A12 Chelmsford to A120 widening scheme

TR010060

7.10 DESIGN PRINCIPLES

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A12 Chelmsford to A120 widening scheme

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7.10 Design Principles

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Artist's impression of how the Marks Tey (junction 25) may look on day of opening (for illustrative purposes only)

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Executive summary

This Design Principles are one of the supporting documents submitted as part of the application for development consent for the A12 to A120 Widening Scheme ('the proposed scheme').

The proposed scheme comprises improvements to the A12 between junction 19 (Boreham) and junction 25 (Marks Tey), a distance of approximately 24km, or 15 miles.

The document summarises the design policy context and design principles of the proposed scheme, developed in response to 4.48 of National Policy Statement for National Networks (NNNPS) criteria for 'good design' for national networks and National Highways 'The Road to Good Design', among other key design guidance.

The design principles have been developed to meet the following the proposed scheme objectives:

- Support the growth identified in Local Plans by reducing congestion related delay, improving journey time reliability and increasing the overall transport capacity of the A12
- Private accesses to the strategic road network closed off and alternative access to local roads provided by the proposed scheme
- Improve road user safety
- Improve road worker safety during maintenance and operational use
- Reduce current and forecast congestion-related delays and therefore improves journey time reliability
- Understand the impacts of other schemes and recognises other RIS schemes
- Reduce the visual, air and noise quality impacts of the proposed scheme on affected communities on the route
- Reduce the impact of severance of communities along the route
- Improve accessibility for walkers, cyclists, horse riders, and public transport users
- Improve customer satisfaction, and reduce customer impact during construction

The Case for the Scheme [TR010060/APP/7.1] details the development of these objectives and contains an appraisal of all potential scheme options against these objectives.
The proposed scheme proposals incorporate the following key elements:

- Widening to three lanes in both directions between Hatfield Peverel and Marks Tey
- A new three-lane bypass at Rivenhall End (junctions 22 to 23)
- A bypass between junctions 24 to 25
- Improvements made to junctions 19 and 25
- Three new junctions constructed to replace existing junctions 20a, 20b and 23
- New and improved walking, cycling and horse riding routes

The design principles should be read alongside the Design and Access Statement (DAS) [TR010060/APP/7.4], Works Plans [TR010060/APP/2.2], General Arrangement Plans [TR010060/APP/2.9] and Engineering Section Drawings and Plans [TR010060/APP/2.12].

1.1 Introduction

1.1.1 This document is intended to identify and summarise the factors that have shaped the preliminary scheme design and ultimately secure principles for detailed design and construction.

1.1.2 The design principles are one of a suite of documents that capture the proposed scheme's design and environmental commitments. These documents include:

- Design and Access Statement (DAS) [TR010060/APP/7.4]
- Environmental Statement (ES) Chapter 2 [TR010060/APP/6.1] which describes the Scheme.
- The ES Figure 2.1 Environmental Masterplan [TR010060/APP/6.2] which defines the spatial layout of physical mitigation proposals.
- The Register of Environmental Actions and Commitments (REAC) [TR010060/APP/6.5] which defines commitments on the processes that need to be used in the delivery, management, monitoring and maintenance of the works.

1.1.3 The design principles are a result of the proposed scheme objectives, vision, policies, consultation and engagement. They set out a unified approach to design and create an overarching, shared resource for stakeholders over the required design outcomes. They provide detail on design commitment and objectives to be achieved through outline detailed design principles which leave some flexibility for the detailed designs to be developed.

1.1.4 The design principles have informed the preliminary scheme design shown on the works plans [TR010060/APP/2.2.1], highways engineering drawings and sections [TR010060/APP/2.12] and structures engineering drawings and sections [TR010060/APP/2.13] which are secured through the draft DCO [TR010060/APP/3.1] and that are certified in Schedule 2 Requirements, Part 1 Requirements '10. Detailed Design' of the draft DCO.

1.1.5 Temporary construction elements of the proposed scheme are addressed in the Temporary Works [TR010060/APP/2.2.3] and are not included in the proposed design principles.

1.1.6 Access and the parameters for access works are addressed in the Outline Construction Traffic Management Plan [TR010060/APP/7.7] with the parameters for their ongoing use during operation addressed in the Environmental Management Plan [TR010060/APP/6.5] and therefore not included in the proposed design principles.

1.1.7 The design principles are limited by the proposed scheme's limits of deviation.

1.1.8 Where appropriate, the design principle has been related to a specific character area as presented in map 1.1.

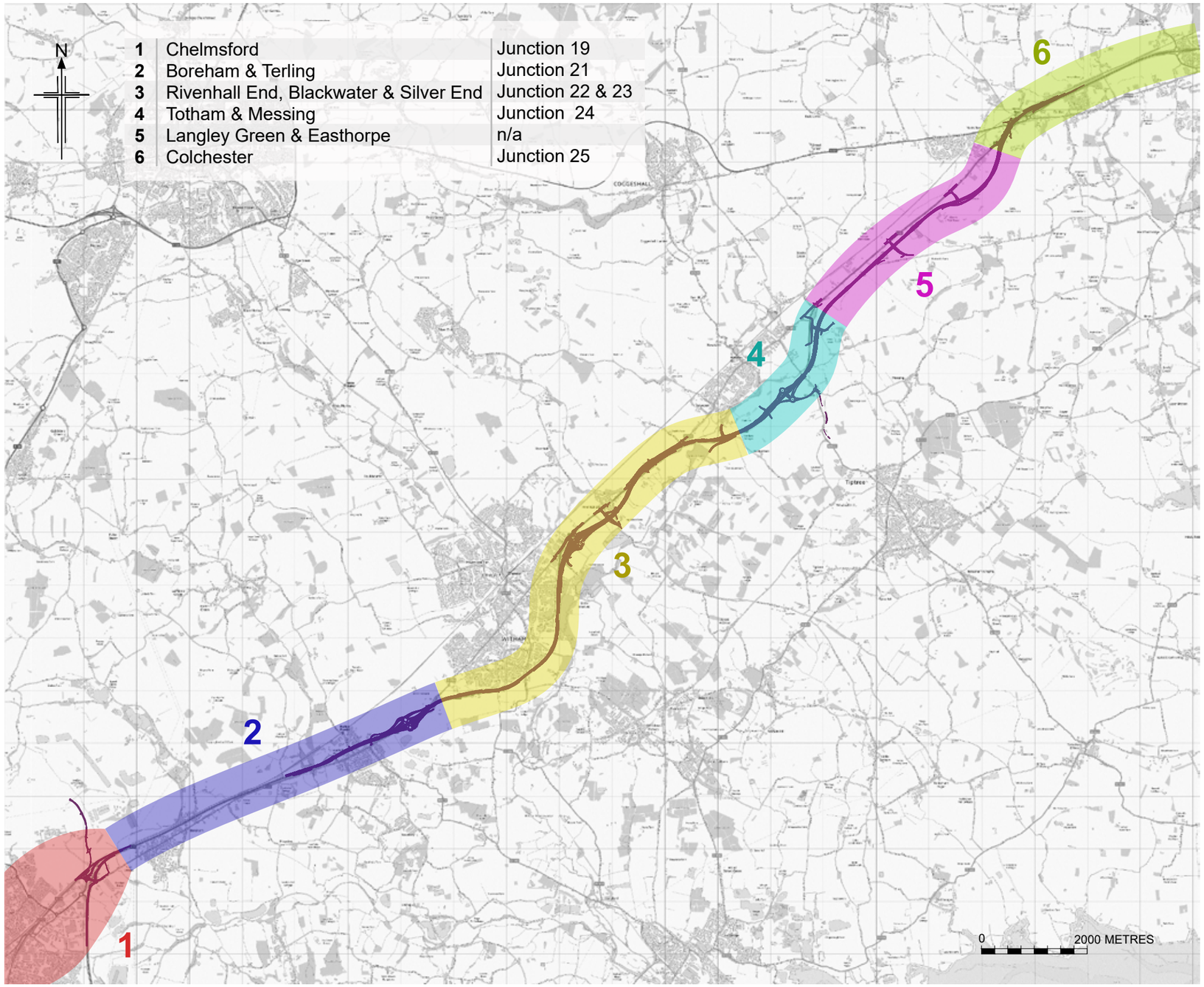
1.2 Character areas (CA)

1.2.1 A design narrative was produced within the Preliminary Environmental Impact Report (PEIR), which described the proposed schemes context and broke the proposed scheme down into 18 CAs. Each CA described the local context and a summary of the design constraints and opportunities.

1.2.2 PEIR CA's were then grouped and aligned to the junctions, to present the design development and proposed designs at Statutory Consultation. The areas presented are reflected in map 1.1.

1.2.3 More details on the CA and associated analysis can be found in the DAS [TR010060/APP/7.4].

Map 1.1: Character Areas



1.3 Design policy and standard context

1.3.1 Design principles are written to capture the key policies and principles that have shaped the design thus far, and to make a commitment that these will be maintained and developed in the future detailed design and delivery phases of the proposed scheme in accordance with NNNPS (Department for Transport, 2014) requirements for 'good design'.

1.3.2 The overarching design principles respond to the design objectives set out in the following:

- NNNPS
- The Road to Good Design
- Design principles for National Infrastructure
- Essex Green Infrastructure Strategy (EGIS)
- Technical Design Standards

1.3.3 Paragraph 4.34 of the NNNPS recognises that applicants may only have limited choice in the physical appearance of some national networks infrastructure. Whilst the development both of and on the strategic road network needs to adhere to standards set out in the Design Manual for Roads and Bridges, every effort has been made to ensure that good design principles are embedded into the design development of the proposed scheme.

National Networks National Policy Statement (NNNPS)

1.3.4 The NNNPS provides guidance and imposes requirements on matters such as good scheme design, as well as the treatment of environmental impacts.

1.3.5 Paragraphs 4.28-4.35 of the NNNPS set out the criteria for 'good design' for national networks noting that design shall be an integral consideration from the outset. Paragraph 4.29 states:

- *"Visual appearance should be a key factor in considering the design of new infrastructure, as well as functionality, fitness for purpose, sustainability and cost. Applying "good design" to national network projects should therefore produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction, matched by an appearance that demonstrates good aesthetics as far as possible."*

1.3.6 Achieving compliance with the NNNPS requires a high level of coordination across design, engineering, and environmental specialisms as well as consultation with external stakeholders. The design principles apply to the proposed scheme's permanent physical structures (including highways, tunnels and buildings) and landscape works; they do not apply to the temporary works, utilities diversions and/or methods of construction, nor do they describe in detail how the works will be operated and maintained.

1.3.7 For more information on how the proposed scheme has been developed to comply with the NNNPS criteria for good design please see the Accordance Table within the Case for the proposed scheme [Document Reference: TR010060/APP/7.2].

The Road to Good Design

1.3.8 The RIS 1 includes the government's vision to *'…see the strategic road network working more harmoniously with its surroundings, impacting less on local communities and the environment'*

1.3.9 The Road to Good Design (Highways England, 2018), sets out the Applicant's vision for delivering roads that, as well as being safe, efficient and affordable, are also beautiful and examples of excellence. It aims to place good design at the heart of everything the organisation does, and ensure our roads better serve the people who use them and the environments through which they pass. It sets out design principles under the following three themes:

- Connecting People: People are at the heart of our design work, making good roads safe and useful, inclusive and understandable. Good road design reflects users' needs, engages with communities and works intuitively for all.
- Connecting Places: Good road design demands a deep understanding and response to place, to create a quality aesthetic experience for the user and wider community. This is restrained and environmentally sustainable design, in fitting with the context.
- Connecting Processes: A successful outcome focused on people and places requires good design processes. These are collaborative, thorough and innovative, generating long-lasting outcomes that are of benefit to users and the wider community.

Design Principles for national infrastructure

1.3.10 National Infrastructure Commission (NIC) published design principles for national infrastructure based on advice received from the independent National Infrastructure Design Group, made up of experts and leaders in design, architecture, engineering and landscape.

1.3.11 NIC developed four principles to guide planning and delivery of major schemes:

- Climate: Mitigate greenhouse gas emissions and adapt to climate change.
- People: Reflect what society wants and share benefits widely.
- Places: Provide a sense of identity and improve our environment.
- Value: Achieve multiple benefits and solve problems well.

Essex Green Infrastructure Strategy (EGIS) (2020)

1.3.12 Essex County Council (ECC) have produced a green infrastructure strategy (Essex

Green Infrastructure Strategy: A strategy that champions for high quality green space and green infrastructure in Essex, 2020). The EGIS outlines the vision and objectives for the county as follows: *'We will protect, develop and enhance a high quality connected green infrastructure network that extends from our city and town centres, and urban areas to the countryside and coast and which is self-sustaining and is designed for people and wildlife.'*

1.3.13 The vision and objectives set out what this strategy aim to achieve, recognising that good infrastructure is not an end, but an enabler of better social, economic and environmental outcomes.

1.3.14 EGIS objectives include:

1. Place
- Protect existing green infrastructure, especially designated sites
- Improve existing green infrastructure so it is better functioning for people and wildlife
- Create more high-quality multi-functional green infrastructure, especially in areas
- of deficiency
- Improve the connectivity of green infrastructure for people and wildlife

1.3.15 2. People
- Increase use and inclusivity of green infrastructure across all user groups, social groups and abilities
- Provide green infrastructure facilities to promote health and wellbeing

3. Funding
- Working with partners to build and secure funding, effective governance and stewardship for new and existing green infrastructure to ensure their long-term sustainability

Technical Design Standards

1.3.16 The proposed scheme proposes to upgrade the existing A12 to a high-performing three-lane carriageway. It would benefit from modern safety measures and construction standards. This is achieved by designing the route to standards as defined in the Design Manual for Roads and Bridges ('DMRB'). The DMRB requirements and advice relating to works on motorways and all-purpose trunk roads for which National Highways is responsible.

1.3.17 The DMRB was prepared jointly by the Overseeing Organisations, which include National Highways. The DMRB embodies the collective experience of the Overseeing Organisations, their agents and designers. It provides requirements and advice resulting from research, practical experience of constructing and operating motorway and all-purpose trunk roads, and from delivering compliance to legislative requirements.

1.3.18 With regard to engineering components of the proposed scheme, including structures, walking, cycling and horse-riding (WCH) routes, and highways drainage, DMRB standards and guidance have been applied during the design development process. These include, but are not limited to:

- CD 109 Highway link design
- CD 116 Geometric design of roundabouts
- CD 122 Geometric design of grade separated junctions
- CD 127 Cross-sections and headrooms
- CD 143 Designing for walking, cycling and horse-riding
- CD 350 The design of highway structures
- CD 351 The design and appearance of highway structures
- CD 529 Design of outfall and culvert details
- CG 501 Design of highway drainage systems
- TD 501 Road lighting design

Place Services: Essex Tree Palette (2018)

1.3.19 ECC have produced a guide to inform tree species (Place Services: Essex Tree Palette. A guide to choosing the most appropriate tree species for Essex sites according to landscape character and soil type, 2018).

1.3.20 The guide is based on landscape character type and has been used to inform typical species mixes within the indicative species lists presented within the first iteration Landscape and Ecological Management Plan, appended to the first iteration ES Figure 2.1 Environmental Masterplan [TR010060/APP/6.2].

1.4 Design Principles

1.4.1 The feedback received at statutory consultation was grouped together by area and similarity of issues raised. These were then used to develop the scheme-wide design principles and also area specific design principles as highlighted out in column four of the design principle tables.

1.4.2 The purpose of the design principles are:

- To define high quality design principles which set the framework within which, through the DCO, the detailed design of the Scheme would be required to respond; taking account of the sites' changing surroundings.
- To provide enough information to guide the EIA and embed essential measures for the mitigation of significant effects.
- Give confidence to stakeholders that their requirements and aspirations for the new infrastructure (including the road, landscape and structures) would be taken into account.
- To capture National Highways design related commitments in response to public consultation and ensure that these are followed through to detailed design.
- To establish how National Highways has, and would continue to take account of the criteria for good design set out in the NN NPS and Road to Good Design, in order to ensure that the development is as sustainable and as aesthetically sensitive, durable, adaptable and resilient as it can reasonably be.

1.4.3 In the following sections of this chapter the preliminary proposed scheme is set out, explaining how these design principles could be realised through the proposed scheme design. Each section is divided by Road to Good Design theme or design discipline and each relevant design principles are reproduced in a simple table, to clearly demonstrate how the illustrative design responds to them.

Connecting people

1.4.4 *'People are at the heart of our design work, making good roads safe and useful, inclusive and understandable. Good road design reflects users' needs, engages with communities and works intuitively for all'* (Highways England, 2018).

Ref. no.	Design principle name	Design principle	Character area
PEO.01	Walking, cycling and horse riding (WCH)	WCH crossings and the paths surrounding the route have a design that is safe, considers the convenience of users, and the local traffic network, and the context of the surrounding landscape character.	All
PEO.02	WCH user experience	In order to allow enable users to stay aware of their location and use crossings safely, WCH crossings across and adjacent to the proposed scheme would include clear and informative signage to provide wayfinding for users.	All
PEO.03	WCH network	In order to enable users to stay aware of their location and use crossings safely, WCH crossings across and adjacent to the proposed scheme would include clear and informative signage to provide wayfinding for users.	All
PEO.04	WCH Accessibility	The design of the new WCH routes maximise access for users (including those with limited mobility) through good design whilst considering and mitigating the potential impacts from misuse.	All
PEO.05	WCH safety	WCH routes are separated where possible from the mainline A12 in order to maximise safety of users and their experience. This would be achieved by separating all WCH paths and crossings from the mainline A12, providing the appropriate separation from the carriageway at junctions and local roads, and providing barriers to prevent unauthorised access.	All
PEO.06	WCH (detailed design)	The surfacing, signage, boundary treatments and access controls would be designed with consideration of the surrounding context. Surfacing, signage, boundary treatments and access controls are adapted where appropriate to better fit with their surrounding context as WCH routes travel between rural and urban environments.	All
PEO.07	WCH bridges	Structures such as bridges are situated in places relevant to the existing WCH network, to address both historical severance and severance caused by the proposed scheme.	All
PEO.08	Horse-riding	The WCH network would provide a safe crossing for horse-riders by addressing historic bridleway severance.	CA.1

Connecting places

1.4.5 *'Good road design demands a deep understanding and response to place, to create a quality aesthetic experience for the user and wider community. This is restrained and environmentally sustainable design, in fitting with the context.'* (Highways England, 2018).

Ref. No.	Design principle name	Design principle	Character area
PLA.01	Design language	The design has been developed according to a common design language whilst remaining sensitive to place. As the proposed scheme travels through both rural and urban contexts, the design language is adapted to be appropriate to its surroundings.	All
PLA.02	Efficient design	Structures, landscape, and engineering design are efficient in their use of resources and multifunctional where practicable.	All
PLA.03	Highways environment	The amount of roadside furniture and signage is reduced or combined as far as practical, whilst remaining within safety standards.	All
PLA.04	Future development	The route of the proposed scheme and related design would be 'forward looking' in regard to future development. The design of the proposed scheme would avoid constraining future development through severance of land parcels or the placement of new habitats, structures and WCH routes.	All
PLA.05	Severance	The severance of communities is avoided and where practicable, improved though the provision of new WCH crossings and routes.	All
PLA.06	Access	Where access from properties and other roads to the existing A12 is removed to improve safety, alternative access to the local road network is provided.	All
PLA.07	Habitat connectivity	The fragmentation of habitats is reduced as far as reasonably practicable by avoiding unnecessary barriers to movement of animals or colonisation by plants.	All
PLA.08	New habitats	New habitats and ecosystems are created where borrow pits or works compounds are located. These habitats are designed with consideration to the wider ecosystem and as discussed in PLA.07, design proposals would ensure their connectedness to the surrounding ecosystem.	All
PLA.09	Potential for A120 link road	A link road between the A12 and the A120 was announced in March 2020 as a 'pipeline Scheme' in the second Road Investment Strategy (RIS2). Efforts would be made to coordinate with and provide all relevant design information to the A120 team.	To be confirmed

Connecting Processes

1.4.6 *'A successful outcome focused on people and places requires good design processes. These are collaborative, thorough and innovative, generating long-lasting outcomes that are of benefit to users and the wider community'* (Highways England, 2018)

Ref. No.	Design Principle Name	Design Principle	Character Area
PRO.01	Design Review	The proposed scheme would continue to engage with the National Highways Design Review Panel on the development of the detailed design and adapt the design according to comments raised by the panel.	All
PRO.02	Stakeholder consultation	The design process has been guided by engagement with stakeholders from the start of the design process. The range of views of stakeholders affected would be taken into account and where practicable, reflected in the detailed design of the proposed scheme.	All
PRO.03	Carbon reduction	All design proposals have been developed with the goal of reducing carbon emissions in mind. Beyond reducing emissions through journey times, low-carbon materials and construction processes shall be specified in the design where practicable and economically viable.	All
PRO.04	Maximising biodiversity	The detailed design of structures, buildings and landscape shall be developed with the goal of maximising biodiversity where practical and within the scope of the proposed scheme.	All
PRO.05	Minimal waste and need for new materials	The design of the proposed scheme seeks to reduce the level of waste and need for new materials in constructing the proposed scheme. This would be achieved by creating borrow pits to minimise the amount of new earth and minerals brought onsite, where practicable, the reuse of existing structures, signage, lighting and technology, and efficient and well-managed construction processes. This would contribute towards minimising carbon reductions, as discussed in principle PRO.03, and delivering value for money.	All

PRO.06	Mineral resources	The design of the proposed scheme considers the use of mineral resources from the outset. Where practicable, the proposed scheme would avoid mineral sterilisation and mineral use. This would be achieved though minimising land take in Mineral Safeguarding Areas, specified in Chapter 10, Geology and Soils, of the Environmental Statement [Document Reference: TR010060/APP/6.1].	CA.1 and CA.3

Structures

1.4.7 This section relates to specific requirements for bridges, culverts and other structures across the proposed scheme.

Ref. No.	Design Principle Name	Design Principle	Character Area
STR.01	Serviceable in use	The detailed design of structures would ensure that they fulfil their function and are able to withstand the required abnormal heavy vehicle loads (Heavy Load Route No. 82) without restriction. As discussed in PEO.07, bridges and other structures would be placed in locations that integrate with the wider WCH and road network.	All
STR.02	Safe to build for workers and public	The detailed design for structures should consider the speed, efficiency and safety of each feature's installment. Construction sequencing, precasting and prefabrication of standardised bridge components would be proposed to reduce the amount of in situ working, in turn leading to less potential for risk of accidents to the workforce and public.	All
STR.03	Design for maintenance	The detailed design of structures should consider their future maintenance from the outset. Whilst materials and designs would be chosen to minimise the need for maintenance, structures should be positioned and designed in such a way that would enable safe maintenance works to be carried out with minimal disruption to A12 users.	All
STR.04	Design for durability	The selection of materials used for structures has been considered for their durability qualities, minimising future maintenance requirements. Where practicable, detailed designs would be adaptable for future needs and technologies, balanced against cost constraints and their suitability to the local context.	All
STR.05	Value for money	The proposed scheme should deliver value for money by achieving its objectives, as set out in Chapter 2.4 of the Case for the proposed scheme, Scheme Aims and Objectives, [Document Reference: TR010060/APP/7.1]. The detailed design of the proposed scheme should deliver these aims and objectives in a cost-efficient manner, considering the cost of construction and materials throughout the design process. Cost-effectiveness would be weighed against aesthetic value, safety, and other design principles discussed in this chapter.	All
STR.06	Bridges (detailed design)	The detailed design of bridges shall share a consistent design approach that uses similar details with appropriate diversification for their local context. Bridges should be incorporated within their context through their material palette and associated landscaping for aesthetic purposes.	All
STR.07	Barriers and fences	In order to avoid duplication leading to the creation of visual clutter, environmental, boundary, and security fences are combined into a single structure as much is reasonably practicable. Parapets and acoustic barriers are also combined where appropriate. The materials used for barriers and fences have been considered for their durability, cost, and their surrounding landscape context.	All
STR.08	Noise barriers	Proposals balance mitigation requirements for noise and visual impacts in such a way as to minimise the negative impact on tranquility and landscape character. The materials used for noise barriers have been considered with respect for the surrounding context of landscape to avoid the perceived urbanisation of rural areas.	All
STR.10	Fit into environment: Urban places	Structures are designed to be incorporated unobtrusively within their environment. Structures should complement the local character context, using similar materials to surrounding structures where practicable.	CA.1 and CA.6
STR.11	Fit into environment: Rural places	The detailed design for structures in rural settings should seek to minimise their impact on the local environment. This should be achieved through use of a muted material palette and incorporating the structure into the local character context through earthworks and planting.	CA.2, CA.3, CA.4 and CA.5

Lighting, signage and technology

1.4.8 '*Road design is more bound to place and function than other design fields, with specific demands of technical design and safety that must be met. Since aesthetic considerations must accept these demands, the potential for variation is more challenging, but still possible for many elements such as signs and lighting'* (Highways England, 2018)

Ref. No.	Design Principle Name	Design Principle	Character Area
LST.01	Lighting safety	Lighting, signage and technology used across the proposed scheme would adhere to and support the most modern and effective safety measures. Signage would clearly communicate risk and danger to drivers, cyclists, pedestrians and horse riders.	All
LST.02	Aesthetic value (detailed design)	The detailed design of lighting, signage and technology should consider aesthetic value and its surrounding context of landscape, balanced against safety, cost and durability considerations.	All
LST.03	Place sensitivity (detailed design)	The detailed design of lighting, signage and technology features should be responsive to their local landscape character. Consideration should be given to the rural or urban location of their placement, and the proximity of heritage assets. Appropriate material palettes and forms should be selected accordingly. Lighting, signage and technology should contribute to a sense of place, contribute towards a place's amenity, help prevent crime and fear of crime.	All
LST.04	Intuitive wayfinding	For both motor and WCH users across the proposed scheme, clear and intuitive signage, positioned in the most suitable locations to aid journeys, would aid wayfinding.	All
LST.05	Unnecessary signage (detailed design)	The detailed design of the proposed scheme should avoid unnecessary traffic signage to minimise clutter, especially where it would act as a roadside distraction or detract from local amenity.	All
LST.06	Lighting signs	Wayfinding signs do not always need to be illuminated by internal or external lighting, or use reflective materials, particularly for signage in the WCH network. The use of lighting with signage should be evaluated against safety, effectiveness and potential light pollution.	All
LST.07	Lighting design	Lighting designs should enhance night-time use, enjoyment and provide safe passage for users of the A12 and surrounding WCH network.	All
LST.08	Light pollution	The need for lighting to promote user safety and enjoyment should be balanced where practicable with the need to promote biodiversity and avoidance of light pollution.	All
LST.09	Lighting: rural context	Lighting, signage and technology should balance the need for safety and effectiveness with the need for discretion in order to maintain the rural context of the route and surrounding WCH network. Lighting should be discreet whilst still being visible and should minimise light pollution.	CA.2 and CA.4
LST.10	Sensitive lighting (detailed design)	Sensitive lighting design should include the use of horizontally mounted flat glass lanterns, the use of modern dimmable light emitting diodes (LED) with cut-off properties, together with dynamic systems of operation to provide the minimum amount of light required at different times.	All
LST.11	Column Height (detailed design)	Minimise the height of lighting columns, particularly where on elevated parts of the proposed scheme.	All
LST.12	Main road signs	Sensitive location of main road signs to limit visual intrusion within the landscape.	All

Landscape

1.4.9 The proposed scheme is based upon the following landscape design principles, which have been applied to the ES Figure 2.1 Environmental Masterplan [TR010060/APP/6.2] which would be carried forward into the detailed design as per Schedule 2, Part 1 to the draft DCO [Document Reference: TR010060/APP/3.1].

Ref. no.	Design principle name	Design principle	Character area
LSC.01	Retain vegetation	Retain as much existing vegetation as possible where it provides an important visual screening function and/or forms part of the landscape structure. Where vegetation loss is unavoidable, replace and extend areas of proposed planting into the landscape to provide screening and to contribute towards the surrounding framework of vegetation.	All
LSC.02	Maximise biodiversity	Maximise the biodiversity value of habitat throughout the proposed scheme extent and improve wildlife connectivity by incorporating linear habitats such as hedgerows and lines of trees, linking with retained woodland and hedgerows where possible.	All
LSC.03	Landscape	Reinforce the landscape character and biodiversity by planting native species typically found within the surrounding landscape.	All

LSC.04	Visual	Provide visual interest for local residents, users of public rights of way and public open space; including incorporating intermittent planting to allow views out from the road for drivers using the A12.	All
LSC.05	Screening	Filter, screen and contain views of major junctions and integrate into the surrounding landscape framework of native planting.	All
LSC.06	Drainage and floodplain	Aim to limit the overall extent of the proposed scheme as much as possible when considering the design and location of drainage ponds and floodplain compensation areas.	All
LSC.07	Drainage (detailed design)	Integrate drainage and earthworks sensitively into the surrounding landscape in terms of earth modelling and planting, and carefully consider structure design over watercourses, aiming to minimise visual intrusiveness, connectivity for wildlife and maintain the character of the landscape and views along valley floors.	All
LSC.08	Floodplain	Within areas of floodplain keep land take and vegetation loss to an absolute minimum to retain the locally distinctive willow plantations. Ensure proposed planting contributes to the pattern and character of existing vegetation.	All
LSC.09	Junction alignment	Alignment of the proposed scheme and location of junctions and borrow pits would be designed to reduce landscape and visual effects.	All
LSC.10	Structures (detailed design)	Careful design of major structures, signage and gantries to limit visual intrusion and to help integrate these into the wider landscape.	All
LSC.11	Earthworks (detailed design)	Refinement of the design of earthworks to create natural gradients and slopes that achieve better integration with the surrounding landform, where space and material are available.	All
LSC.12	Borrow pits and attenuation	Sensitive design of borrow pits and attenuation ponds, to integrate these features into the landscape and reduce visual intrusion.	All
LSC.13	Species	Planting of native hedgerows, shrubs and trees would reduce adverse landscape and visual effects. Consideration of the species, pattern and distribution of proposed hedgerows, shrubs and trees along the proposed scheme would reflect the distinctive local character of vegetation within the adjacent landscape and provide screening for visual receptors.	All
LSC.14	Minimise scale	Dense native tree and shrub planting on and adjacent to highway earthworks would create woodlands, copses and shelterbelts in order to break up the scale of the road, screen structures, traffic and lighting, and help integrate the proposed scheme into the existing landscape pattern.	All
LSC.15	Integration	Support green infrastructure objectives through use of planting to link into existing field boundary vegetation to provide screening and integration into the local pattern and character, as well as connection of existing wildlife corridors.	All
LSC.16	Planting	Use of locally indigenous native and non-native plants as appropriate to reflect the distinctive local character, such as the replication of willow plantation on valley floors.	All
LSC.17	Screening	Consideration of balance between screening the proposed scheme, and retention of views out from the highway through breaks in the planting to help create a sense of place and stimulating visual experience for vehicle travellers where practicable.	All

Borrow Pit Restoration

Ref. no.	Design principle name	Design principle	Character area
BPR.01	Gradient (detailed design)	Borrow pits would be shaped to form natural gradients with rounded contours to integrate into the surrounding landscape.	All
BPR.02	Waterbodies (detailed design)	Where waterbodies remain after excavation these would include scalloped edges and shallow slopes or berms for safety, and to improve access and egress for animals.	All
BPR.03	Planting	Planting within the restored borrow pits would include woodland planting where screening is required along with intermittent tree and scrub planting and individual trees in species-rich grassland.	All
BPR.04	Boundaries	Boundaries with new or gapped up hedgerows with trees would tie into existing features to help restore the landscape pattern and maintain ecological connectivity.	All
BPR.05	Aquatic and wetlands	Aquatic and wetland planting would be introduced at the margins of waterbodies along with areas of wet woodland planting.	All

BPR.06	Flood Risk Assessment	Borrow pits would be restored such that the designed flood mitigation would function as described in the Flood Risk Assessment (Appendix 14.5 of the ES) [TR010060/APP/6.3]	All

Veteran Trees

Ref. no.	Design principle name	Design principle	Character area
VT.01	Loss (detailed design)	Where the loss of ancient or veteran trees is unavoidable the hulk of the ancient or veteran tree would be left as close as possible to its original location to benefit invertebrates and fungi. If that is not possible they would be moved near other ancient and veteran trees in the area.	All
VT.02	Compensation (detailed design)	Loss would be compensated for by planting young trees of the same species near to the trees they are replacing. Over planting of young trees would be implemented where practicable to ensure a good survival rate.	All

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