land which will be impacted by the scheme. An area of open access land designated under the CRoW Act will be impacted and mitigation may be required, depending on the nature of the land and its dedication.

Development Land

7.7.4.15 Although a further 610 dwellings are to be built in the CNA of St Agnes and Perranporth before 2030, the scheme traverses through rural land which has not been designated for development and therefore no mitigation is required.

Private Land

7.7.4.16 Any environmental effects which result from the demolition of private property (for example visual or noise) will be dealt with separately within the relevant topic assessment.

Agricultural Land

7.7.4.17 More than 20 ha of BMV agricultural land is likely to be required to enable development. Therefore, it is likely there will be a need to undertake an Agricultural Impact Assessment. This should consider the impact of the preferred option on the existing agricultural business affected by the loss, and the future viability of any land which is severed by development. The Agricultural Impact Assessment will be undertaken in conjunction with a consultation with Defra, and the affected land owners during the EIA process.

7.7.4.18 Although agricultural land required within the footprint of the route will be lost permanently, the following measures can be implemented during construction:

- Wherever possible, land required in addition for construction, for example for site compounds, would be returned to agricultural use;
- Severance during construction to be minimised through careful siting of construction compounds and lay down areas, and careful planning of construction activities through consultation with landowners;
- Crop loss can be reduced by giving advanced warning to enable farmers to plan ahead;
- Consideration of field drainage impacts during the design phase; and
- Noise and dust to be kept to a minimum and within acceptable working limits, using best practice methods to be outlined in the CEMP.

Effects on People

Economy

7.7.4.19 Where possible, the workforce and project supply chain should be sourced locally.

Social Profile

7.7.4.20 Design should take account of vulnerable groups such as the disabled, children and elderly people where necessary.

Health Profile

7.7.4.21 Best practice construction methods should be used to minimise noise and vibration and emissions to air during construction.

7.7.4.22 PRoW should remain open where possible and diverted if necessary, instead of closures, to allow active travel and recreational use by residents.

7.7.5 Proposal level and scope of assessment

7.7.5.1 A detailed level of assessment for People and Communities will be undertaken, as prescribed for Stage 3 assessments within each of the DMRB Volume 11 Chapters 6, 8 and 9, as there is potential for significant effects on travellers and communities.

7.7.5.2 In accordance with DRMB guidance, if the quantity of BMV agricultural land lost as a result of the scheme exceeds 20ha, a detailed Agricultural Impact Assessment may be required, including consultation with DEFRA. The scheme agricultural land take is likely to exceed 20ha of BMV land, and therefore a detailed assessment is proposed.

7.7.5.3 As there is currently no guidance within DMRB on health impact assessments, reference will be made to IEMA's *Health in Environmental Impact Assessment: a*

primer for a proportionate approach[7] and a high level qualitative assessment will be carried out using publicly available data and information from other topic assessments. Assessment may be required, including consultation with DEFRA.

7.7.6 Proposed methodology including significance

Effects on All Travellers

Motorised Travellers: View from the Road

7.7.6.1 The DMRB Volume 11, Section 3, Part 9 describes 'Views from the Road' as "…the extent to which travellers, including drivers are exposed to the different types of scenery through which a route passes." Aspects to be considered are:

- The types of scenery or the landscape character as described and assessed for the baseline studies;
- The extent to which travellers may be able to view the scene;
- The quality of the landscape as assessed for the baseline studies; and
- Features of particular interest or prominence in the view.

7.7.6.2 Views from the road will be categorised by the criteria in Table 7.18. The magnitude of impact on views from the road will be assessed using the criteria in Table 7.22.

Table 7.22:
DMRB Impact Criteria for Views from the Road

Magnitude of Impact	Beneficial	Adverse
No Change	Views remain the same	
Minor	No view – restricted	Restricted – no view
	Restricted - Intermittent	Intermittent – Restricted
	Intermittent – Open	Open – Intermittent
Moderate	No View – Intermittent	Intermittent – No View
	Restricted - Open	Open - Restricted
Major	No View – Open	Open – No View

[7] https://www.iema.net/assets/newbuild/documents/IEMA%20Primer%20on%20Health%20in%20UK%20EIA%20Doc%20V11.pdf May 2017

Motorised Travellers: Driver Stress

7.7.6.3 Driver Stress is defined in Volume 11 of the DMRB as the adverse mental and psychological effects experienced by a driver traversing a road network. Stress can induce in driver's feelings of discomfort, annoyance, frustration, or fear culminating in physical or emotional tension that detracts from the value and safety of the journey. Volume 11 of the DMRB indicates that with increased driver stress, a drop in driving standards occurs, which may be expressed as an increase in aggression towards other road users, or a diminished response to visual and other stimuli.

7.7.6.4 The level of stress experienced by a driver may be affected by a number of factors including: road layout and geometry; surface riding characteristics; junction frequency and speed; and flow per lane. There are three main components of driver stress as follows:

7.7.6.5 Driver frustration - Caused by an inability to drive at a speed consistent with the standard of the road, and increases as speed falls in relation to expectations.

7.7.6.6 Driver fear - The main factors are the presence of other vehicles, inadequate sight distances and the likelihood of pedestrians, particularly children, stepping into the road. Fear is highest when speeds, flows and the proportion of heavy vehicles are all high, becoming more important in adverse weather conditions.

7.7.6.7 Driver uncertainty - caused primarily by signing that is inadequate for the individual's purposes.

7.7.6.8 The measurable aspect of driver stress is associated with frustration due to delays. However, no detailed modelling of the performance of the A30 has been undertaken at this stage of assessment. The level of Driver Stress will be determined through a qualitative assessment of the above factors, under a three point descriptive scale, as recommended under DMRB guidance, as Low, Moderate or High.

Non-Motorised Users

7.7.6.9 The proposed methodology will be based on the procedures set out in the DMRB Volume 11, Section 3, Part 8 and 9 and the application of DMRB Volume 5, Section 2, Part 5, HD42/05 and will consider:

- The proposed scheme's impact on the journeys that pedestrians, cyclists and equestrians make in its locality;
- The impact on existing usage of the community facilities and routes by pedestrians and others;
- Changes in safety and amenity value of routes which may be affected by the proposed route; and
- The effects of the scheme on community severance.

7.7.6.10 The assessment will involve a desk study to identify likely NMU activity, as well as how local community facilities are likely to be affected by the construction and operation of the options in both adverse and beneficial senses.

7.7.6.11 The level of new severance will be taken into account using criteria set out by DMRB Volume 11, Section 3, Part 8 which categorises the level of severance as Slight, Moderate or Severe.

Effects on People

7.7.6.12 In the absence of guidance within DMRB, a high level qualitative assessment will be undertaken on the effects of the proposed scheme on the health, social and economic profile of the study area. Health impacts will be considered in line with the requirements of the Infrastructure Planning (EIA) Regulations 2017, and will draw on publicly available data and other topic assessment information.

7.7.7 Assumptions and limitations

7.7.7.1 The assessment of the NMU route amenity relies on qualitative descriptions by the assessor which is subjective. There is also a degree of subjectivity in the assessment of views. Where subjective assessments are presented, attempts to reconcile against evidence will be made throughout.

7.7.7.2 The DMRB Volume 11, Section 3, Part 8 methodology is over 20 years old (published in 1993) and some aspects may not be as relevant to the assessment of road schemes today. The guidance is currently being revised.

7.7.7.3 The assessment will rely, in part, on data provided by third parties (e.g. local authorities, Natural England) which are the most up-to-date, available at the time of the assessment. No significant changes or limitations in these datasets have been identified that would affect the robustness of the assessment for EIA purposes.

7.7.7.4 Any limitations found or assumptions used in the final assessment will be highlighted within the EIA.

7.7.8 Summary

7.7.8.1 The assessment for People & Communities will follow the guidance within DMRB Volume 11 Chapters 6, 8 and 9.

7.7.8.2 There will be a loss of agricultural land required to accommodate the works, which is likely to be more than 20ha. Detailed assessment may be required should this be found to be of BMV quality.

7.7.8.3 A qualitative high level assessment of the health of residents in the administrative area of Cornwall Council will be carried out, as required by the new Environmental Impact Assessment (EIA) Regulations 2017.

7.8 Road Drainage and the Water Environment

7.8.1 Study Area

7.8.1.1 The study area will encompass surface water features up to a minimum of 0.5km from the proposed scheme. This distance is appropriate for the assessment of direct effects. Features that are in hydraulic connectivity with the study area will also be considered, including surface water abstractions and downstream watercourses. Based on the professional judgement and knowledge of the area, features located up to a distance of approximately 1km from the proposed scheme will be considered. This distance is appropriate for the assessment of indirect effects, although if sensitive features located further than 1km from the scheme are identified to be at risk, these features will also be considered within the assessment.

7.8.1.2 The study area will encompass groundwater features within the vicinity of the proposed scheme and groundwater abstractions up to a minimum of 1km from the proposed scheme. This distance is appropriate for the assessment of surface-borne pollutants migrating to groundwater features.

7.8.1.3 A standalone Flood Risk Assessment (FRA) will be prepared to support the EIA. It will assess potential impacts to the scheme and to people and property elsewhere associated with flood risk from all sources of flooding. Paragraphs 5.92 to 5.97 of the NN NPS provide guidance on flood risk assessment for nationally significant road schemes and would be used to inform the preparation of the FRA.

7.8.2 Baseline Information

Surface Water Features

7.8.2.1 Review of OS mapping indicates that the proposed scheme alignment crosses or is located in close proximity to approximately 26 watercourses and surface water features within 0.5km of the scheme alignment. All watercourses identified within 0.5km of the scheme alignment are classified as ordinary watercourses under the jurisdiction of Cornwall Council as Lead Local Flood Authority (LLFA). Downstream extents (typically in excess of 1km from the scheme alignment) are classified as main rivers and therefore under the jurisdiction of the Environment Agency (EA).

7.8.2.2 The alignment of the existing A30 broadly follows a ridgeline and, as such, surface water runoff broadly falls to the north and south of the A30. Where the existing A30 (and proposed scheme alignment) crosses identified watercourses, this is at the upstream extent of these watercourses.

7.8.2.3 All watercourses within the study area form part of the West Cornwall and the Fal Management Catchment, and the South West River Basin District. However, streams to the east of the scheme flowing north are within the North Cornwall Seaton Looe and Fowey catchment.

7.8.2.4 The majority of watercourses within the study area and located to the north of the scheme alignment form part of the catchments of the Perranporth Stream, Bolingey Stream, Holywell Stream and Benny Stream that discharge at various points along the north coast. The majority of watercourses within the study area and located to the south of the scheme alignment form part of the River Kenwyn catchment and River Allen catchment, confluencing in Truro and outfalling to the tidal Truro River.

7.8.2.5 The quality of these watercourses is monitored by the EA in accordance with WFD objectives. A summary of current WFD classification for the 2016 cycle is provided within Table 7.23.

Table 7.23
WFD Classification - 2016 Cycle 2

Watercourse	Overall Quality	Ecological Quality	Chemical Quality
Bolingey Stream	Moderate	Moderate	Failed
Holywell Stream	Moderate	Moderate	Good
Benny Stream	Moderate	Moderate	Failed
River Kenwyn	Good	Good	Good

Table 7.23 WFD Classification - 2016 Cycle 2			
Watercourse	**Overall Quality**	**Ecological Quality**	**Chemical Quality**
River Allen	Moderate	Moderate	Good

7.8.2.6 Many of the watercourses flow through designated sites which are reliant on the water environment associated with the watercourse. Important features that have been identified by this assessment include sites such as Newlyn Downs SAC/SSSI, Carrick Heaths SSSI (comprised of several components located across the length of the scheme), Trenerry Wood CWS, Callestick Vean CWS and Goonwinnow CWS. All designated sites are discussed in more detail in Section 7.4.

7.8.2.7 The drainage database held by Kier (Area 1 MAC) indicates that the existing surface water drainage systems along this stretch of the A30 discharges directly to adjacent ditches and watercourses. Further information will be obtained as part of the EIA.

7.8.2.8 Review of the EA's Water Abstraction Licences map (obtained through the EA's What's in Your Back Yard website) indicates one licensed surface water abstraction within 1km of the scheme alignment. This is located approximately 1km to the south of the existing A30 at approximate chainage 8500m and is believed to be used for non-potable uses. The water feature from which water is abstracted appears to be the Zelah Brook that will be crossed by the proposed scheme alignment. Information regarding local and non-licensed abstractions was not available at the time of preparing this scoping report. This information will be obtained through consultation with the EA and Cornwall Council during the course of the EIA.

Groundwater Quality

7.8.2.9 Review of British Geological Survey (BGS) mapping indicates that the proposed scheme alignment is underlain by Porthtowan Formation and Grampound Formation bedrock geology comprising mudstone, sandstone and siltstone. Review of the EA's Groundwater map indicates that the bedrock geology is classified as Secondary A Aquifer, described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

7.8.2.10 Superficial deposits within this area are minimal, with a scattering of clay, silt, sand and gravel overlying the bedrock geology in places.

7.8.2.11 Review of the EA's Groundwater map (obtained through the EA's What's in Your Back Yard website) indicates that the majority of the area which encompasses the scheme alignment is not located within a designated groundwater Source

Protection Zone (SPZ). However, land immediately to north of Carland Cross, along the alignment of the existing A30, is located within SPZ Zone 2, and approximately 230m from SPZ Zone 1. Review of the EA's Water Abstraction Licences map indicates a licenced groundwater abstraction at this location, approximately 440m from the carriageway, recorded to be used for domestic and agricultural purposes.

7.8.2.12 Review of the EA's Water Abstraction Licences map (obtained through the EA's What's in Your Back Yard website) indicates a second groundwater abstraction within 1km of the proposed scheme alignment, located approximately 450m south of the A30 at approximate chainage 2000m. This is reported to be used for agricultural purposes. Information regarding local and non-licensed abstractions was not available at the time of preparing this scoping report. This information will be obtained through consultation with the EA and Cornwall Council during the course of the EIA.

7.8.2.13 Review of the EA's River Basin Management Plan for Groundwater online mapping shows that groundwater resources in the vicinity of the scheme alignment are assessed against the objectives of the WFD. Current quantitative quality for the 2016 monitoring cycle is assessed to be good and current chemical quality is assessed to be poor.

Flooding

7.8.2.14 Review of the EA's Flood Map for Planning (Rivers and Sea) (obtained through the EA's What's in Your Back Yard website) indicates that the area of the proposed scheme alignment is located entirely in the low risk Flood Zone 1 where the risk of flooding from fluvial and tidal sources is less than 1 in 1000 (0.1%) in any year.

7.8.2.15 Review of the EA's Flood Risk from Surface Water map (obtained through the EA's What's in Your Back Yard website) indicates that sections of the proposed scheme alignment are at risk of flooding from surface water sources. Flooding from surface water is typically associated with natural overland flow paths and local depressions in topography where surface water runoff can accumulate during or following heavy rainfall events. The Flood Risk from Surface Water map can also indicate fluvial flood risk from watercourses with a catchment of less than c.3km^2 that are too small to be mapped on the EA's Flood Map for Planning. The greatest risks are therefore associated with the ordinary watercourses that are crossed by the scheme alignment.

7.8.2.16 The A30 is located within predominantly rural areas with the majority of receptors comprising agricultural farmland and residential and farming properties.

7.8.3 Value of environmental resources and receptors

7.8.3.1 The value of identified surface water features groundwater features will be determined following a more detailed review of available information and in

consultation with the relevant authorities (i.e. EA and Cornwall Council). An initial review of the importance of identified features is provided below.

7.8.3.2 Watercourses within the study area include ordinary watercourses with no known designations, recreational value or value to the economy. However, a number of the watercourses flow through designated sites of national and county-wide importance, are monitored against the objectives of the WFD and form part of wider catchments assessed to have good and moderate ecological and chemical quality. One of the watercourses is also known to support a surface water abstraction. The value of these resources is currently considered to be Medium to High at this stage of the assessment.

7.8.3.3 Other surface water features within study area include a number of ponds which were identified within close proximity, located between approximately 20m to 35m, to the proposed scheme. A number of ponds were also identified between 190m and 360m from the proposed scheme. They have no known designations, and the use, quality and ecological value of these features is currently unclear. The ponds are located within predominantly rural areas and have no known significant recreational value or value to the economy. The value of these resources is currently considered to be Low at this stage of the assessment.

7.8.3.4 The scheme alignment is underlain by Secondary A Aquifer with current WFD classification of good. The majority of the extent of the scheme alignment is not located within a SPZ and the value of this resource is considered to be Medium. The scheme alignment to north-west of Carland Cross Junction is located in Zone 2 of a SPZ and approximately 230m from Zone 1, although the local abstraction at this location is not believed to be for potable use. The value of this resource is considered to be High.

7.8.3.5 Potential flood risk receptors include the proposed highway, residential properties and agricultural land. The proposed highway is considered to have Very High importance as an essential infrastructure route. Residential receptors are considered to have High value and agricultural land is considered to have Medium value.

7.8.4 Potential effects, including monitoring and mitigation measures

7.8.4.1 The proposed scheme has the potential to impact the water environment during construction and operation.

7.8.4.2 During construction, it is considered likely that the most significant of effects to surface water features, groundwater features and flood risk could arise from:

- Increased pollution risks from mobilised suspended solids, spillage of fuels or other harmful substances that may migrate to surface water and groundwater receptors.
- Impacts to the hydromorphological and ecological quality of watercourses associated with works within or in close proximity to watercourses, including longer term changes associated with sediment deposition.

7.8.4.3 A CEMP will be required during the construction stage to prevent pollutants entering the drainage system or discharging directly to surface water features or to ground. The CEMP would detail the procedures and methods that must be followed to minimise the potential environmental effects of construction activities. The CEMP would also describe the procedures in the event of an environmental emergency such as a fuel or chemical spillage.

7.8.4.4 During operation, it is considered likely that the most significant of effects to surface water features, groundwater features and flood risk could arise from:

- Polluted surface water runoff containing silts and hydrocarbons that may migrate or be discharged to surface water features or groundwater resources via the proposed highway drainage system.
- Permanent impact to the hydromorphological and ecological quality of water features associated with works within or in close proximity to water features.
- Permanent impacts to catchment hydrology caused by the introduction of a barrier to natural overland flow and changes to natural catchment dynamics associated with the proposed highway drainage system.
- Permanent impacts to catchment hydrology caused by impact to natural groundwater springs or groundwater flow associated with proposed road cuttings that could affect baseflow to rivers.
- Increased rates and volumes of surface water runoff from an increase in impermeable area or changes to the existing drainage regime leading to a potential increase in flood risk.
- Increased flood risk to the scheme and to people and property elsewhere caused by crossing of watercourses thus impacting flood flow conveyance.

7.8.4.5 A robust surface water drainage system should be provided to ensure discharge from the proposed scheme does not increase flood risk elsewhere up to and including the 1 in 100 annual probability rainfall event, allowing for climate change effects. If online improvements are proposed, consideration must also be given to the ability of existing drainage systems to receive any additional flows. In sections where offline improvements are proposed, consideration must be given to the provision of new drainage systems that provide sufficient attenuation and restrict the rate and volume of discharge to a rate agreed with Cornwall Council as the LLFA.

7.8.4.6 Isolated sections of the proposed scheme are identified to be at risk of surface water flooding due to natural depressions in topography and overland flow paths, typically associated with the watercourses that are crossed by the scheme. In order to protect the proposed route alignment, consideration should be given to maintaining these overland flow paths and localised raising of ground levels to mitigate the potential impact of surface water flooding on the highway and to its users.

7.8.4.7 Any widening of existing highway culverts must maintain hydraulic capacity and, where possible, explore opportunities to provide betterment.

7.8.4.8 Any new crossings of watercourses should strive to provide clear span bridges where practicable. Alternatively, any new culverts must maintain the capacity of the channel, ensure no increased flood risk up to the 1 in 100 year event considering the potential effects of climate change, be designed in accordance with DMRB guidance, and be sensitive to ecological requirements.

7.8.4.9 Surface water runoff from highway schemes typically contains high levels of sediment and hydrocarbons that can pollute surface water and groundwater features through direct migration or via the surface water drainage system. A robust treatment system will therefore be required. Little is known regarding existing drainage arrangements and water treatment provision. The works may provide an opportunity to provide betterment. Multi-stage proposals that maximise passive treatment through the use of Sustainable Drainage Systemes (SUDS) would be considered.

7.8.5 Proposal level and scope of assessment

7.8.5.1 Paragraphs 5.221-5.223 of the NN NPS set out how water quality and resources should be assessed for nationally significant road schemes and the ES should describe:

- the existing quality of waters affected by the proposed project;
- existing water resources affected by the proposed project and the impacts of the proposed project on water resources;
- existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project, and any impact of physical modifications to these characteristics;
- any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and SPZs around potable groundwater abstractions; and
- any cumulative effects.

7.8.5.2 The assessment and description of impacts in the ES will be set out in accordance with these paragraphs.

7.8.5.3 The assessment of potential effects to surface water features, groundwater features and flood risk will be undertaken in accordance with DMRB Volume 11, Section 3, Part 10 (HD 45/09).

7.8.5.4 The assessment of potential effects that may arise during construction will be a qualitative assessment that considers risks to the chemical quality of surface water and groundwater features associated with pollutants typically experienced during construction. When assessing risks to groundwater resources, particular attention should be given to deep excavations or retaining features that could present a direct pathway to groundwater resources. When assessing risks to surface water features, particular attention should be given to works within surface water features (such as new crossings) and features located within close proximity of the works or proposed compound areas (c.100m) that are most likely to experience direct

impact from overland flow. Monitoring of water quality during the construction phase may be required for ecologically sensitive sites.

7.8.5.5 The assessment of potential effects that may arise during operation will be undertaken in accordance with the methods outlined in the DMRB (HD 45/09) that states the following impacts should be considered:

- Potential effects of routine runoff on surface water;
- Potential effects of routine runoff on groundwater;
- Pollution impacts from spillages; and
- Impacts from flooding.

7.8.5.6 Method A will be used to undertake a simple assessment of the potential impact of routine runoff on the chemical quality of receiving surface waters. This will indicate if there is likely to be a risk of pollution that should be explored further or if the risks can be considered sufficiently low not to warrant any further investigation. If further assessment is required, Method B will be used to undertake a detailed assessment of the potential impact. It is considered unlikely that sampling of baseline water quality will be required to inform the assessment and that, if necessary, catchment descriptors from similar rural and upstream catchments can be used.

7.8.5.7 Method C will be used to assess the risk of pollution impacts from routine runoff on groundwater quality and is based on an assessment of the source-pathway-receptor protocol used in risk assessment procedures. This will be undertaken if soakaway drainage or unlined drainage channels are proposed.

7.8.5.8 Method D will be used to determine the potential impacts from accidental spillages predominantly due to road collisions involving the spillage of a potentially polluting substance somewhere on the length of the scheme alignment. It calculates the risk, assuming a spillage has occurred, that the pollutant will reach and impact on the receiving watercourse. This method considers local collision data, existing incident response arrangement and the vulnerability of receiving water bodies.

7.8.5.9 An FRA will be undertaken in accordance with NPPF to assess the potential implications of the proposed scheme on flood risk to people and property elsewhere, as well as assess the potential risk of flooding to the scheme. It is proposed that the following aspects will be considered:

- Potential impacts to flood flow conveyance in watercourses crossed by the scheme associated with the construction of new culverts and embankments;
- Potential impacts to the scheme from all sources of flooding, including fluvial, surface water, groundwater, drainage systems and artificial sources;
- Potential impacts to fluvial and surface water flooding associated with an increase in impermeable surfacing and/or changes to catchment hydrology associated with the proposed surface water drainage system.

7.8.5.10 It is considered unlikely that hydrological modelling will be required to inform the assessment of risk and impact to watercourses within the study area. It is, however, considered likely that quantitative analysis will be undertaken to inform

the appropriate sizing and design of proposed watercourse crossings, taking into account the potential effects of climate change.

7.8.5.11 In addition to the core aspects of assessment as defined within DMRB (HD 45/09), the assessment of potential impacts to the water environment will also consider potential impacts to the hydromorphological quality of surface water features. This is likely to be associated with the introduction of new structures such as culverts, potential realignment of existing watercourses, and potential changes to watercourse hydrology associated with the introduction of a linear barrier or diversion of 'natural' flow caused by the proposed surface water drainage system or cuttings that could affect baseflow to rivers. The findings of this assessment will also contribute to the assessment of potential ecological effects assessed within Section 7.4. It is proposed that this assessment is qualitative and informed by desk based study, site walkover and consultation with the project ecologist.

7.8.6 Proposed methodology including significance

7.8.6.1 The approach that will be adopted for this 'detailed' assessment comprises:

- Review of international, national and local legislation, policies and guidelines in relation to water resources, water quality and flood risk. This shall include a review of the requirements of the WFD.
- Establish baseline conditions within the study area through review of desk based sources of information, Envirocheck Report (or similar), consultation with relevant authorities (EA and Cornwall Council) and other discipline specialists, and site walkover.
- Identify the importance of sensitive receptors and likely key issues.
- Identify potential risks to surface water quality, groundwater quality and flood risk from the proposed scheme and hence the likely impacts, during both the construction and operational phases.
- Identify potential cumulative impacts associated with other planned schemes in the area.
- Recommend appropriate mitigation and assess residual effects.

7.8.6.2 The method of assessment and reporting of significant effects will be based on guidance contained in HD 45/09. The DMRB promotes the following approach:

- Estimation of the importance of the attribute.
- Estimation of the magnitude of the impact.
- Assessment of the significance of the impact based on the importance of the attribute and magnitude of the impact.

7.8.7 Assumptions and limitations

7.8.7.1 The assessment of potential effects is currently based on indicative scheme layout drawings and decisions regarding the proposed design and mitigation have not yet been made. This is of particular importance when considering impacts associated with the quality of surface water runoff, impacts to hydromorphology and channel hydraulics, and the potential effects of the scheme relating to flood risk. Similarly,

little is currently known regarding the existing and proposed drainage systems. This will be essential to the detailed assessment of risks associated with water quality and increased flood risk.

7.8.8 Summary

7.8.8.1 The proposed scheme has the potential to adversely affect surface water quality, groundwater quality and flood risk during both construction and operational phases.

7.8.8.2 The assessment of potential effects that may arise during construction will be a qualitative assessment that considers risks to the chemical quality of surface water and groundwater features associated with pollutants typically experienced during construction. Monitoring of water quality during the construction phase may be required for ecologically sensitive sites.

7.8.8.3 The assessment of potential effects that may arise during operation will be informed by the methods outlined in HD 45/09 (namely Methods A, C and D) to assess potential effects to surface water and groundwater quality, including risks associated with spillage. A FRA will be undertaken in accordance with NPPF to assess the potential implications of the proposed scheme on flood risk to people and property elsewhere, as well as assess the potential risk of flooding to the scheme. It is considered unlikely that hydrological modelling will be required to inform the FRA. It is, however, considered likely that quantitative analysis will be required to inform the appropriate sizing and design of proposed watercourse crossings, taking into account the potential effects of climate change.

7.9 Geology and Soils

7.9.1.1 This chapter of the Scoping Report covers the potential impacts of the development on both the soil and the underlying rocks, with a particular emphasis on land stability, land contamination and land designations. Potential impacts on groundwater and surface water quality due to the geology and soils of the schemeland contamination are also included in this chapter. However, potential impacts on groundwater associated with drainage and discharge proposals are considered within the Road Drainage and the Water Environment of this Scoping Report. The effects on the agricultural resource of soils are considered within the Community and Private Assets chapter. Waste and management of materials is considered in the Materials chapter.

7.9.1.2 The assessment will be undertaken with due consideration of the following relevant legislation and guidance:

- Part IIA of the Environmental Protection Act (1990);
- Contaminated Land Regulations (2012);
- Environment Act (1995); and
- Environmental Permitting Regulations (2010).

- Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009;
- EU Water Framework Directive (WFD) 2000/60/EC (as amended in 2008);
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 which implement Water Framework Directive (2000/60/EC);
- The Water Framework Directive (Standards and Classification) Directions England and Wales 2015;
- Groundwater Regulations (England and Wales) 2009, which transpose the EC Groundwater Directive 80/68/EC into UK law;
- Groundwater Daughter Directive (GWDD) (2006/118/EC);
- Department for Environment Food and Rural Affairs (Defra) (2015) The Water Framework Directive (Standards & Classification) Directions (England and Wales); and
- The Environmental Damage (Prevention and remediation) Regulations 2009.
- Geotechnics and Drainage, Earthworks, Managing Geotechnical Risks DMRB Volume 4, Section 1, Part 2 HD22/08;
- DMRB Volume 11, Section 2, Part 5 Assessment and Management of Environmental Effects, Highways Agency, 2008;
- DMRB Volume 11, Section 3, Part 11 Geology and Soils, Environmental Assessment, Environmental Assessment Techniques, Highways Agency, 1993;
- Contaminated Land Statutory Guidance, Department for Environment, Food and Rural Affairs (Defra), 2012;
- Model Procedures for the Management of Land Contamination (CLR11) Defra and Environment Agency, 2004;
- Construction Industry Research and Information Association R132: A Guide for Safe Working on Contaminated Sites;
- CIRIA SP73: Roles and Responsibility in Site Investigations;
- BS5930: 2015: Code of Practice for Site Investigations including Amendment 2, issued;
- BS10175:2011 + A1 2013: Code of Practice for Investigation of Potentially Contaminated Sites;
- Groundwater protection principles and practice, GP3;
- The Environment Agency's approach to groundwater protection;
- CIRIA 552: Contaminated Land Risk Assessment, A guide to good practice;
- BS 8485:2015: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings;
- CIRIA 665: Assessing risks posed by hazardous ground gas to buildings;
- CIRIA 681: Unexploded ordnance (UXO) A guide for the construction industry;
- CIRIA 733: Asbestos in soil and made ground: a guide to understanding and managing risks;
- Eurocode 7 (BS EN 1997-1 & EN 1997-2) and all relevant normative guidance.
- Planning Practice Guidance for land stability.
- Planning Practice Guidance for land affected by contamination.

7.9.1.3 Due consideration will also be given to national, regional and local planning policy guidance with respect to geology and soils.

7.9.2 Study Area

7.9.2.1 The 'study area' comprises the maximum physical extent of the development footprint plus a buffer zone of 250 m. This distance is referenced in Best Practice documents, including Guidance for the Safe Development of Housing on Land Affected by Contamination: R&D Publication 66 (NHBC, 2008), and is typical at the hazard identification stage of an assessment.

7.9.2.2 If there is considered to be a potential for features outside of this buffer zone to be impacted by or to constrain the development, then these will be included in the assessment. It is noted that Volume 11 Section 3 of the DMRB does not specify a minimum study area distance for the assessment of impacts to geology and soils.

7.9.3 Baseline Information

7.9.3.1 A summary of baseline environmental conditions within the study area is provided in this section, based on a review of data from the following sources:

- British Geological Survey (BGS) 'Geology of Britain' viewer Available at: http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html (accessed 16 May 2017);
- British Geological Survey (BGS) Onshore Geoindex viewed available: at http://mapapps2.bgs.ac.uk/geoindex/home.html (site accessed 21 July 2017); (accessed 16 May 2017);
- Environment Agency 'What's In Your Backyard?' application Available at: http://apps.environment-agency.gov.uk/wiyby/ (accessed 2 March 2017);
- Defra online 'Magic' map application; Available at: http://magic.defra.gov.uk/MagicMap.aspx (accessed 2 March 2017);
- Topographical maps;
- Ordnance survey maps at scales of 1:50,000 and 1:25,000;
- Geological maps (1:50,000 scale, and if available, 1:10,000) and available geological memoirs;
- An Envirocheck report is available for the scheme (contained in the 2016 PSSR) that contains geological and historical plans, hydrogeological and hydrological data/features including recorded wells, springs and abstraction points;
- Highways Agency Geotechnical Data Management System (HAGDMS) records available at http://www.hagdms.com (accessed 21 July 2017);
- Records of mines are to be reviewed through the Cornwall Council online web viewer;
- Mineral valuer and Cornwall Consultant mining records and assessment provided within the 2003 Hyder Consulting Ltd PSSR;
- The Review of Mining Instability in Great Britain – South West Regional report prepared by Arup for the Department of the Environment;

- British Geological Survey 1:100,000 Mineral Resource map for Cornwall and the accompanying Mineral Resource Information for Development Plans report;
- Historic OS plans will be used to identify the potential presence of historic quarries;
- The potential for natural cavities will be assessed from geological maps and memoirs and the Envirocheck report and information contained within HAGDMS;
- A site walkover and the Envirocheck report will be used to assess current land use. Current and historic aerial photographs will be used to assess recent historical land use;
- A site walkover, Envirocheck report and information contained within HAGDMS will be used to assess landsliding;
- Existing and proposed ground investigation information shall be reviewed from the BGS borehole records database; Factual reports on previous ground investigations for the scheme; and factual and interpretive reports obtained from HAGDMS.
- Recorded contaminated land, pollution incidents and areas of landfill will be reviewed from data contained within the Envirocheck report.

7.9.3.2 A Preliminary Sources Study Report (PSSR) was prepared by WSP March 2017 for the proposed Scheme, to document the findings of the geotechnical desk study investigation. This was certified with no departures from standards in May 2017. Another PSSR was previously prepared by Hyder Consulting Ltd in February 2003 for a similar scheme between Carland Cross and Chiverton Cross.

7.9.3.3 A Phase 1 ground investigation was undertaken on behalf of Highways England by Structural Soils Ltd in spring 2017. The results are presented within their factual report. The work included excavation of boreholes, obtaining soil and rock samples for chemical and geotechnical laboratory testing and installation of groundwater monitoring instrumentation in selected boreholes along the proposed alignment. This work was carried out in advance of the announcement of the preferred route and not all areas were accessible. A Phase 2 ground investigation will be undertaken to fill in the non-accessible locations and fill in any gaps in information as a result of the announcement of the preferred route.

7.9.3.4 Groundwater level monitoring is being undertaken using data logging ‘divers’ for long term hourly data collection. At present monitoring will cease in September 2017, but proposals are to extent this through the winter months.

7.9.3.5 It is proposed that the following statutory and non-statutory consultees will be consulted with for the purpose of this assessment:

- Environmental Record Centre for Cornwall and the Isles of Scilly (ERCCIS);
- Cornwall Council;
- Environment Agency;

- Natural England;

7.9.3.6 It is also proposed to consult with the British Geological Survey to obtain information on the geology of the Scheme.

Ground conditions

Geology

Artificial Ground

7.9.3.7 It is assumed that artificial ground may be present across the study area. There is a potential for Made Ground and worked ground to be present in association with all current and historical developments, including embankments and cuttings constructed for the existing highways network.

7.9.3.8 There is a potential for disturbed ground associated with near-surface historical mineral workings. Numerous borrow pits, spoil heaps, and slate and 'elvan' quarries operated in the vicinity of the study area since antiquity and throughout the 18th and early 19th centuries, many of which have been backfilled.

7.9.3.9 There is a known area of worked ground shown in the British Geological Society (BGS) Onshore GeoIndex adjacent to the proposed alignment at approximate chainage Ch 13,000 m.

Superficial Deposits

7.9.3.10 The 1:50,000 scale geological map published by the BGS shows the study area to be generally devoid of superficial deposits. There are likely to be alluvial and 'head' deposits (comprising clays, silts, sands and gravels) present in association with all current and former river channels.

7.9.3.11 In historical borehole records available from the BGS, "brown silty sand and gravel of slaty siltstone" and "very stiff light brown clay with gravel of quartz and soft slaty mudstone" was encountered in the southeast part of the study area to depths of 1.4-1.9 m below ground level (b.g.l.) (refs. SW74NW15 and SW74NW16).

Bedrock

7.9.3.12 The 1:50,000 scale map published by the BGS shows the southeast and central parts of the study area (Ch 0 m to Ch 8,000 m) to be underlain by the Porthtowan Formation (mudstone and sandstone). This is sedimentary bedrock formed approximately 375 to 398 million years ago in the Devonian Period in a local environment previously dominated by deep seas.

7.9.3.13 In historical borehole records available from the BGS, "highly to completely weathered" mudstone was encountered in the southeast part of the study area beyond depths of 1.4-1.9 m b.g.l. (refs. SW74NW15 and SW74NW16).

7.9.3.14 The central-northwest part of the study area (Ch 8,000 m to Ch 14,000 m) is underlain by the Grampound Formation (interbedded siltstone and mudstone). This is sedimentary bedrock formed approximately 385 to 398 million years ago in the Devonian Period, in a local environment previously dominated by open seas with pelagite deposits.

7.9.3.15 The far northwest part of the study area (> Ch 14,000 m) is underlain by the Trendrean Mudstone Formation (mudstone and siltstone). This is sedimentary bedrock formed approximately 359 to 416 million years ago in the Devonian Period, in a local environment previously dominated by shallow seas.

7.9.3.16 The Trendrean Mudstone Formation contains a series of east-west trending quartz-porphyry dykes of late-Carboniferous to early-Permian age.

7.9.3.17 The bedding of both bedrock lithologies frequently contorts towards rockhead, with dips ranging from 30° to 90°. The cleavage developed tends to coincide with the bedding, parting along the laminae, with a second set recorded in some of the cores at 0-10° and 40-70°. The joints are predominantly at approximately 90°, with further sets at 20-40°.

Mineral Workings

7.9.3.18 Mining is known to have been undertaken historically at St. Agnes (west of Chiverton Cross) and Newlyn Downs (west of Carland Cross) since antiquity and throughout the 18th and early 19th centuries. There is a potential for near-surface underground mineral workings to be present within the study area, including the ground beneath the existing A30.

Soil Quality

7.9.3.19 Soil quality is discussed in the chapter on People and Communities.

Topography

7.9.3.20 The topography of the southwest part of the A30 (Ch 0 m to Ch 5,600) varies between 100 m AOD and 150 m AOD. The central part of the alignment (Ch 5,600 to Ch 10,000) is situated at lower elevation, with topography varying between 70 m AOD and 100 m AOD. The topography of the northeast part of the alignment (>Ch 10,000) varies between 100 m AOD and 139 m AOD.

7.9.3.21 The existing A30 is located along a topographical ridge. Ground elevation falls shallowly to the northwest and southeast.

Groundwater

7.9.3.22 The 1:50,000 scale aquifer designation data provided by the Environment Agency shows the bedrock and superficial strata underlying the study area to be classified as Secondary A Aquifers. In historical borehole records available from the BGS (ref. SW85SW3, in which clay was logged to a depth of 3.00 m b.g.l.), groundwater level was measured at 2.4 m b.g.l.

7.9.3.23 The existing A30 is located along a topographical ridge and catchment divide. It is considered likely that groundwater flows away from the ridge to the northwest and southeast of the A30, with a potential for local modification associated with historical mineral workings, should these be present.

7.9.3.24 Groundwater flow within the bedrock aquifers is likely to be fracture flow while flow within the head deposits (where present) is likely to be intergranular flow.

7.9.3.25 There are two groundwater abstraction points in the northeast of the study area < 50 m from the existing highway at Carland Cross (license no. 15/49/271/G/030). These are springs from which groundwater is abstracted for household domestic and agricultural use. The groundwater abstractions are SPZs, as defined by the Environment Agency. The existing highway is located within the Zone I (Inner Zone) and Zone II (Outer Zone) protected areas.

7.9.3.26 The land on the southeast side of the A30 is a surface water Nitrate Vulnerable Zone (NVZ). The land on the southeast side of the A30 at Carland Cross is also a groundwater NVZ.

7.9.3.27 The potential effects of drainage on the water environment are discussed in the Road Drainage and Water Environment Chapter.

Surface Water

7.9.3.28 The A30 is located along a topographical ridge and catchment divide, with rainfall incident to the southeast draining into the catchments of the River Kenwyn, River Allen, and Tresillian River. These rivers confluence to the southeast becoming Truro River and flow southeast into Carrick Roads.

7.9.3.29 The drainage network to the northwest is less well developed. Rainfall drains through unnamed watercourses towards Perranporth and Holywell. The largest watercourse in this area is the River Gannel. There are no Main Rivers, as defined by the Environment Agency, within the study area.

7.9.3.30 There are no surface water abstraction licenses within the study area.

Designated Sites

7.9.3.31 There are no geological SSSIs, County Geology Sites, or known Regionally Important Geological Sites within the study area. There is a World Heritage Site (Cornwall and West Devon Mining Landscape) located 75 m (at its nearest) southwest of the Chiverton roundabout.

Natural Geological Hazards

7.9.3.32 In BGS GeoSure Data 'moderate' geological hazards are identified relating to landsliding and compressible ground. All other identified geological hazards, including shrink-swell, soluble rocks, collapsible rocks and running sand are rated 'low', 'very low', or 'negligible'.

Historical Land Use

7.9.3.33 The study area has historically been rural and agricultural. Mining has historically been undertaken in the region of the study area and there is a potential for features including borrow pits, spoil heaps and infilled quarries and shafts to be present within the study area.

Potential Sources of Contamination

7.9.3.34 This summary of potential sources of land contamination is based on publicly available information reviewed in conjunction with the PSSR produced by WSP in May 2017 (informed by a walkover survey by WSP in August 2016).

7.9.3.35 In publicly available records from the Environment Agency, there is a historical landfill at Boswellick which is partially located within the study area. This accepted inert waste (such as glass, concrete, bricks, tiles, soil and stones) between October 1990 and June 1991.

7.9.3.36 There are no recorded pollution incidents within the study area in records held by the Environment Agency.

7.9.3.37 There are fuel retail sites within the study area at Chiverton Cross (Esso) and Carland Cross (Shell). Other industries within the study area with the potential to result in contamination include a Toyota dealer (at TR8 5AY) and a Nissan dealer (at TR4 9DH). These sites, as well as the existing highways network, are considered possible sources of hydrocarbon based contamination (e.g. fuels and lubricants) associated with leaks or spills from vehicles.

7.9.3.38 The study area is generally rural and agricultural and there is a potential for a diffuse presence of contaminative substances such as agricultural fertilisers, pesticides and herbicides.

7.9.3.39 Any Made Ground present within the study area is considered a potential source of contaminative substances including heavy metals and asbestos.

7.9.3.40 Any historical mineral workings within the study area, including any borrow pits, spoil heaps, infilled quarries and shafts, and any vehicle storage or maintenance areas which may have stored fuels or other substances, may have the potential to impact the environment if disturbed by construction phase works.

7.9.3.41 The mineral workings at Newlyn Downs are known to have worked lead, zinc, copper and silver, present as sulphide ore. Background concentrations of these elements and their derivatives are likely to be present above normal background concentrations in affected ground. Elevated concentrations of sulphate are also likely to be present in mining spoil due to oxidation of sulphide ore.

7.9.3.42 No other potentially contaminative land uses have been identified.

Identification of Sensitive Receptors

7.9.3.43 Sensitive receptors will be identified based on the review of existing information, as detailed above. Receptors relevant to this topic area may include:

- Areas of geological or geomorphological interest;
- Soils;
- Sensitive human receptors;
- Controlled waters that may be affected by release and migration of contaminants; and
- Ecological receptors that may be affected by release of contaminants.

7.9.3.44 Identification of receptors and consideration of their sensitivity will be undertaken in accordance with the DMRB Volume 11, Section 3, Part 11 and Volume 11, Section 2, Part 5. The assessment applied in relation to potentially contaminated land will be in accordance with the risk management framework provided in CLR11, Model Procedures for the Management of Land Contamination.

Future Baseline Conditions

7.9.3.45 Consideration will be given to the potential for changes in the baseline conditions in the medium to long-term as a result of climate change. The UK Climate Change Risk Assessment 2017 report will be reviewed, however, it is considered unlikely that there would be significant change in the geological conditions. With respect to soils, the Climate Change Risk Assessment identifies the following:

- reduction in soil moisture and lower river flows, and an increase in the frequency and magnitude of droughts;
- changes in soil organic carbon, although the ways in which this might be affected are not adequately understood at present;
- increases in soil erosion in drier summers; and
- wetter soils and increased waterlogging in wetter winters.

7.9.3.46 It is anticipated that the key areas of existing potentially contaminated land would remain in the future, as there are no other plans for their remediation.

7.9.3.47 Consideration will also be made to Local Plans and the potential for future development in the area, including plans for mineral mining.

7.9.4 Potential effects, including monitoring and mitigation

Geology and Geomorphology

7.9.4.1 No protected areas with respect to geology or geomorphology have been identified within the study area, and therefore no potential effects on such features have been identified. Rock exposures as a result of cuttings may have beneficial effect as a result of exposing the geological formation.

7.9.4.2 The majority of the scheme is offline and therefore the Scheme would limit access to mineral resources beneath the proposed alignment. Some embankments are proposed, which will prevent future access to the underlying rock, which is considered a mineral resource. The proposed cuttings in the eastern offline bypass section would result in removal and potential effective use of mineral resources.

7.9.4.3 There are no Mineral Safeguarding Sites within the vicinity of the Scheme, and hence there are no potential effects on these locally designated sites.

7.9.4.4 The Scheme is located within areas that have been mined historically, both below ground and from the surface. If mine working or mine entrances are present beneath the scheme there is an increased risk of collapse settlement of the ground surface. The stabilisation of possible mine workings may also affect the hydrogeological regime, including the chemical characteristics of the groundwater and the flow and supply of groundwater. The effects on groundwater chemistry will be assessed as part of this chapter, however the effects on the hydrological and hydrogeological resources will be considered within the Road Drainage and Water Environment Chapter.

7.9.4.5 Consideration of the hydrogeological regime to be affected by the construction and operation of the road will also be made within the Road Drainage and Water Environment Chapter. Temporary or even permanent drainage may be required in areas of cutting, which may affect the supply of water to springs, streams and other surface water features such as bogs, marshes and ponds. Consideration will also be given the position of embankments to ensure that they do not block springs and streams.

Soils

7.9.4.6 Potential effects upon soils within the study area will manifest as a result of the construction and presence of the development. The potential effects on the agricultural use of soils are considered within the Community and Private Assets chapter.

7.9.4.7 Other potential effects to soils that will be considered within the chapter include the following:

- Soil erosion as a result of new road cuttings leading to sediment loading of nearby surface water bodies (if contaminated this could potentially be a more significant negative effect); and

- Soil compaction and devegetation as a result of increased hardstanding cover leading to a reduction in infiltration and an increase in surface water runoff.

Contaminated land

7.9.4.8 Potential effects of the construction and operation of the Scheme in relation to contaminated land may include:

- Creation of new migratory pathways between potentially contaminated soils and underlying aquifers through ground disturbance such as piling activities;
- The migration of ground gas in association with mine workings/mine entrances; and
- The introduction of contaminative materials, e.g. due to inappropriate storage and use of fuels, etc., or use of grout during minewokings treatment works, which may impact water resources.
- Contamination of controlled waters as a result of contaminated surface water runoff from the proposed development discharging into surface water bodies or groundwater resources will be discussed within the Road Drainage and Water Environment Chapter.

7.9.4.9 Any potential mitigation measures will be developed as the assessment is carried out.

7.9.4.10 It will be assumed that potential effects on human health (e.g. construction and maintenance workers) will be mitigated through adherence to all relevant legislation and best practice including the Construction (Design and Management) Regulations (CDM) 2015 and the Control of Substances Hazardous to Health Regulations (COSHH) 2002, as amended.

7.9.4.11 The assessment will also consider potential constraints on the scheme design relating to designated sites and existing land contamination, including the potential aggressivity of chemical agents in the ground which are destructive to concrete.

7.9.5 Proposal level and scope of assessment

7.9.5.1 Paragraph 5.168 of the NN NPS states that applicants should should seek to minimise impacts on soil quality and consider the risk posed by land contamination and how it is proposed to address this.

7.9.5.2 There is an identified potential for contaminant linkages to exist within the study area relating to potentially contaminative current and historical land use and sensitive human health, controlled waters and built environment receptors.

7.9.5.3 It is therefore recommended that a desk-based assessment is undertaken in accordance with Volume 11 Section 3 Part 11 ‘Geology and Soils’ of the DMRB. The assessment should include a Phase 1 Preliminary Risk Assessment (PRA) and development of a preliminary conceptual site model and should seek to

identify potentially significant effects and constraints relating to soil, geology, and land contamination.

7.9.5.4 As part of the contamination assessment, conceptual site models (CSMs) will be developed in accordance with the risk management framework provided in CLR11, Model Procedures for the Management of Land Contamination. The need for further focused assessment will be considered where existing or suspected contaminated land may have an effect as a result of construction and operation, i.e. by creating or altering pollutant linkages between sources of potential contaminants and sensitive receptors such as humans, ecological receptors, surface water and groundwater bodies.

7.9.5.5 The existing baseline knowledge suggests that a desk-based assessment is likely to be sufficient to determine all relevant effects and constraints associated with the proposed development with confidence. The conceptual site models will be used to establish the risks posed by each location and the need or otherwise for further assessment.

7.9.5.6 The assessment will include consideration of post-construction impacts due, for example, to the potential for remobilisation of contamination within ground disturbed by the construction processes.

7.9.5.7 The assessment of potential constraints associated with land contamination will be undertaken in accordance with the framework described in Contaminated Land Research (CLR) Report 11 (2004) and ensure the proposed development will not result in unacceptable risks to sensitive receptors (mitigation measures will be proposed as necessary).

7.9.5.8 It is possible that after completion of the desk-based assessment, if there remains a high uncertainty with respect to the likelihood or significance of effects, a detailed assessment may still be required, involving Phase 2 ground investigation and quantitative risk assessment. The likely sufficiency of a desk-based assessment does not preclude the possibility that a requirement for a detailed assessment may arise.

7.9.5.9 If the Scheme is affected by the presence of shallow mine workings or mine entrances, then more detailed assessment may be required to satisfy statutory consultees and stakeholders. This will be undertaken in accordance with the guidance provided within the Planning practice Guidance for Land Stability, which sets out the broad planning and technical issues with respect to development of unstable land, including landsliding, underground mining and naturally occuring cavaties. The key aims of the PPG on land stability are as follows:

- Minimise the risk and effects of land stability on property, infrastructure and the public;
- Ensure that various types of development should not be placed in unstable locations without various precautions; and

- Bring unstable land, wherever possible, back into productive use.

7.9.5.10 The following steps will be followed to manage the risks associated with land stability and identify further action that may be required:

- Carry out a preliminary assessment of ground instability through appropriate desk study, site visits and other investigations. Investigations should be undertaken with the aim of ascertaining that their sites are or can be made stable;
- Such information may be provided in the form of a land stability or slope stability risk assessment report, or phased reporting, e.g. desk study, followed by a ground investigation.

7.9.5.11 If the risk cannot be eliminated then further studies may be required including the intrusive or non-intrusive site investigation, assessment of land instability hazards and possible design and construction of remedial or stabilisation measures.

7.9.6 Proposed methodology including significance criteria

7.9.6.1 The significance of the effects of the proposed development may have on soil, geology and geomorphology attributes and contaminated land receptors will be assessed in accordance with the DMRB guidance on the basis of the severity of the consequence, should the hazard be realised, and the probability that the hazard will be realised.

7.9.6.2 A Phase 1 Preliminary Risk Assessment (PRA) will be undertaken to establish baseline conditions within the study area. This will comprise a desk-based review of all relevant information including historical mapping and any available ground investigation reports and, if necessary, a walkover survey to inspect the study area and obtain recent photography.

7.9.6.3 Information from the PRA will be used to develop a preliminary Conceptual Site Model (CSM) which will identify potential 'source-pathway-receptor' contaminant linkages and associated estimated levels of risk.

7.9.6.4 The tables used to classify consequence and probability and the matrix used to determine the level of risk, reproduced from CIRIA C552: Contaminated Land: A Guide to Good Practice, are presented in Table 24, Table 25 and Table 26.

Table 7.24
Qualitative Risk Assessment – Classification Of Consequence

Classification	Definition

Severe	Short term (acute) risks to human health, likely to result in significant harm. Short-term risk of pollution of sensitive water resource. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem.
Medium	Chronic damage to human health (significant harm). Pollution of sensitive water resources. A significant change in a particular ecosystem, or organism forming part of such ecosystem.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or to the environment.
Minor	Harm, not necessarily significant, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health. Easily repairable effects of damage to buildings, structures and services.

Table 7.25
Qualitative Risk Assessment – Classification of Probability

Classification	Definition
High Likelihood	There is a pollution linkage and an event that appears very likely in the short term, and/or almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	It is probable that an event will occur. Whilst not inevitable, it is possible in the short term, and likely over the long term.
Low Likelihood	Circumstances are possible under which an event could occur, but it is not certain that (even over a long time period) such an event would occur.
Unlikely	It is improbable that an event would occur, even in the very long term.

Table 7.26
Qualitative Risk Assessment – Determination of Risk Level

		Severity			
		Severe	**Medium**	**Mild**	**Minor**
Probabi	**High Likelihood**	Very high risk	High risk	Moderate risk	Moderate / low risk

	Likely	High risk	Moderate risk	Moderate/ low risk	Low risk
	Low Likelihood	Moderate risk	Moderate/ low risk	Low risk	Very low risk
	Unlikely	Moderate / low risk	Low risk	Very low risk	Very low risk

7.9.6.5 The significance of the effects of the proposed development may have on soil, geology and geomorphology attributes and contaminated land receptors will be assessed in accordance with the DMRB guidance on the basis of the severity of the consequence, should the hazard be realised, and the probability that the hazard will be realised.

7.9.6.6 The outcome of the contaminated land assessment will inform the EIA and form part of the ES.

7.9.6.7 If a detailed assessment is required this is likely to involve intrusive Phase 2 ground investigation works. These would be completed in accordance with BS10175:2011+A1:2013 'Investigation of potentially contaminated sites: Code of practice'. Following the intrusive works, quantitative risk assessments would be undertaken and a revised CSM developed.

7.9.6.8 If plausible contaminant linkages are present, it may be necessary to develop a remediation strategy. Implementation of the remediation strategy would be followed by validation works and production of a closure report.

7.9.7 Summary

7.9.7.1 There is potential for contaminant linkages to exist within the study area relating to potentially contaminative current and historical land use and sensitive human health, controlled waters and built environment receptors.

7.9.7.2 It is therefore recommended that a desk-based assessment is undertaken in accordance with Volume 11 Section 3 Part 11 'Geology and Soils' of the DMRB. The likely sufficiency of a desk-based assessment does not preclude the possibility that a requirement for a detailed assessment may arise.

7.9.7.3 The assessment should include a Phase 1 PRA and development of a preliminary conceptual site model (undertaken in accordance with CLR11) and should seek to identify potentially significant effects and constraints relating to soil, geology, and land contamination. The outcome of the assessment will inform the EIA and form part of the ES.

7.9.7.4 The effects of the proposed scheme on environmental attributes and constraints associated with land contamination will typically be evaluated up to 250 m from the maximum physical extent of the development footprint, or greater where deemed necessary.

7.9.7.5 There are many other potential effects associated with the geology, hydrogeology and soils. These potential effects will be assessed in accordance with relevant national, regional and local legislation and guidance.

7.10 Materials

7.10.1 Study Area

7.10.1.1 IAN 153/11[8] provides guidance on the environmental assessment of material resources.

7.10.1.2 The study area will comprise the anticipated maximum physical extent of the proposed scheme, as well as the locations of waste management facilities and associated transportation networks within Cornwall, which may be impacted by the proposed scheme.

7.10.1.3 Many material resources will originate offsite, but others will arise onsite during construction such as excavated soil and rock or recycled elements of existing roads. The latter will be included within the study area.

7.10.1.4 This chapter will not cover indirect impacts which occur offsite and may possibly occur outside the UK, including the production of materials at the point of extraction and during manufacturing. These impacts are outside the scope of this assessment as they are likely to be subject to separate environmental assessment processes, such as those required to obtain consent to abstract the materials. The direct energy associated with the operation of the scheme, such as the energy use from lighting, is beyond the scope of this assessment. A whole lifecycle consideration of the projects carbon emissions will be included as part of the overall ES. This will be covered in the separate Climate Change chapter (with reference to Materials, Air Quality, Road Drainage, Water Environment) and is not included in the scope of the Materials chapter.

7.10.2 Baseline Information

7.10.2.1 The proposed development will require material to be imported onsite and surplus material to be disposed of as waste. Surplus material waste usually arises from two sources:

- Existing site materials for example, excavation of material from earthworks; and

[8] Highways England, 2011. IAN 153/11. [online] Accessed 11/11/2016 May 2017

- Construction materials brought on to the site but not used for its intended purpose.

7.10.2.2 Some vegetation clearance and limited demolition will be required and will, therefore, produce waste material requiring disposal.

7.10.2.3 The main minerals currently available in Cornwall are granite (for aggregates and building stones), china clay, slate and sandstone. Cornwall has over 110 sites permitted for mineral working.[9] The proposed scheme will require materials to construct the new carriageways and undertake the required improvement works to the existing carriageway.

7.10.2.4 The construction, demolition and excavation (CDE) sector is the largest contributing sector to the total waste generation in England and generated 77.4 million tonnes (Mt) of waste in 2010. This was down from 81.4 Mt in 2008. In 2009, this was approximately 67% of the total waste produced in the UK. [10]

7.10.2.5 In Cornwall, the annual CDE waste arisings have decreased to just over 900,000 tonnes in 2008. The CDE industries in Cornwall are expected to increase waste production by approximately 252,000 tonnes up to a total of just below 1.2 million tonnes in 2031. The projected level of re-use is expected to grow by nearly 364,117 to 1,076,061 tonnes in 2031.[11]

7.10.2.6 It is generally recognised that there is a shortage of strategic waste management facilities, and an increase in waste management infrastructure is required to manage waste in the UK.[12]

7.10.2.7 Waste management within Cornwall has traditionally been heavily reliant on landfill disposal. There is increasing recognition that the landfilling of waste is unsustainable and a waste of resources. Furthermore, landfill disposal is becoming increasingly expensive and capacity is becoming exhausted.[13]

7.10.2.8 In January 2012, Cornwall Council commissioned a study to estimate existing and planned local waste management capacity, including landfill. The report states that the total licensed capacity for CDE Waste stream is as follows[14]:

- 105,529 tonnes for recycling / reuse (aggregate) – annual license; and
- 549,095 tonnes for landfill void space (total not annual capacity) tons.

[9] Cornwall Council, 2011. Minerals Issues Paper. [online] Accessed 18/05/2017.

[10] Defra, 2013. *Waste Management Plan for England*. [online]. Accessed: 18/05/2017.

[11] Cornwall Council, 2012. Technical Paper W1, An Assessment of the Future Waste Arisings on Cornwall up to 2031. [online] Accessed 18/05/2017.

[12] Defra, 2006. An Action Plan for the Waste Infrastructure Development Programme

[13] Cornwall Council, 2016. Minerals, Waste and Renewable Energy. [online] Accessed 18/05/2017.

[14] Cornwall Council, 2012. Technical Paper W1, An Assessment of the Future Waste Arisings on Cornwall up to 2031. [online] Accessed 18/05/2017.

7.10.2.9 There are two main landfill sites in Cornwall which accept municipal waste, as well as some types of construction waste. These are Connon Bridge and Lean Quarry, both are near Liskeard in the east of the County. Connon Bridge is due to be closed in 2018[15]. Following the opening of the Cornwall Energy Recovery Centre, this landfills Licence Capacity per year decreased to 40,000 tonnes[16]. Lean Quarry accepts both municipal and commercial, and industrial waste. Planning permission for landfill at the Lean Quarry site will end in August 2032. It has an EA Licence Capacity per year of 300,000 tonnes.[17]

7.10.2.10 The only landfill site that can currently accept only inert waste, such as that arising generally from the construction and demolition waste stream in Cornwall, is Roodscroft. The permitted licensed annual capacity is 152,000 tonnes.[18]

7.10.3 Value of environmental resources and receptors

7.10.3.1 The sensitivity of the receptor will be dependent on the capacity of the local environment to provide materials or dispose of waste (i.e. the capacity of available waste management infrastructure). The quantities of materials to be used and the waste forecasts will be used to identify the magnitude of an impact.

7.10.3.2 An assessment will be undertaken to identify how the use of materials conforms to high level strategy targets outlined in the following policy documents (this list is not exhaustive):

- EU Waste Framework Directive 2008/98/EC;
- National Policy Statement for National Networks (NN NPS)
- National Planning Policy Framework 2012[19];
- National Planning Policy for Waste[20];
- Waste Prevention Programme for England 2013[21];
- Cornwall Minerals Plan[22]; and
- Cornwall Waste Local Plan[23].

[15] Sita Cornwall, 2016. Landfill. [online] Accessed 08/03/2016.

[16] Cornwall Council, 2015. Cornwall Local Plan, Technical Paper W2 Existing Waste Management Capacity in Cornwall. [online] Accessed 10/11/2016.

[17] Cornwall Council, 2015. Cornwall Local Plan, Technical Paper W2 Existing Waste Management Capacity in Cornwall. [online] Accessed 10/11/2016.

[18] Cornwall Council, 2012. Technical Paper W1, An Assessment of the Future Waste Arisings on Cornwall up to 2031. [online] Accessed 08/03/2016.

[19] Department for Communities and Local Government, 2012. *National Planning Policy Framework*. [online] Accessed 18/05/2017.

[20] Department for Communities and Local Government, 2014. *National Planning Policy for Waste*. [online] Accessed 18/05/2017.

[21] Defra, 2013. *Waste prevention programme for England*. [online] Accessed 18/05/2018.

[22] Cornwall Council, 1998. *Cornwall Minerals Plan*. [online] Accessed 18/05/2018.

[23] Cornwall Council, 2003. *Cornwall Waste Local Plan*. [online] Accessed 18/05/2018.

7.10.3.3 The EU Waste Framework Directive 2008/98/EC provides the overarching legislative framework for the collection, transport, recovery and disposal of waste, and includes a common definition of waste. It lays down measures to protect the environment and human health by preventing or reducing the adverse effects of the generation and management of waste, and by improving the efficiency and reducing the overall impacts of resource use.

7.10.3.4 The Directive also mandates the Waste Hierarchy[24] which requires that where waste is unavoidable, products and materials should, subject to regulatory controls, be used again, for the same or a different purpose (re-use). Otherwise resources should be recovered from waste through recycling. Value can also be recovered by generating energy from waste but only if none of the above offer an appropriate alternative solution. The EU Landfill Directive 1999/31/EC sets stringent requirements for the landfilling of wastes.

7.10.3.5 The NN NPS requires that evidence of appropriate mitigation measures (incorporating engineering plans on configuration and layout, and use of materials) during both design and construction needs to be presented together with the arrangements for managing any wastes that are produced. It specifically states, at Paragraph 5.42 that:

'The applicant should set out the arrangements that are proposed for managing any waste produced. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome.'

7.10.3.6 The NN NPS identifies that the government policy on waste is intended to protect the environment, and human heath, by producing less and using it as a resource wherever possible. Where this is not possible, the NN NPS identifies that waste management regulation ensures waste is disposed of in a way that is least damaging to the environment and to human health and utilising the waste hierarchy. This includes consideration of the ability for the waste from the development to be dealt with appropriately by waste infrastructure, without having an adverse effect on the capacity of existing waste management facilities to deal with other waste arisings in the area. The National Planning Policy for Waste[25] sets out detailed waste planning policies. It should be read in conjunction with the NPPF and the Waste Management Plan for England.

7.10.3.7 The South West Regional Waste Strategy 'From Rubbish to Resource' (2004), is a non-statutory Regional Waste Strategy which aims to ensure that by the year 2020 over 45% of waste is recycled and reused and less than 20% of waste produced in the region will be landfilled.

[24] European Commission, 2016. Directive 2008/98/EC on Waste (EU Waste Framework Directive). [online] Accessed 21/06/2017.
[25] DCLG, 2014. National Planning Policy for Waste. [online] Accessed 21/06/2017.

7.10.3.8 The Cornwall Minerals Plan[26] provides existing policy on minerals. The chapters that are most applicable to this project are Chapter 9, Aggregates and Chapter 10, Secondary Aggregates and Recyclable Material. Cornwall Council is preparing a Minerals Safeguarding Development Plan Document to identify areas of mineral resource which will be safeguarded for future use.

7.10.3.9 The Cornwall Waste Local Plan[27] provides a broad overall strategy for the management of future waste arisings in Cornwall, including the minimisation of construction and demolition waste.

7.10.3.10 There are a number of primary legislative instruments in the UK on waste listed below which enact a wide range of secondary legislation that governs the storage, collection, treatment and disposal of waste:

- The Control of Pollution Act 1974;
- The Control of Pollution (Amendment) Act 1989;
- Environmental Protection Act 1990 (EPA);
- The Environment Act 1995;
- The Finance Act 1996;
- Waste Minimisation Act 1998;
- The Waste and Emissions Trading Act 2003;
- The Clean Neighbourhoods and Environment Act 2005; and
- The Waste (England and Wales) (Amendment) Regulations 2012 and 2014.

7.10.4 Potential effects, including monitoring and mitigation measures

7.10.4.1 Road schemes such as that proposed will consume large quantities of materials and will therefore have permanent direct effects on the environment e.g. the depletion of natural resources and transport of materials.

7.10.4.2 The scheme will result in large quantities of material consumption. This is because a large amount of primary and secondary materials are expected to be required for the construction of the carriageway and its supporting infrastructure. This effect becomes increasingly more significant for longer lengths carriageway, particularly offline alignments. The proposed scheme requires large scale improvements. The existing Chiverton Cross and Carland Cross roundabouts are to be replaced with grade separated junctions to provide connections to the local highway network. This will require considerable use of primary material resources and will produce groundwork related spoil that will need to be disposed of as waste or reused. A number of additional structures will be required. This includes a new bridge at Chybucca and six other crossing points where local roads cross the new road using under or over bridges. This will require further material resource and have to potential to create waste.

[26] Cornwall Council, 1998. Cornwall Minerals Plan [online] Accessed 21/06/2017.

[27] Cornwall Council, 2003. Cornwall Waste Local Plan. [online] Accessed 21/06/2017.

7.10.4.3 The types of material likely to be required for construction include concrete, bricks, wood, bitmac, steel, stone and soil.

7.10.4.4 The potential environmental effects arising from waste will be associated with production, transport, processing and disposal. The assessment will identify the quantities and types of waste to be produced, likely to include top soil, other spoil, concrete, bitmac, metal, stone and vegetation.

7.10.4.5 The use of materials and management of waste may give rise to other impacts to be assessed elsewhere in the ES, such as detrimental impacts on air quality and increased noise. For example, there will be potential impacts through the transportation of road construction products to and waste being taken away from the construction site associated with the effects of noise and air pollution on sensitive receptors from HGVs. This effect would be temporary. All materials have an embodied carbon and hence have an effect on climate change. A whole lifecycle consideration of the projects carbon emissions will be required as part of the overall ES, which will be covered in the separate Climate Change chapter (with reference to Materials, Air Quality, Road Drainage, Water Environment). This should cover construction and decommissioning.

7.10.4.6 The proposed scheme works should aim to minimise export and import of fill materials. An example of how this could be achieved would be by balancing earthworks cut and fill volumes. Topsoil stripped as a result of the works would be reused wherever possible in order to establish landscaping features such as embankments and verges as well as to provide a basis for landscape planting. Where existing surfaces are to be replaced, this material should be re-used as either a sub-base or inclusion within new scheme construction. Using site-won material will mitigate the potential impacts of importing large quantities of raw material whilst reducing associated haulage.

7.10.4.7 To mitigate the potential impacts of transporting materials to site, material should be sourced from the nearest available and suitable location to keep HGV journey distances to a minimum.

7.10.4.8 Mitigation during construction should be managed through the implementation of a Site Waste Management Plan (SWMP). The SWMP will aim to ensure that the waste produced during the construction phase, in addition to other phases of the scheme is dealt with in accordance with the Duty of Care Provisions in the Environmental Protection Act 1990.

7.10.5 Proposal level and scope of assessment

7.10.5.1 According to IAN 153/11, for projects such as this with an estimated cost greater than £300,000, it is assumed that the potential does exist for impacts to occur. Therefore, due to the scale of the development proposed and the large quantity of materials likely to be required it is proposed that a Detailed level assessment is undertaken in accordance with DMRB.

7.10.5.2 IAN 153/11 identifies that a Detailed Assessment should gain an in-depth appreciation of the environmental consequences of the project. The Detailed Assessment will be a quantitative exercise using available information which will aim to identify the following:

- The types and quantities of materials required for the project;
- Details of the source or origin of materials;
- The cut and fill balance;
- The types and quantities of forecast waste arisings from the project;
- Surplus materials and waste falling under regulatory controls;
- Waste that requires storage on site prior to re-use, recycling or disposal;
- Waste to be pre-treated on site for re-use within the project;
- Wastes requiring treatment and/or disposal off site;
- The impacts that will arise from the issues identified in relation to materials and waste;
- A conclusion about the magnitude and nature of the impacts; and
- The identification of measures to mitigate the identified impacts.

7.10.6 Proposed methodology including significance

7.10.6.1 The assessment of materials will consider two aspects: the use of material resources; and the generation and management of waste. It does not include the direct energy use associated with operation of the development.

7.10.6.2 IAN 153/11 identifies that it is not possible to provide detailed guidance on some aspects of the assessment process, such as the significance and magnitude of effect. The sensitivity of the receptor is dependent on the capacity of the local environment to provide materials or dispose of waste (i.e. the capacity of available waste management infrastructure). The quantities of materials to be used and the waste forecasts will be used to identify the magnitude of an impact. The sensitivity and magnitude will be utilised to determine the overall impact of the scheme.

7.10.6.3 The assessment will identify whether the impacts are positive or negative, permanent or temporary and direct or indirect. Permanent impacts are likely to be significant in terms of their effects.

7.10.7 Assumptions and limitations

7.10.7.1 The determination of the materials and waste impacts of the scheme will depend on the availability of the required information. This includes the types and quantity of materials, and waste forecasts for the construction of the scheme in order to determine the magnitude of an impact. To determine the sensitivity of receptors, information on the local waste and material capacity will be required.

7.10.7.2 Liaison with the Environment Agency, the developer, the scheme engineer and the local authority should ensure this information is obtained but the availability of information is not known at this time.

7.10.8 Summary

7.10.8.1 The potential impacts associated with Materials and Waste as a result of the proposed scheme will be assessed in accordance with IAN 153/11. It is anticipated that a 'Detailed' level assessment will be required. The assessment will cover the use of material resources and the generation and management of waste.

7.11 Climate change

7.11.1.1 This chapter describes the methodology for three individual climate change assessments to be conducted as part of the EIA:

- greenhouse gas (GHG)[28] emissions assessment
- climate change resilience (CCR) assessment; and
- in-combination climate change impact (ICCI) assessment

7.11.2 Study Area

GHG emissions assessment

7.11.2.1 For the assessment of capital carbon, the study area will cover all assets and infrastructure constructed (i.e. demolition works, enabling works, earthworks, construction works) for the Proposed Scheme.

7.11.2.2 For the assessment of the operational carbon, the study area will be as above, including any additional operational and maintenance activities that are required during the design life of the Scheme.

7.11.2.3 For the assessment of user carbon (i.e. the tailpipe emissions from vehicles using the Scheme during operation) the study area will be the same as defined in the traffic model (see Section 7.2). Unlike the Air Quality study area, the assessment of user carbon will include the total emissions across the model, irrespective of presence and location of receptors etc.

CCR assessment

7.11.2.4 The study area for the CCR assessment covers all assets and infrastructure to be designed and constructed as part of the Proposed Scheme.

ICCI assessment

[28] The terms 'carbon' and 'greenhouse gasses' (GHG) are often used interchangeably. GHGs are gasses in the atmosphere which absorb heat, of which carbon dioxide (CO2) is the most common and important gas when considering anthropogenic emissions; but in addition, there are many other gasses which have a global warming potential, and which are classified as GHG emissions. In this scoping report the term GHG emissions and carbon are both used and should be taken to mean the same thing, i.e. a measure of CO2 equivalent (CO2e) covering all GHGs. Engineering and design work on infrastructure projects like the Proposed Scheme often use the term carbon and categories emissions as falling into one of three types: 1) capital, 2) operational, and 3) user carbon emissions (see Infrastructure Carbon Review 2013).

7.11.2.5 The ICCI assessment explores the combined effect of the impacts of the Proposed Scheme and potential climate change impacts on the receiving environment. The study area for the ICCI assessment will be defined in accordance with the respective study area for each environmental topic undertaking an assessment as part of the current EIA.

7.11.3 Baseline information

GHG emissions assessment

7.11.3.1 A baseline assessment will be undertaken to quantify the carbon emissions from the current road network layout and traffic emissions profile. This baseline will be compared to the Proposed Scheme.

CCR and ICCI assessments

7.11.3.2 In order to gain an appreciation of the current climate baseline for the study area, published historical weather data will be used. The planned approach is to use Met Office gridded observational data, which is available for the years 1961-2011, as well as any additional available climate data sources. Commercial license fees may apply. Identifying recent weather patterns and extreme events in the study area provides an indication of how the project may need to account for changes in climate conditions in the immediate future.

7.11.3.3 The description of the future climate baseline will be based upon climate change projection data from the United Kingdom Climate Projections 2009 (UKCP09). The UKCP09 climate change projection data is the most widely used data for the UK and the most appropriate data to be used, as recommended in the document Environmental Impact Assessment: Implementing the Requirements of 2011/92/EU as amended by 2014/52/EU (EIA Directive). UKCP09 projections are available for different emission scenarios and time periods up to the 2080s.

7.11.3.4 The emissions scenarios in UKCP09 are plausible representations of the future development of emissions of substances (e.g. GHGs and aerosols) that can influence global climate. The medium and high emissions scenarios available from UKCP09 will be included in the description of climate change projections. The low emissions scenario will not be considered, as this is generally considered overly optimistic and not suitable for the purposes of the CCR and ICCI assessments for the Proposed Scheme.

7.11.3.5 The 50% probability level for the medium emissions scenario will be used for the ICCI and CCR assessments with additional sensitivity testing for a wider range of probability levels (the 10% and 90% probability levels) and the high emissions scenario (the 10%, 50% and 90% probability levels). This consideration of

probability levels is in agreement with the recommendations in UKCP09[29] and IEMA[30] guidance.

7.11.3.6 The ICCI assessment relating to flood risk will be based upon current Environment Agency guidance[31].

7.11.3.7 The ICCI assessment will be undertaken in accordance with the timeframes outlined in the methodologies of each topic. Timeframes for the CCR assessment will be determined based on the design life of assets and infrastructure.

7.11.3.8 Climate change projections for extreme weather events will be obtained using the Weather Generator (WG)[32] in UKCP09. However, it should be noted that the WG is subject to a number of limitations which are described on the UKCP09 website[33]. The main limitations of the WG relate to the representation of extreme weather events, especially in the representation of short duration (hourly) extreme rainfall and long-term events such as droughts.

7.11.4 Value of environmental resources and receptors

GHG emissions assessment

7.11.4.1 GHG emissions are responsible for global climate change, which is estimated to have large potential negative cost impacts (these will be burdened by society at large, and in some instances they will impact a Proposed Scheme directly). The monetary valuation of changes in the GHG emissions will be undertaken following guidance detailed in TAG Unit A3 Environmental Impact Appraisal (DfT, 2015).

CCR assessment

7.11.4.2 There is currently no guidance within the DMRB on placing value on climate change resilience.

ICCI assessment

7.11.4.3 The value of the different environmental resources and receptors considered as part of the ICCI assessment is described in the sections relating to the respective environmental topics.

[29] UK Climate Projections: Briefing report. http://ukclimateprojections.metoffice.gov.uk/media.jsp?mediaid=87867&; Accessed 1 June 2017

[30] Institute of Environmental Impact Assessment (IEMA); IEMA guide to climate change resilience and adaptation, 2015

[31] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances Accessed: 25 May 2017.

[32] UK Climate Projections, 2009; About the Weather Generator; http://ukclimateprojections.metoffice.gov.uk/22540;;http://ukclimateprojections.metoffice.gov.uk/22540; Accessed: February 2016.

[33] UK Climate Projections, 2009; Limitations of Weather Generator 2.0;http://ukclimateprojections.metoffice.gov.uk/22653; Accessed: February 2016
May 2017

7.11.5 Potential effects, including monitoring and mitigation

GHG emissions assessment

7.11.5.1 The implications of GHG emissions cannot easily be attributed to a single climate change impact in a specific location, but instead contribute to wider atmospheric GHG concentrations. These in turn lead to changes and trends in climate averages and extreme weather events.

7.11.5.2 In line with the recommendations in PAS2080[34], carbon emissions for the Proposed Scheme will be estimated as part of the EIA and mitigation measures will be proposed. Monitoring processes for emissions during construction and throughout the asset's design will be proposed. A whole life approach will be taken, which seeks to balance capital carbon emissions with offset potential (i.e. reductions) that may be achieved in user carbon emissions (during Scheme operation).

7.11.5.3 User carbon is a function primarily of length of route travelled and as a secondary consideration, of the number of junctions along that route (as junctions result in acceleration/ deceleration of vehicles) and gradient (which primarily affects HDVs). Moreover, the presence of the scheme and its inter-relation with the surrounding road/ transport network dictate the tailpipe emissions on the surrounding network and how these change depending on the amount of congestion or perceived effectiveness of the corridor considered.

CCR and ICCI assessments

7.11.5.4 The CCR and ICCI assessments will assess potential effects and support the project in taking mitigating actions where necessary. Monitoring processes will have a role during the operation of the Proposed Scheme to ensure the asset performs successfully under future climatic conditions. Allowances for further monitoring during operation will be identified as part of the CCR assessment.

7.11.6 Proposed level and scope of assessment

GHG emissions assessment

7.11.6.1 The assessment will be undertaken in accordance with the principal steps identified in PAS2080 (Figure 7.47.4). Consideration will also be given to TAG Unit A3 Environmental Impact Appraisal (DfT, 2015), Chapter 4 Greenhouse Gases.

7.11.6.2 A whole-life approach will be adopted, capturing both direct and indirect carbon emissions arising as a result of the Proposed Scheme across supply chain, construction, operation and use. End of life will not be considered due to the long design life of the asset and given that emissions associated with end of life are commonly small.

[34] PAS 2080:2016: Carbon Management in Infrastructure, 2016. Published by the British Standards Institution May 2017

7.11.6.3 The scheme appraisal will estimate traffic carbon emissions (user carbon), because these vehicle tailpipe emissions typically give rise to the majority of the carbon footprint of a road scheme. Construction (capital) and operational emissions will be considered but in less detail.

Figure 7.4 Principal steps of carbon emissions quantification (from PAS2080)

7.11.6.4 As part of the baseline assessment, a high level qualitative review of the Stage 2 scheme options will be undertaken in terms of GHG emissions.

7.11.6.5 A full quantitative study of the Proposed Scheme will then be undertaken incorporating the latest DMRB requirements (where available) and using the Highways England carbon calculator (or similar), with user carbon calculated separately based on the Proposed Scheme traffic model.

CCR assessment

7.11.6.6 The technical scope of the CCR assessment comprises an assessment of all potential climate hazards for all infrastructure and assets associated with the Proposed Scheme to the end of their design life and the identification of any significant climate change risks; a list of the climate hazards to be considered is summarised in paragraph 0. Climate change projections for the UK are available until the 2080s and this will be the latest time period included in the assessment. Climate resilience will be assessed at asset type level; assessing resilience at individual asset level is outside the scope of the current EIA.

ICCI assessment

7.11.6.7 An initial ICCI assessment will be undertaken for all environmental topics in collaboration with topic specialists. Topics considered sensitive to climate change will remain scoped in for a more detailed assessment of in-combination climate change impacts for topic specific effects. This more detailed assessment will determine whether there are any significant in-combination impacts or effects to report.

7.11.6.8 Potential climate change impacts relevant to the effects of operation of the Proposed Scheme will be assessed for the 2080s (the latest UKCP09 time period), in order to cover as much of the operational life of the Proposed Scheme as possible.

7.11.7 Proposed methodology including significance

GHG emissions assessment

7.11.7.1 **Significance:** the GHG emissions assessment will be consistent with the Good Practice approach set out in the IEMA guidance on assessing GHG emissions and evaluating their significance[35].

7.11.7.2 This defines all GHG emissions as significant and suggests that the project addresses their occurrence by taking action to mitigate them.

7.11.7.3 The assessment will therefore look at opportunities to reduce the whole-life carbon of the Proposed Scheme. Targets for reduction of carbon will be agreed at the beginning of the project as part of project baseline development.

7.11.7.4 **Capital carbon** is a function of the length of the road and the materials and processes associated with on-site works at construction and over the design life (i.e. including supply chain materials production, logistics / transport to site, on-site works including plant and accommodation and employee travel).The assessment of capital carbon will be undertaken using the Highways England carbon calculator (or similar) and is therefore defined by the methodological approach set out in that tool and associated guidance[36].

7.11.7.5 **User carbon** is a function of the length of the road and to a lesser extent the gradient and number of junctions.

7.11.7.6 The assessment of user carbon will follow the principles of the regional assessment of pollutants outlined in DMRB HA207/07; it will include all road links of the transport (SATURN) model network without any screening of the carbon emissions.

7.11.7.7 The analysis will incorporate the latest DMRB requirements in conjunction with applying emission rates for carbon provided in Interim Advice Note 185/15 (Highways Agency, 2015) to the outputs from the SATURN highway assignment component. By taking the average speed on a link by link basis along the route, the method makes allowance for the increase in emissions from acceleration / deceleration of vehicles due to congestion.

7.11.7.8 The impact of junctions and gradient of road will be applied to the traffic model.

CCR assessment

7.11.7.9 The integration of potential climate change impacts into the EIA process through the CCR and ICCI assessments is still a relatively new approach. For transport infrastructure and assets, the evidence base is growing but not definitive, or there

[35] IEMA, Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017)

[36] https://www.gov.uk/government/publications/carbon-tool
May 2017

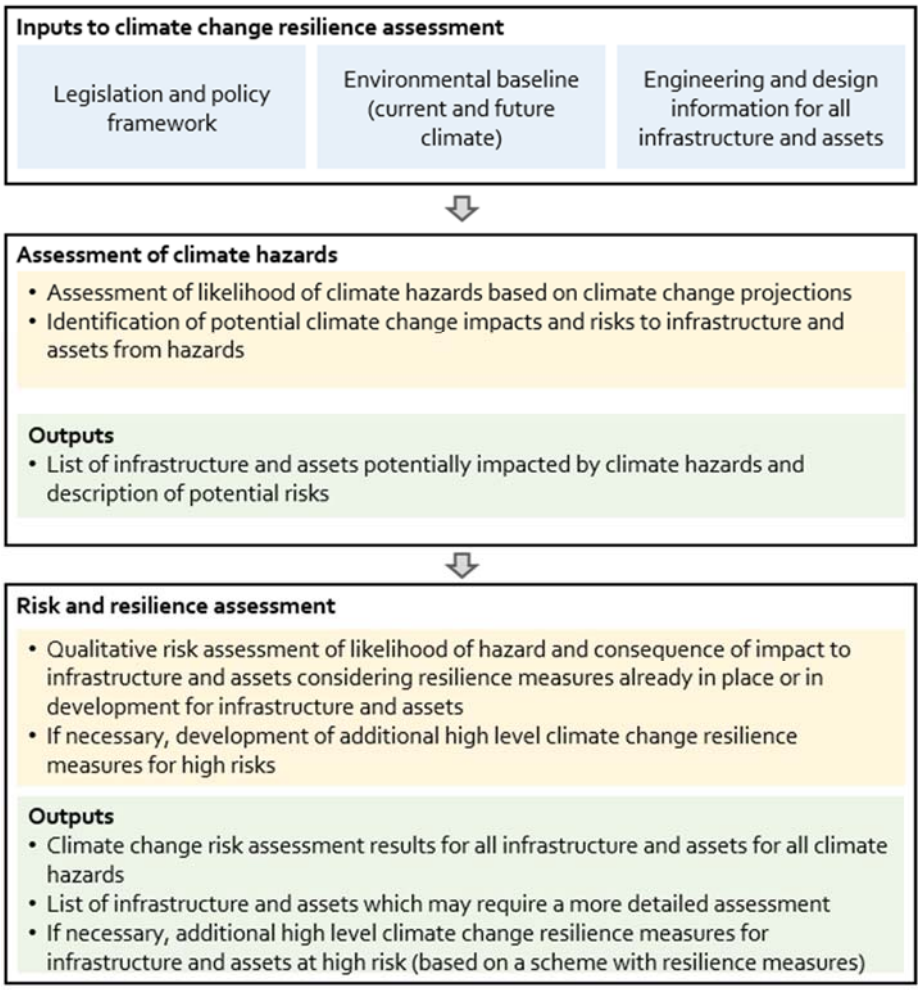
is insufficiently detailed evidence available at the asset specific level. Conversely, for some engineering and design disciplines, such as flood risk engineering, there is a relative abundance of evidence and guidance, for example EA guidance, mentioned earlier in this chapter. IEMA guidance on climate change resilience and adaptation will also be used, as referenced in paragraph 7.11.3.5.

7.11.7.10 The CCR assessment will qualitatively assess the impacts and risks of climate change on the Proposed Scheme using professional expertise and judgement. A more detailed and quantitative assessment may then be carried out during future design stages; this is outside of the scope of the current EIA.

7.11.7.11 In the case of flood risk, more detailed planning requirements and design guidance relating to climate change exists. Therefore, an assessment of climate change impacts on flood risk will be carried out within the water resources and flood risk topic assessment at the route-wide and site-specific levels taking into account current EA climate change allowances for increases in peak river flow and rainfall intensity.

7.11.7.12 The climate change resilience assessment will be composed of two main parts: the assessment of climate hazards and the risk and resilience assessment, see

Figure 7.5 Approach to the CCR assessment



7.11.7.13 The following climate hazards will be considered in this risk assessment:

7.11.7.14 The potential likelihood and consequence of impacts to the infrastructure and assets associated with the Proposed Scheme will be scored using a qualitative five point scale:

- likelihood – very likely, likely, as likely as not, unlikely, very unlikely; and
- consequence of impact – very high, high, medium, low, very low

7.11.7.15 The resulting risk level will be scored as either: very high, high, medium, low, or very low.

7.11.7.16 The risk assessment will identify the need for any additional resilience measures to protect against the effects of climate change, based on those risks assessed as

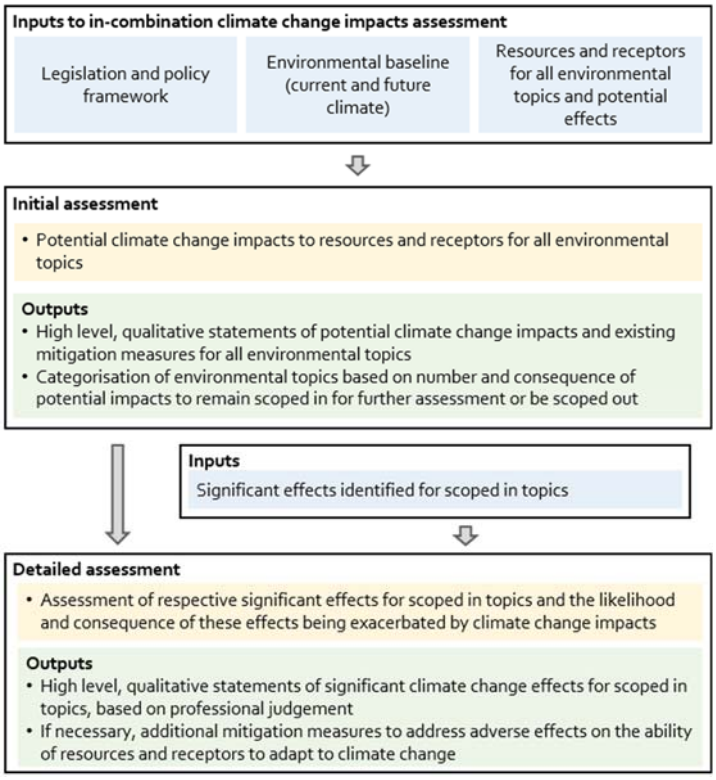
'high' or 'very high'. High level resilience measures will be designed as part of workshops and focus groups with key engineering and design experts.

ICCI assessment

7.11.7.17 Potential climate change impacts relevant to the Proposed Scheme will be considered for all environmental topics. This will form the basis for an initial ICCI assessment, the scope of which will include all environmental topics. The initial ICCI assessment will identify environmental topics to remain scoped in for a more detailed assessment. See Figure 7.6 for an illustration of this approach.

7.11.7.19 Following consideration of potential climate change impacts, professional judgement will be used by topic experts to produce high level, qualitative statements about potential topic specific impacts resulting from projected climate change (i.e. changes and trends in climate averages and extreme weather events) for receptors and resources in the area surrounding the Proposed Scheme. These will include recommendations for any mitigation measures as well as allowances for future monitoring to ensure continued resilience of environmental receptors and resources.

Figure 7.6 Approach for the ICCI assessment



7.11.7.20 Following the initial assessment, topics will then be categorised into one of the following five categories, based on the number and consequence of potential in-combination impacts as part of the initial assessment:

1) many potential climate change impacts with high consequences (to remain scoped in for more detailed assessment);

2) few potential climate change impacts with high consequences (to remain scoped in for more detailed assessment);

3) many potential climate change impacts with low consequences (to be scoped in);

4) few potential climate change impacts with low consequences (to be scoped out); and

5) no potential climate change impacts (to be scoped out).

7.11.7.21 A more detailed assessment will then be undertaken for the topics that remain scoped in. This will include an assessment of each topic's respective significant effects and a determination of whether they could potentially be exacerbated or ameliorated by climate change impacts. The assessment will determine whether there are any significant in-combination climate change effects to report.

7.11.7.22 The potential significance of in-combination climate change impacts will then be assessed qualitatively, based upon the professional judgement of relevant environmental topic specialists working closely with the climate change topic specialists.

7.11.7.23 An exception to the approach outlined above is the assessment of water resources, flood risk and drainage design, which will be quantitative and take into account current Environment Agency climate change allowances for increases in peak river flow and rainfall intensity[37].

7.11.7.24 If existing mitigation measures[38] are considered insufficient to address the ability of resources and receptors to adapt, then additional mitigation measures will be developed by the climate change topic specialists in collaboration with the environmental topic specialists.

7.11.8 Assumptions and limitations

GHG emissions assessment

[37] Environment Agency, Flood risk assessments: climate change allowances (updated 3 February 2017) Available online at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances ;;https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances; Accessed on 3 April 2017

[38] Existing mitigation measures refers to embedded design mitigation measures and environmental mitigation measures identified by topics as part of their assessments.

7.11.8.1 Assumptions behind carbon factors used in the assessment will exist although care will be taken to use data of an appropriate quality for the study.

7.11.8.2 Similarly, vehicle movements and vehicle emissions will be forecast and therefore based on an assumed future scenario.

CCR assessment

7.11.8.3 Climate modelling is associated with a range of uncertainties, as described in the UKCP09 Briefing Report[39]. Updated climate projections for the country, UKCP18, are due for publication in March 2018, which does not fit the timescales for this assessment. Uncertainties within the UKCP09 Weather Generator are even larger, due to additional spatial and temporal downscaling using statistical methods.

7.11.8.4 One limitation pertinent to the current EIA is that the UKCP09 only provides projections up to the 2080s; thus, climate projections until the end of the full design life of the scheme will not be fully explored.

7.11.8.5 Resilience of individual assets will not be assessed as part of this assessment; climate resilience will be assessed at the asset type level.

ICCI assessment

7.11.8.6 In addition to the limitations and assumptions within climate modelling discussed above, the ICCI assessment will be bound by the limitations and assumptions outlined within each environmental topic chapter.

7.11.9 Summary

7.11.9.1 The Proposed Scheme will have an impact on climate change through the emission of GHG during the course of its design, construction and operation. These will be assessed and mitigated wherever practical as part of the current EIA.

7.11.9.2 Infrastructure assets designed and constructed as part of the Proposed Scheme will likely be impacted by the effects of climate change. These effects will be explored at the asset type level and necessary additional mitigation measures will be developed where necessary and appropriate in order to ensure the continued resilience of the scheme in the context of a changing climate.

7.11.9.3 The assessments undertaken by all environmental topics within the current EIA may be affected by changes in climatic conditions. These in-combination climate change impacts will be assessed for all topics, with significant effects being further explored in detail.

[39] DEFRA, UKCP09 Briefing report; Available online at: http://ukclimateprojections.metoffice.gov.uk/media.jsp?mediaid=87868&filetype=pdf ; Accessed 17 Jul 2017 May 2017

8. Cumulative Effects Assessment

8.1 Approach to Cumulative Effects Assessment

8.1.1.1 The NN NPS states at Paragraph 4.16 that when considering significant cumulative effects, any ES should provide information on how the effects of the proposal would combine and interact with the effects of other development (including projects for which consent has been granted, as well as those already in existence).

8.1.1.2 In accordance with legislation the DMRB Volume 11, Section 2 Part 5: Assessment and Management of Environmental Effects (HA205/08) Cumulative Effects will be considered as part of the assessment process.

8.1.1.3 The DMRB identifies two types of cumulative impact in environmental assessment:

- Cumulative effects from a single scheme (acknowledging the outcomes of each of the environmental topics assessed for the proposed scheme) (also known as intra project effects); and
- Cumulative effects from different schemes (assessed in combination with the scheme in question) (also known as inter project effects).

8.1.1.4 The approach to identify the likely cumulative effects arising from the proposed scheme and its interaction with other schemes will be based upon guidance contained within DMRB. However, this guidance will be adapted in order to make it relevant to each environmental topic.

8.1.1.5 In-combination impacts on natural and human receptors and how climate change may impact in combination with the project will be assessed. The assessment should be undertaken by means of all other topic assessors considering climate projections and how they affect the evolving future baseline.

8.2 Study Area

8.2.1.1 DMRB guidance on the assessment of cumulative effects requires that the spatial boundary of the receptor/resource with potential to be affected directly or indirectly is considered. The study area for intra project effects will be set for each individual topic in line with DMRB Guidance. In setting the study area consideration will be given to schemes that:

- Will be occurring at times prior to or during construction of the proposed scheme;
- Are ‘in proximity’ to the proposed scheme; or
- Are considered likely to result in environmental effects which could act in synergy with effects arising from the proposed scheme.

8.2.1.2 The spatial scope of the inter-project cumulative effects study is taken to be the potential physical extent of the proposed scheme, and a 500m study area surrounding this area.

8.3 Identifying Cumulative Developments

8.3.1.1 The main source of data for the cumulative effects assessment will be the outcomes and information obtained from the individual environmental topic assessments. The assessment of cumulative effects arising from the proposed scheme in combination with other schemes will primarily constitute a desk-top study of planning documents broadly covering the location of schemes (if any are identified) considered relevant to the assessment.

8.3.1.2 Liaison will be undertaken with the Local Planning Authority to determine whether other schemes in the vicinity of the scheme should be taken into consideration.

8.3.1.3 The focus of the desk-top study will be the collection of information relating to the background of relevant projects, their expected timelines and likely environmental impacts.

8.3.1.4 The DMRB (HD 205/08) Guidance interprets 'reasonably foreseeable' projects to be considered for cumulative effects to encompass all schemes which are 'committed', including (but not necessarily limited to):

- Trunk Road projects which have been confirmed (i.e. gone through the statutory processes) in proximity to the Scheme; and
- Development projects with valid planning permissions for which statutory EIA is a requirement or a non-statutory EIA has been undertaken.

8.3.1.5 A high level review of planned major developments including those registered on the Cornwall Council Planning system has identified a number of planning applications within the surrounding Wards of Perranporth; Newlyn and Goonhavern; Ladock, St Clement and St Erme; Chacewater, Kenwyn and Baldhu; Mount Hawke; St Agnes and St Enoder.

8.3.1.6 The planned developments that were identified included several residential developments ranging from 28 to 132 new homes, several solar photovoltaic and wind turbine developments, as well as industrial site developments. Once the design process has been finalised, it will be possible to identify the developments that are likely to have construction and operation interactions with the proposed options. This will need to be updated once the construction programme and anticipated year of operation is available during later stages.

8.3.1.7 The adopted Cornwall Local Plan (2016) allocates housing and employment sites in various towns within 40 km, including Cambourne, Pool and Redruth, Truro, Falmouth, Newquay and St Austell. The Chiverton Cross to Carland Cross scheme is identified as a key infrastructure improvement on the draft Key Diagram. The cumulative impact of proposed development in the vicinity of the proposed Scheme would require assessment. The major cumulative impacts caused by this housing and employment growth are likely to be in relation to the intensification on scheme options use and the wider road network, which are considered in the transport work undertaken as a separate assessment.

9. Glossary

A		
AADT	Annual Average Daily Traffic	One of several ways of measuring the flow of traffic; represents the daily average number of vehicles using a particular link in the network, averaged across the whole year.
ADMs	Atmospheric Dispersion Models	The mathematical simulation of how air pollutants disperse in the ambient atmosphere.
ALC	Agricultural Land Classification	A system of classifying the quality of agricultural land, from Grade 1 (best) to Grade 5 (worst). Grade 3 is subdivided into 3a and 3b. For the purposes of government policy, Grades 1-3a are further classified as 'best and most versatile' agricultural land.
AONB	Area of Outstanding Natural Beauty	Statutory designation which confers the means to protect the most important landscape of England and Wales for the benefit of future generations.
APIS	Air Pollution Information Service	Searchable online database providing information on pollutants and their impacts on habitats and species.
AQMA	Air Quality Management Area	Local planning authorities are obliged to declare an AQMA in any area where there are, or are expected to be, exceedences of the relevant Air Quality objectives. The authority declaring an AQMA is obliged to prepare a management plan to prevent or remove any such exceedences.
B		
BAP	Biodiversity Action Plan	Biodiversity Action Plan is the UK Government's response to the Convention on Biological Diversity (CBD) signed in 1992. It describes the UK's biological resources and commits a detailed plan for the protection of these resources. The UK BAP has 391 Species Action Plans, 45 Habitat Action Plans and 162 Local Biodiversity Action Plans with targeted actions.
BMV	Best and Most Versatile	Agricultural land that falls within classification 1, 2 or 3a.

C		
CAD	Computer Aided Design	Use of computer systems to assist in the creation, modification, analysis, or optimisation of a design.
CDE	Construction, Development and Excavation	Preventing pollution, managing waste and resources sustainably.
CC	Cornwall Council	The applicant.
CEMP	Construction Environmental Management Plan	A plan prepared by a contractor before the start of construction work, detailing 'environmental aspects' that may be affected by the construction work and management methods to prevent any such effects. The CEMP would include methods and site management practices to be applied to prevent generation of nuisance dust, accidental pollution events and a range of other potential sources of accidental damage to the environment, and response and reporting procedures to minimise the damage in the event of a pollution incident.
CO	Carbon Monoxide	A pollutant emitted from vehicle exhausts.
COBA	Cost Benefit Analysis	A systematic process for calculating and comparing benefits and costs of a project.
CRoW	Countryside Rights of Way	Areas where the public can walk freely on mapped areas of mountain, moor, heath, downland and registered common land without having to stick to paths.
CRTN	Calculation of Road Traffic Noise	A computer model used to calculate the noise levels at any given location, identifying the contribution to that noise made by traffic.
CTMP	Construction Traffic Management Plan	A Plan that is prepared to minimise the impact of development on the public domain.
CWS	County Wildlife Site	Non-statutory designations for sites of county significance for wildlife or geology.
CWT	Cornwall Wildlife Trust	Local charity working to protect and enhance Cornwall's wildlife and wild places.
D		
DBA	Desk Based Assessment	Collation of existing written, graphic, photographic and electronic information.
DCLG	Department for Communities and Local Government	

DCMS	Department for Culture, Media and Sport	
DCO	Development Consent Order	Order under which the relevant Secretary of State can grant consent for construction of a Nationally Significant Infrastructure Project, on the advice of the Planning Inspectorate, under the Planning Act 2008 as amended.
DETR	Department of the Environment Transport and the Regions	
DEFRA	Department for Environment, Food and Rural Affairs	
DfT	Department for Transport	
DM	Do Minimum	A hypothetical scenario used to provide a realistic comparison of the effects of a scheme. The do-minimum scenario includes any changes to the highway infrastructure that would occur even if the scheme does not go ahead, and any other developments in the surrounding area that would influence the movement of traffic and would occur independently of the scheme.
DMP	Dust Management Plan	A DMP will include a risk assessment, and the proposed dust control measures and a timetable of dust generating activities.
DMRB	Design Manual for Roads and Bridges	The 'Design Manual for Roads and Bridges' was introduced in 1992 in England and Wales. It provides a comprehensive manual system, which accommodates all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads and motorways.
DS	Do Something	
E		
EA	Environment Agency	A non-departmental government body covering England and Wales, responsible for protection of the environment, including the regulation of polluting activities and the control and prevention of Flooding.
EcIA	Ecological Impact Assessment	An assessment of the possible positive and negative impacts that a proposed project may have the ecological receptors.
EHO	Environmental Health Officer	Local Authority Officer responsible for carrying out measures for protecting public health, including administering and enforcing legislation related to environmental health and providing support to minimise health and safety hazards

EIA	Environmental Impact Assessment	Under Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, proposers of certain scheduled developments are required to submit a planning application with an accompanying environmental statement, evaluating the likely environmental impacts of the development, together with an assessment of how the severity of the impacts could be reduced.
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2009	These Regulations set out the procedures that must be followed so that the consideration of applications for Nationally Significant Infrastructure Projects fully reflect the requirements of European Council Directive 85/337/EEC – as amended – on the assessment of the effects of certain private and public projects on the environment (The 'EIA Directive').
EPA	Environmental Protection Act 1990	An Act to make provision for the improved control of pollution arising from certain industrial and other processes.
ERCCIS	Environmental Records Centre for Cornwall and the Isles of Scilly	
ES	Environmental Statement	The report on the results of an EIA.
EU	European Union	
EUNIS	European Nature Information System	Contains information on selected species, habitats and sites of importance for protecting Europe's biodiversity.
F		
FRA	Flood Risk Assessment	An assessment of the risk of flooding, particularly in relation to residential, commercial and industrial land use.
G		
GDR	Geotechnical Design Review	A process whereby soils and geology are assessed for potential instability in order to provide a safe design.
GIS	Geographic Information System (computer mapping database)	A system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data.

GI	Ground Investigation	Assessment to obtain information on the physical properties of soil and rock around a site.
GLVIA	Guidelines for Landscape and Visual Assessment	Good practice guidance for the assessment of impacts on landscape and visual receptors.
H		
	Highways England	An Executive Agency of the DfT responsible for operating, maintaining and improving the SRN in England.
HAWRAT	Highways Agency Water Risk Assessment Tool	A method published by the HA to assist in assessing impacts on water quality in accordance with DMRB.
HDV	Heavy Duty Vehicle	A vehicle designed for heavy work.
HE	Historic Environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
HEPAO	Historic Environment Planning Advice Officer	Officer of the local authority responsible for the historic environmental.
HER	Historic Environment Record	A database maintained by individual counties or local authorities, containing records of archaeological sites, historic buildings and other aspects of the historic environment.
HGV	Heavy Goods Vehicle	The EU term for any lorry with a gross combination mass of over 3,500 kilograms.
HLC	Historic Landscape Character	Historic landscape character types are distinctive and repeated combinations of components defining generic historic landscapes such as ‘ancient woodland’ or ‘parliamentary enclosure’. The types used in this study were defined based on evidence from historic maps and other sources.
HMP	Habitat Management Plans	Habitat Management Plans are designed on a site basis and over a suitable time period for the purpose of creating and conserving habitats.
HSE	Health and Safety Executive	
I		

IAN	Interim Advice Note	Published by HA to modify/update guidance given within DMRB, in advance of the permanent replacement of the relevant sections of DMRB.
IAQM	Institute of Air Quality Management	
IEEM	Institute of Ecology and Environmental Management	A professional body for ecologists and environmental managers.
IEMA	Institute of Environmental Management and Assessment	A professional body for environmental managers and EIA professionals.
J		
JNCC	Joint Nature Conservation Committee	The public body that advises the Government on UK-wide and international nature conservation.
K		
L		
LAQM (TG)	Local Air Quality Management Technical Guidance	Designed to support local authorities in carrying out their duties under the Environment Act 1995.
LB	Listed Building	Building that has been placed on the Statutory List of Buildings of Special Architectural or Historic Interest.
LCA	Landscape Character Area	A zone or area as perceived by local people or visitors, whose visual features and character are the result of the action of natural and/or cultural (that is, human) factors
LEMP	Long Term Environmental Monitoring Plan	
LI	Landscape Institute	
LMP	Landscape Management Plan	A plan that includes a timetable and measures for landscape.

LMVR	Local Model Validation Report	Report which describes the steps taken to validate the transport model used for a particular scheme.
LPA	Local Planning Authority	Council responsible for determining planning applications within their administrative area and preparing Local Plans.
LTP	Local Transport Plan	
LWS	Local Wildlife Site	Sites designated for their local nature conservation value.
M		
MAFF	Former Ministry of Agriculture, Fishery and Food	
MOD	Ministry of Defence	
MPP	Monuments Protection Programme	A comprehensive review and evaluation by English Heritage of England's archaeological resource, designed to collect information which will enhance the conservation, management and appreciation of the archaeological heritage.
MT	Motorised Travellers	Persons using motor vehicles
N		
NE	Natural England	A public body responsible for the protection of the natural environment and landscape in England and the management of NNRs and SSSIs.
NMTs	Non-Motorised Travellers	Includes pedestrians, cyclists and equestrians.
NMR	National Monuments Record	Public archive of architectural and archaeological records.
NMUs	Non-Motorised Users	Includes pedestrians, cyclists and equestrians
NNR	National Nature Reserve	Established to protect sensitive features and to provide ‘outdoor laboratories’ for research
NO	Nitrogen Oxide	A chemical pollutant emitted from vehicle exhausts.
NO2	Nitrogen Dioxide	A chemical pollutant emitted from vehicle exhausts.
NPPF	National Planning Policy Framework	A statement of central government guidance on planning policy.

NSIP	Nationally Significant Infrastructure Project	Any infrastructure project that is deemed, according to the criteria set in the Planning Act 2008 (as amended), to be nationally significant. Such project are authorised through a statutory process that requires an application for a DCO, rather than either a conventional planning application or the traditional model through the publication of statutory Orders and the holding of Public Inquiries
NVC	National Vegetation Classification	A comprehensive classification and description of the plant communities of Britain.
NVZ	Nitrate Vulnerable Zone	Areas of land draining into nitrate polluted waters.
O		
OSR	Other Sensitive Receptors	Noise sensitive receptors other than dwellings.
P		
PAHs	Polycyclic Aromatic Hydrocarbons	Are potent atmospheric pollutants geological value
PEI	Preliminary Environmental Information	Information that the applicant must publicise before carrying out consultation of the community in advance of applying for a DCO, if the project concerned is subject to a requirement for EIA.
PMoW	Precautionary Method of Working	Method of legal compliance for working with protected species and sites.
PPIP	Public Path Improvement Programme	A strategy to improve and modernise the public path network and countryside access provision.
PPV	Peak Particle Velocity	The maximum or peak velocity value during a given measurement period.
PRoW	Public Right of Way	Includes public footpaths, bridleways and restricted byways.
Q		
R		

RIGS	Regionally Important Geological Site	Selected by voluntary geoconservation groups for their educational, historic and aesthetic value. Now referred to as Local Geological Sites.
S		
SM	Scheduled Monument	A schedule has been kept since 1882 of monuments considered to be of national importance by the Government. This is required under the Ancient Monuments and Archaeological Areas Act 1979 and a Scheduled Monument appears is listed on the relevant schedule.
SNC	Site of Nature Conservation	Designations used by local authorities in England for sites of substantive local nature conservation and geological value.
SoS	Secretary of State	Government minister.
SSSI	Site of Special Scientific Interest	A statutory designation under the Wildlife and Countryside Act 1981 (as amended), protecting nationally important wildlife sites, habitats and geological sites.
SWMP	Site Waste Management Plan	A plan required by law in England for all construction projects worth more than £300,000, governing the minimisation, management, storage, re-use and disposal of wastes generated through construction work.
SPZ	Source Protection Zone	These zones show the risk of contamination from any activities that might cause pollution in the area of groundwater sources such as wells, boreholes and springs used for public drinking water supply.
SWARMMS	South West Area Multi Modal Study	Long term strategy to address passenger and freight transport movement needs on the key transport corridors providing routes between London and the South West.
SAC	Special Area of Conservation	Strictly protected sites designated under the EU Habitats Directive, representing internationally important, high-quality conservation sites that significantly contribute to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended).
SPA	Special Protection Area	Site of European importance for bird conservation, designated under the EC Birds Directive.
SoCC	Statement of Community Consultation	A statement published by the proposer of a Nationally Significant Infrastructure Project, detailing how they intend to consult the community about their project before applying for a DCO. Required under the Planning Act 2008 as amended by the Localism Act 2011.

SSD	Stopping Sight Distance	The distance a vehicle driver needs to be able to see in order have room to stop before colliding with something in the roadway, such as a pedestrian in a crosswalk, a stopped vehicle, or road debris.
SRN	Strategic Road Network	Are the roads that move people and freight around the country.
SuDS	Sustainable Drainage System	A system designed to reduce the potential impact of new and existing developments with respect to surface water drainage discharges.
T		
TAG	Transport Analysis Guidance	Central Government guidance on the conduct of transport studies.
TPO	Tree Preservation Order	An Order made by a Council in respect of a tree(s) because the tree is considered to bring amenity value to the surrounding area.
U		
UKCIP	United Kingdom Climate Impacts Programme	Supports adaptation to the unavoidable impacts of a changing climate.
V		
VEDC	Value Engineered Dual Carriageway	
VER	Valued Ecological Receptor	Ecological receptors includes any living organisms other than humans, the habitat which supports such organisms, or natural resources which could be adversely affected by environmental contaminations resulting by a release at or migration from a site.
VDV	Vibration Dose Value	A cumulative measurement of the vibration level received over an 8-hour or 16-hour period.
W		
WCA	Wildlife and Countryside Act 1981 (as amended)	
WFD	Water Framework Directive	

WMP	Woodland Management Programme	Management plans provide information about the a site, its history and context in the landscape, operations planned for the first five years in detail and 20 years in outline
WSI	Written Scheme of Investigation	A methodology for the investigation and recording of artefacts and samples identified during construction.
X		
Y		
Z		
ZVI	Zone of Visual Influence	The area within which a project may be visible and may influence the quality of views. The 'zone of visual influence' approximately covers all land from which the scheme is visible. It is limited by topographic features such as hills and valleys, and by visual barriers such as woodland and buildings.

Appendix A. Comments on Scoping for Environmental Study Report

Consultee	Comment	How was the comment addressed?
Public Protection (Environmental Health), Cornwall Council	This fails to identify Truro AQMA (which is only 1km from Chiverton Cross junction.	The Truro AQMA had not been registered by Defra at the time of writing the scoping report.
	Monitoring has showed that air pollution levels in Truro are higher than they should be and a detailed assessment of air quality was commissioned. This report confirmed poor air quality at several locations along the A390, primarily at Highertown and Tresawls Road as well as the B3284 Kenwyn Road.	Truro AQMA has now been added into the Scoping report as a risk.
	There is no mention of construction phase impact to the wider road network, for instance Truro AQMA and Highertown corridor.	Construction impacts are at this stage unknown, as no construction plan has been developed. It is not possible to quantitatively assess impacts on traffic during construction as no construction phase traffic data will be made available.
	Careful management and monitoring necessary regards construction phase (diversions, phasing of works etc), 'rat running'.	Narrative relating to reducing impacts on local road networks during construction will be included within the mitigation section of the Environmental Impact Assessment Report. This will

		include potential impacts on the Truro AQMA and Highertown corridor.
	Rat-running (due to construction works, drivers chose to travel on surrounding roads), this can affect traffic flows on roads not directly affected by construction works, can result in reduced air quality, increased noise …effective traffic management or night-time working to reduce risk of rat-running however as above Truro AQMA, careful consideration needs to be given to minimising impacts to roads in Truro which already exceed the hourly mean.	WSP | PB will consult (discussion have begun) the Cornwall Council Public Protection team.
	Public Protection would need to be consulted with regards to data for monitoring and modelling purposes.	All emission factors are extracted from the EfT, and model outputs are validated using recent monitoring data as per IAQM guidance.
	Public Protection need to ensure the vehicles emission factor toolkit or traffic data are the most appropriate and relevant to Cornwall.	Due to the dispersed nature of residential receptors which are close (within 100m) proximity to the scheme options, dust impacts are considered to be of low risk.
	The scoping report states that dust emissions are only to be quantitatively assessed with dispersion modelling. Doesn't appear to mention the option for actual dust monitoring only future modelling.	Dust deposition monitoring is being scoped out. This scheme is of a similar scale with anticipated impacts as the A30 dualling at Temple, where no dust monitoring was implemented within that scheme.

	Public Protection have particulate monitors that can be hired with regards to dust monitoring, experience from recent East – West link road construction did result in numerous dust complaints, particular problem seems to be vehicle moving over dirt roads/surfaces etc. We would expect that all risks regards dust are assessed and management methods are proposed.	Dust management methods will be put forward within the schemes Environmental Impact Assessment Report.
	Private Water Supplies Section 4.7 The scoping report only mentions groundwater and surface water features within 1 km of the proposed scheme, these are to be identified using Envirocheck Report and site	We will include a review of private water supplies within the Environmental Impact Assessment at Stage 3.

	walkover to identify sensitive receptors, no mention of Private Water Supplies. Public Protection will need to be contacted to carry out a search for all private water supplies within 1km buffer of chosen route, there would be a charge for carrying out this search.	
	<u>Nuisance</u> (The scoping report details the main impacts from the construction and operational phases regards nuisance, however the report states that baseline monitoring has not yet been undertaken. It would be efficient to discuss the locations and methods of assessment with public protection prior to investigation/assessment.	The noise survey methodology will be discussed and agreed with the Public Protection team at Cornwall Council prior to undertaking the monitoring.
	<u>Contaminated Land Section 4.8</u> Preliminary risk assessment of scheme prior to development as detailed in section 4.8.	A Preliminary Risk Assessment has been undertaken and will be updated at Stage 2 and Stage 3.
	<u>CEMP: suggested to include table 4.8.1</u> To include full identification of risks, monitoring where necessary and management methods for control.	A Construction Environmental Management Plan will be prepared at Stage 3.
Coal Authority	I have reviewed the Scoping Report and can confirm that we have no comments to make on the issues to be included in the Environmental Assessment Report for this project.	No action required.

Historic England	Whilst the sensitivity of neighbourhood (negligible), and local (low), assets may be as described, it should be noted that these features have the potential for greater sensitivity within their neighbourhood or locality and should not be dismissed out of hand.	Noted, we will be mindful of this during the assessment phase.
	Whilst we welcome the reference to *The Setting of Heritage Assets* (English Heritage 2011), we would note that this document has been superseded by Historic Environment Good Practice in Planning Note 3; The setting of Heritage Assets (2015).	Reference to out of date documents is an oversight. We use the 2015 Planning Note 3.
	We do note that this document is referenced within the text. This document should be read in conjunction with Good Practice Advice notes 1 (The Historic Environment in Local Plans), and particularly note 2 (Managing Significance in Decision Taking in the Historic Environment).	Noted.
	Here we note that the correct version of *The Setting of Heritage Assets* is referenced. In addition to this section we would note the importance of understanding 'what's important and why', to the assessment of significance process.	This process is an integral part of the assessment.
	We would note that this table is incorrectly attributed to *The setting of Heritage Assets*. Whilst the content within the table is drawn from that document it is important to understand that it is presented there as a checklist and as such is not intended for tabular use. Indeed, the use of matrix based assessments is now discouraged for all but	The information is only presented in a table for presentation purposes. It is used in the essence in which it is presented in the original document.

	large complex projects, of which we appreciate this could be considered. Certainly for the designated heritage assets we would expect any attempt at a matrix based approach to be supported by detailed, reasoned narrative discussion. Whilst the Heritage Values described are those defined in NPPF, it is important to recognise that the Heritage Values as described *in Conservation Principles* (English Heritage 2008), are those that should be used when determining the significance of heritage assets. Finally, we would recommend that any visualisations relied upon to illustrate impacts on designated heritage assets should be based upon 75-80mm single image fixed focal length base photography.	The baseline will present the information as a narrative, but with the overall judgement using the matrix as outlined by DMRB guidance. We use the NPPF values to satisfy the planning policies, the Historic England values could be considered for those assets where there is the potential for significant impacts. It is not intended to produce any formal visualisations for the heritage assessment. They be prepared by the landscape team.
Natural England	Even though this is not an EIA scoping report, a similar structure of has been used and Natural England concurs with this decision. It is important that these sections are expanded once further details are confirmed once the project develops. Specifically, details should include: • A description of the development – including physical characteristics and the full land use requirements of the site during construction and operational phases.	Noted.

	• Expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development. • An assessment of alternatives and clear reasoning as to why the preferred option has been chosen. • A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors. • A description of the likely significant effects of the development on the environment – this should cover direct effects but also any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects. Effects should relate to the existence of the development, the use of natural resources and the emissions from pollutants. This should also include a description of the forecasting methods to predict the likely effects on the environment. • A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment. • A non-technical summary of the information. • An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	

	It will be important for any assessment to consider the potential cumulative effects of this proposal, including all supporting infrastructure, with other similar proposals and a thorough assessment of the 'in combination' effects of the proposed development with any existing developments and current applications. A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment. <u>Topic areas</u> *Air Quality* The Environmental Assessment Scoping report states that the guidance presented in the DMRB Volume 11, Section 3, Part 1 (HA 207/07) will be used to determine whether traffic effects are significant or not with regard to air quality. It should be noted that Natural England applies slightly different significance screening criteria for the protection of designated sites than those set out in the DMRB. The differences in approach and should be taken into account and applied where appropriate. Any potential impacts from dust should be demonstrated as having no significant impacts on designated sites, particularly within the 200m corridor either side of the road and during the construction phase. Of particular relevance is air quality issues potentially impacting the SAC. Once the Temple improvements works	Without specific reference to the origin of the revised screening thresholds for Habitats supplied by Natural England, the Threshold Criteria cannot be updated within the Scoping Report. Further information on the origins of this criteria are required, whether this be guidance or precedent. Dust impacts will be assessed using IAQM Construction Dust guidance (see

	on Bodmin Moor are complete next summer, weekend queuing of peak period traffic (often in the summer) has the potential to move from Bodmin Moor to Carland Cross until the Carland Cross to Chiverton Improvements have been completed. It is important that baseline Air Quality monitoring commences now so that the potential air quality impacts on Newlyn Downs SAC as a consequence of this change in traffic movements can be understood.	below) upon all designated sites within 200m of the scheme. Ambient air sampling is due to commence once the Scoping Report has been accepted.
	Air quality in the UK has improved over recent decades but air pollution remains a significant issue; for example over 97% of sensitive habitat area in England is predicted to exceed the critical loads for ecosystem protection from atmospheric nitrogen deposition (England Biodiversity Strategy, Defra 2011). A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The assessment should take account of the risks of air pollution and how these can be managed or reduced. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk). Further information on air pollution modelling and assessment can be found on the Environment Agency website. *Climate Change Adaptation*	Noted.

	The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The development of an innovative Green Infrastructure proposal as an integral part of the new road corridor has the potential for this scheme to help in delivering climate change resilience in this part of Cornwall in teams of both wildlife connectivity and catchment management. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 109), which should be demonstrated through the ES.	This will be considered at Stage 3.
	Ecology and Nature Conservation: Internationally and Nationally Designated Sites Further detailed assessment of the proposal should consider the potential to affect designated sites. Both proposed alignments will impact on land between the current A30 and Newlyn Downs Special Area of Conservation (SAC). This land provides important back up grazing for cattle which graze the SAC. Natural England will look to ensure that the new road alignment does not constrain the land managers ability to manage the SAC.	The impacts on the SAC have been considered.
	European sites (eg designated Special Areas of Conservation and Special Protection Areas) fall within the	Noted.

	scope of the Conservation of Habitats and Species Regulations 2010. In addition paragraph 118 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites. Under Regulation 61 of the Conservation of Habitats and Species Regulations 2010 an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site. Should a Likely Significant Effect on a European/Internationally designated site be identified or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an Appropriate Assessment, in addition to consideration of impacts through the EIA process. It has been confirmed that Natura 2000 sites are located within 2km of the route corridor. All the proposed route corridor options would cross within approximately 200m of Newlyn Downs Special Area of Conservation. Natura 2000 network site conservation objectives are available on our internet site	A screening assessment would be undertaken as part of Stage 3. Preceding this, a screening Assessment of Implications on European sites (AIES) has been undertaken as part of Stage 1 and is summarised as part the ESR at Paragraph 7.8. It will be updated at Stage 2. It should be noted that in this case the Secretary of State would be the competent authority for preparing the assessment. Noted.

	http://publications.naturalengland.org.uk/category/6490068894089216 *Sites of Special Scientific Interest (SSSIs) and sites of European or international importance (Special Areas of Conservation, Special Protection Areas and Ramsar sites)* It has been confirmed within Environmental Assessment Scoping Report, that four Sites of Special Scientific Interest are within 2km of the proposed route corridor. These sites include Newlyn Downs SSSI, Carrick Heaths SSSI, Carnkief Ponds SSSI and Ventongimps SSSI. The SSSIs in this central part of Cornwall are characterised by their small size and dispersed distribution. We would like to see the road corridor capture any opportunities to provide connectivity links between these SSSIs, but also building links between statutory designated sites non-statutory sites such as County Wildlife Sites as well as other areas of semi-natural habitat. By using the road corridor to build links between sites that support important wildlife features, the new road would demonstrate commitment to the delivery of the NPPF (in particular para 109) through the establishment of coherent ecological networks which are resilient over time. Further information on the SSSI and its special interest features can be found at www.magic.gov . A full assessment of the direct and indirect effects of the development on the features of special interest is required and this should identify mitigation measures in order to avoid, minimise or reduce any adverse significant effects.	Noted. This will be considered at Stage 3.

	Protected Species - Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2010 The Environmental Assessment Scoping Report has identified a number of protected and notable species. Natural England does not hold comprehensive information regarding the locations of species protected by law, but advises on the procedures and legislation relevant to such species. Records of protected species should be sought from ERCCIS (Environment Record Centre for Cornwall and the Isles of Scilly), the National Biodiversity Network , Cornwall Wildlife Trust and local Recording groups. Consideration must be given to the wider context of the site for example in terms of habitat linkages along and across the road corridor and protected species populations in the wider area will be impacted or could be benefited by the new road, to assist in the impact assessment. The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 *Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System*. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included. In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary,	Noted. Surveys have been programmed appropriately and WSP | Parsons Brinckerhoff is seeking confirmation that Natural England agrees with the survey methodology.

	licensed, consultants. Natural England has adopted standing advice for protected species which includes links to guidance on survey and mitigation. *Designated Landscapes and Landscape Character* *Nationally Designated Landscapes* The Environmental Assessment Scoping Report confirms the St Agnes section of the Cornwall Area of Outstanding Natural Beauty (AONB) lies approximately 5km north west of the A30 at Chiverton Cross. Consideration should be given to the direct and indirect effects upon this designated landscape and in particular the effect upon its purpose for designation, as well as the content of the relevant management plan. *Landscape and visual impacts* Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. Full assessment should also be made of the potential impacts of the development on local landscape character using landscape assessment methodologies. The road corridor is known to support important archaeological features which are prominent in the local landscape. These landscape features will require particular consideration. Natural England supports the publication *Guidelines for Landscape and Visual Impact Assessment*, produced by the Landscape Institute and the Institute of Environmental	The Cornwall AONB Unit has been consulted as part of the scoping exercise and do not consider there will be any impacts. The Landscape team will generally consider the location of the AONB and any potential impacts throughout all stages of assessment. This would be undertaken as part of EIA once the preferred route is announced. This guidance would be used.

	Assessment and Management in 2013 (3rd edition). The methodology set out is almost universally used for landscape and visual impact assessment. The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. *Water Quality* Any potential water quality impacts on surface or groundwater relevant to designated nature conservation sites should be assessed both during the construction and operation phases. Impacts should be considered locally but also in the wider catchment where issues of run-off of silt and pollutants may potentially impact some distance from the construction location. The design of runoff pathways and attenuation structures has the potential to significantly benefit not only the management of water resources in the catchments through which the road corridor runs, but along these features can play an important role in benefiting wildlife using the road corridor. Water management features should be designed and considered as a key element in Green Infrastructure approach to the design and management of the road corridor. *Hydrology* Heathland sites whose catchment area falls within the road corridor will be sensitive to hydrological changes such as drainage. The significance of any such potential hydrological impacts on relevant designated nature	These principles have and will be followed. These principles have and will be followed.

	conservation sites must be assessed and mitigation designed in at an early stage.	
Cornwall Area of Outstanding Natural Beauty (AONB) Unit	We will not be involved in this scheme as it is not within the Cornwall Area of Outstanding Natural Beauty (AONB).	No action required.
Natural Environment Team, Cornwall Council	No additional comments at this stage except to say that I would expect a report to inform appropriate assessment to be required for this project due to the proximity of the Newlyn Downs SAC. This is mentioned in your report but appears to have been left as an uncertain option.	Assessment of the Implications on European Sites (AIES) has been carried out in accordance with DMRB standards (DMRB Volume 11, Section 4, Part 1).
Cornwall Wildlife Trust	I have had a look at the scoping report and the key ecological issues all appear to be covered so I have nothing to add.	No action required.
CORMAC	<u>Ecology</u> Ensure survey corridor is wide enough to encompass proposed junctions and any construction activities (may not be appropriate for this stage)	The survey corridor has been based on the current design and includes a buffer, the size of which is dependent on the species. The ecology team will discuss potential construction footprint requirements as the Scheme progresses and where appropriate will take a precautionary approach in the surveys.
	<u>Trees</u>	

	Is there an arboricultural survey proposed? (again, may not be appropriate at this stage)	A 'light' tree survey (British Standard 5837:2012) will be carried out for the scheme corridor as part of Stage2.
	<u>Landscape</u> Wind farms mentioned but no mention of the solar farms evident adjacent to the A30. Does tranquillity (IAN 135/10) need considering?	 We have included mention of the solar farms at Marazanvose and Four Burrows within the ESR. We confirm that tranquillity will be considered in the Environmental Impact Assessment.
	<u>People</u> Paragraph 4.10.42 states that it is unlikely that private property will be required and Paragrah 4.6.4 states that some residential properties will have to be demolished. Is that correct? Paragraph 4.10.43 states no community land uses para 4.10.51 states some loss of community land. Is that correct?	 It is not known if any residential properties are required to be demolished, although private land will be required to build the preferred route. The route alignment for Option 1 does traverse an area of Open Access Land designated under the Countryside and Rights of Way Act. Although not required to be assessed under DMRB guidance, impacts upon Open Access Land will be assessed under the People and Communities assessment in the same manner as for other types of community land.
	<u>Cumulative</u>	

	Paragraph 4.11.9 – check Camborne spelling.	Checked.
Cornwall Council Environment Team. (multi-disciplinary comprising Environment Officers, Ecologists, Flood Officer, Conservation Officer, Area Manager for Landscape and Environment)	<u>Environmental Impacts</u> Many of the potential environmental impacts to do with the following issues will be picked up within the Environmental Impact Assessment (EIA) process: Some specific impacts highlighted by the group are as follows; *Statutorily Protected Sites (NE)* There are several SSSI's which could be indirectly impacted e.g. Newlyn Downs, Carrick Heaths and Silverwell Moor. *UK BAP Habitats* These are of high biodiversity value nationally and damage should be avoided. These habitats are also likely to support unknown protected species. This includes: - Lowland Heath at SW84147 53724 – adjacent and already impacted by existing A30 - Newlyn Downs closeby and SSSI - Chiverton Lodge SW80558 51006 – deciduous woodland	Constraints have been identified as part of the scoping process and encompass all those listed here.

	- Nanteague Farm, Venton Lea SW79506 49762 deciduous woodland adjacent to A30 - North Plantation SW76934 48606 deciduous woodland nearby. *Protected Species* Full surveys will be required but the following are known from site. - Otters: There are several crossings within this route which has reported RTAs so suitable new crossings should be considered for road design. - Bats: There are significant populations of bats particularly around the Chiverton Cross junction which includes Greater Horseshoe, Lesser Horseshoe and several other species. Unlit crossings and flight lines must be provided to ensure spring and autumn migration in the vicinity. A full ERCCIS data search for known populations is essential. - Dormice: The nearest dormice records include Perrancoombe Valley and St Agnes so given the presence of suitable habitat surveys will be required. - Night Jar: Predominantly located on the heathland to the north of the site, e.g. at Newlyn Downs.	

	Scheduled Ancient Monuments 1. The Four Burrows 2. The Three Burrows 3. Bowl barrow 125m south of St Peter's Church at Three Burrows 4. Bowl barrow 100m south west of Callestick Vean 5. Bowl barrow 425m south west of Higher Callestick Farm 6. Bell barrow 520m west of Pendown 7. Trevalsa Cross 350m north west of Trerice 8. Hillfort 250m south west of Tresawsen 9. Bowl barrow 130m south east of Penglaze 10. Warren's Barrow 11. Bowl barrow 500m north west of Higher Ennis Farm 12. Two bowl barrows 290m and 375m north of Higher Ennis Farm 13. Prehistoric long barrow and four round barrows 580m and 750m south west of Mitchell Farm 14. Round barrow cemetery 420m north east of Higher Ennis Farm *Hydrological features* The route follows the ridgeway / ridgeback of Cornwall and is effectively the top of the water catchment from the north and south of the road. Therefore any water will have to be managed carefully to avoid excess run off and contaminants into the water catchments. <u>Pinch points</u>	

	The discussion revealed a number of pinch points along the route from Carland Cross to Chiverton Cross as follows: • Carland Cross • Penglaze / Honeycombe Farm (underpass) • Zelah (village) • Zelah (stream) • Zelah Lane Farm (bridge / bridleway) • Chiverton Lodge (underpass) • Marazanvose • Nanteague Farm / Venton Lea (underpass) • Callestick Vean / Chybucca • Four Burrows • Chiverton Cross <u>Environmental Growth opportunities</u> The overall aspiration is for the route to be classed as a 'Super Green Highway'. To achieve this, a number of environmental enhancements were suggested corresponding to the pinch points as follows: <u>Carland Cross</u> - A green bridge concept to be incorporated into the design of the new bridge at the existing Carland Cross roundabout. This could be similar to the one near the Eden Project. This green bridge would	These opportunities will be explored as part of Stages 2 and 3.

	include natural vegetation and use seeds collected from plants in the nearby area and would link roads, footpaths, cycleways and bridleways. The green bridge would include a rest area (layby) with viewing point and interpretation boards to outline the landscape viewpoints (views to north coast), information about wind turbines, heathland, the Warren's Barrow heritage area and the natural flora and fauna in the area. Potentially some of the earth (from the soil being stripped away in the earthworks) could be used to expand the heathland area to the north of the road, so the soil is re-used locally. - Joining of Newlyn Downs SSSI/SAC with the Carland Moor CWS and Treworgan Quarry and Lower Tolcarne CWS through habitat creation, e.g heathland on north side of A30. This will create a wildlife corridor and enrich the existing habitats. - Any buildings associated with the road infrastructure should be built to the highest level of BREEAM standard. - <u>Penglaze / Honeycombe Farm (underpass)</u> - Joining of Newlyn Downs SSSI/SAC to north and Treworgan Quarry and Lower Tolcarne CWS to south of the road through habitat creation and improved links of footpath, cycleway and bridleway.	

	<u>Zelah (village)</u> - Join habitat to north and south of the road through habitat creation and improved links of footpath, cycleway and bridleway. - <u>Zelah (stream)</u> - Join habitat to north and south of the road through habitat creation and improved links of footpath, cycleway and bridleway. - <u>Zelah Lane Farm (bridge / bridleway)</u> - Enlarge the existing bridleway to encompass habitat and multi-use trails (footpath and cycleway also). <u>Chiverton Lodge (underpass)</u> - Enlarge the underpass to encompass habitat and multi-use trails (footpath, bridleway and cycleway also). - Important deciduous woodland which should be preserved and enhanced. <u>Marazanvose</u> - This is a particular pinch point due to the Town & Country garage on the north side and housing on the south side.	

	<u>Nanteague Farm, Venton Lea (underpass)</u> - Enlarge the underpass to encompass habitat and multi-use trails (footpath, bridleway and cycleway also). - Pine trees are an important landscape feature here on the north side of the road. - Joining up of the Carrick Heaths SSSI to the north and south of the A30. - Important deciduous woodland adjacent to A30 which should be preserved and enhanced. <u>Callestick Vean / Chybucca</u> - This is a dangerous and busy junction. Ideally a roundabout or green bridge would be good here. - Expand Callestick Vean CWS towards the road through habitat creation. <u>Four Burrows</u> - This is an important heritage site adjacent to the road, which would need to be by-passed (ideally to the north of the burrows). <u>Chiverton Cross</u>	

	- A green bridge concept to be incorporated into the design of the new bridge at the existing Chiverton Cross roundabout. This green bridge would include natural vegetation and use seeds collected from plants in the nearby area and would link roads, footpaths, cycleways and bridleways. The green bridge would include a rest area (layby) with viewing point and interpretation boards to outline the landscape viewpoints (views to north coast), information about solar farms, heathland, the heritage areas and the natural flora and fauna in the area. - Any buildings associated with the road infrastructure should be built to the highest level of BREEAM standard. <u>General Comments</u> - Any attenuation ponds that are put in along the route need to be designed well in order to include wildlife habitat. - Existing hedgerow enhancement along the route would be preferred, by letting the hedgerows grow and replacing any gaps. - New Cornish hedgerows can be built to maintain heritage and create a wildlife corridor along the route, as built along the A30 at Goss Moor.	

	- Access for multi-use trails; pedestrian footpaths, cycle ways and bridleways etc should be enhanced throughout the route area, providing links both along the A30 and across or under it. - Interpretation boards and signage could be placed throughout the route to emphasise the natural and cultural habitat, e.g. the signage used in around Nottingham / Midlands. - The Cornwall Wildlife Trust HQ at Allet is situation very close to the A30 and could help to provide information for the interpretation boards and work with local private landowners along the A30 route to enhance natural habitat. - Potential to create an 'Environment Hub' at the Chiverton Cross site for the joint housing of potentially CWT, RSPB, Natural England, Historic England, Eden Project etc staff and / or information. This would be the first of its kind in Cornwall. - - Any joining of existing landscape and wildlife sites needs to be done mindfully and only if it provides benefits to the natural environment. In some cases it may be better to just increase the size of the sites. - One reservation about joining up habitats is that it might cause the accidental spread of invasive	

	species, e.g. skunk cabbage and Japanese knotweed. - Any bat surveys that are undertaken need to show where key commuting routes are (from roosting to foraging areas). - Any culverts for otters could be heightened and widened to encompass the size needed for bats to pass through also (approx. 2.2m). - There is the potential to work with Clean Cornwall on a litter awareness campaign with signage along the new route and in lay-bys. - Ideally central reservations shouldn't be made out of solid concrete as they're not wildlife friendly. They should be made out of ordinary crash barrier metal and wire. - Where old sections of the A30 are by-passed, then these can be used for interpretation as parts of the important 'ridgeback' highway heritage. - The route improvements will increase flow, access and potentially the number of vehicles entering Cornwall. It could also increase movement of vehicles to sensitive sights, e.g. Godrevy / Gwithian. Can some funding be used to make off-site	

	contributions to improve visitor management at those sites? - Has there been any consideration for a park & ride service to alleviate the extra traffic entering Truro? This could potentially be placed on the Shortlanesend side of Truro. The group also noted that Historic England has not been invited to the meeting on 26th January and wondered how they will be consulted (as they are a key consultee).	Historic England has been consulted as part of the scoping exercise and will continue to be consulted at appropriate stages. Historic England was present at the meeting on 26th January.