A12 Chelmsford to A120 widening scheme

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT NON-TECHNICAL SUMMARY

Statutory Consultation 2021

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Introduction

Scheme overview

We, on behalf of the Department for Transport, are proposing to deliver improvements to the A12 between junction 19 (Boreham interchange) and junction 25 (Marks Tey interchange), a distance of approximately 24km, or 15 miles (see location plan below). Known as the A12 Chelmsford to A120 widening scheme, the proposed scheme involves widening the A12 to three lanes throughout (where it is not already three lanes) with a bypass between junctions 22 and 23 and a second bypass between junctions 24 and 25. It also includes safety improvements, including closing off existing private and local direct accesses onto the main carriageway, and removing provision for walkers, cyclists and horse riders along the A12 by providing alternative routes.

Location plan

Development Consent Order

The proposed scheme is classed as a Nationally Significant Infrastructure Project under the Planning Act 2008, triggering the need to apply for a Development Consent Order (DCO).

The proposed scheme is currently in the pre-application stage of the DCO process. This involves developing the design and carrying out all necessary assessment and consultation before submitting the DCO application. We are intending to submit the application in spring/summer 2022.

The proposed scheme could result in significant environmental effects, so an Environmental Impact Assessment (EIA) is needed. The results of the EIA will be documented in an Environmental Statement, which we will submit as part of the DCO application.

Preliminary Environmental Information Report

The Preliminary Environmental Information Report (PEIR) for the proposed scheme has been produced to support the statutory consultation. The PEIR includes environmental information to allow consultees to understand the likely significant environmental effects of the proposed scheme and measures proposed to avoid or reduce such effects. The PEIR is provided to help members of the public, consultees and other stakeholders to develop an informed view of the proposed scheme when submitting consultation responses.

This is the non-technical summary of the PEIR, which presents the information in the PEIR in non-technical language.

The proposed scheme

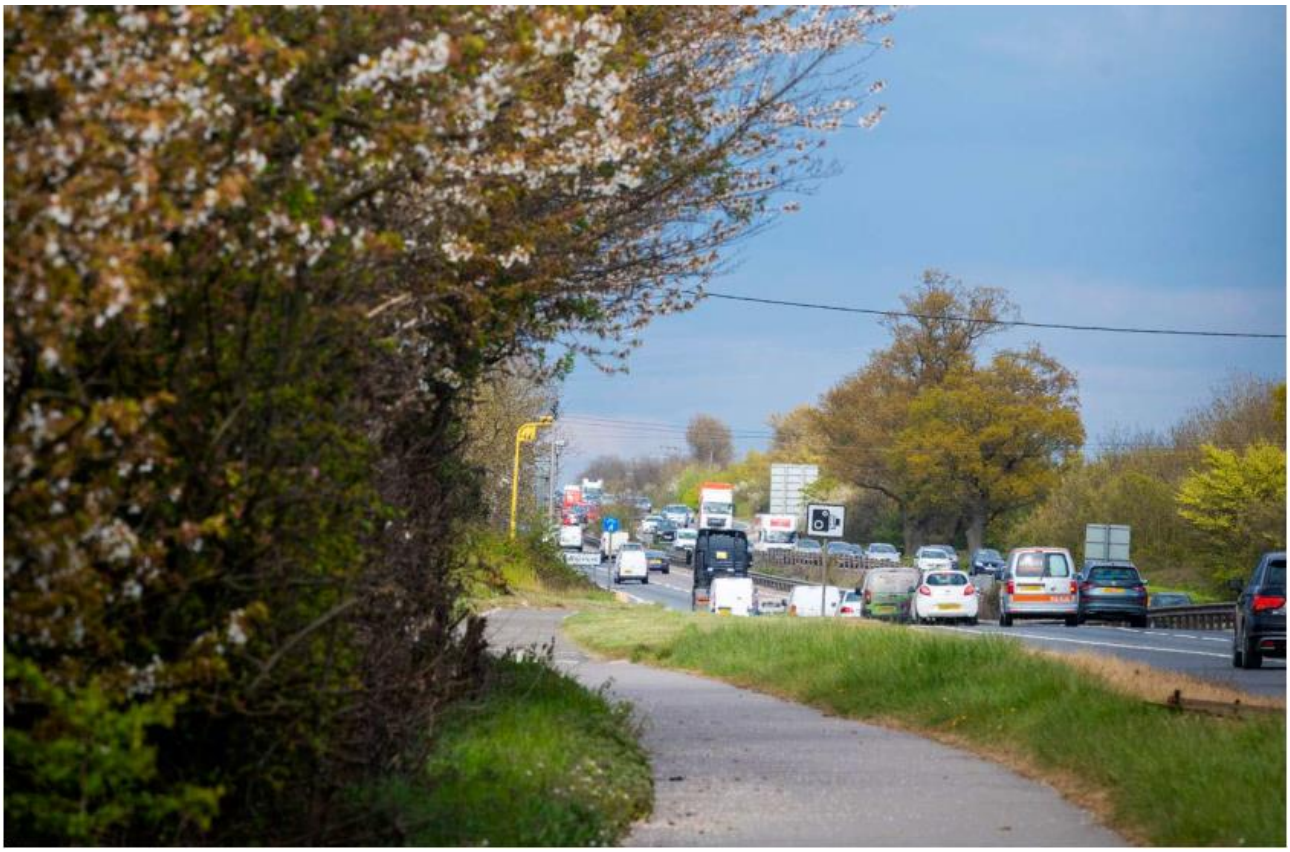
Need for the scheme

The A12 is an important economic link in Essex and across the east of England. It provides the main south-west/north-east route through Essex and Suffolk, connecting Ipswich to London and to the M25.

The section between Chelmsford and Colchester carries high volumes of traffic, with up to 90,000 vehicles every day. Heavy goods vehicles account for up to 12% of the traffic on this section due to its important freight connection, especially to Felixstowe and Harwich ports.

This section of the A12 is also an important commuter route between Chelmsford and Colchester. The resulting congestion leads to delays and means that, during the morning commute, a driver’s average speed is particularly slow in both directions for a dual carriageway A-road of its kind.

Traffic on the A12



Our proposed changes to this stretch of the A12 road would:

- improve safety for road users, especially at the junctions and slip roads through better design, as well as by removing the current direct private accesses onto the A12
- reduce traffic congestion by increasing the capacity of the road, making journey times more reliable
- take long-distance traffic off the local roads and put it back onto the A12 where it belongs, so that local roads are not used as ‘rat runs’, affecting local villages and their communities
- ensure that the road can cope with the predicted increase in traffic from more jobs and homes in the area
- make improvements for walkers, cyclists and horse riders and public transport users, to give them better connections and safer, more enjoyable journeys

Environmental input to the design process

The scheme design is being developed through an iterative process in which the ongoing EIA identifies design refinements and other mitigation measures that are needed to protect or enhance sensitive environmental features. This includes measures such as changing the road’s horizontal and vertical layout, reducing the temporary and permanent footprint of the proposed scheme and altering construction methods.

Environmental considerations have been a key factor in developing the preliminary design which is now subject to statutory consultation. The ongoing design development and refinement will continue to be influenced by the EIA process.

We have developed the following design principles in relation to the environment for the proposed scheme:

- Retain as much existing vegetation as feasible where it provides important visual screening or forms part of the landscape structure. Where vegetation loss is unavoidable, and where feasible, we will replace and extend areas of proposed planting into the landscape to provide visual screening.
- Achieve no net loss of natural wildlife habitat throughout the proposed scheme and improve wildlife connectivity by incorporating hedgerows and lines of trees that link to retained woodland and hedgerows where possible.
- Reinforce the landscape character and biodiversity by planting native tree and hedge species typically found within the surrounding local landscape.
- Provide visual interest for local residents, and users of the public rights of way and public open spaces, including incorporating intermittent planting to improve views out from the road for drivers using the A12.
- Filter, screen and contain views of major junctions and incorporate them into the surrounding landscape with native planting.
- Aim to limit the overall area of the road design as much as possible when considering the design and location of drainage ponds and new floodplain areas. Integrate drainage and earth bunds and embankments sensitively into the surrounding landscape by using planting and not making them too visually intrusive. Carefully consider the design of structures over watercourses, aiming to minimise their visual impact whilst helping wildlife to thrive and maintaining the character of the landscape and views along valley floors.
- Within areas of floodplain, minimise the amount of land needed and loss of vegetation to retain the locally distinctive willow plantations. Ensure proposed planting improves the pattern and character of existing vegetation.
- Improve the quality and capacity of existing walking, cycling and horse riding routes, and seek opportunities to create new routes. Maintain routes to and within open space from Witham, including Whetmead Local Nature Reserve (LNR), Witham River Walk and the Blackwater Rail Trail (which is a Country Park).

Scheme development and alternatives considered

During our first consultation in 2017, four route options for the scheme were presented. Our preferred route is based on route 2. Our proposals widen the existing A12 between junctions 19 and 25 to three lanes in each direction (where it is not already) and create a three-lane bypass in each direction at Rivenhall End. This route reflects the feedback we received on junctions in our first consultation, as well as comments about the Rivenhall End bypass being close to the Rivenhall Long Mortuary Enclosure scheduled monument. The proposals also include constructing a bypass between junctions 24 and 25. Our proposed scheme will cover all the work necessary to construct the proposed new road layout.

The ongoing EIA process has influenced the route options selection and ongoing design development. Examples of where we have altered this scheme design to avoid or reduce environmental effects include:

- shortening the length of the proposed bypass between junctions 22 (Colemans interchange) and 23 (Kelvedon South interchange) to avoid impact on a scheduled monument and to reduce the footprint of the scheme in the River Blackwater floodplain
- working with the owner of Colemans Farm Quarry to design the proposed junction 22 to reduce impacts on the operational quarry and to protect the planned post-extraction biodiversity restoration plan
- revising the position of the new junction 24 to reduce impacts on the grade II listed Prested Hall
- changing the layout of the proposed bypass between junctions 24 (Kelvedon North interchange) and 25 (Mark Tey interchange) to avoid having to cut down a veteran tree located near Easthorpe Road
- discounting potential borrow pit and construction compound locations due to likely disruption to local communities (e.g. from noise, dust and construction traffic impacts). A borrow pit is an excavation hole or pit that has been dug to remove gravel, clay and sand used in a construction project.

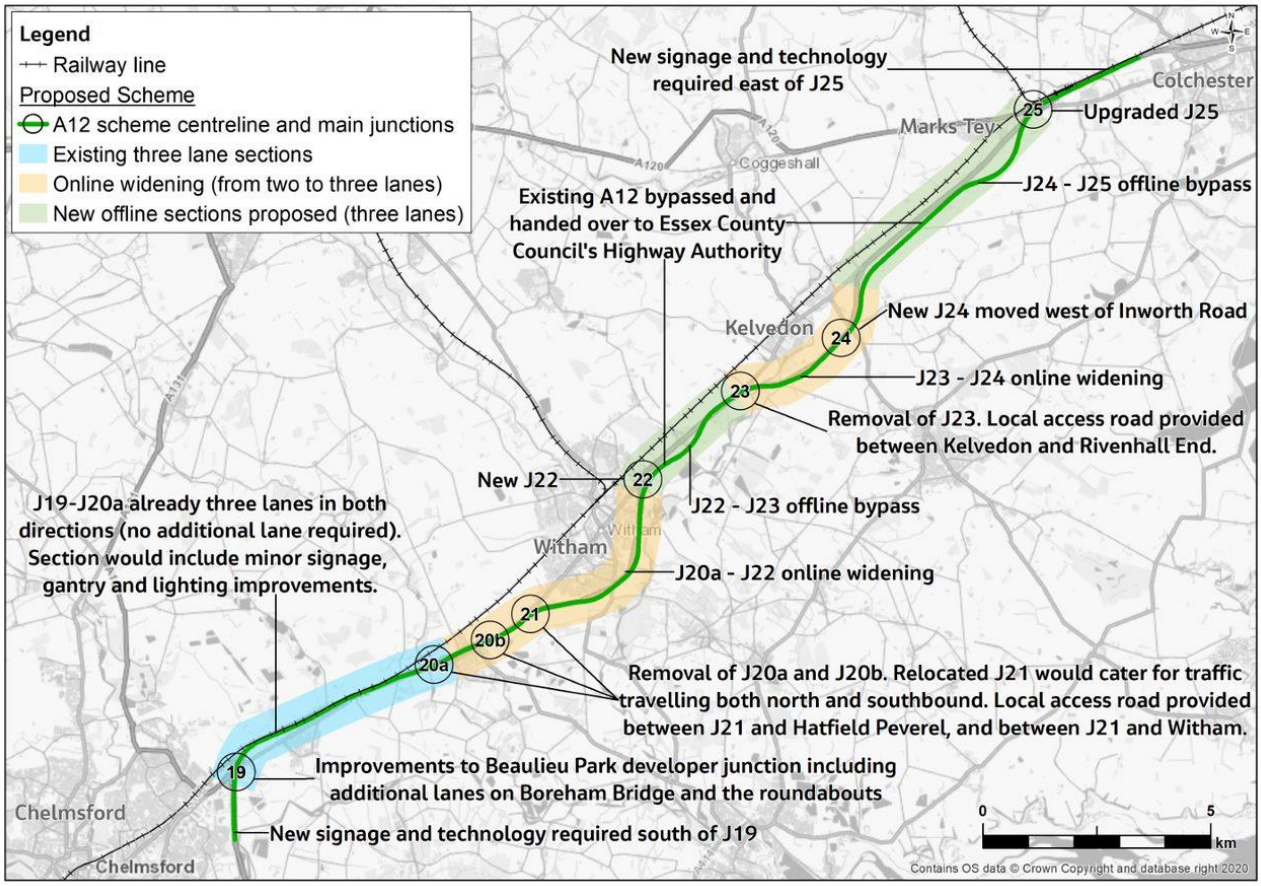
The preferred route for this scheme was selected based on several factors, including environmental impacts, journey times, complexity of build, affordability, feedback from the public and advice given by the Planning Inspectorate on the joint Local Plan for the area. For more information on the previous consultation results and the preferred route announcement, please visit our webpage at www.highwaysengland.co.uk/A12.

Key features of the proposed scheme

Scheme design

An overview of the proposed scheme is provided on the next page. Further detail is shown on the General Arrangement Plans (in Map Book 1 of the statutory consultation).

Proposed scheme design overview



Our proposals start at junction 19 (Boreham interchange) where we would improve the junction, adding to proposed improvements already planned by the developers of the adjacent Beaulieu Park. As we move north towards Hatfield Peverel, the A12 is already three lanes in each direction, so our changes would be focused on improving signs, overhead gantries and lighting.

We would widen the road to three lanes in each direction at Hatfield Peverel. The current junctions 20a and 20b would be closed and replaced by a new junction 21 (Witham South interchange). The new junction 21 would provide access to the A12 both northbound and southbound, and would take traffic from all directions between Hatfield Peverel and Witham.

As we move north, the road widening would continue along the current A12. A new junction 22 (Colemans interchange) would be built just to the east of its current location. It would provide access to the A12 both northbound and southbound, taking traffic from Rivenhall End, Kelvedon, Witham and Little Braxted onto the A12. After the new junction 22, a new bypass with three lanes in each direction would be provided, running to the south of Rivenhall End. The bypass would re-join the existing A12 just to the east of Rivenhall End.

The current junction 23 (Kelvedon South interchange) would be removed, but we would provide a new local road from Kelvedon to the existing A12 for journeys between Rivenhall End and Kelvedon. A new access road to the Essex County Fire and Rescue Service Headquarters would also be provided. We are aware of the potential impacts the future A120 Braintree to A12 project may have on this junction. The two project teams are working together, ensuring the development of the two projects is progressed in a considered manner while recognising that a decision has yet to be taken about whether to fund construction of the A120 Braintree to A12 scheme.

The proposed scheme would also be upgraded to a three-lane road in each direction south of Kelvedon. Just before the road passes over Inworth Road (B1023), we would create a new junction 24 (Kelvedon North interchange) which would provide access to the A12 both northbound and southbound. It would take traffic from Kelvedon, Inworth and Tiptree onto the A12.

After the new junction 24, another three-lane bypass would take traffic to and from Marks Tey. It would be located just to the south of the current A12. The new bypass would re-join the current A12 just before the existing junction 25 (Marks Tey interchange). A new upgraded junction 25 would provide access to the A12 both northbound and southbound. It would take traffic from Marks Tey, Copford and the A120, and provide a connection to the existing A12 which would be kept for use by local traffic.

The proposed scheme would include side road upgrades to connect to the A12, a number of new or replacement bridges and structures, and provision for walkers, cyclists and horse riders.

Our proposals have been developed in discussion with walking, cycling and horse riding stakeholders, and aim to better link to other paths or communities. They will also be designed to the latest standards. This would enable people to cross the route safely and conveniently and avoid using busy road junctions. There would be seven new bridges for walkers, cyclists and horse riders and approximately 9 miles (15 km) of new or improved walking and cycling paths across the proposed scheme. Highlights of the facilities proposed are:

- new controlled crossings at junction 19 which would allow both walkers and cyclists to cross safely
- a new bridge link on the north side of junction 19 for use by walkers, cyclists and horse riders
- a new Wellington Bridge to enable walkers, cyclists and horse riders to bypass junction 21 travelling between Hatfield Peverel and Witham
- a new bridge at junction 22 (Coleman’s Bridge) to enable walkers, cyclists and horse riders on National Cycle Route 16 to bypass the main junction, along with new controlled crossings for both walkers and cyclists near Eastways junction
- a new signalised crossing and the opportunity to reinstate the bus stops in Rivenhall End
- a new bridge for use by walkers, cyclists and horse riders across the proposed new A12, linking Essex County Fire and Rescue Service Headquarters and a number of rural public rights of way to a new local access road as well as a proposed bus stop

- a new controlled crossing which would allow both walkers and cyclists to cross the A120 safely, and a new bridge for walkers and cyclists at junction 25

Construction

Construction programme

We expect construction to start in 2023 and take approximately four years. For the first few months, the construction would likely focus on preparing the area for the main construction works to begin, such as archaeological work, moving utility pipes and cables, and environmental protection work.

Environmental management

All construction work would be done with appropriate environmental controls in place, in line with an Environmental Management Plan. This would include specific controls for the construction phase such as:

- control of noise, dust and other emissions
- temporary drainage and treatment facilities to protect watercourses from potential pollution
- traffic management (e.g. temporary traffic lights, lane closures, contraflows and overnight road closures) would be included in a Traffic Management Plan
- restricting construction work to normal daytime hours, avoiding night-time working unless absolutely required to avoid major disruption on the A12 during the daytime
- controlling lights used in construction compounds and working areas
- managing borrow pits and construction site compounds to minimise impacts on sensitive environmental features and residential areas
- establishing buffers and work-free zones to protect environmental features

Site compounds

Two potential main construction site compounds have been identified, subject to further investigations. These locations have been selected to be as close to the current A12 as possible to limit the need for construction traffic to use local roads, and as far away from residential properties as feasible.

- **Junction 20b (Hatfield Peverel South interchange).** It is expected that this would be a main compound on the north side of the A12 near the existing junction 20b and Wellington Bridge. This site compound would be the main base for the construction team on site. A temporary site entry road would need to be put in from the junction 20b northbound entry slip road. As the construction progresses, a temporary site entrance would need to be created off one of the access roads linking to the new junction 21.
- **Junction 22 (Colemans interchange).** The second main site compound is anticipated at junction 22 on the north side of the existing A12. This location is roughly in the middle of the proposed scheme, would be used by project management staff, and would be accessed off the existing A12.

In addition to the proposed main site compounds, we expect to have other smaller site compounds to help reduce the number of staff making journeys on and around the A12 on a daily basis. These smaller site compounds will be subject to further review, and we expect that they may decrease in size and number depending on how the road design and work programme develops.

Construction noise and working hours

During major construction work, there are many sources of noise. These can include the movement and operation of construction vehicles, and the operation of heavy machinery.

To help reduce the impacts of our construction work, we would take steps such as timing construction to minimise work outside normal working hours where possible, using low-noise equipment and temporary noise barriers.

To reduce the impact on residents, most construction work would be done during normal daytime working hours. There would be some instances when work would need to be done at night or at weekends. There are several reasons for this, such as limiting the disruption to motorists using the A12, or for safety reasons where we are constructing new bridges over the A12 or demolishing old ones. Our normal daytime working hours would probably be between 7.30am and 6pm Monday to Friday, and between 7.30am and 1pm on Saturdays. In addition, there may be an hour before or after these times when we are setting up or removing the roadworks or machinery. During the summer months, working hours may extend from 7am to 7pm. These are standard working hours for infrastructure projects across the country. Work done outside of these hours or on bank holidays is considered off-peak work.

We will discuss the exact details of construction working hours with the local authorities and these will be detailed in our Environmental Management Plan.

Reducing construction traffic on local roads and traffic management

To reduce the amount of construction traffic on the existing roads, construction traffic would use temporary roads where possible. These are likely to be close to the existing A12 route. However, where this is not possible, additional land within the provisional Order Limits (the application land boundary) may need to be used temporarily.

Where the existing road is to be widened, we would keep the road open but have roadworks that make the existing lanes on the A12 narrower and implement lower speed limits.

By locating our site compounds near the existing A12 and using temporary roads, we would aim to limit the number of Heavy Goods Vehicles using local roads.

We would also use shuttle buses to take workers from local transport hubs (e.g. bus depots or railways stations) to and between the site compounds.

Borrow pits

To construct the proposed scheme, we would use borrow pits. Borrow pits are areas where soil, gravel or sand would be dug out for use in construction at another location, to build banks or for landscaping. We have selected these borrow pits based on their closeness to our site compounds and main construction work and this will help reduce construction traffic.

Environmental constraints have been considered when siting and designing the proposed borrow pits. This includes siting the borrow pits to avoid densely populated areas and specifying exclusion zones around sensitive environmental features such as hedgerows and trees.

Borrow pits are proposed at the following locations (shown on the General Arrangement Plans):

- Between the existing junction 20b and junction 21
- To the east of junction 21 on the south side of the A12 south of Witham
- To the east of Rivenhall End and west of junction 23 on the north side of the A12
- On the southbound side of the A12 with Kelvedon to the north and Inworth Road to the east

The final land use of the proposed borrow pits is subject to further assessment and discussion with stakeholders.

The Environmental Impact Assessment

Environmental scoping

We submitted an Environmental Scoping Report to the Planning Inspectorate on 28 October 2020, which can be viewed by clicking the following link:

https://infrastructure.planninginspectorate.gov.uk/A12/ScopingReport

The Environmental Scoping Report was produced to document the proposed scope of the EIA, including a description of what would be included in the Environmental Statement.

The Planning Inspectorate reviewed and consulted on the Environmental Scoping Report and published a Scoping Opinion on 7 December 2020. It was republished with an errata sheet on 15 March 2021, which can be viewed by clicking the following link:

https://infrastructure.planninginspectorate.gov.uk/A12/ScopingOpinion

We are having ongoing conversations with the Planning Inspectorate and other consultees to ensure that the scope of the EIA is proportionate and meets the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Basis of the PEIR

The PEIR has been prepared at an interim stage of the proposed scheme's preliminary design process. Stakeholder feedback received during the statutory consultation will be considered and could influence the design. There could therefore be changes to the provisional Order Limits (the application land boundary) to allow for changes in temporary working areas, or changes in the amount of land needed for the road design and its environmental mitigation areas. The provisional Order Limits presented in the PEIR are considered a realistic estimate of how much land is likely to be needed to build the road. These are likely to be refined as we get closer to a DCO application being submitted.

The PEIR therefore represents a ‘snapshot in time’ of the ongoing environmental assessment process. It does not report the full results of the EIA, which will be presented in the upcoming Environmental Statement that will be submitted with the DCO application. As such, the environmental information presented in the PEIR is based on assessment and survey data available at the time of writing the report.

Surveys and assessment

Extensive baseline environmental surveys have been carried out as part of the environmental assessment, as follows:

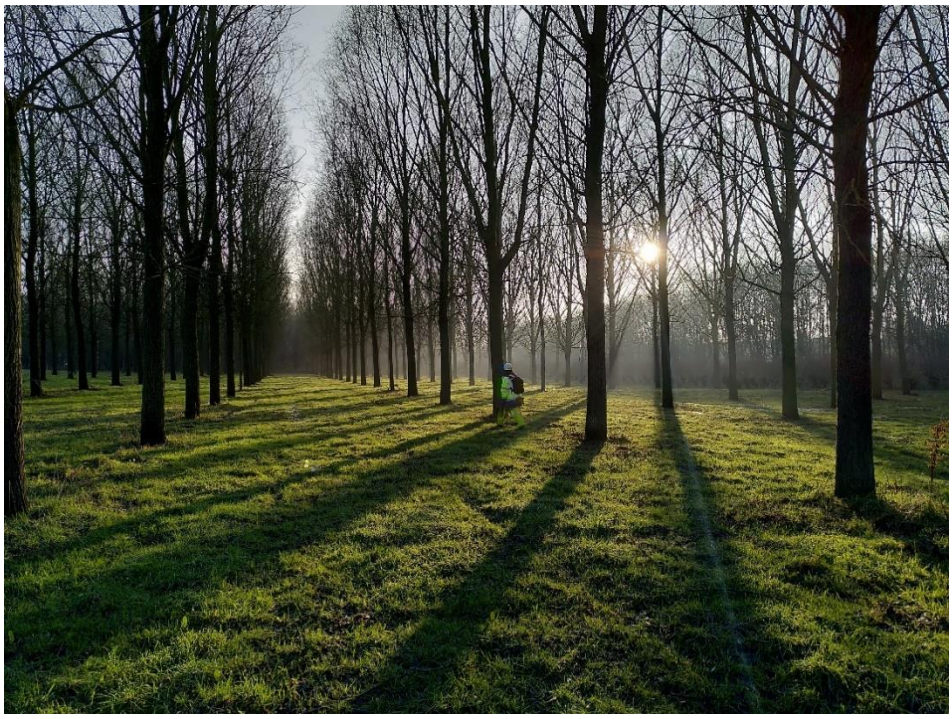
- Ecology surveys, including for habitats, otters, water vole, badgers, dormice, bats, birds including protected and notable species such as barn owls, reptiles, amphibians such as great crested newts, and aquatic species such as freshwater crayfish
- Landscape winter walkover (with summer walkovers planned in summer 2021). A ‘walkover’ is an inspection of the site and its surrounding area
- Arboriculture (tree) surveys (see photo from tree survey on the next page)
- Air quality monitoring
- Ground investigations including groundwater monitoring and testing for contaminated soils
- Geophysical surveys for below-ground archaeology
- Trial trenching surveys for below-ground archaeology have started and are scheduled to be completed before we submit the DCO application
- Agricultural Land Classification soil surveys
- Noise monitoring surveys are due to be undertaken in 2021

The above surveys were generally undertaken in 2020/2021. In some instances, surveys were undertaken in 2017 to inform the route option development and selection process. In these instances, surveys are being updated to ensure that results are current.

In addition to surveys, other predictive techniques are being used to inform the EIA, such as air quality, noise and flood risk modelling (computer generated simulations).

At the time of writing, some of the surveys and modelling are only partially complete due to seasonal constraints and the availability of design information. These surveys will be completed in full during summer 2021 and reported on within the Environmental Statement.

Surveying trees in the willow plantation west of Little Braxted



Environmental aspects

The PEIR covers the following environmental aspects: air quality, cultural heritage (including archaeology and built heritage), landscape and visual, biodiversity, geology and soils, material assets and waste, noise and vibration, population and health, road drainage and the water environment, climate, and cumulative effects. The conclusions from the preliminary assessment of these aspects are summarised in the following sections of this non-technical summary.

In line with regulatory requirements, the PEIR also considers heat and radiation, major accidents and disasters and transboundary effects (i.e. effects which could potentially affect another European Economic Area state). The preliminary assessments of these aspects have identified that the proposed scheme is unlikely to result in any significant environmental effects, and as such, they have been scoped out of the assessment.

Air quality

Baseline

We have carried out a preliminary air quality assessment to assess likely increases in air quality pollutants as a result of the proposed scheme. In line with recognised guidance, the assessment has focused on the air quality objective (AQO) for nitrogen dioxide, a significant pollutant from exhaust emissions which is harmful to human health and the environment.

The study area for air quality assessment is based on traffic modelling results, which enables an ‘affected road network’ (ARN) to be defined. Sensitive features, such as residential properties within 200m of the ARN, are then assessed for potential air quality impacts and the risk of exceeding the AQO.

Features are selected for assessment based on existing air quality (i.e. where the existing air quality is close to or exceeds the AQO) and/or where the proposed scheme could have the greatest adverse effects on air quality. Features are also chosen where beneficial effects are likely, such as where the proposed scheme would change the layout of existing roads.

The existing air quality within the study area has been based on local authority air quality monitoring data collected between 2015 and 2019. We also installed additional temporary monitoring along the proposed scheme route in 2017/18. This monitoring recorded exceedances of the nitrogen dioxide AQO at three locations within 1km of the ARN. However, these are unlikely to be affected by the proposed scheme. In addition, these three locations are not anticipated to exceed the nitrogen dioxide AQO by the time the scheme opens in 2027, due to the projected uptake of cleaner vehicle technologies by that time.

Features which are sensitive to changes in air quality near the ARN, and which have been considered in the air quality assessment, are as follows:

- Air quality management areas (AQMAs). These are sensitive locations identified by local authorities where specific measures are needed to reduce emissions in order to meet UK AQOs. There is one AQMA, Lucy Lane North, within 200m of the ARN, located near junction 26 of the A12.
- Human features. These are locations that are sensitive to air quality, including all residential properties and buildings used by the young, elderly and other susceptible populations, such as schools and hospitals. We have also considered future residential developments where planning permission has been granted.
- Ecological features. These are designated ecology sites close to the ARN where nitrogen deposition (the transfer of nitrogen from the atmosphere to vegetation and habitats) from exhaust emissions could potentially affect plant health and productivity.

Construction

We would use well established mitigation measures to control dust emissions during construction, such as dampening down of surfaces, planning the site layout so that dust-causing activities would occur as far from human and ecological features as possible, and erecting screens or barriers around the dust-causing activities. With these measures in place, it is unlikely there would be significant effects resulting from dust.

Air quality modelling showed that a single residential property would be at risk of exceeding the nitrogen dioxide AQO in the peak construction year. Modelling shows that this exceedance would occur both without the proposed scheme (i.e. just taking into consideration future traffic growth) and a scenario with future growth and the proposed scheme's construction traffic. However, the change in concentration at this receptor was assessed as imperceptible in accordance with relevant guidance.

Overall, the preliminary assessment has concluded that air quality effects at human health features **is not likely to be significant**.

There were no ecological sites found to have potentially significant effects by the proposed scheme in relation to nitrogen deposition.

Operation

As with the construction phase, the preliminary assessment has identified a single residential property as being at risk of exceeding the nitrogen dioxide AQO in the opening year of 2027. This exceedance was noted to occur in modelled scenarios both with and without the proposed scheme. The magnitude of the change in concentration was deemed to be 'small' in accordance with relevant guidance and is not assessed as a significant effect.

The preliminary assessment has indicated no significant effects on the Lucy Lane North AQMA (i.e. no exceedance of the nitrogen dioxide AQO).

Overall, the preliminary assessment has concluded that air quality effects at human health features (i.e. no exceedances of the nitrogen dioxide AQO except for one exceedance as stated above) during operation **is not likely to be significant**.

The nitrogen deposition assessment showed that that there **could be significant effects at a number of ecological sites during operation**. These sites are located in the Whetmead Local Nature Reserve (LNR), Perry's Wood LWS/ancient woodland, and at four potential veteran tree locations. These will be further assessed for the upcoming Environmental Statement.

Cultural heritage

Baseline

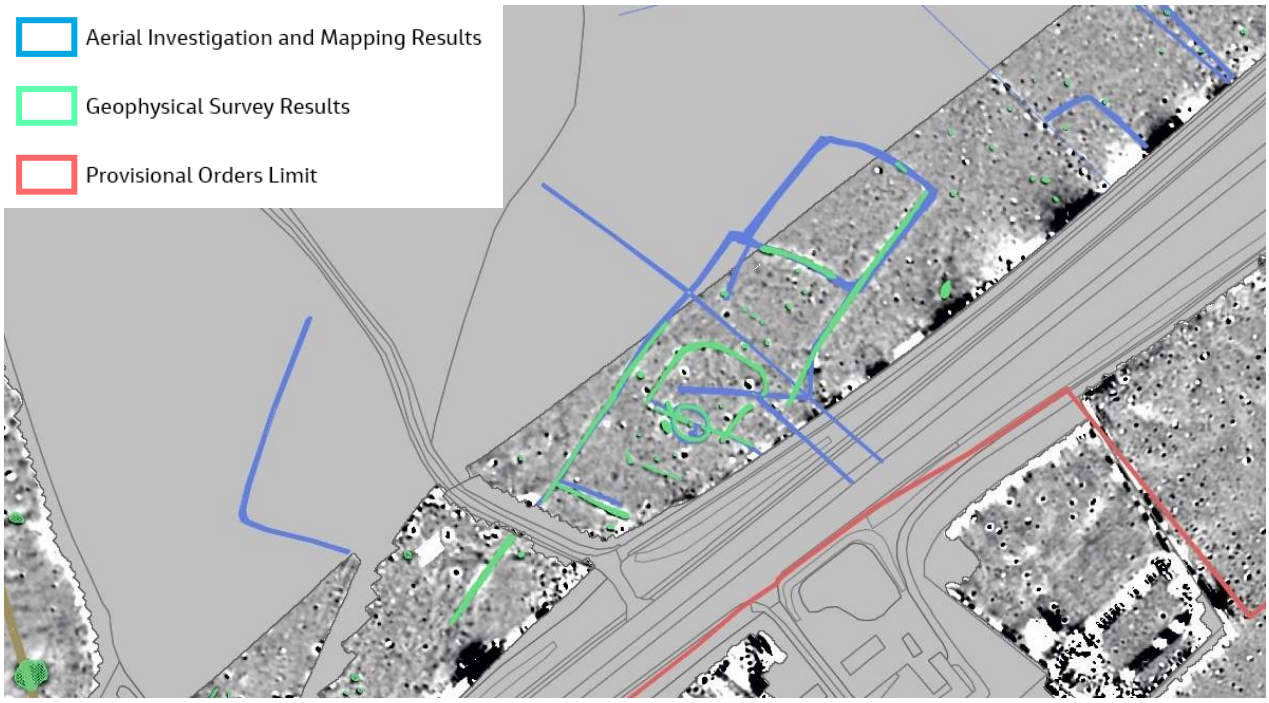
Cultural heritage includes archaeological remains, historic buildings and structures, and the historic landscape including parks and gardens. We are carrying out desk-based studies and site surveys to build a picture of the existing cultural heritage assets near the proposed scheme.

The following designated assets (i.e. assets protected by law) have been identified near the proposed scheme: six scheduled monuments; 414 listed buildings (including 10 grade I listed and eight grade II* listed buildings); one grade II* and three grade II registered parks and gardens.

Many of the listed buildings are located within seven conservation areas (these are areas of special architectural or historic interest where the character or appearance should be preserved or enhanced), while 24 are located within Braxted Park grade II* registered park and garden. Boreham House, a grade I listed building, is located within Boreham House grade II registered park and garden.

In addition, there are 417 known non-designated archaeological remains and 15 non-designated historic landscape assets recorded from local authority Historic Environment Records or identified during recent desk-based studies, geophysical surveys (see example results from the geophysical survey on the next page) and aerial investigation mapping for the proposed scheme. Non-designated heritage assets are buildings, monuments, sites, places, areas or landscapes identified by local authorities as having a degree of heritage value meriting consideration in planning decisions, but which do not meet the criteria for designated heritage assets.

Results from a geophysical survey north of the A12, east of Sniveller's Lane near Hole Farm (Rivenhall), indicating a ring ditch and internal features interpreted as a possible Bronze Age burial mound



A programme of archaeological surveys is being carried out within the proposed scheme footprint. This will establish the nature, extent, survival and value of known and unknown below ground archaeological remains, the different types of soils and rocks that are present, and the potential for these to provide important information about how the land was formed and changed in the past. The results of these surveys will inform the EIA and development of the archaeological mitigation strategy.

Construction

The preliminary assessment has concluded that construction of the proposed scheme would result in adverse impacts on cultural heritage assets. This includes the partial or total removal of archaeological remains within the scheme footprint. There would be no direct impacts upon historic buildings and structures, but there would be temporary impacts on the settings of some assets from construction activities due to traffic movements, lighting and noise.

The preliminary assessment has identified that construction of the proposed scheme would result in **likely significant adverse effects on 13 historic buildings and structures**. The impact assessment for historic buildings and structures is ongoing and will be included in the Environmental Statement. This will include mitigation measures for reducing significant residual effects during construction.

The preliminary assessment has identified 37 archaeological remains and seven historic landscapes which have the potential to be significantly affected by the proposed scheme during the construction phase. We will design and implement a comprehensive archaeological mitigation strategy (informed by results of the ongoing archaeological evaluation) to mitigate the effects of the proposed scheme. This would result in **two likely residual significant effects** on archaeological assets and none for the historic landscape. All other effects are not likely to be significant with the application of mitigation measures.

Operation

During operation, cultural heritage impacts are restricted to those associated with the setting of heritage assets, principally due to new permanent infrastructure, changes in lighting and signage, and traffic noise levels from vehicles using the road.

The preliminary assessment of operational effects has concluded that there would be **six likely significant adverse effects on historic buildings**, and no significant adverse effects on archaeological remains and the historic landscape. The six historic buildings include five grade II listed buildings and one grade II* listed building. The impact assessment on historic buildings and structures is ongoing and will be reported in full in the Environmental Statement, taking into account the mitigation measures which are currently being developed to reduce significant adverse effects during operation. All other effects are not likely to be significant with the application of mitigation measures.

Landscape and visual

Baseline

The landscape surrounding the proposed scheme is largely arable farmland. The existing A12 and settlements, including Chelmsford, Witham and Marks Tey, present urban and built up features within the landscape. Trees and shrubs are present within highway vegetation along the A12, within small woodland blocks and copses scattered throughout the wider surrounding landscape, along hedgerow field boundaries, and along watercourses. The network of ditches, streams and rivers (including the River Blackwater, River Ter and Domsey Brook) are key distinctive features within a flat and low-lying landscape.

The key baseline constraints relevant to landscape include:

- Green Wedge local landscape designation identified within the Chelmsford Local Plan, located to the east of Chelmsford and west of the A12 (this area is protected by planning policy due to its landscape features)
- ancient woodland (none within the scheme footprint), trees protected by tree preservation orders, and a small number of veteran, ancient and notable trees (see photo of a potential veteran tree on the next page)
- Blackwater Rail Trail, which is a Country Park (see photo on the next page), runs south from Witham, passing beneath the A12
- a network of public rights of way which run close to and cross the A12

- cultural heritage features, which help inform the sensitivity of the landscape and are relevant to the assessment of landscape and visual effects

Views of the proposed scheme might be possible from residents within houses on the edges of settlements close to the A12 and scattered throughout the rural landscape. There might also be views of the proposed scheme from users of public rights of way; users of public open space, such as the Blackwater Rail Trail in Witham, Whetmead LNR (east of Whitham) and Brockwell Meadows LNR (Kelvedon); users of private open space, such as registered parks and gardens and golf courses; people at their places of work, such as on the edges of Chelmsford and Witham; and users of the A12 and local road network.

Potential veteran oak tree noted in the tree surveys

Construction

Temporary activities, such as movement of construction machinery, excavation and earthworks, the presence of compounds, temporary roads, any temporary lighting needed for the works, stockpiled soil and materials, and loss of vegetation, would result in likely significant landscape and visual effects during construction of the proposed scheme.

Good practice measures would be put in place to reduce landscape and visual effects during construction. These would include the following:

- Existing vegetation within the provisional Order Limits and within temporary works areas would be retained as far as possible, and all trees, shrubs and hedges to be retained would be protected throughout the construction phase.
- Where feasible, soil stripped from temporary works areas would be stored in mounds to restrict views of construction compounds and stockpiled materials. The type of security fencing around construction compounds and working areas near to houses would be considered, to provide an additional temporary visual screening function.
- Temporary lighting would be kept to a minimum, and measures taken to reduce light spill as far as reasonably possible.

There would be **likely significant residual landscape and visual effects** throughout the construction period.

View of the Blackwater Rail Trail

Operation

During operation, adverse landscape and visual effects would be caused by the presence of the proposed scheme. This would include new bridges, newly lit junctions and in particular the bypasses between junctions 22 and 23, and junctions 24 and 25. The proposed scheme would be viewed within the context of the existing A12; however, vegetation loss would open up views of the new and existing highway infrastructure. There would be day and night-time landscape and visual effects from lighting and vehicle headlights, signage and traffic flows. Proposed scheme elements within the landscape surrounding the A12, including restored borrow pit sites, drainage ponds and access tracks, would also affect the landscape and views.

Key mitigation for reducing landscape and visual effects would include:

- sympathetic design of the road, junctions, bridges, signage and gantries
- sensitive design of earth bunds and embankments, borrow pits and drainage ponds to integrate these features into the landscape and reduce visual intrusion
- use of sensitive lighting design
- planting, including native hedgerows, shrubs and trees to integrate the proposed scheme into the surrounding landscape

Mitigation planting would grow over time to progressively reduce landscape and visual effects. However, the presence of the proposed scheme would permanently increase the amount of highway infrastructure and encroach on the surrounding landscape. There would **likely be residual significant effects on areas of landscape** that would be directly affected by new junctions and the offline bypasses. There would also **likely be residual significant effects on views for features** very close to the proposed scheme, and where the presence of new bridges or borrow pits would remain a prominent feature of the view, or significantly change the character of the view, despite established mitigation planting.

Biodiversity

Baseline

The area around the proposed scheme is mainly made up of arable land with hedgerows, pasture, ponds, small localised areas of woodland, and a number of rivers and streams.

There are two Local Nature Reserves (LNRs) and three Local Wildlife Sites (LWSs) next to the provisional Order Limits (Whetmead LNR and LWS, Brockwell Meadows LNR and LWS, and Sandon Riverside LWS). There are many other LWSs and LNRs located within 1km of the proposed scheme or near the network of roads being assessed for changes in air quality.

Field surveys have shown that the area around the proposed scheme is used by a number of protected and notable species, including badgers (see photo of a badger hole on the next page), bats, otter, water vole, brown hare, hedgehog, various breeding and wintering birds, common lizard, grass snake, slow worm, great crested newt, freshwater fish, and various invertebrates. Notable plants, such as the nationally scarce lesser calamint (see photo on the next page), where also observed.

A number of ecological surveys and assessments are ongoing, including surveys and monitoring for badgers, roosting and commuting bats, and otters.

Badger hole identified within the provisional Order Limits

Lesser calamint, a nationally scarce plant, noted in a roadside verge

Construction

Construction of the proposed scheme would result in temporary and permanent changes to, and loss of, habitats including small areas of woodland, trees, hedgerows and ponds. There would also be impacts at watercourse crossings, where small sections of the Rivenhall Brook, Domsey Brook and Roman River need to be realigned. A strip of woodland habitat would also be lost alongside the A12 within Whetmead LNR and LWS.

We are proposing to replace and enhance habitat, which would mean that, overall, these effects would be offset and the gain in habitat would be beneficial once planting has matured, except for the loss of small amounts of irreplaceable habitats such as the loss of two potential veteran trees and a number of ancient hedgerows. There would therefore be an increase in habitats available to local wildlife after construction of the proposed scheme, in particular for water vole where provision of new ditch and pond habitat is proposed. There would also be an increase in habitat for great crested newts where the mitigation for habitat loss would be provided off-site, and therefore any additional ponds created on-site would provide habitat gains.

We would put in place measures to avoid the mortality or injury to wildlife, fragmentation of habitats and disturbance to wildlife. This would include, for example, establishing construction 'no-go' zones around sensitive features and habitats. Standard good practice measures during construction would prevent impacts from dust or changes to water quality.

The preliminary assessment has concluded that there would be **likely significant adverse effects** on two potential veteran trees, a number of ancient hedgerows, and woodland habitat, and **likely significant beneficial effects** on water vole and great created newt. All other effects are not likely to be significant with the application of mitigation measures.

Operation

Operation of the proposed scheme may lead to impacts from changes to air quality, notably to Whetmead LNR and LWS, Perry's Wood LWS and potential veteran trees.

Wildlife could also be hit by moving vehicles when attempting to cross the A12. We would mitigate this by providing features such as mammal ledges within culverts underneath the A12, badger and otter proof fencing, and if feasible, through sensitive design of new bridges to allow use by wildlife. Landscape planting would also provide 'hop-overs' for species such as bats. Hop-overs are where tall vegetation planted on either side of the road with overhanging branches create a continuous canopy over the gap created by the road.

Operation of the proposed scheme could disturb wildlife. However, we would mitigate this through sensitive design of the lighting, providing noise bunds and fencing where appropriate, and screening through landscape planting.

The proposed drainage ponds along the proposed scheme would provide water quality treatment from road runoff before being released to receiving watercourses.

In summary, the preliminary assessment has concluded that there would be **likely significant adverse effects from air quality** on Whetmead LNR and LWS, Perry's Wood LWS and potential veteran trees during operation (subject to further assessment). All other effects are not likely to be significant with the application of mitigation measures.

Geology and soils

Baseline

We have carried out ground investigations (see photo below) between junctions 19 (Boreham interchange) and 21 (Witham South interchange), and of the proposed borrow pit locations. This data has informed the assessment presented in the PEIR. We are currently reviewing findings from ground investigations for the rest of the proposed scheme between junctions 21 and 25 (Marks Tey interchange). The results of these ongoing investigations will inform the Environmental Statement.

Borehole drilling during the ground investigations

Provisional soil data suggests the area around the proposed scheme is dominated by very good to moderate quality soils for agricultural land. We are planning to undertake an agricultural land classification soil survey and will report the results in the Environmental Statement.

There are records of seven historical landfills in the area and several infilled lands associated with historical gravel pits which are being investigated as part of the ongoing ground investigations. We are currently reviewing the survey data for potentially contaminated land. The results and assessment will be included within the Environmental Statement.

Ground investigations have revealed no significant contamination across the proposed scheme between junction 19 and junction 21. An area of historical infilled land at the borrow pit near Inworth Road revealed the presence of suspected asbestos cement sheets and other waste materials. This area would be excluded from the borrow pit and fenced off as not for use. Chemical analysis of soil samples taken during the ground investigation of the remainder of the borrow pit sites identified no significant land contamination. This indicates that soils excavated from the borrow pits would be suitable for use during the construction of the proposed scheme.

Groundwater chemical analysis results indicate that there are elevated concentrations of various contaminants in groundwater beneath some parts of the proposed scheme and most of the borrow pit sites. Based on the soil analysis undertaken, soils within some of the borrow pits could act as a source of contamination to surface water and groundwater if used without mitigation.

Construction

Soils would be affected in two ways during construction, via:

- physical removal or permanent sealing of agricultural land
- degradation during stripping, handling and storage, through mechanisms such as soil compaction

The predicted loss of very good to moderate quality agricultural land has been assessed as a significant effect. We are exploring opportunities to reduce the development footprint to limit the loss of agricultural land. Where the design cannot be refined, topsoil would be stripped from the footprints of all permanent development, followed by sustainable reuse within the proposed scheme or elsewhere wherever feasible.

Topsoil would also be stripped from all temporary construction working areas and stored so that it can be used to restore the land after construction.

An Environmental Management Plan, including a Materials Management Plan for reuse of materials, will be developed before the start of construction works which will detail best practice for using soils on site.

Construction works and the dewatering (removal of water from a location to facilitate construction) of borrow pits during construction could contaminate surface watercourses and groundwater if uncontrolled. Further assessment will be required to determine if any treatment would be needed before being released.

Based on the surveys we have carried out to date, it is unlikely that contaminated land would constitute a significant risk to human health. The ongoing ground investigations may identify unknown contamination that requires treatment of targeted areas, particularly where the proposed scheme is located on or near to potential sources of land contamination, however, this is considered unlikely.

Overall, the preliminary assessment has concluded that, during construction, there would be **significant adverse effects from the loss of agricultural soils**, and **likely significant effects on surface water and groundwater from land contamination**. All other effects are not likely to be significant with the application of mitigation measures.

Operation

The operational impacts on geology and soils have been scoped out of the assessment. **No significant effects are expected**. The permanent loss of agricultural land occurring during construction would persist during operation but is not considered as an additional effect.

Material assets and waste

Baseline

Regional data show that there is likely to be a good supply of both primary (new materials rather than recycled) and recycled aggregates (minerals which are used for construction including soft sand, sand and gravel, and crushed rock) within the East of England to support the construction of the proposed scheme. There is also likely to be available waste management capacity within the region to accommodate the majority of waste likely to arise during construction.

A large proportion of the proposed scheme is located within a Mineral Safeguarding Area for sand and gravel, and part of the proposed scheme footprint falls within a Mineral Safeguarding Area for brick clay to the east. Mineral planning authorities designate these identified areas which cover known mineral locations and are protected from development that does not use the minerals within them. The proposed scheme footprint also crosses a number of consultation areas for existing and allocated mineral and waste sites (areas where the local authority should be consulted if any development takes place that does not use the minerals below the ground).

Construction

Construction of the proposed scheme would need materials and would generate waste that would need to be managed.

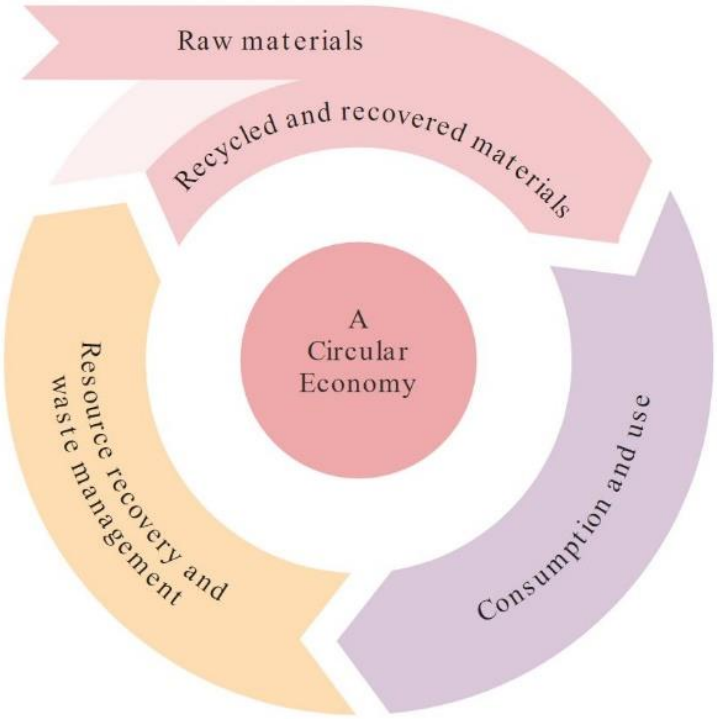
The use of primary materials affects their immediate and – in the case of primary aggregates – long-term availability, resulting in direct impacts on the environment through the reduction of limited natural resources. Disposal of waste to landfill would result in direct impacts on the environment through the permanent use of landfill capacity and the loss of material that could potentially be recycled.

To construct the proposed scheme, we would need to take some land permanently. This would include land take inside the Mineral Safeguarding Areas and consultation areas for existing and allocated mineral and waste sites. This could sterilise existing and allocated minerals and waste sites by constraining or preventing existing and potential future use of these sites.

Mitigation measures would be implemented throughout the design and construction of the proposed scheme to reduce the consumption of primary materials, unnecessary sterilisation of safeguarded mineral and waste sites, and disposal of waste to landfill. Where feasible, any surplus materials and wastes would be reused, recycled or otherwise recovered on or off-site. Maximising reuse and diverting waste away from landfill would reduce the environmental impacts associated with materials production, thereby supporting a circular economy (see visual representation of a circular economy on the next page).

A circular economy is an alternative to a traditional approach (of make, use, dispose) in which resources are kept in use for as long as possible.

A circular economy



Source: https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england/resources-and-waste-strategy-at-a-glance

At this preliminary environmental assessment stage, there is limited information available regarding the precise material requirements and waste quantities associated with constructing the proposed scheme.

Impacts relating to the consumption of material assets and generation and management of wastes have been assessed at this preliminary stage as **not likely to be significant** after the application of mitigation. This will be checked, using estimated material and waste quantities for the proposed scheme when they become available, and the final conclusions reported in the Environmental Statement.

Operation

No significant maintenance activities would occur during the opening year, and therefore no significant materials consumption or waste generation is expected. Operational impacts on material assets and waste have therefore been scoped out of the assessment on the basis that there would be **no likely significant effects**.

Noise and vibration

Baseline

There are 21 Noise Important Areas between junctions 19 and 25 or on roads near to the proposed scheme. These are areas that have been identified as experiencing particularly high noise levels and are generally those close to the A12.

Along the route of the proposed scheme there are many features that are sensitive to noise and vibration, both from construction and following the opening of the proposed scheme. There are large areas of noise sensitive features in the major settlements (e.g. Boreham, Hatfield Peverel), smaller communities (e.g. Rivenhall End), and isolated properties.

Online widening would bring traffic closer to some noise sensitive features which may be particularly sensitive to noise. The two bypasses would take traffic away from noise sensitive features currently experiencing traffic noise from the A12, although along certain sections this may also result in the main noise source being moved from one side of a property to another. This could potentially impact residents who have become accustomed to spending most of their time on one side of a property, for example where a garden may be located.

Due to the COVID-19 pandemic, no noise measurement surveys have been carried out. The level of noise very much depends on the level of traffic, and with traffic levels lower during the pandemic, any noise surveys are likely to measure untypical noise levels that would not provide a good representation of the noise baseline. We are planning a series of noise surveys during 2021 when traffic levels should return to normal levels following the gradual lifting of COVID-19 restrictions (photo of typical noise monitoring equipment provided on the next page).

Construction

At this preliminary environmental assessment stage, we have carried out a qualitative (i.e. descriptive) assessment of likely noise effects, based on a preliminary construction methodology. When the construction methodology has been refined, we will calculate the expected noise and vibration levels. The results of this detailed calculation based assessment will be reported in the Environmental Statement.

Construction activities can cause adverse noise effects due to the overall noise level and the time and duration of the works. The activities likely to generate the highest overall levels of noise include piling and demolition works. The longer-term activities, such as the construction of a new junction or bridge, can cause adverse effects due to the duration of the works. Works such as bridge replacement or gantry installation may need to be carried out during off-peak working hours such as nights, evenings and weekends due to the need to partially or fully close the A12. Any increase in noise at night could generate adverse effects.

Typical noise monitoring equipment

Adverse effects from vibration from activities such as piling are only likely to be experienced at noise sensitive features within 50m of the works. Piling activities may be required in areas where retaining walls need to be constructed.

Well established measures to reduce the noise from construction activities would be included in an Environmental Management Plan and incorporated into the working practices. These would include using well-maintained equipment, building elements of the construction away from the site, and using temporary noise barriers and bunds for the noisiest activities.

Good community relations are key to managing the adverse effects of noise. We would keep nearby residents informed of forthcoming works, especially at night, through a range of measures including for example, newsletters, emails, text alerts and, in some situations, visits from the community relations team.

The preliminary assessment has identified the **potential for significant effects during construction**. However, the significance of these effects will be assessed in the Environmental Statement, where they will be quantified on a well-developed construction methodology and programme.

Operation

At this preliminary environmental assessment stage, we have assessed potential traffic noise impacts using predicted noise levels from a noise model. This assessment has focused on short-term effects (i.e. when the proposed scheme opens) during the daytime. For the Environmental Statement, we will also examine the potential effects at night and in the long term (i.e. 15 years after the proposed scheme opens to traffic).

Where the proposed scheme involves online widening of the existing road, there is predicted to be an increase of around 2dB(A) at nearby sensitive features. This increase in noise is mainly due to an expected increase in traffic flow and speed, together with changes to the road layout due to the widening. This increase would not normally result in a significant effect for noise sensitive features unless they currently experience a high level of noise.

In locations where the proposed scheme moves away from the current route of the A12, noise would increase at some sensitive features, but would decrease at many others. There are expected to be more sensitive features experiencing a noticeable decrease in noise than there would be experiencing an increase in noise. Some of these increases and decreases in noise would be significant in environmental terms.

To reduce the predicted increases in noise, the inclusion of noise barriers and bunds within the scheme design has been considered at several locations, and these will be refined for the Environmental Statement. The location of the proposed noise barriers and bunds is shown on the General Arrangement Plans.

The preliminary assessment has concluded that, as a result of the operation of the proposed scheme, there could be **significant adverse effects for about 63 residential dwellings** and **significant beneficial effects for around 225 residential dwellings**.

Population and health

Baseline

The main settlements along and around the A12 corridor are Chelmsford, Boreham, Hatfield Peverel, Witham, Rivenhall End, Kelvedon, Tiptree, Feering, Marks Tey and Copford. The larger settlements provide places of employment and various community facilities, and attract regular commuting journeys across the area by various modes of transport.

There are several housing allocations and approved planning applications for development near the proposed scheme, reflecting projected housing growth above the national average for the local authority areas of Chelmsford, Maldon and Colchester.

Outside of the main settlements, land use is mainly arable agricultural farm holdings, combined with some other land uses, for example fishing lakes, golf and country clubs, wedding venues and nature reserves.

There is a network of public rights of way that cross or are close to the existing A12. Some public rights of way have been severed by the previous dualling of the A12. Walkers, cyclists and horse riders are likely to be put off from using many existing routes which cross or are alongside the A12 due to the lack of physical segregation from high volumes of high-speed traffic.

Construction

Land use and accessibility

The route of the proposed scheme has been selected to avoid as many impacts on houses and property as possible. However, there would still be impacts on some properties, including the demolition of two houses at Rivenhall End and one business property near the new junction 24 to accommodate the footprint of the proposed scheme. We may also need to take small amounts of land from other residential or commercial properties, such as parts of gardens, driveways or car parks, to provide space for construction or, in some cases, to accommodate the permanent new footprint of the proposed scheme. Consultation is ongoing with all affected landowners.

Fourteen agricultural land holdings across Chelmsford, Witham, Rivenhall End, Kelvedon, Feering and Marks Tey are likely to be affected by the proposed scheme in terms of temporary or permanent land take and/or changes in access. There are also 15 further plots of land which are either tenanted or for which the current land ownership and land use is unknown.

During construction, many public rights of way and other routes used by walkers, cyclists and horse riders would be disrupted. In particular, potential disruption is likely to occur for people who cross the Station Road bridge in Hatfield Peverel to access the train station or schools, as well as the shared use footways and cycleways alongside the A12 between Hatfield Peverel and Witham, and through junction 25 at Marks Tey. Disruption is likely to be temporary or short-term, depending on the scale of works in those areas. We would provide safe and segregated diversions for walkers, cyclists and horse riders where necessary, and possible, for routes affected by the construction works.

The preliminary assessment has concluded that, overall, there would be **no likely significant effects on land use and accessibility during construction** for the population in the study area as a whole, with mitigation measures in place. However, it is noted that permanent loss of properties and garden areas for a small number of households would have large significance for the individuals concerned.

Human health

During construction, there would be some inconvenience and disruption to some residents from construction traffic. There would also be noise, dust and visual intrusion from site compounds and construction activities. This is likely to generate a degree of community concern and may affect mental wellbeing for some residents.

Those particularly susceptible would be shift workers and residents who live close to key locations of construction activity and may be at home a lot, such as retired elderly people or those with long-term health conditions or disabilities. However, it is not anticipated that the nature of the construction activities and length of the construction phase would have a measurable effect on the health status of communities. Effective engagement with communities before and during construction, to allow residents to raise any concerns and for them to be addressed where possible, will be important in reducing the likelihood of adverse effects on mental wellbeing. Community engagement measures will be included in the Environmental Management Plan.

The preliminary assessment has concluded that, overall, **effects on human health at a population scale during construction would be neutral**. However, it is noted for some individuals there may be temporary or short-term negative impacts on wellbeing associated with actual or perceived disruption from construction.

Operation

Land use and accessibility

The main impacts of land take and changes to access would occur during construction, so no significant effects during operation have been identified for land use.

The proposed scheme would improve connectivity for walkers, cyclists and horse riders. Separate links for these groups would be provided at four proposed new major junctions to help cyclists to bypass junctions and slip roads, including National Cycle Route 16 which crosses the A12 at junction 22.

The design of the proposed scheme would also address some issues of past severance of public rights of way. For example, a proposed footbridge (suitable for walkers, cyclists and horse riders) in Boreham would re-connect a bridleway which follows Payne's Lane south of the A12 with the bridleway north of the A12 allowing access to the wider public rights of way network. A new footbridge proposed in Witham would replace an existing crossing, which is level with the A12, for a public right of way which crosses the A12 between the industrial estate and the Coleman's Cottage Fishery. This route would be reclassified from a public footpath to a public bridleway to also allow users of National Cycle Route 16 to cross as an alternative to the segregated cycleway to be provided at the proposed new junction 22 arrangement.

The preliminary assessment has concluded that, overall, there would be **no likely significant effects on land use and accessibility during operation** for the population in the study area as a whole, with mitigation measures in place.

Human health

Air quality, noise and health

Air pollution is the greatest environmental risk to public health in the UK. Noise from road traffic is considered to be the second greatest environmental risk to population health in Europe.

Air pollution is linked to health conditions, such as cardiovascular conditions, respiratory diseases and cancer, which cause reduced life-expectancy. Based on the results from the preliminary air quality assessment, the proposed scheme is unlikely to have an observable effect on health outcomes related to air quality.

Noise can cause sleep disturbance and annoyance, and there is a growing body of evidence for links between long-term exposure to high levels of traffic noise and cardiovascular conditions such as high blood pressure. People most likely to be affected would be shift workers and residents who live close to key locations of construction activity and may be at home a lot. The preliminary noise assessment has concluded that there could be significant adverse effects for about 63 residential dwellings and significant beneficial effects for around 225 residential dwellings.

The preliminary assessment has concluded that, overall, **effects on human health from air quality and noise are uncertain at this stage**. Further assessment is needed, the results of which will be reported in the Environmental Statement.

Walking, cycling, physical activity and health

Increased physical activity levels are linked to better health outcomes such as reduced risk of the leading causes of premature death in the UK: cardiovascular disease (heart disease and stroke) and cancer. For many people, switching to active travel modes (walking or cycling) for regular journeys is an effective way of building in regular physical activity into daily life. Once operational, the improved connectivity of walking and cycling routes incorporated into the proposed scheme would have an **overall positive effect on active travel** opportunities and outdoor recreation, and so this would support positive health outcomes associated with increased physical activity.

Access to services and community severance

The proposed scheme has opportunities to reintroduce bus stops on sections of the A12 road that will be bypassed (e.g. at Rivenhall End, Essex County Fire and Rescue Service Headquarters, and Feering). This means access for those who depend on public transport would be improved, particularly for residents of Rivenhall End given the limited number of facilities, such as shops and medical facilities, within the settlement itself.

Traffic flows would be substantially reduced along the bypassed section of the existing A12 at Rivenhall End, with daily traffic flows being around five times lower. We would also install new crossings and provide new segregated footway/cycleways where a new local road junction is proposed on the western side of Rivenhall End. The combination of these factors would help reduce perceived and physical severance for this community.

Traffic flows would similarly be reduced on the bypassed section of the existing A12 between Feering and Marks Tey. While this route does not directly sever an existing settlement, the resulting improvement to the amenity of this route would likely encourage walking and cycling journeys between the two settlements, reducing severance.

An increase in traffic flows is forecast on the B1023 Inworth Road between Tiptree and Kelvedon where traffic modelling indicates flows would increase by more than 50%. Traffic flows on this route are already relatively high, so community severance in the baseline is high. The predicted increase in traffic flows could make the feeling of severance worse within the village of Inworth, with a potentially negative impact on community wellbeing. Opportunities for reducing this impact are being explored.

However, on balance, given the strong beneficial effects identified in other locations within the study area, the **overall effect of the proposed scheme on community severance is assessed as positive**.

Use of outdoor space and access to greenspace

The presence, type and accessibility of local greenspace plays a role in good mental and physical health. The reconnection of previously severed public rights of way would improve physical access to greenspace and outdoor recreation opportunities. However, changes in highway layout and junction arrangements could make it harder for people within settlements and on some public rights of way to see greenspace. As a result, there is **uncertainty as to whether the proposed scheme would be positive or negative in terms of mental wellbeing** associated with access to greenspace.

Collisions and road safety

As well as risk to life and the life-long implications of disability through injury, there is psychological trauma and other adverse mental health conditions associated with road traffic collisions.

We would improve infrastructure for walkers, cyclists and horse riders, and improve the standard of highway layouts, which would reduce the risk of road traffic collisions. This would have the **benefit of reducing rates of deaths and injuries on roads**. However, the results of collision and safety analyses, which are being undertaken to support the DCO application, are needed to confirm this assessment and will be referred to in the upcoming Environmental Statement.

Road drainage and the water environment

Baseline

The preliminary assessment considers the proposed scheme's interaction and impact on the water environment, encompassing surface water (i.e. water quality, water resources, and hydromorphology – the form of rivers), groundwater, drainage and flood risk. It also considers the proposed scheme's compliance with the Water Framework Directive.

We have prepared a number of technical reports and issued these to the Environment Agency and the Lead Local Flood Authority to support the water environment assessment for the PEIR. This includes a preliminary Water Framework Directive (WFD) Assessment (which assesses compliance of the proposed scheme against WFD objectives) and preliminary Flood Risk Assessment (which assesses the risk of flooding to and from the proposed scheme from all sources) The results of these reports are summarised in the road drainage and water environment chapter of the PEIR. A Water Quality Assessment Report has also been issued to the Environment Agency. This documents the water quality assessments that have been undertaken and presents the results of the impacts upon water quality during the operational stage.

The proposed scheme crosses a number of rivers. The larger watercourses (from south to north) are Boreham Brook, River Ter, River Brain (see photo of the River Brain on the next page), Rivenhall Brook, River Blackwater, Domsey Brook and Roman River. In addition, the proposed scheme crosses numerous smaller watercourses, field drains and ditches.

River Brain close to the Witham bypass

Classified water bodies under the Water Framework Directive are assessed for their ecological and chemical status in relation to the directive. All classified water bodies within the study area currently 'fail' for chemical status, and their ecological status varies between 'poor' and 'good' based on 2019 data. In most cases, the main sources of pollution are urban runoff, transport and agriculture.

Hydraulic models have been constructed to confirm the existing risk of flooding from rivers and to assess the impact of the proposed scheme. The assessment considers the predicted impact of climate change on flood risk in accordance with national planning requirements. The hydraulic models have been reviewed by the Environment Agency as the appropriate regulator.

Construction

The key likely impacts during construction of the proposed scheme are sediment and other polluting substances in runoff from temporary working areas reaching watercourses, particularly when those works are close by; local changes to flow conditions; loss of vegetation on riverbanks; dewatering of groundwater (removal of water from a location to facilitate construction) due to excavations and cuttings; temporary extension of culverts (structures that allows water to flow under a road); and temporary roads encroaching into the floodplain.

We would mitigate effects on flood risk, water quality, hydromorphology and groundwater during construction by following good construction practice, such as pollution prevention guidelines, and locating construction activities outside of areas at risk of flooding, which would prevent any likely significant adverse effects.

The preliminary assessment has concluded that there would be **no likely significant adverse effects** on the water environment with the application of appropriate mitigation measures.

Operation

The proposed scheme includes a number of mitigation measures to reduce its impact on the water environment, including swales (grassed channels) and drainage ponds to store and treat water that would run off the road surface before being released into rivers; designing outfalls to minimise impacts to watercourses, such as bank protection; and addressing potential flood risks at new river crossings.

We have carried out a preliminary assessment based on the current design to identify potentially significant effects on the water environment during the operational phase:

- **A small number of discharges of runoff via the proposed drainage outfalls would potentially have significant water quality effects upon the receiving watercourses.** These discharges are being further assessed to determine the additional treatment required before being released into watercourses.
- **One watercourse would potentially have significant effects on its hydromorphology**. This effect results from a realignment of the Rivenhall Brook, which would cut off a smaller watercourse, disconnecting it from its source.

No potentially significant effects have been identified for groundwater or flood risk during operation with the application of mitigation measures.

Measures are required to address a predicted localised increase to flood risk on the Boreham Brook, Rivenhall Brook and Domsey Brook. Details of these measures are currently being developed but may include excavations to replace floodplain lost due to the proposed scheme (known as floodplain compensation).

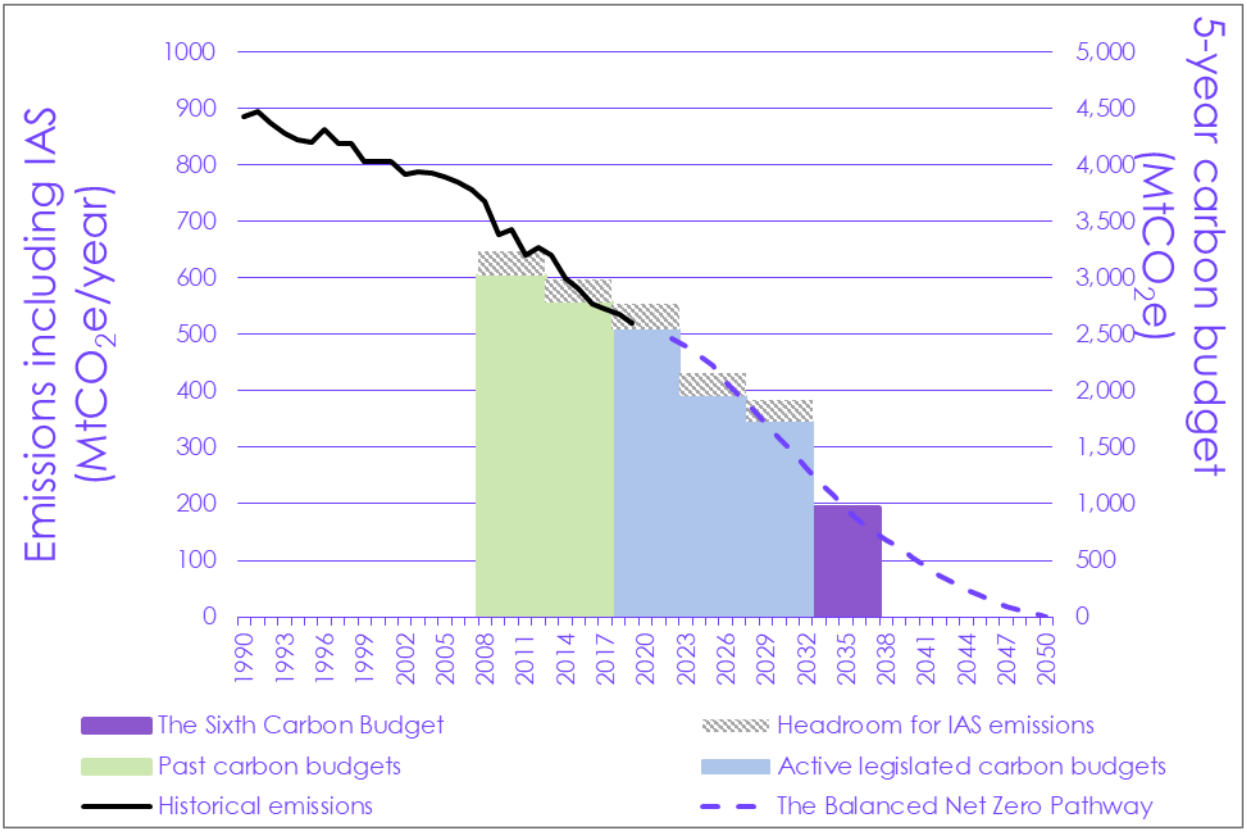
Climate

Baseline

We have carried out a preliminary assessment of the potential impact of the proposed scheme on climate by estimating resulting changes in greenhouse gas (GHG) emissions. We have also assessed the potential vulnerability of the proposed scheme to potential future changes in climate.

We have compared the estimated GHG emissions against the UK carbon budgets. Each carbon budget (as illustrated on the next page) provides a five-year, statutory cap on total UK GHG emissions, which should not be exceeded, in order to meet the UK's commitments to reduce emissions.

UK carbon budgets set to achieve net zero carbon by 2050



Units are in million tonnes of carbon dioxide equivalent ($MtCO_2e$) per year. Carbon dioxide equivalent is a metric used to compare the emissions of various GHGs, based on their global-warming potential. IAS is emissions from international aviation and shipping.

Source: https://www.theccc.org.uk/publication/sixth-carbon-budget/

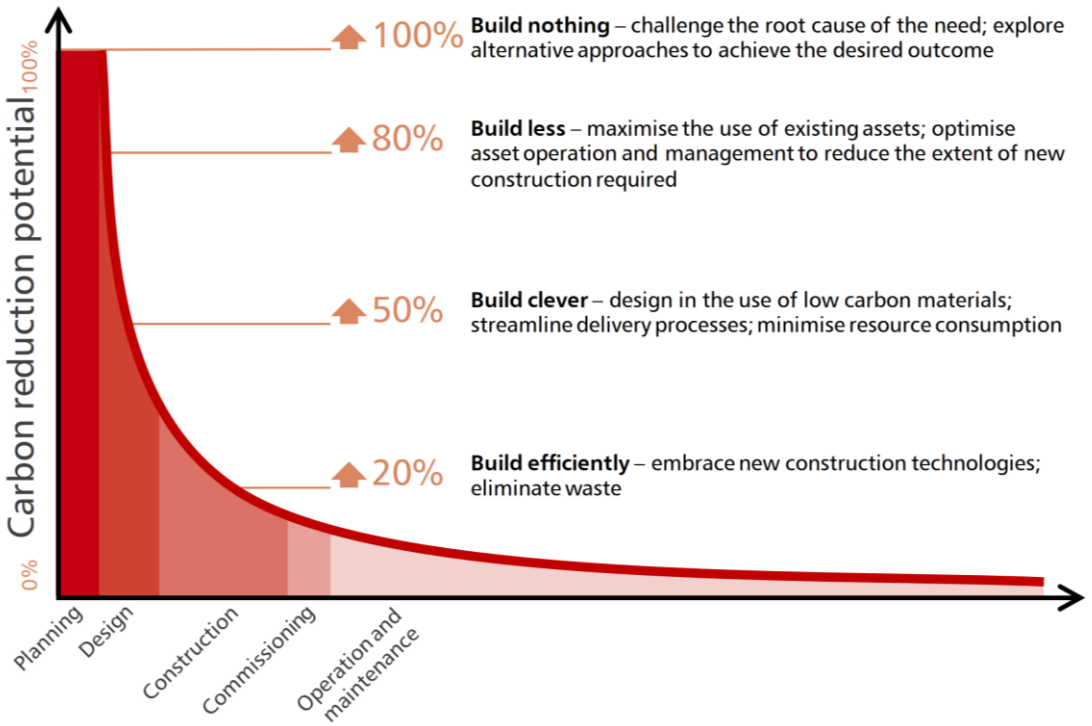
Features relevant to the proposed scheme that are potentially vulnerable to climate change include elements of the proposed scheme itself (e.g. pavements, structures, earthworks, drainage and technology) and operational road users, including the public and commercial operators, who may be affected by disruption.

Construction

As part of the process for calculating GHG emissions associated with construction of the proposed scheme, we have processes to review these throughout the design process, thereby informing and identifying opportunities to reduce such emissions. This includes exploring opportunities to build less or more efficiently. The graph on the next page shows how this process can reduce carbon emissions.

Construction phase GHG emissions have not been quantified at this stage but will be estimated going forwards and reported within the Environmental Statement. The magnitude of construction phase GHG emissions, particularly following the implementation of mitigation measures to avoid or reduce GHG emissions, is considered likely to be negligible in comparison to relevant UK carbon budgets. On this basis, construction phase GHG emissions are considered unlikely to have a material impact on the ability of the UK Government to meet its carbon reduction targets and are therefore **not likely to be significant**.

Carbon reduction curve



Source: https://www.gov.uk/government/publications/infrastructure-carbon-review

Climate change related impacts are considered **unlikely to result in substantial disruption** during the construction phase following the application of standard mitigation measures to reduce the vulnerability of the proposed scheme to impacts from climate change. This would include, for example, suitable management of site drainage and using weather forecasts to plan on-site activities to minimise the impacts of heavy rainfall.

Operation

At this preliminary environmental assessment stage, we have only considered GHG emissions associated with operational road users (i.e. emissions associated with the consumption of fuel and electricity by vehicles).

Within the Environmental Statement, we will consider emissions associated with maintaining and operating the proposed scheme (i.e. emissions associated with materials used during maintenance activities, including repair and replacement of proposed scheme assets, and electricity consumption for operational needs such as signage and lighting).

Preliminary estimates of operational road user GHG emissions indicate that changes in GHG emissions as a result of the proposed scheme are negligible in comparison to relevant UK carbon budgets. On this basis, operational phase GHG emissions are considered unlikely to have a material impact on the ability of the UK Government to meet its carbon reduction targets and are therefore **not likely to be significant**.

For the operational phase, a number of potential climate hazards have been identified at this stage for a minimum 60-year design life, including:

- various hazards related to increased rainfall and extreme rainfall events in winter
- various hazards associated with decreased rainfall and higher occurrence of dry spells
- increased summer temperatures and heatwaves/hot spells

We will choose materials that comply with relevant highways design standards, guidance and good engineering practice. Additionally, the design will incorporate suitable climate change allowances in accordance with relevant Environment Agency guidance (e.g. in relation to the sizing and capacity of the drainage systems).

It is considered that these mitigation measures, coupled with appropriate asset management during operation, including monitoring and inspections, would adequately address the potential climate change hazards identified. As a result, it is considered that the potential climate-related hazards identified **would not result in a significant effect** during the operational phase.

Cumulative effects assessment

Although an individual development may not itself have significant environmental effects, when combined with other development(s), the impacts could potentially combine to result in a significant cumulative effect. The Environmental Scoping Report identified a long-list of other development projects that would be considered for the cumulative effects assessment. This has now been reduced to a short-list which is presented in the PEIR and will be taken forward for further assessment. The cumulative effects assessment will be presented in the Environmental Statement.

Summary of the preliminary environmental assessment

The table below provides a summary of the potential residual significant environmental effects associated with the proposed scheme's construction and operation. We have developed mitigation measures for this preliminary assessment to avoid or reduce environmental effects where possible. We have considered these mitigation measures when determining the significance of effects.

The conclusions presented in the table below are preliminary and subject to the ongoing EIA process, which includes further surveys, studies and mitigation development. The final results of the environmental assessment will be reported in the upcoming Environmental Statement.

Summary of the preliminary environmental assessment

Aspect	Summary of significant (residual) environmental effects	
	Construction	**Operation**
Air quality	No significant effects on human health or ecology features.	No significant effects on human health features. Potential for significant adverse effects on biodiversity sites from nitrogen deposition (subject to further assessment).

Aspect	Summary of significant (residual) environmental effects	
	Construction	**Operation**
Cultural heritage	Likely significant adverse effects on 13 historic buildings and structures and two archaeological remains.	Likely significant adverse effects on the settings of six listed buildings.
Landscape and visual	Likely significant adverse effects on the landscape and features with views of construction activities (e.g. movement of construction machinery, excavation and earthworks; the presence of compounds, temporary roads and stockpiled soil and materials; and loss of vegetation).	Likely significant adverse effects on areas of landscape that would be directly affected by new junctions and the offline bypasses, for visual features that are very close to the proposed scheme, and where the presence of major new infrastructure would significantly change the character of the view.
Biodiversity	Likely significant adverse effects on two potential veteran trees, a number of ancient hedgerows, and woodland habitat; and likely significant beneficial effects on water vole and great created newt.	Likely significant adverse effects from air quality on Whetmead LNR and LWS, Perry's Wood LWS and potential veteran trees.
Geology and soils	Significant adverse effects on soils from loss of agricultural land and likely significant effects on groundwater and surface waters from contamination.	No significant effects identified.
Material assets and waste	No significant effects identified.	No significant effects identified.
Noise and vibration	Likely significant adverse effects on noise sensitive features close to construction activities such as pilling and demolition, construction of new junctions and bridges, and night-time working.	Likely significant adverse effects for about 63 residential dwellings and significant beneficial effects for around 225 residential dwellings.
Population and health	No significant effects on land use and accessibility identified (although it is noted there would be a small permanent loss of property and land which would have large significance for the individual households concerned). Effects on human health at population level have been assessed as neutral. However, it is noted for some individuals there may be negative impacts on wellbeing associated with construction.	No significant effects on overall land use and accessibility resources identified. There would be likely positive human health effects on community severance, access to services, active travel and road safety; and uncertain (subject to further assessment) effects from air quality and noise and on access to greenspace.

Aspect	Summary of significant (residual) environmental effects	
	Construction	**Operation**
Road drainage and the water environment	No significant effects identified.	Likely significant adverse water quality effects for a small number of watercourses due to drainage outfalls (mitigation currently under development). Likely significant adverse hydromorphology effects for one watercourse.
Climate	No significant effects identified.	No significant effects identified.
Cumulative effects assessment	Cumulative effects will be assessed and reported within the Environmental Statement.	

Consultation and next steps

Consultation

We are currently holding a public consultation, and this PEIR non-technical summary forms part of the consultation package. Please share any ideas, local knowledge or concerns that you may have. The consultation will run for eight weeks from Tuesday 22 June to Monday 16 August 2021.

Further information on the consultation can be found on our webpage at www.highwaysengland.co.uk/A12. All the consultation materials will be digitally available, including:

- the consultation brochure
- a digital flythrough of the proposed scheme
- other technical information (including the PEIR) which you will be able to download

Subject to COVID-19 restrictions, you can also take away copies of the brochure and view additional materials at public information points as detailed in the consultation brochure. Please contact our project team at A12chelmsfordA120wide@highwaysengland.co.uk to request an accessible format of the brochure.

You can respond using one of the following methods:

- Online via the response form at www.highwaysengland.co.uk/A12
- Complete the consultation response form available from the public information points (as listed in the consultation brochure), and return the form to FREEPOST A12 widening
- Email your response to A12chelmsfordA120wide@highwaysengland.co.uk
- Write to us at FREEPOST A12 widening

All responses should be returned by 11.59pm on Monday 16 August 2021.

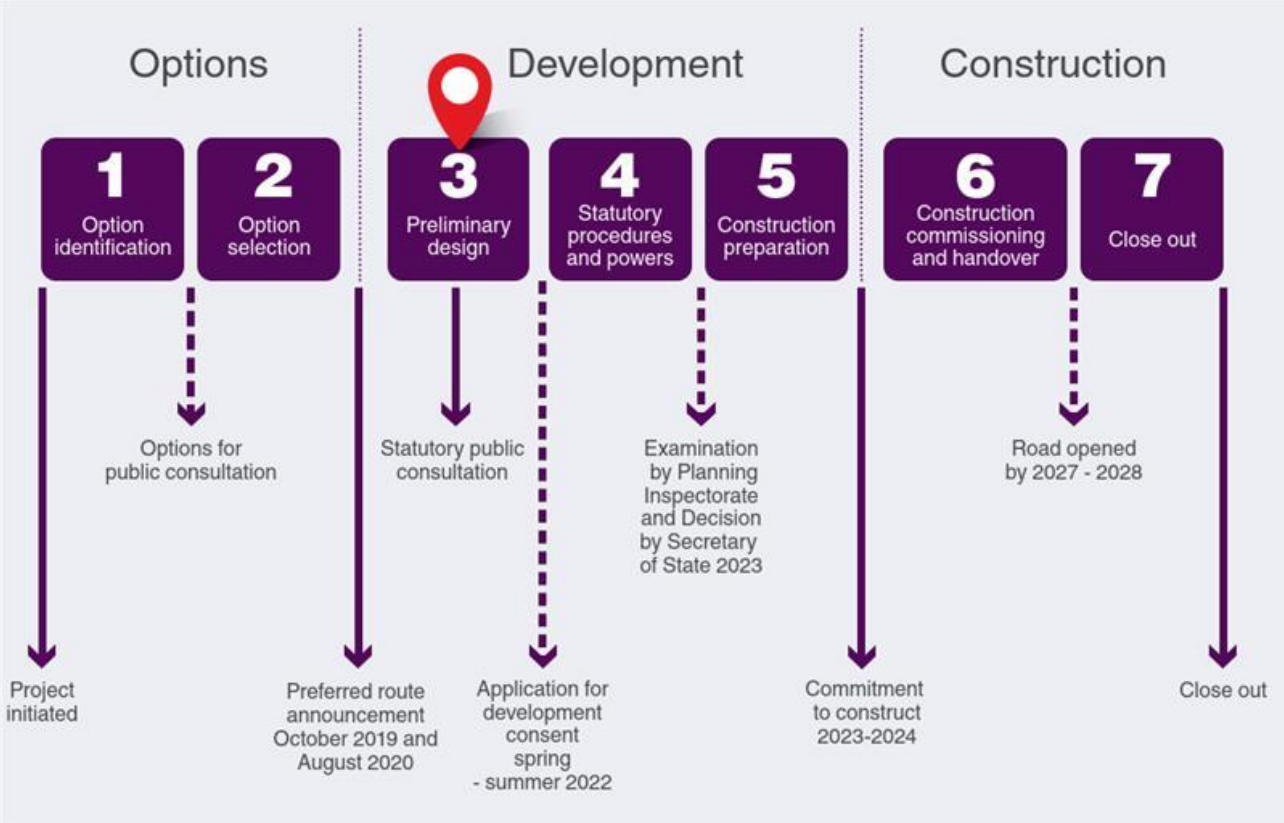
Next steps

Once the consultation closes, we will review all the suggestions and comments received. We will take time to analyse and consider your feedback when making further refinements to the proposed design and developing our planned mitigation measures. We will set out a summary of the responses and describe how our proposals have been informed and influenced by them in a consultation report. This will form part of our application for development consent and will also be available to the public following submission of the application.

We expect to submit our application by spring/summer 2022 and, provided consent is granted, construction work is expected to start in 2023.

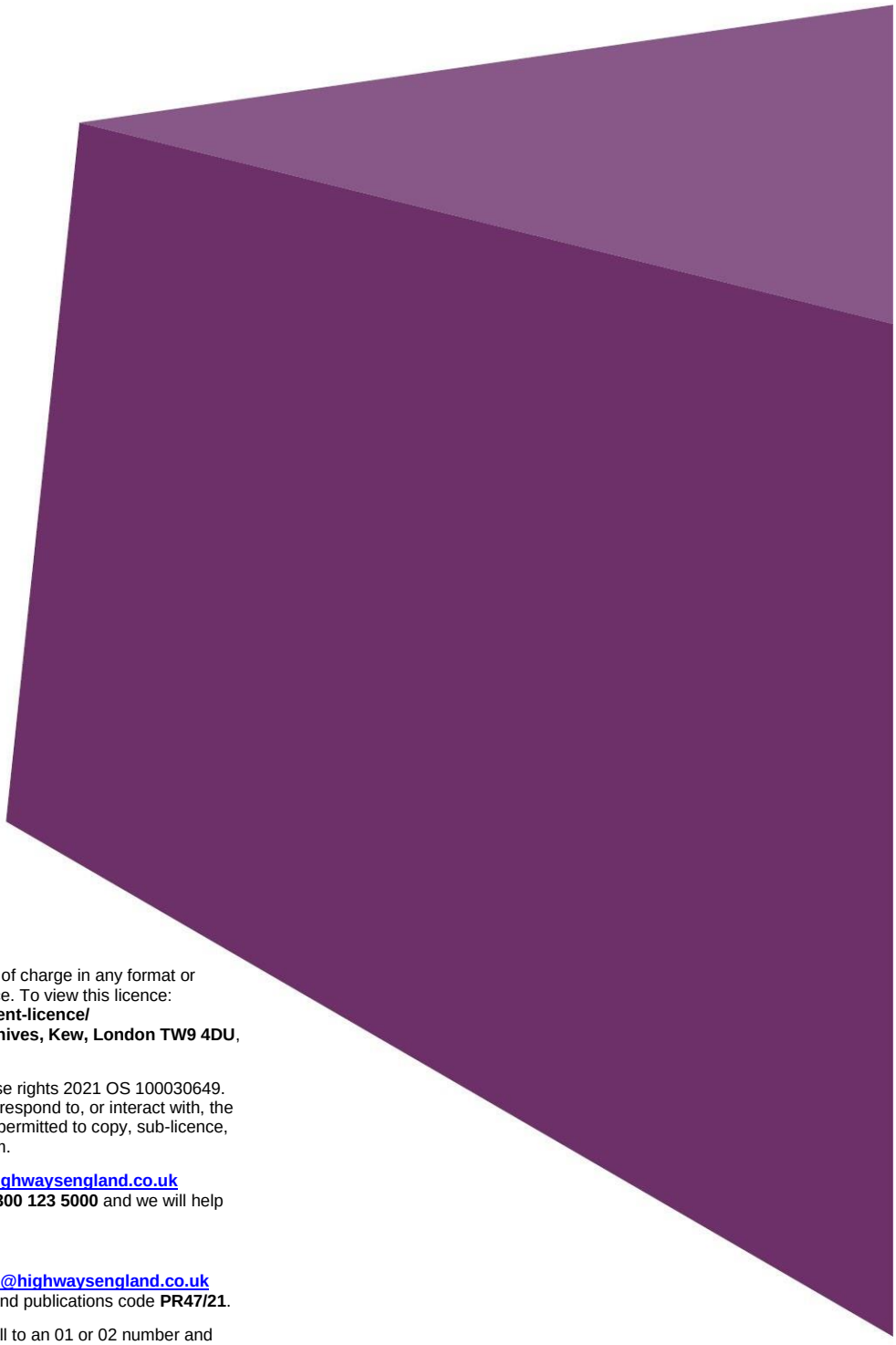
Once we submit our application, the Planning Inspectorate (acting on behalf of the Secretary of State) will examine the application and may hold some public hearings, before making a recommendation to the Secretary of State for Transport, who will decide on whether or not the proposed scheme will go ahead. The process for the next steps for the proposed scheme is shown below.

Next steps for the proposed scheme



How to find out more

For more information, please visit our webpage (www.highwaysengland.co.uk/A12) where you can also sign up for email alerts whenever the webpage for the proposed scheme is updated. If you have any queries about this scheme, please contact us by calling 0300 123 5000 or emailing A12chelmsfordA120wide@highwaysengland.co.uk



This document is also available on our website at **www.highwaysengland.co.uk**
For an accessible version of this publication please call **0300 123 5000** and we will help you.

If you have any enquiries about this publication email **info@highwaysengland.co.uk** or call **0300 123 5000***. Please quote the Highways England publications code **PR47/21**.

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