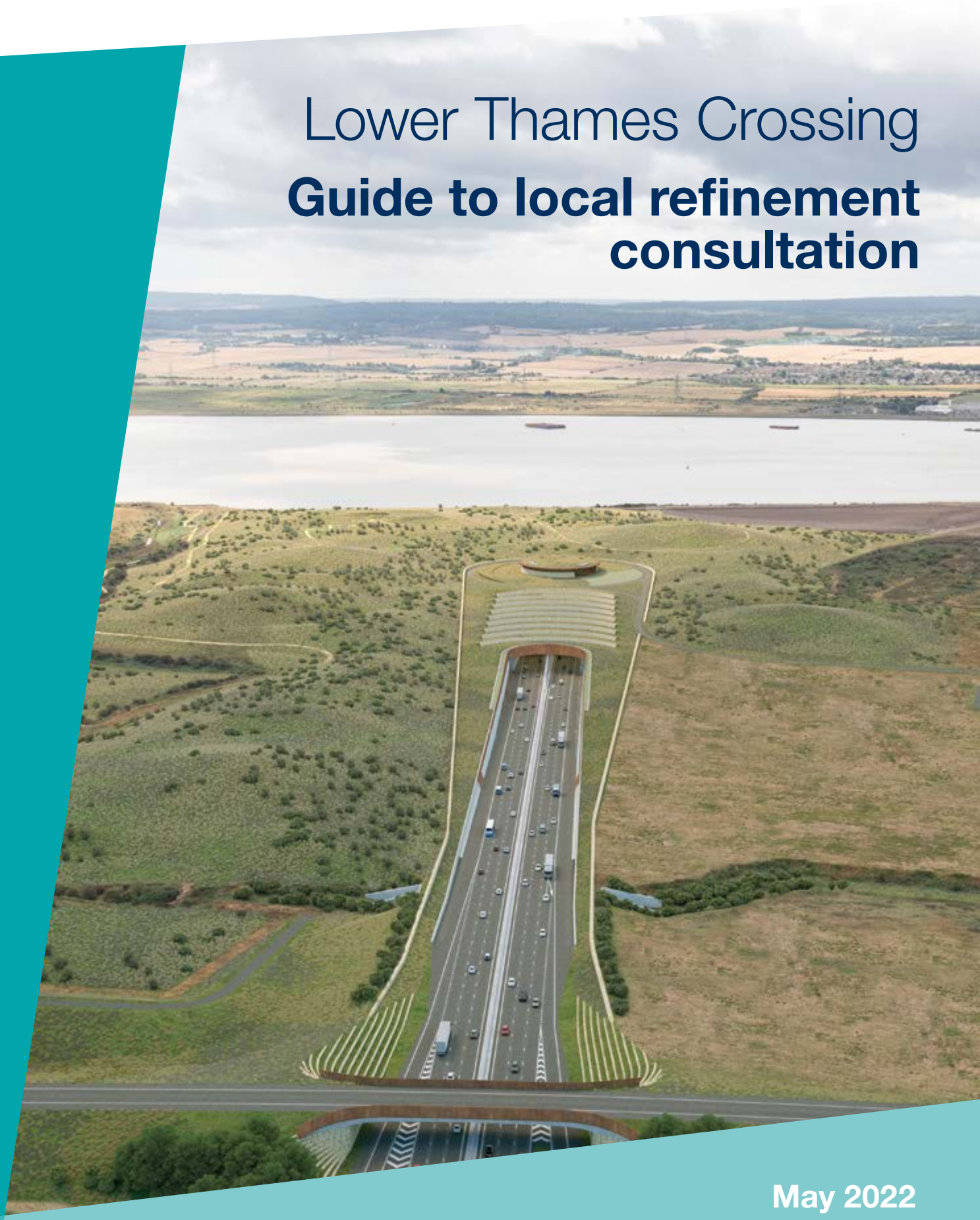
national highways

Lower Thames Crossing

Guide to local refinement consultation



May 2022

About this guide

We want to get all aspects of the design, construction and operation of the Lower Thames Crossing right. Your views are vital in helping us to do this and shape the project.

Following our community impacts consultation in 2021, we are now holding a non-statutory local refinement consultation, where we are seeking feedback on a number of localised changes we are proposing to make to the project.

This is your opportunity to have your say on these refinements.

National Highways

We are a Government-owned company that works with the Department for Transport.

Previously known as Highways England, our new name reflects our focus on delivering the Government's £27.4 billion strategic roads investment programme, while also continuing to set highways standards across the UK.

We plan, operate, maintain and improve England's strategic road network, which plays a key role in connecting the country's regions, ports and international trade corridors.

Our aim is to ensure that road users have safer and more reliable journeys, and that businesses have the high-quality, effective road links they need to prosper.

Contents

Appendix

Throughout this document, we have highlighted the other material that provides more detail about our local refinement consultation. This is available on our website at **https://ltcconsultation2022.nationalhighways.co.uk/**

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Foreword

Matt Palmer,
Lower Thames Crossing
Executive Director

Since we first consulted on the route of the Lower Thames Crossing, tens of thousands of you have helped us design a project that will improve lives across the region and beyond. It will boost our economy, support jobs and education, regenerate local communities and provide the vital road capacity that is so desperately needed.

Our last consultation was one of the most comprehensive ever delivered by National Highways. Focusing on our proposals for building and operating the new road, it helped us to develop our plans for this transformative project, so we can maximise its benefits.

We couldn't have got here without you. Your feedback has been invaluable. Now, we are launching this consultation to gather further feedback from you, this time on some localised changes to the project, before we submit our Development Consent Order (DCO) application, which we intend to do later this year.

The changes we're consulting on are the result of our ongoing design work, engagement with our stakeholders, and your feedback, which is summarised in our 'You said, we did' chapter.

Improvements for local people

The Lower Thames Crossing will almost double road capacity between Kent, Thurrock, Essex and Havering, providing much-needed relief to the millions of people who use the Dartford Crossing every year.

If given the green light, the project can play a vital role in connecting communities and bringing people closer to jobs and leisure opportunities.

This consultation is about improving the project for local people and includes:

- the redesign of Tilbury Fields
- increasing the amount of open space south of the river by adding land to the east of Chalk Park
- a new link road from the Orsett Cock junction to the A1089
- a new bridge over the A127 for walkers, cyclists and horse riders
- modified access to the northern tunnel entrance, providing safer operation of the tunnel facilities and better access for the emergency services
- additional environmental compensation

Reducing our environmental impact

There have been two other significant project developments. These relate to how we plan to compensate for potential air quality impacts on sensitive habitats, and our ground-breaking approach to setting new standards for reducing carbon during construction.

At the request of Natural England, we've refined the way we assess the impacts of nitrogen, so it includes ammonia being emitted from vehicle exhausts, as well as nitrogen oxides (NOx). It means we're better able to understand the impact of vehicle emissions from traffic using the new road on sensitive designated habitats.

As a result, we're now consulting on providing around 270 additional hectares for new wildlife habitats that would compensate for potential environmental impacts on these habitats.

I'm delighted that earlier this year, the Lower Thames Crossing was designated a 'pathfinder' project. This means that we are exploring carbon-neutral construction as part of our efforts to make the new crossing the greenest road ever built in the UK.

We know the vehicles on our roads are evolving rapidly and carbon emissions from those using the Lower Thames Crossing is expected to fall dramatically as more people switch to electric.

Together with our partners and local businesses, we'll continue to identify innovative ways of building and operating our infrastructure. Ideas include removing diesel from our sites by only using hydrogen and electric equipment, and looking at alternatives to carbon-intensive materials like concrete and steel.

Have your say

Once again, your views will be important in helping us to ensure the new road delivers everything we need it to. More information on how to share your feedback can be found in chapter 6 of this guide.

When we submit our DCO application, we will include a Consultation Report that explains how we have listened to comments received from all our consultations, and how they have informed our proposals.

Many thanks for your time – your input continues to be essential.

Matt Palmer
Lower Thames Crossing Executive Director
National Highways

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Local refinement consultation

What is the Lower Thames Crossing?

National Highways is proposing a new road and tunnel, the A122 Lower Thames Crossing. It would connect to the A2 and M2 in Kent, passing through a tunnel under the River Thames, before linking to the A13 in Thurrock and junction 29 of the M25 in the London Borough of Havering, north of the Thames.

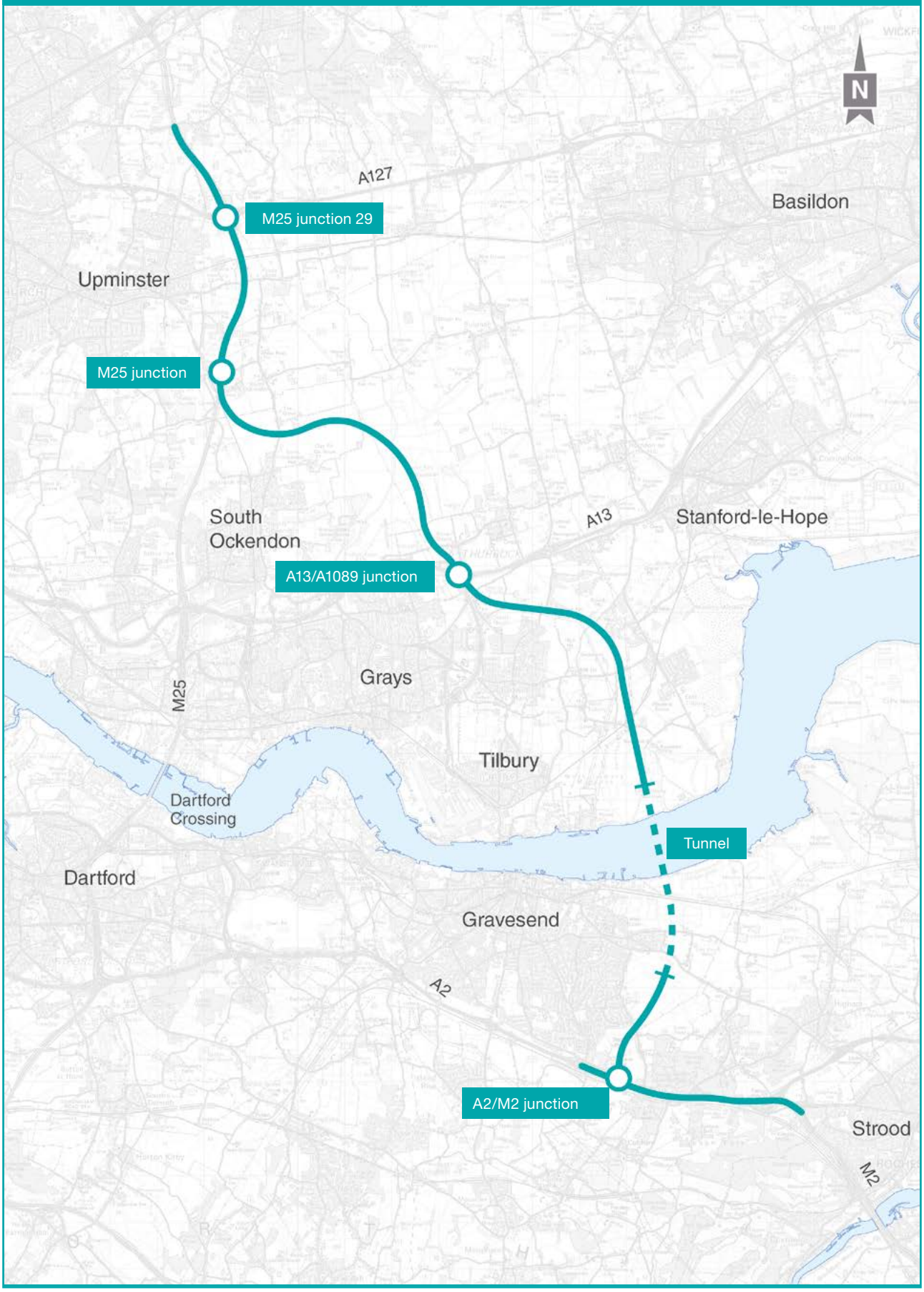
It would be approximately 23km long, with 4.25km of this in a tunnel. This would be located to the east of the village of Chalk on the south side of the Thames, and to the west of East Tilbury on the north side.

About the project

For more than 50 years, the only road across the River Thames, east of London, has been the Dartford Crossing. It is a critical part of the country's road network, connecting communities and businesses south and north of the river and providing a vital link for the nearby major ports that distribute goods throughout the rest of the UK. It is often congested as it regularly carries more vehicles than it was originally designed for. When accidents and incidents occur, it can take up to five hours for traffic to clear.

The Lower Thames Crossing would offer an alternative route across the Thames. It would provide a number of benefits to local communities, while enabling businesses to operate more effectively and improving access to housing, jobs, leisure and retail opportunities on both sides of the river.

Figure 2-1: Overview map of the Lower Thames Crossing



The project's objectives

We have worked with the Department for Transport (DfT) to agree the following objectives for the Lower Thames Crossing:

- to relieve the congested Dartford Crossing and approach roads, and improve their performance by providing free-flowing, north-south capacity
- to improve resilience of the Thames crossings and the major road network
- to improve safety
- to support sustainable local development and regional economic growth in the medium to long term
- to be affordable to Government and users
- to achieve value for money
- to minimise adverse impacts on health and the environment

Local refinement consultation

We're holding this local refinement consultation to seek your feedback on some localised changes to the project before we submit our DCO submission later this year (see **www.lowerthamescrossing.co.uk/archive**).

Chapter 3 includes an explanation of how feedback received at the community impacts consultation, along with ongoing engagement with stakeholders and landowners, has influenced our proposals.

Chapter 4 sets out the changes we are seeking your feedback on as part of this consultation.

Chapter 5 sets out the further environmental work we have carried out to compensate for the potential impact of nitrogen deposition from vehicle emissions on sensitive habitats. This is supplemented by a technical note in the appendix.

We have further refined the Order Limits to reflect the changes we are proposing in chapters 4 and 5.

Case study: Low-noise road surfacing

Once the Lower Thames Crossing is open, we will ensure that we mitigate any noise impacts on local residents. One way we are proposing to do this is by using low-noise road surfacing in some areas. This would reduce noise from traffic and would be in addition to the other measures such as noise barriers or landscaping features such as false cuttings.

The locations where this type of surfacing may be considered will be informed by our assessment work, which is currently being completed based on the latest traffic forecasts. The locations will be fully presented in the Environmental Statement as part of the DCO submission.

Applying for development consent

As with all projects of this type and scale, the Lower Thames Crossing is a Nationally Significant Infrastructure Project (NSIP), so a DCO application will need to be made to build and operate the road.

Our application will be examined by the Planning Inspectorate, the Government's independent planning authority. It will report its findings to the Secretary of State for Transport, who will ultimately decide whether to grant consent for the project.

At our community impacts consultation last year, we said we would submit our DCO application later in 2021. However, in November 2021 we announced plans to change our proposals for land next to the River Thames at the request of Thurrock Council and local stakeholders such as the Port of Tilbury. This was to ensure that Thames Freeport's potential was not impacted by the Lower Thames Crossing.

As a result, we now intend to submit our DCO application later this year. If consent is granted, we intend to start construction in 2024. Our target road opening is 2029/30, but for the purposes of construction and traffic modelling, the road opening date is assumed to be 2029 throughout this consultation.

Nitrogen deposition

When nitrogen is emitted from vehicle exhausts it can enter the atmosphere and fall on habitats. This process is known as nitrogen deposition. It can also affect the way plants grow.

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You said, we did

In this chapter, we explain how we have used feedback from our community impacts consultation in 2021, along with ongoing engagement with stakeholders and landowners, to refine the project.

We asked

During the consultation, we asked a number of questions to understand the level of support for the different elements of the project. Consultees could also expand on their answers. The response form was split into the following four sections:

- the project's impacts and mitigation
- changes since the design refinement consultation
- Order Limits
- the 'You said, we did' document presented at the community impacts consultation

You said

3,218 responses were received to the community impacts consultation.

Overall, the feedback we received supported the proposals presented across all four sections. Responses to some of the questions asked at the community impacts consultation are outlined below.

The project's impacts and mitigation

- **1,564** (59%) respondents supported or strongly supported our plan to build the Lower Thames Crossing; 973 (36%) opposed or strongly opposed.
- **1,231** (47%) respondents supported or strongly supported our plan to operate the Lower Thames Crossing; 847 (33%) opposed or strongly opposed.

Breakdown of response type

3,218 consultation responses

2,556 Response forms (online)

512 Emails

150 Letter and response forms (hardcopy)

Changes since the design refinement consultation

- **1,367** (54%) respondents supported or strongly supported the proposed changes south of the river; 721 (25%) opposed or strongly opposed.
- **1,300** (51%) respondents supported or strongly supported the proposed changes north of the river; 824 (31%) opposed or strongly opposed.

Order Limits

- **1,335** (52%) respondents supported or strongly supported the proposed area of land that would be needed to build the Lower Thames Crossing; 783 (31%) opposed or strongly opposed.
- **1,432** (57%) respondents supported or strongly supported the proposals for the inclusion of a new open space site, Tilbury Fields; 528 (21%) opposed or strongly opposed.
- **1,051** (42%) respondents had no preference about the two options presented for the height of the landform at Tilbury Fields; 387 (16%) were in favour of the higher landform, 226 (9%) were in favour of the lower landform and 501 (20%) were in favour of neither.

You said, we did

- **1,244** (49%) respondents supported or strongly supported how issues and suggestions about the Lower Thames Crossing have been addressed following earlier rounds of public consultation; 739 (29%) opposed or strongly opposed.

The statistics above are taken from the 'Response to community impacts consultation' document. More information about this is included below.

Response to community impacts consultation document

If you would like to find out more about the feedback received from the community impacts consultation, we have published a document called 'Response to community impacts consultation'. It includes graphs showing the results for all the questions that we asked. We've also summarised the most common feedback received and provided a response for the issues that were raised.

The document also explains some of the minor refinements we have made to the project in response to ongoing engagement with stakeholders and landowners.

It can be found online at **https://nationalhighways.co.uk/our-work/lower-thames-crossing/contact-us-and-archive/public-presentations-and-documents/**

If you do not have access to the internet or require an alternative format, please call us on **0300 123 500** or email **info@lowerthamescrossing.co.uk**

We are currently drafting detailed responses to all the issues raised at our community impacts consultation. This will form a chapter of the Consultation Report within our DCO application, which we plan to submit later this year.

We did

We presented some changes to the project in our community impacts consultation that included refinements to utility diversions, changes to special category land and amendments to the Order Limits. We listened to feedback and considered this carefully when developing our proposals. We believe the changes presented were an improvement to the project and these were generally supported by respondents. We have, therefore, decided to incorporate them within our proposals.

Our Consultation Report, which will be part of our DCO application, will set out how we considered the feedback received in relation to these changes. We are now proposing further refinements to the project and are seeking your views on these in chapter 4.

In this section, we explain the changes to the project that we are proposing to make and that have been influenced by feedback received at the community impacts consultation. These are set out in the table below. We are seeking your feedback on these changes as part of this consultation.

Draft DCO application documents

In our community impacts consultation, we shared a series of draft documents that will form part of our DCO application. These are technical documents that were provided to help you understand how we, and our appointed contractors, would build and operate the project. These included:

- Draft Development Consent Order schedule 2 & explanatory note
- Outline Site Waste Management Plan
- Outline Traffic Management Plan for Construction
- Outline Materials Handling Plan
- Code of Construction Practice (including the Register of Environmental Actions and Commitments)
- Design Principles
- Wider Network Impacts Management and Monitoring Plan
- Outline Landscape and Ecology Management Plan
- Framework Construction Travel Plan

Comments on the documents were received from local authorities, the public and other stakeholders. We are now considering all the feedback, which we will use to prepare updated versions of the documents for submission with our DCO application.

Changes we are proposing that have been influenced by feedback from the community impacts consultation

In the table below, we describe the changes we are proposing that have been influenced as a direct result of feedback received from the community impacts consultation.

For more detail on these, and to read about other changes we are consulting on as part of this local refinement consultation, see chapter 4, which includes maps, visuals and a description of the impacts.

NOTE: Throughout this chapter, we refer to the Lower Thames Crossing as 'LTC'.

What is a permissive path?

It is a path that a landowner allows the public to use, but is not a Public Right of Way with a formal right to access.

You said, we did change summary	Map showing section of the route	Map reference
Gravesham		
Refinements to woodland planting around Shorne Ifield Road – We are proposing to relocate some of the area of compensatory tree planting that was previously proposed north of Shorne Ifield Road, to fields south of Shorne Ifield Road. This is to avoid a significant impact on the archaeology linked to a newly discovered medieval settlement north of the road. This change responds to consultation feedback from nearby residents, who requested that the area for tree planting be moved to maintain their existing views.	A2/M2 corridor	1
Redesignation of Hever Court pedestrian-cycle track north of A2/LTC junction to a bridleway – Following consultation feedback from the British Horse Society about improving connections for horse riders in the area, we are proposing to redesignate the Hever Court pedestrian-cycle track, north of the A2/LTC junction, to a bridleway. This would improve local connections for horse riders from the existing bridleway along NCR 177 to footpath NG17 (also upgraded to a bridleway). In addition, this would provide better links with existing bridleways and newly created routes to Chalk Park.	South of Gravesend	2
Redesignation of footpath NS169 as pedestrian-cycle track at Michael Gardens – We received feedback from the local community and the British Horse Society about the potential presence of horses near the play area in Michael Gardens and the lack of stables in this location, meaning it is less likely to be used by horse riders. As a result, we are proposing to redesignate the existing footpath NS169 as a pedestrian-cycle track, rather than a bridleway (as proposed at the community impacts consultation). The redesignation of Hever Court Road (described above) would provide better access for horse riders to the proposed new routes and existing ones.	South of Gravesend	3

You said, we did change summary	Map showing section of the route	Map reference
Gravesham		
A2 Roman Road increased working area for electricity works – We are proposing an extension of the Order Limits to include the road and footpath of a section of Roman Road and Pepper Hill. This is to provide enough room for the electricity cables (required to provide a permanent power supply for the southern tunnel entrance building and the tunnel) and would avoid the potential closure of NCR 177. It would also mean that existing vegetation in this area can be retained. This proposal has been developed following further investigations by UK Power Networks, which had some concerns about delivering the works along the previous footpath alignment. In addition, this proposal addresses comments raised at the consultation about retaining vegetation that screens the A2 corridor from the cycle route and limits any new visual impacts.	South of Gravesend	4
Extension of open space provision (east of Chalk Park) – We listened to concerns at the community impacts consultation that existing public open space would be negatively impacted by the project. After further engagement with the landowner and additional design development, we propose to permanently acquire the remaining 8ha area of Southern Valley Golf Club. By extending our open space proposals in this location, we would be able to provide a larger area of landscaped amenity space for the local community.	A2/M2 corridor	5
Redesignation of footpath NG8, south of the A226 Gravesend Road – Further to discussions with the British Horse Society and its request for an equestrian route parallel to the A226 Gravesend Road, we are proposing to redesignate the northern section of footpath NG8 so it could be used by walkers, cyclists and horse riders. This addresses feedback from the British Horse Society that the previous proposal, which used the footpath and verge along the A226 Gravesend Road, was unsuitable due to the narrow verges.	South of the River Thames/ southern tunnel entrance	6

You said, we did change summary	Map showing section of the route	Map reference
Thurrock		
Redesign of Tilbury Fields – In response to consultation feedback from the Port of Tilbury and Thurrock Council, as well as ongoing stakeholder engagement, we are proposing changes to the design of Tilbury Fields. Our changes would ensure Thames Freeport proposals can be brought forward alongside the LTC. The changes include redesigning the environmental mitigation and open space provision, as well as changes to construction access in the area.	Tilbury area	7
Removal of proposed Dock Road water connection – We are proposing a reduction in the area of land required in the Dock Road, Hume Avenue and Port of Tilbury area. Following discussions with Essex and Suffolk Water, we no longer require the proposed pipeline along Dock Road. This change addresses concerns raised by residents at the community impacts consultation as it means that the connection would no longer take place on a residential road (Dock Road). It also means the associated traffic management measures are needed for two months instead of nine.	Tilbury area	10
Coopers Shaw Road water connection refinement – At our previous consultations, potential routes for a new temporary water pipeline were presented along Coopers Shaw Road, Rectory Road and Dock Road. Following ongoing discussions with Essex and Suffolk Water and having considered the potential noise impacts for residents on Rectory Road, we have decided that the proposed new water pipeline should be placed around Coopers Shaw Road. This would reduce construction work and the associated traffic management, responding to concerns from residents about the impacts of construction. This change means that the proposals along Dock Road, Hume Avenue, the A1089 to Fort Road access road, Rectory Road, Church Lane and part of Station Road are no longer required and the land associated with these proposals can be removed from the Order Limits.	Tilbury area	11

You said, we did change summary	Map showing section of the route	Map reference
Thurrock		
New footpaths to link the heritage assets of Coalhouse Fort, Coalhouse Battery and Bowaters Battery to East Tilbury – Following feedback from the consultation about linking Tilbury Fields to Coalhouse Fort and providing access for all users, we are proposing to include new Public Rights of Way and permissive path links to the heritage sites of Coalhouse Fort, Coalhouse Battery and Bowaters Battery, and to East Tilbury. These new connections would create a variety of alternative routes that walkers, cyclists and horse riders in the local area could use. This change also addresses feedback from Thurrock Council about active travel routes around the Coalhouse Fort area.	Tilbury area	12
New Orsett Cock/A1089 junction link road – To address concerns about traffic re-routing on to the local road network in this area, we are proposing to change how traffic on the A13 corridor would access the A1089. We propose a new link road from the Orsett Cock junction to the A1089 southbound. This change also addresses feedback from Thurrock Council, the Port of Tilbury and DP World about the lack of connectivity between the LTC and the A1089, and the resulting impacts on other local roads.	A13/A1089 junction	16
Refinements to the route of a gas pipeline diversion around Orsett – We are proposing to change the route of a gas pipeline diversion to avoid a scheduled monument and veteran tree west of Orsett. This results in minor changes to the Order Limits along the length of the diversion route, which would reduce the area needed for works overall by approximately 2ha. This change responds to feedback from Cadent Gas and addresses concerns raised by the public about impacts to veteran trees.	A13/A1089 junction	17

You said, we did change summary	Map showing section of the route	Map reference
Havering		
Refinements to electricity works west of Clay Tye Road – Following site investigations, engagement with UK Power Networks and feedback from landowners, we are proposing to use more of the existing infrastructure to deliver changes to the electricity network in this location. Instead of laying cables underground, the powerlines would remain overhead but would be diverted north on to two taller pylons to cross the M25. This removes the requirement for an electricity substation on Clay Tye Road. This change would also reduce the time required for construction of this diversion and also addresses feedback from UK Power Networks and the landowner about protecting farmland.	M25 junction 29	23
Refinements to the electricity diversion north of St. Marys Lane – To address concerns about impacts to local communities during construction, we are proposing to move the working area for construction to the east of properties in Tyas Stud Farm. This would enable access for construction, operation and maintenance from Warley Street from the east to the works area, which requires an extension to the Order Limits. The number of properties impacted by construction would be reduced and the change would also remove 2.5ha of land from the Order Limits. This change addresses feedback from UK Power Networks about extending the works area to provide enough space to deliver the diversion.	M25 junction 29	24
New walking, cycling and horse riding bridge over the A127, west of M25 junction 29 – Following feedback from the London Borough of Havering and local cyclists' groups, we are proposing a new bridge for walkers, cyclists and horse riders across the A127 west of M25 junction 29, linking Moor Lane in the south to Folkes Lane in the north. This change addresses consultation feedback about connectivity between the north and south footways and cycleways alongside the A127, to both east and west sides of the M25.	M25 junction 29	25

You said, we did change summary	Map showing section of the route	Map reference
Brentwood		
Upgrade of walking, cycling and horse riding bridge over the A127, east of M25 junction 29 – Following consultation feedback from the British Horse Society and Essex County Council, and safety concerns about horses sharing routes with motor traffic, we are proposing an update to the planned A127 bridge so it can accommodate horse riders and to include a link to bridleway BR183. This means horse riders would no longer be dependent on the existing vehicle bridge across the A127, which is shared with motor traffic including HGVs.	M25 junction 29	26

Have your say

You can provide your feedback about this chapter by answering question 6 in the response form for this local refinement consultation.

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Proposed changes since the community impacts consultation

The proposed changes described in this chapter are a result of feedback received from the community impacts consultation, ongoing engagement with landowners and stakeholders, design work and a greater understanding of technical constraints. This chapter looks at changes proposed to the project's design and Order Limits since our last consultation. Along with the proposals described in chapter 5, the changes covered in this chapter are those that we are seeking your feedback on as part of this consultation.

Landowner engagement and minor refinements document

We have published a document called 'Landowner engagement and minor refinements', which explains the other changes we are taking forward as part of the project following engagement with affected landowners and others with an interest in land. It includes route section maps that detail the further minor refinements we are making to the project. This can be found online at **https://nationalhighways.co.uk/our-work/lower-thames-crossing/contact-us-and-archive/public-presentations-and-documents/**

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Proposed Order Limits

The Order Limits are the outermost edges of the Lower Thames Crossing project. They are indicated on the route section maps in this chapter by a red line. This shows the land that may be acquired or used to build and operate the project and the areas to which the DCO would apply. The Order Limits proposed at the previous consultation are indicated by a blue dashed line. Additional land now required for the project is shown by purple shading. Land removed from the Order Limits is indicated by light orange shading.

Following engagement with stakeholders, refinements to the utilities design and feedback from the community impacts consultation, we have further refined our Order Limits in certain areas. Land added to the Order Limits includes four habitat compensation areas in Brentwood, Thurrock, Shorne Woods (in Gravesham) and along the M2 corridor/Blue Bell Hill (in the boroughs of Tonbridge & Malling and Maidstone). This additional land is indicated by light green shading. These sites are proposed to compensate for the potential effects from nitrogen caused by the forecast changes in traffic as a result of the Lower Thames Crossing. There are dedicated figures showing the extents of the compensation areas along with more information on the reasons why these additional sites have been identified and included within the Order Limits in chapter 5. The figures in chapter 4 giving an overview of changes in each section of the Lower Thames Crossing route do not show all of the compensation areas such as the land near Blue Bell Hill, given its location away from the Lower Thames Crossing route.

The land within the revised Order Limits has increased from 22.2km^2 to 24.35km^2. There is no change to the number of properties in the Order Limits as detailed in the community impacts consultation.

Figure 4-1: Order Limits at the 2021 community impacts consultation

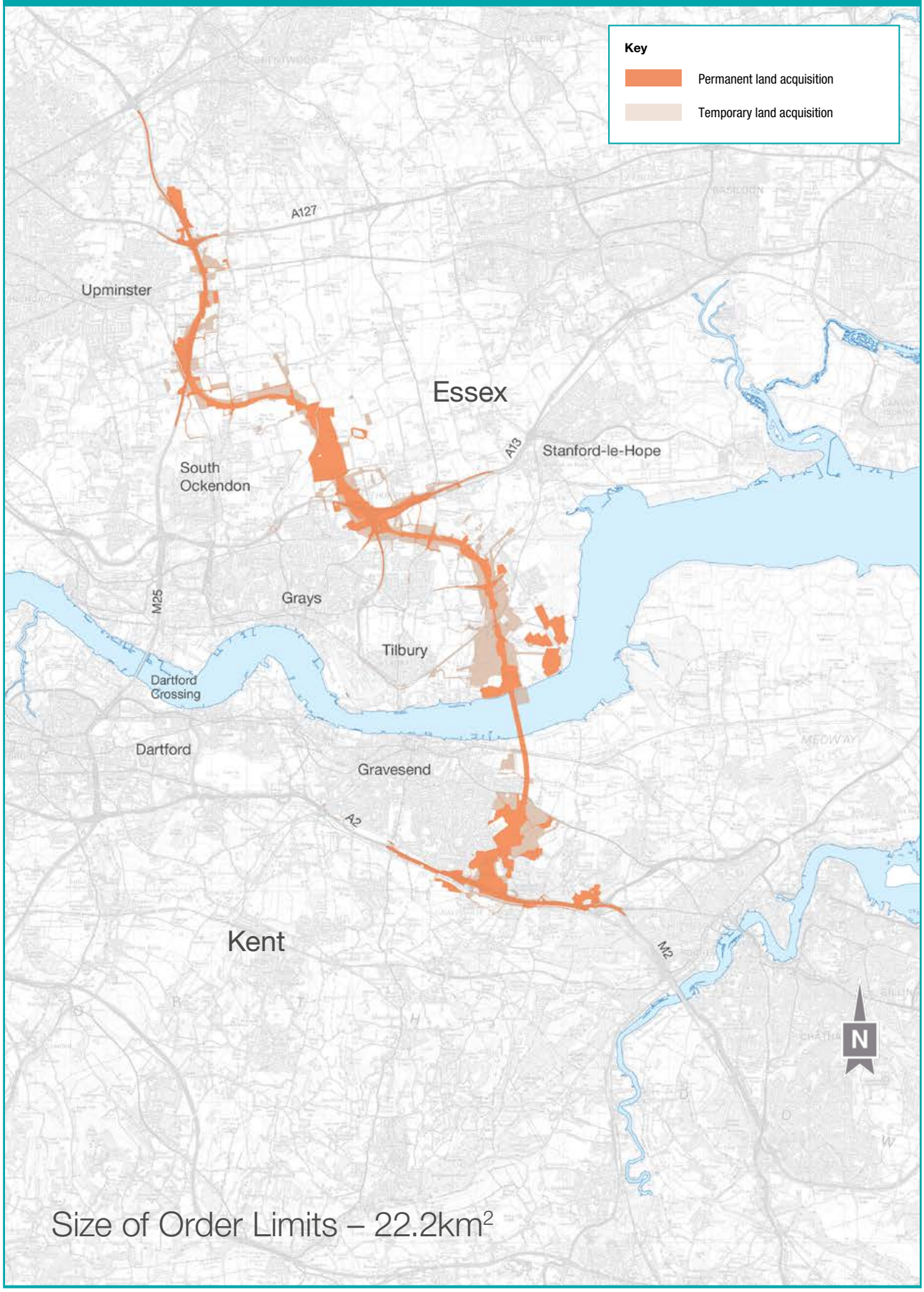


Figure 4-2: Proposed land acquisition at the 2022 local refinement consultation

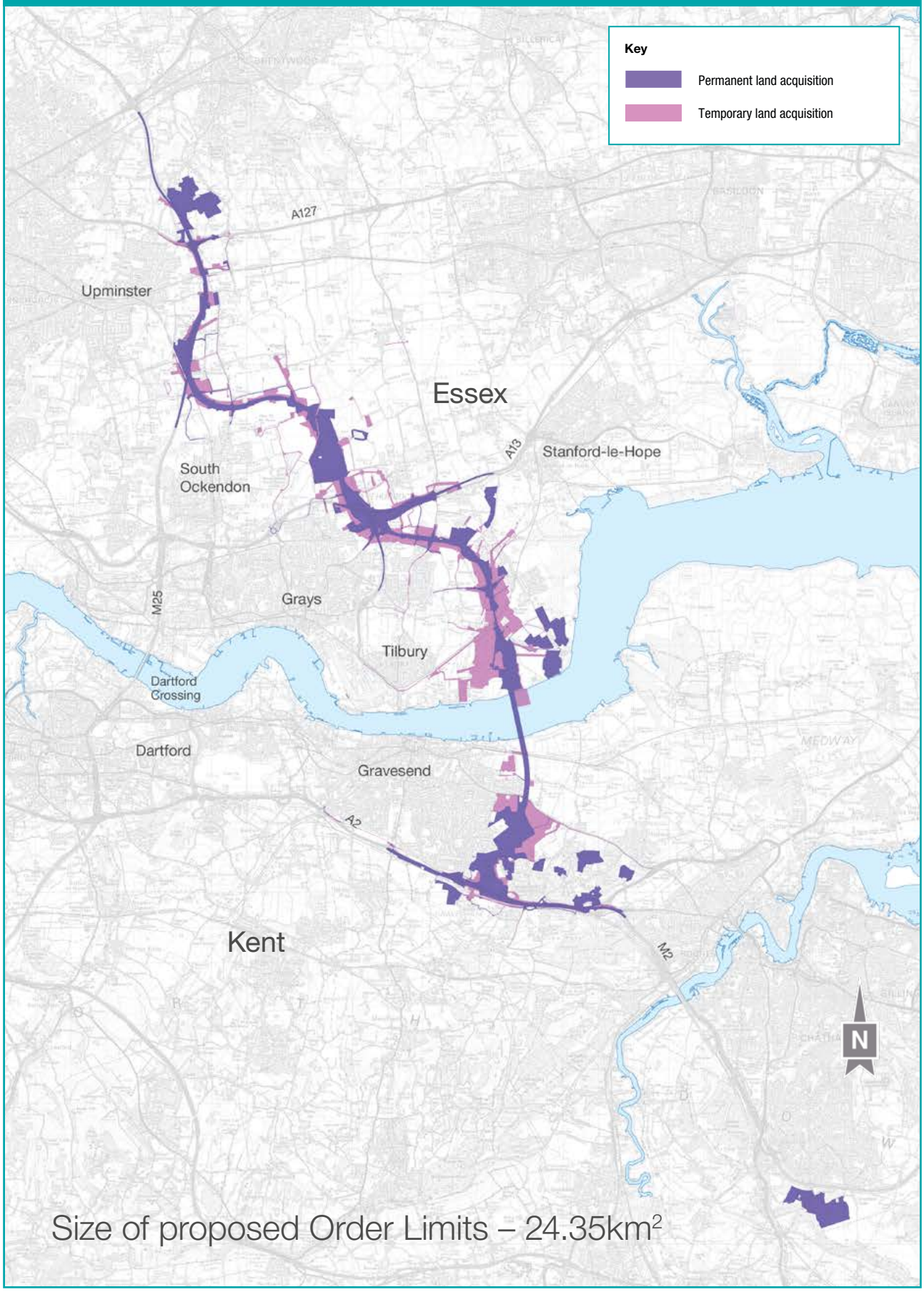
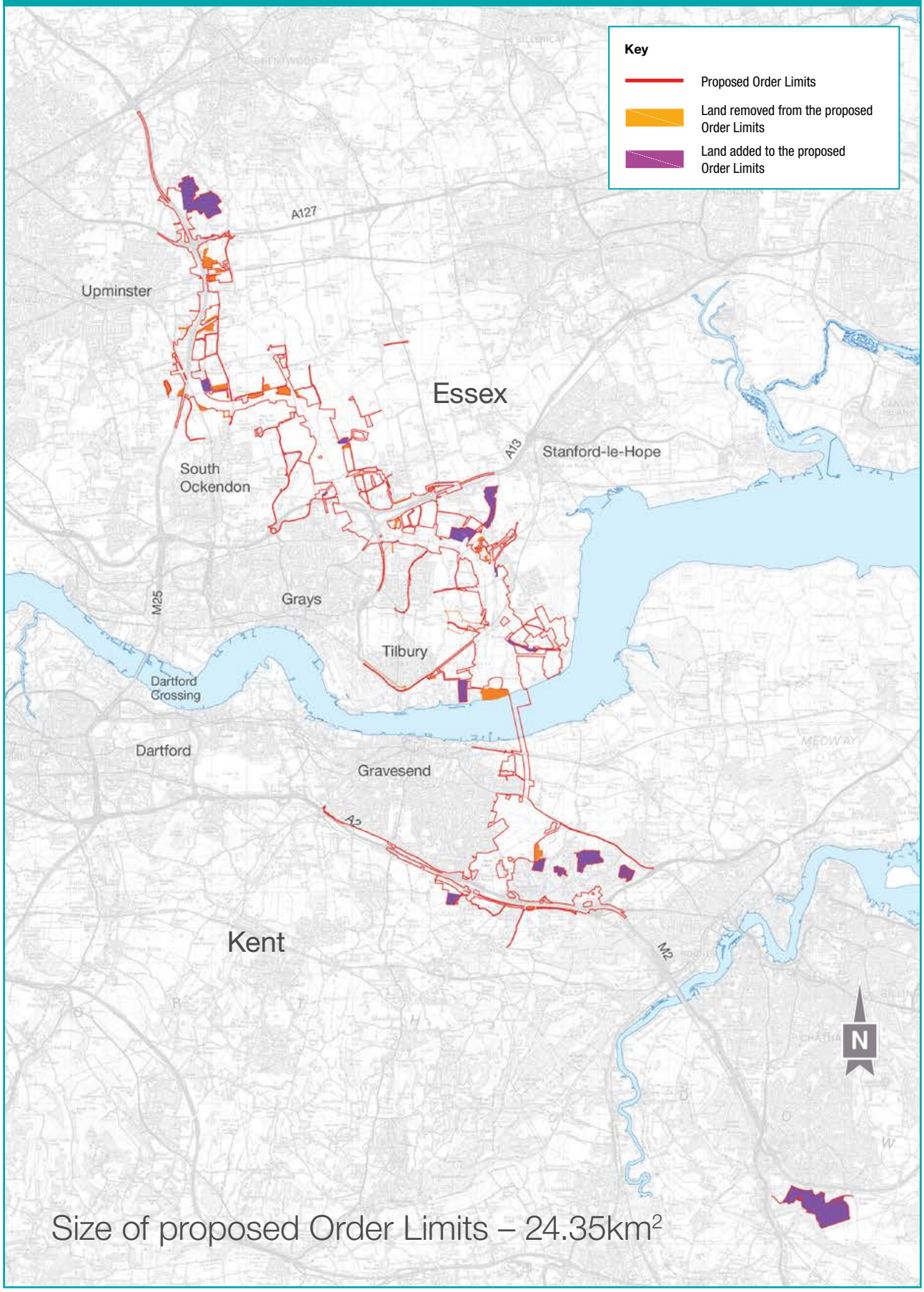


Figure 4-3: Proposed Order Limits at the 2022 local refinement consultation

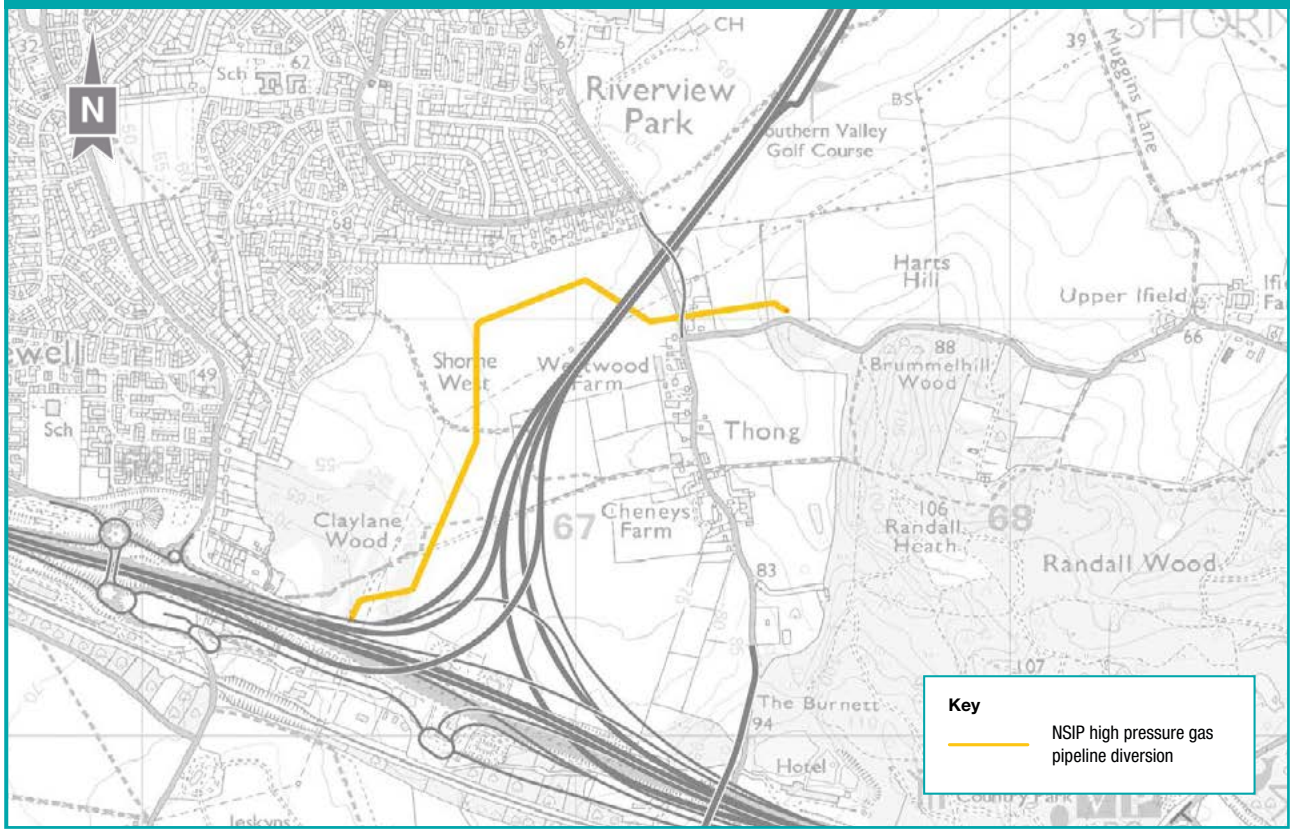


Utilities

Since the previous consultation, we have continued to work with utility companies and affected parties to develop the proposals for utility works. This has resulted in some refinements to the Order Limits and the proposed land use to deliver these works. These changes seek to ensure the road and the utility networks can be constructed and operated in a way that is sensitive to local communities and the environment.

In our community impacts consultation we identified a number of utility diversions that would meet the relevant criteria for them to be defined as Nationally Significant Infrastructure Projects (NSIPs) in their own right. As we have developed our assessments, we have identified that a gas pipeline diversion between the A2 and Thong Lane, presented in our previous consultations and shown in Figure 4-4, would also qualify as an NSIP. The proposals for diverting this gas main have not changed. Details of other utilities works that meet the relevant NSIP thresholds were presented as part of our community impacts consultation. We continue to keep the legal assessment of whether the proposed works are NSIPs under review and our DCO application will set out all of the utilities-related NSIPs for which development consent is being sought.

Figure 4-4: Gas pipeline diverted as a result of the Lower Thames Crossing



Sustainable construction

In our community impacts consultation, we reported that the construction of the project would result in more than 1,200,000 cubic metres of surplus excavated material to the north of the river. This would need to be transported via the road network for disposal and managed outside of the Order Limits. Since then, we have continued to refine our design and proposals for landscape mitigation to reduce the amount of material that would need to be transported. This includes:

- updated landscaping design at various locations around the A13/A1089 junction and at the M25/Lower Thames Crossing junction in North Ockendon (within the previous consultation Order Limits) to provide noise mitigation bunds, enhance biodiversity and create other environmental benefits. This would involve the reuse of clean excavated material for construction activities.
- Raising the road level in cuttings where this can be achieved without increasing other impacts (for example visual and noise). This means that less material would need to be excavated and disposed of. Raising the road level in this way is proposed at a section of the route along Ockendon Link at North Road crossing ('The Wilderness') and at the M25/Lower Thames Crossing junction (North Ockendon).

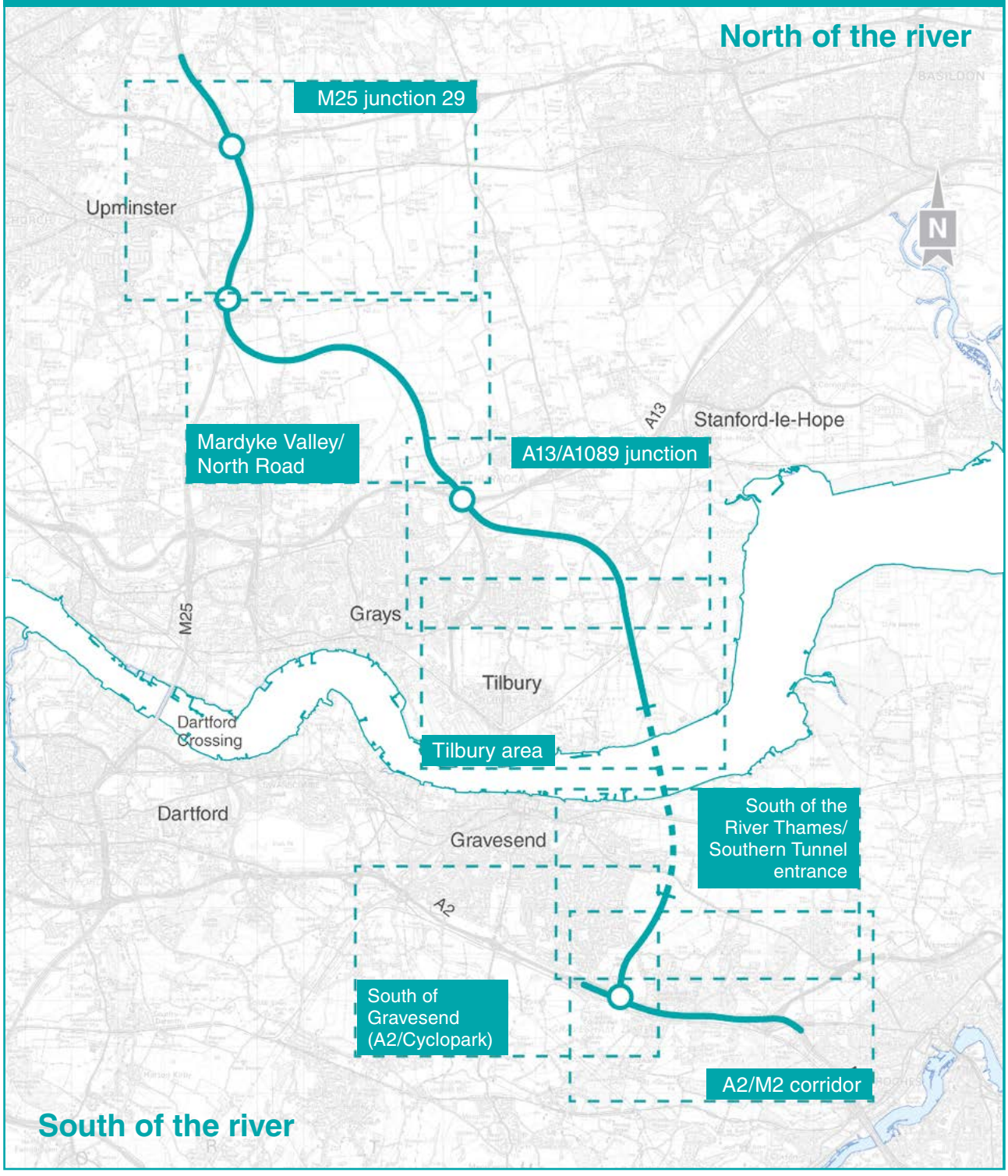
These changes are described later in this chapter.

Including these proposals within the DCO application would result in a reduction of approximately 700,000 cubic metres of excavated material required to be disposed off-site. As a result, this would reduce the need to use local waste management infrastructure and reduce the truck movements on the road network during the construction period (compared with the proposals at the community impacts consultation).

To describe the changes in this chapter in more detail, we have divided the route into two sections:

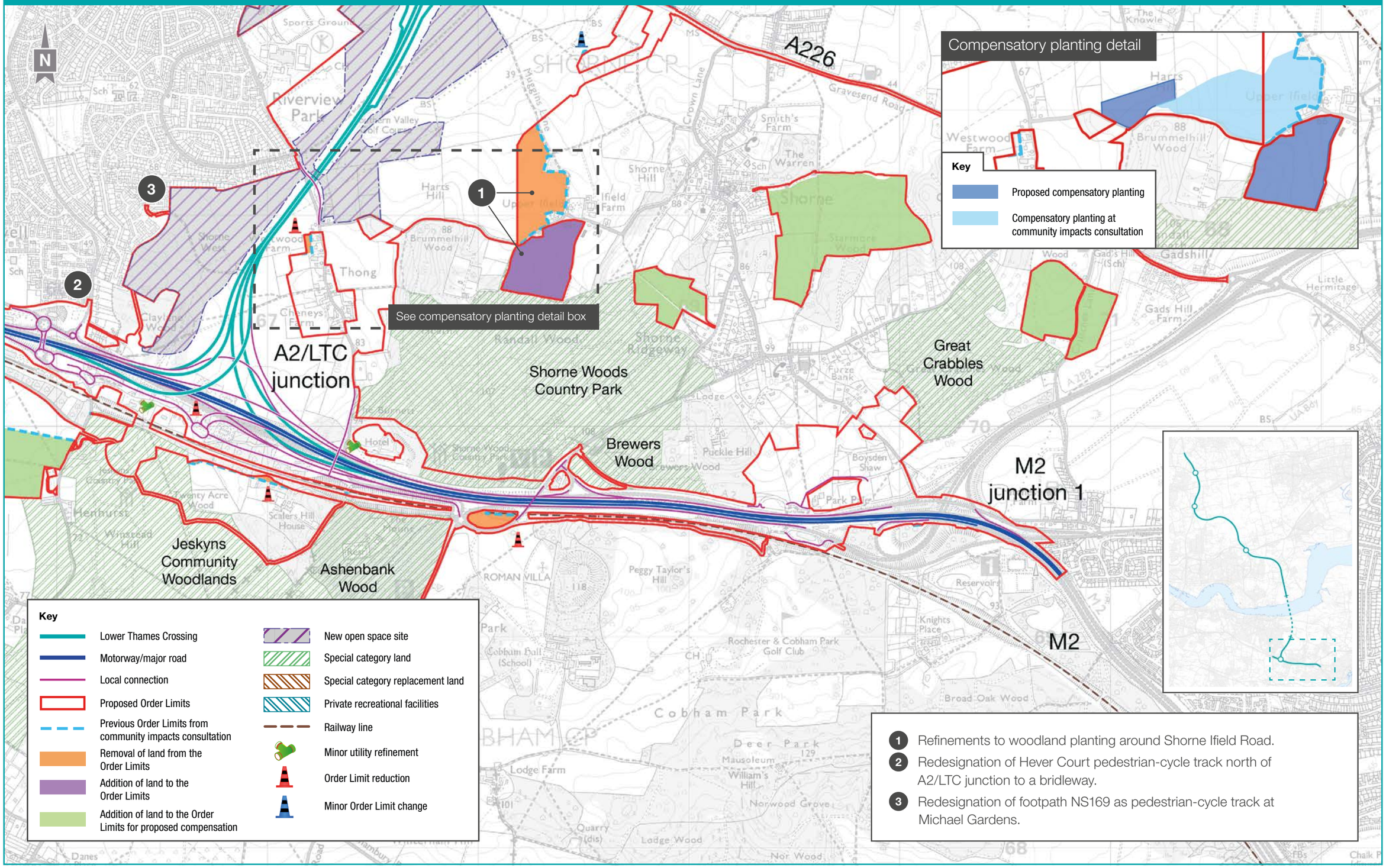
- South of the river in Kent: A2/M2 corridor, south of Gravesend (A2/Cyclopark), south of the River Thames/southern tunnel entrance.
- North of the river: Tilbury area, A13/A1089 junction, Mardyke Valley/North Road, M25/junction 29.

Figure 4-5: The route explained



First, we describe our proposals south of the river. See section 4.2 for changes for walkers, cyclists and horse riders.

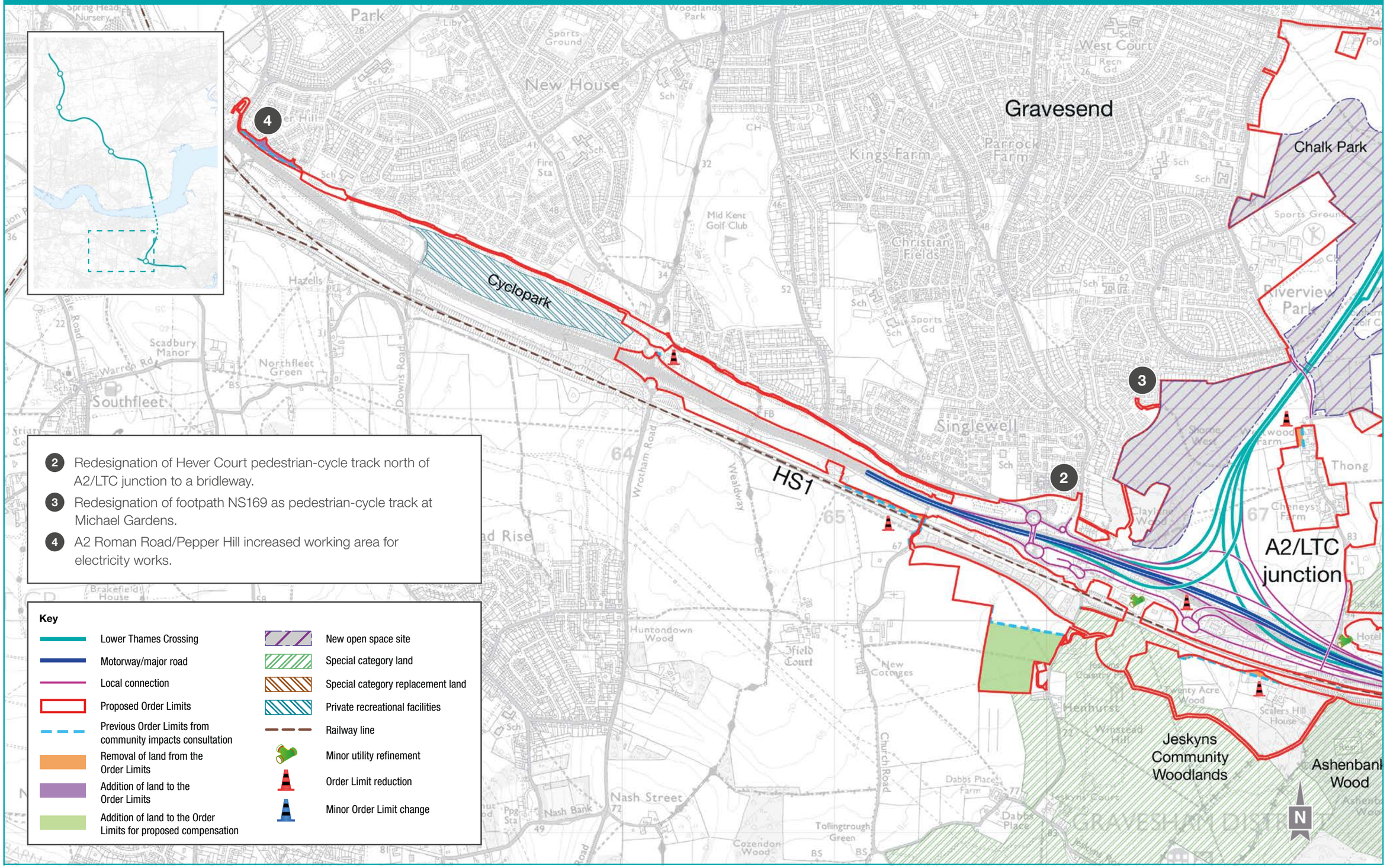
Figure 4-6: A2/M2 corridor



NOTE: Throughout this chapter, we refer to the Lower Thames Crossing as 'LTC'.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
1	An area north of Shorne Ifield Road and a field south of Shorne Ifield Road.	Following the completion of archaeological work, and feedback received during the community impacts consultation from landowners, Shorne Woods Country Park and people with properties to the north of Shorne Ifield Road, we are proposing to move the area of compensatory woodland planting (12.5ha) to the south of Shorne Ifield Road. To support this change, the wider landscape design to the east of Thong Lane has been reviewed and refined following the relocation of the woodland planting. We have also extended our Order Limits to reflect this. This woodland is being provided as part of a wider area of planting to compensate losses to ancient woodland resulting from the construction of the utilities and highways working areas in the A2/M2 corridor. This planting would improve the woodland link between the Thong Lane Green Bridge and the woodlands within the Site of Special Scientific Interest (SSSI) and Shorne Woods Country Park.	Moving the area of proposed compensatory tree planting would avoid a significant impact on the buried archaeology associated with a medieval settlement that has been discovered north of Shorne Ifield Road, while delivering the same level of woodland planting compensation as previously proposed at our statutory consultation. It would also retain an area of agricultural land and maintain far-reaching views of the River Thames. The new area of land for compensatory woodland planting is currently used for agriculture and has been added to our Order Limits. As a result of this, there would be a change in the landscape views to the south of Shorne Ifield Road and the views from a Grade II listed property and its setting. The landscape in this location is currently an agricultural field with a woodland edge. The extent of woodland planting now proposed south of Shorne Ifield Road is similar to that previously proposed to the north of the road. However, the current location would relate better to existing woodland in Shorne Woods Country Park and therefore achieve a better fit with the existing landscape. The revised location would also avoid obstructing views towards the Thames Estuary and beyond for users of Shorne Ifield Road and residents.

Figure 4-7: South of Gravesend (A2/Cyclopark)



2 Redesignation of Hever Court pedestrian-cycle track north of A2/LTC junction to a bridleway.

3 Redesignation of footpath NS169 as pedestrian-cycle track at Michael Gardens.

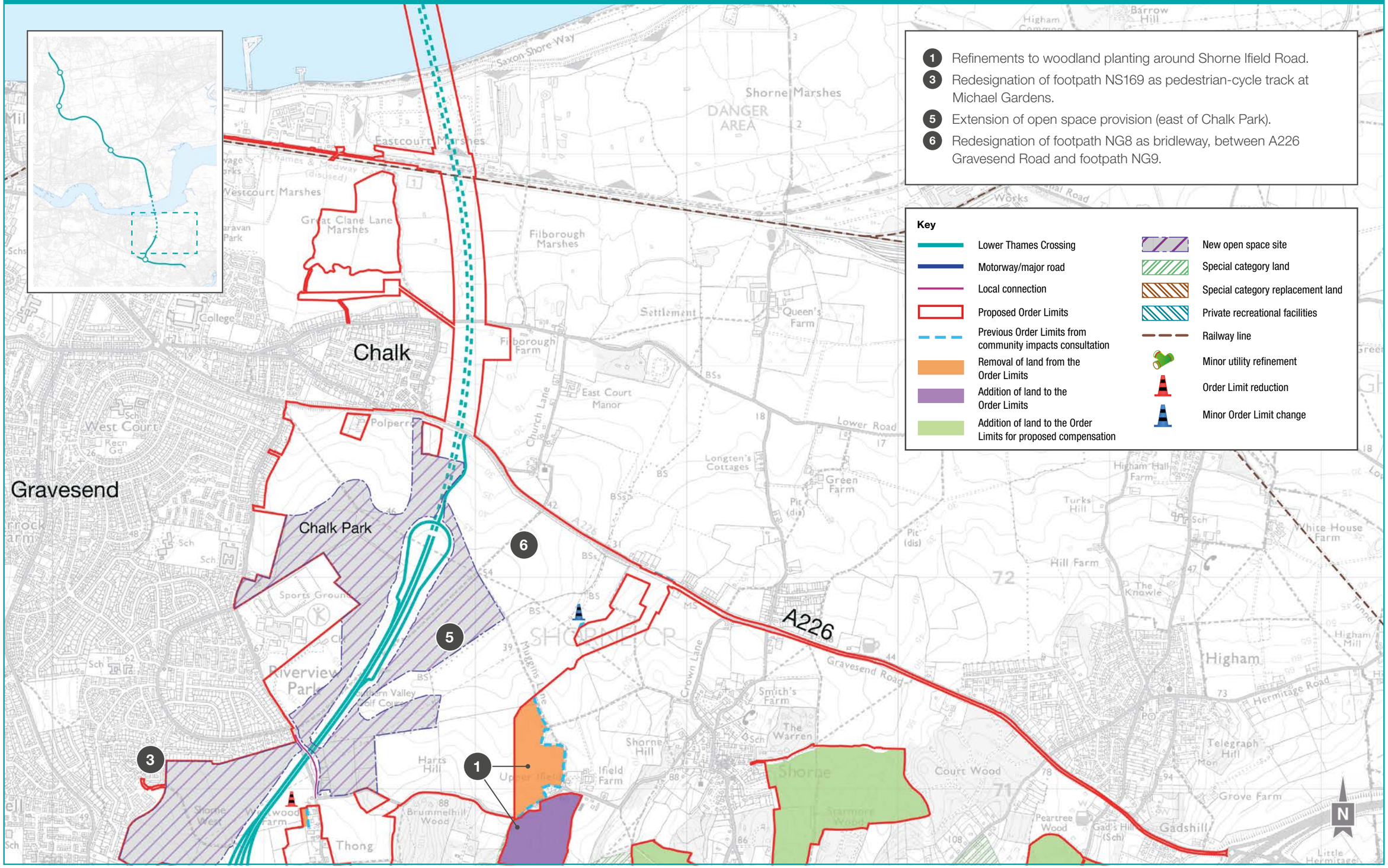
4 A2 Roman Road/Pepper Hill increased working area for electricity works.

Key

- Lower Thames Crossing
- Motorway/major road
- Local connection
- Proposed Order Limits
- Previous Order Limits from community impacts consultation
- Removal of land from the Order Limits
- Addition of land to the Order Limits
- Addition of land to the Order Limits for proposed compensation
- New open space site
- Special category land
- Special category replacement land
- Private recreational facilities
- Railway line
- Minor utility refinement
- Order Limit reduction
- Minor Order Limit change

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
4	A2, Roman Road and Pepper Hill, Gravesend.	As a result of ongoing engagement and feedback from UK Power Networks during the community impacts consultation, a change to the Order Limits along the A2 and Roman Road is proposed. This would provide a safe working space and a viable route for electricity cables and avoid the potential closure of cycle route NCR177 for a prolonged period. The Order Limits would now extend to include Roman Road and Pepper Hill.	To accommodate this change, there would be an extension of approximately 1ha to the Order Limits along the A2 and Roman Road. This would move utility works marginally closer to residents than previously proposed at the community impacts consultation. However, these works would only be for approximately one month and we expect any change in noise impacts to be minor. There is likely to be traffic management in the form of localised single lane closures as the works progress. The prolonged closure of cycle route NCR177 along the A2 (which would have been a risk under our previous proposals) has been avoided. In addition, the previous proposals would have involved removing the majority of the vegetation along the A2 and Roman Road, which screens the road from residents in the area. The change means that approximately 300 metres of vegetation would be retained and would continue to provide visual and noise screening. Only 20 metres of vegetation (two 10-metre parcels) would be removed to allow for utility works.

Figure 4-8: South of the River Thames/southern tunnel entrance



Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
5	Land at the Southern Valley Golf Club (east of the proposed southern tunnel entrance).	Following engagement with the landowner, feedback received during the community impacts consultation and further design development, we propose to permanently acquire the remaining 8ha area of Southern Valley Golf Club. This site was previously identified for temporary use during construction. This additional area would form part of the wider 92ha provision of open space land south of the river. This will therefore provide 8ha more land for public recreation than we proposed during the community impacts consultation.	The additional land will be linked to the east of Chalk Park, a recreational area for the public containing new recreational routes and views to the Kent Downs Area of Outstanding Natural Beauty, by a public footpath and would provide further public access. The existing ground level would be maintained, and the planting would include species that provide a rich, chalk grassland habitat and woodland groups that are reflective of the local area. The land would provide additional biodiversity benefits as well as enhancing the visual experience for users of the local footpath networks.

Figure 4-9: Tilbury area

7 Redesign of Tilbury Fields.
8 Redesigned tunnel maintenance access.
9 Extension of Order Limits for use during construction.
10 Removal of proposed Dock Road water connection.
11 Coopers Shaw Road water connection refinement.
12 New footpaths to link the heritage assets of Coalhouse Fort, Coalhouse Battery and Bowaters Battery to East Tilbury.

Key

- Lower Thames Crossing
- Motorway/major road
- Local connection
- Proposed Order Limits
- Previous Order Limits from community impacts consultation
- Removal of land from the Order Limits
- Addition of land to the Order Limits
- Addition of land to the Order Limits for proposed compensation
- New open space site
- Special category land
- Special category replacement land
- Private recreational facilities
- Railway line
- Minor utility refinement
- Order Limit reduction
- Minor Order Limit change

Chadwell St Mary
Tilbury
Condovers Scout Activity Centre
Parsonage Common
Walton Common
West Tilbury Marshes
East Tilbury Marshes
Tilbury Fields
Docks
Coalhouse Battery (dismantled)
Bowaters Farm
Gravelpit Farm
Barvills Farm
Holford Farm
Biggin
Biggin Marsh Farm
Gunhill Farm
Manor Farm
Hill House
Industrial Park
Tilbury Station
Power Station
Warehouses
KARTING
Stadium
Academy
Fort Road
Low Street Lane
Muckingford Road
Linford Road
Turnpike Lane
Coal Road (Track)
Station Road
Church Road
Hall Hill
Shaw Road
Pit (dis)
Wks
Schs
Pol Sta
PC
N

Changes to Tilbury Fields and our permanent access to the surrounding areas

The Thames Estuary is the UK's number one growth opportunity. Vital to this are Thames Freeport and the Lower Thames Crossing. Thames Freeport has the potential to deliver 25,000 new jobs and will be much better connected to the rest of the country if the Lower Thames Crossing is constructed. Together, they represent a huge opportunity for economic regeneration. Thames Freeport, connected via the Lower Thames Crossing, can maximise the beneficial use of land to the north of the Thames, which has been under-used for decades.

To support this wider regeneration of the area, we have amended our proposals for Tilbury Fields public park and environmental mitigation. The table below explains our new plans for Tilbury Fields, our permanent access proposals for the surrounding area and some further works associated with these.

The revised proposals for Tilbury Fields include more recreational routes and links to footpaths than we previously proposed, an increase in the amount of mosaic habitat proposed and improved connectivity to existing habitats. In addition, we are proposing seven landforms that will act as a visual separation from the more industrial East Tilbury and the development expected at the Freeport. We are also proposing changes to our permanent operational access arrangements to allow maintenance and emergency vehicles to access the new road in this location. In addition, we are working to align our construction activities to better support the development of the Freeport.

We have explained these changes in three sections, as outlined in the table opposite.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
7	Proposed location of Tilbury Fields.	An area of land previously identified for Tilbury Fields on the western side of the area (that borders the riverfront) has been relocated to the eastern side of the LTC . This is due to the land previously identified being required for the potential future development of Thames Freeport. Proposed landscaping would provide accessible footpaths to the top of the landform, which connect with the existing local footpath network. New footpaths within Tilbury Fields would ensure the park could be accessed via the Two Forts Way in the south and in the north via footpath FP200. Alongside other footpath improvements in the Tilbury area, there would be enhanced recreational walks and loops connecting Tilbury Fields to the wider landscape and better access to the riverfront. For details on FP200 at Tilbury Green, see section 4.3 of this chapter on 'special category land'.	As a result of repositioning the proposed Tilbury Fields, the following changes in impacts to those set out at the community impacts consultation have been identified: ■ Improved access to the riverfront as a result of moving the proposed bridleways and pathways to provide a north-south link. ■ Access to more recreational routes in this area than presented at the community impacts consultation. The newly proposed footpaths would link to existing Public Rights of Way and new permissive paths (paths that are privately owned but the owner has allowed the public to access) that are being provided by the project. For details on the recreational routes and Public Rights of Way, see section 4.2 of this guide 'Improvements for walkers, cyclists and horse riders'.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
7	Proposed location of Tilbury Fields.	The landscape design for Tilbury Fields, along with the existing area of habitat to the west, would improve habitat connectivity. New areas of habitat creation within Tilbury Fields would link established ecological habitats to the west of Tilbury Fields with new habitats further to the east at Mucking Flats and Marshes landfill restoration and the Thameside Nature Reserve. The revised proposal would also introduce a new link to other new habitats proposed at Linford to the north, improving habitat connectivity in this area. At the community impacts consultation, we proposed two significant landforms at a maximum height of up to 22.5 metres above ordnance datum level (height of the mean sea level).	■ There may be a change to the noise impacts for the residential areas towards East and West Tilbury while the landforms are being built. These changes are unlikely to be noticed above other construction activities in this area. In the community impacts consultation, we predicted that the background noise level would be exceeded on occasion at certain locations in East Tilbury (Points 1, 4, 5 and 11 of figure 12.14 of the East Tilbury ward impact summary). The changes we are proposing are predicted to result in impacts that are in line with those reported in the community impacts consultation. The operational impacts are also expected to be in line with those represented in figure 12.20 of the East Tilbury ward impact summary, with impacts ranging from major (greater than a 5dB increase) to negligible (less than a 1dB increase).

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
7	Proposed location of Tilbury Fields.	In our revised location, we are now proposing several place-making landforms that will range from 18 to 24 metres in height to the south and east of the northern tunnel entrance. These would provide a visual separation between East Tilbury and the more industrial emerging development that is expected as Thames Freeport seeks to unlock the opportunities in the local area. These landforms would also offer far-reaching views of the Thames Estuary and nearby heritage features, such as Coalhouse Fort, Cliffe Fort and Shornemead Fort. The largest mound, at the south-east corner of Tilbury Fields, would feature a star-shaped area 22 to 24 metres above ordnance datum level that would act as a focal and destination point.	■ The amount of open mosaic habitat being proposed within Tilbury Fields would marginally increase but the total area will remain at about 45ha. The habitat will, however, be across several areas within Tilbury Fields, rather than in one single area as previously proposed. ■ The landscape proposals would remain sympathetic to the historic environment as per the previous design. However, the design reflects the circular nature of Coalhouse Fort and the gun embankments of Tilbury Fort, rather than the more angular geometry of the forts within the wider Thames Estuary. The newly proposed earthworks extend further north than the previous design, and provide an opportunity to screen the views west from Coalhouse Fort of the emerging development of Thames Freeport, which is more industrial in nature. This design responds to the expected development at the Freeport.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
8	North of the tunnel entrance and south of the Tilbury Loop railway line.	We have modified our proposals to include operational access roads so that maintenance and emergency vehicles can access the LTC. This will improve the safety of the new road once it is in operation. We have introduced a new bridge that would allow National Highways operational vehicles and emergency service vehicles to cross over the new road at this location. As a result, we have been able to remove the access road on the eastern side of the route. The access road along the western side of the LTC has been re-routed to allow us to reuse the haul road that was previously only required during construction, making better use of this infrastructure. The operational and emergency access to Station Road has been maintained to the west of the route, with minor amendments to connect into the modified access roads. There would be no access for public traffic on or off the LTC at this location. The operational access could potentially accommodate further development in the future.	As a result of the changes to our operational access and environmental mitigation, the following changes in impacts compared with those we presented at the community impacts consultation are predicted: ■ The addition of the bridge over the LTC allows us to reduce the number of accesses from Station Road from two to one. ■ The new operational access arrangement will give emergency services the flexibility to turn vehicles around in the event of an incident further north or south on LTC . This was not possible with the previous operational layout at this location. ■ Aligning the access road on the western side of the LTC with the proposed construction haul road will reduce the overall level of construction works in this area, helping to reduce construction noise and air quality impacts for local residents. continued...

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
8	North of the tunnel entrance and south of the Tilbury Loop railway line.	Any new road connecting to the LTC at this point would have to follow the relevant planning process at the appropriate time. As a result of the changes to the access roads, two further alterations have been made to the engineering design in this area: ■ The flood protection for the tunnel entrance has been changed from flood bunds to concrete retaining walls, which can be built earlier to provide better flood protection during the construction works. On the western side, an earth embankment would blend the wall into the landscape, while on the eastern side, the wall would be integrated into the revised Tilbury Fields landforms. ■ The main attenuation pond, to contain and manage storm water, which was to the west of the LTC in this area, has now been relocated within the footprint of the new operational access.	■ The new operational access arrangement at Tilbury has been designed, in consultation with key stakeholders, with possible future development in mind, helping to avoid potentially disruptive re-work at a later date. The previous design may have required substantial work in this area. This is a significant benefit with this layout compared with that presented at the community impacts consultation. ■ The form of flood protection has been changed from flood bunds to concrete retaining walls. It is predicted that this will have a minor detrimental visual impact for those using the LTC but is unlikely to be noticeable from the west or east of the new road, due to the nearby adjacent landforms screening the LTC. ■ Moving the attenuation pond to sit within the footprint of the new operational access.

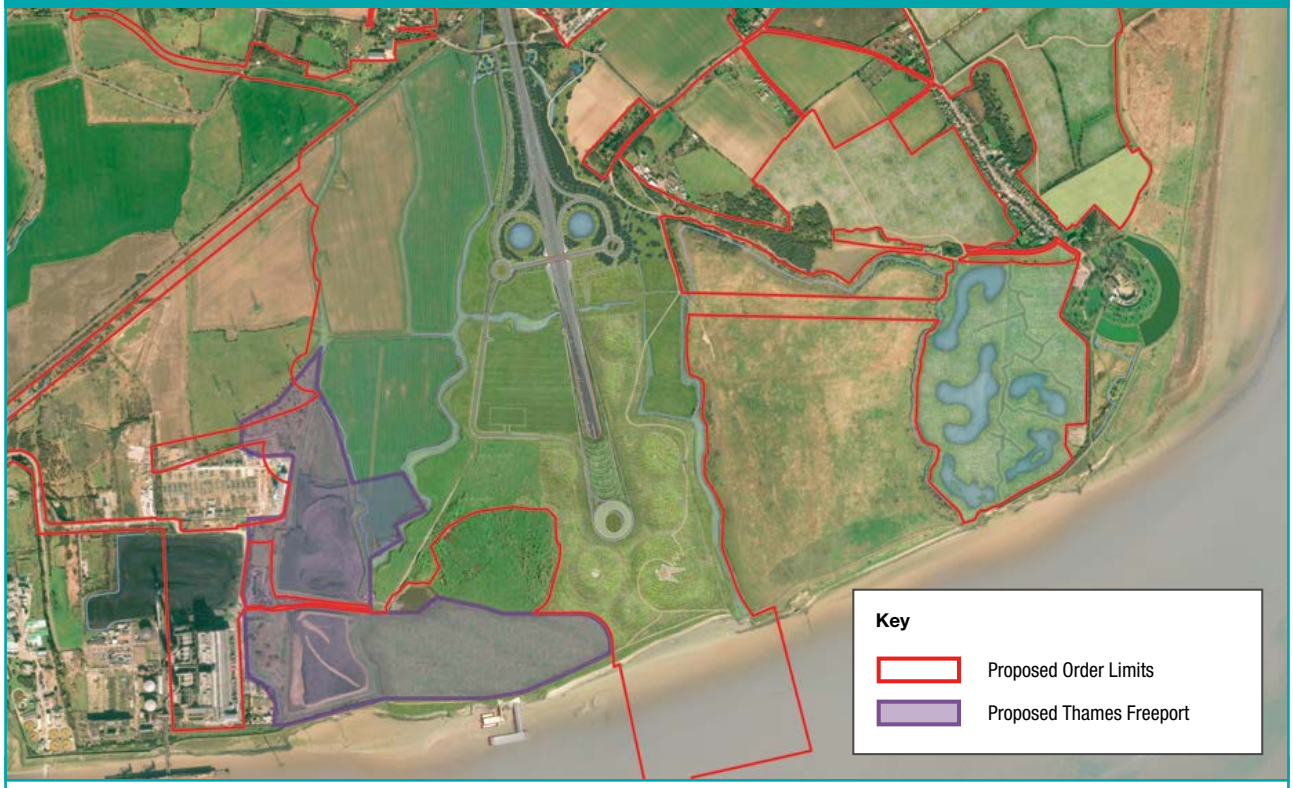
continued...

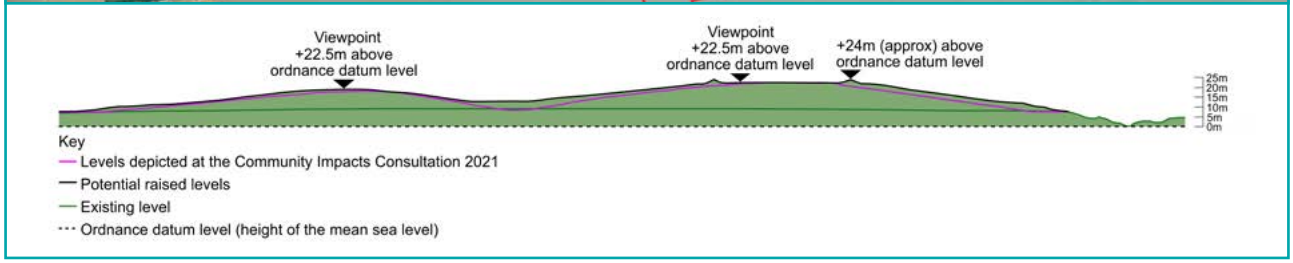
Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
8	North of the tunnel entrance and south of the Tilbury Loop railway line.		In addition to the above: ■ In the context of Tilbury Fields we expect that there would be minimal impacts on the landscape and views of the built heritage in this area as a result of the new bridge. ■ To accommodate the revised design, the land required to secure rights for the utility companies to construct and operate their overhead power line networks has been modified. A small section of the West Tilbury Main River would need to be realigned because of the revised operational access arrangements. This does not change the conclusions of our previous assessments, which confirmed that there would be no significant effects to the water environment in this location.

Figure 4-10: Existing landscape near East Tilbury, looking south

Figure 4-11: Proposed northern tunnel entrance approach, looking south

Figure 4-12: Proposed redesign of Tilbury fields and Figure 4-13: Proposed changes in the form and height of the landscaping at Tilbury Fields





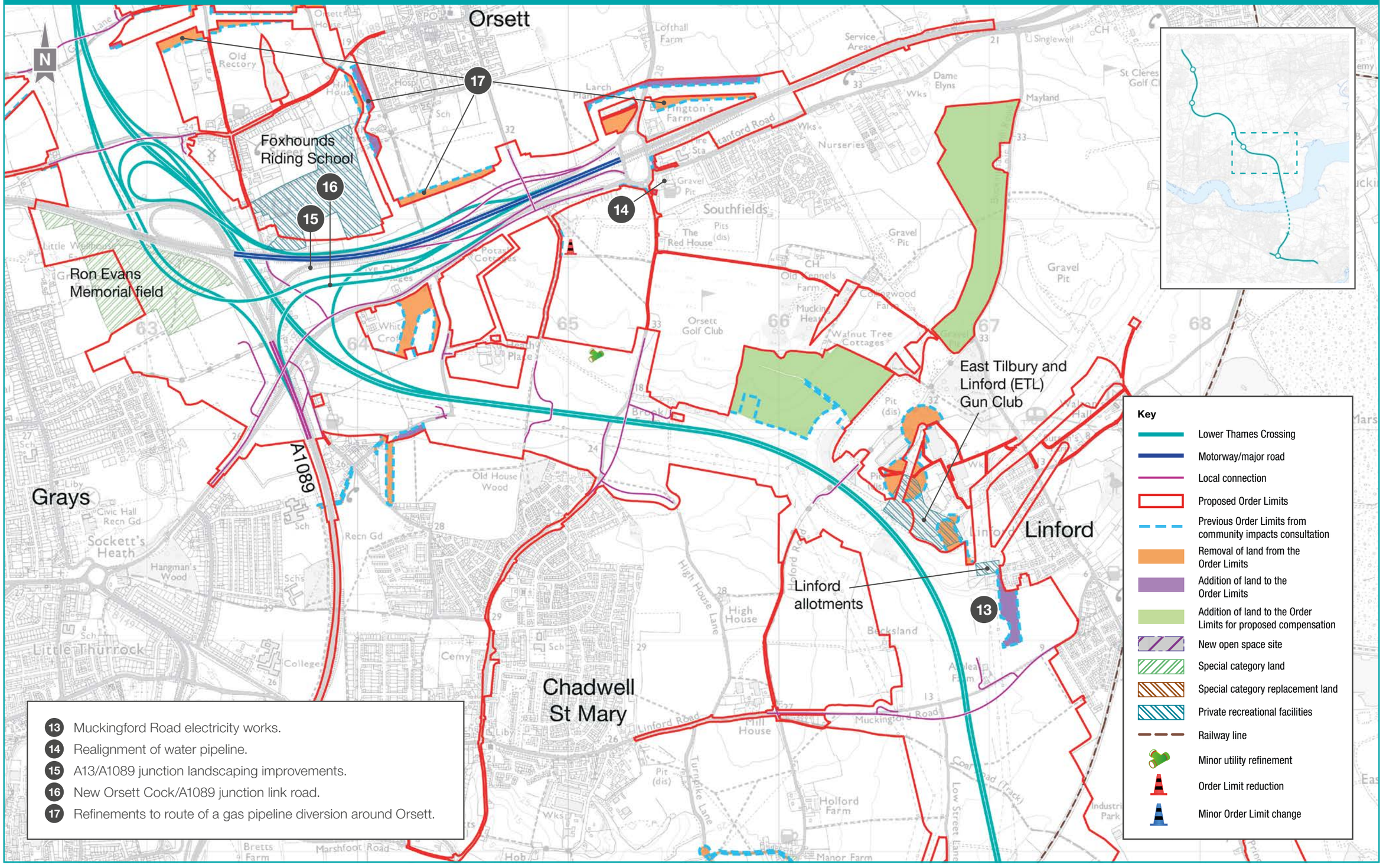
Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
9	West of the LTC, on the site of the former Tilbury Power Station.	We are working with the Port of Tilbury to refine our construction activities and support the future plans for Thames Freeport. As part of this work, we have extended our Order Limits to include the former Tilbury Power Station and former coal yard sites so they can be used during construction. We are also working with the developers of the Thurrock Flexible Generation Plant and Port of Tilbury to coordinate the multiple construction plans and accesses for this area, increasing the sustainability of the combined development plans.	As this area is next to the Tilbury2 facility and has formerly been the site of a power station, activities here are not likely to lead to new significant environmental effects. This is because of the recent clearance of this industrial site. The measures we published as part of the community impacts consultation in the draft Code of Construction Practice and the Register of Environmental Actions and Commitments would be applied to control activities on the site.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
10	Dock Road, Hume Avenue and Port of Tilbury.	Two routes were previously proposed at the design refinement consultation to supply water to the northern tunnel entrance compound for the construction and operation of the LTC. One was along Coopers Shaw Road and the other was along Dock Road. Following discussions with Essex and Suffolk Water, and a further understanding of how the network operates, it has been determined that the water pipeline connection around Coopers Shaw Road (that has also been amended following feedback from the community impacts consultation and is the next detailed change in this chapter) would be sufficient. As a result, the previously proposed pipeline along Dock Road would no longer be required and the land associated with this proposal has been removed from the Order Limits.	A change to the water pipe connection means that the pipeline would not be required on a residential road (Dock Road), reducing the impact for local residents. Traffic management measures associated with the installation of the water pipe connection on Dock Road would no longer be required. These included lane closures and traffic lights on 1.4km of the affected road in 300-metre sections for nine months. This would reduce the impact on this road compared with proposals presented at the community impacts consultation.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
11	Coopers Shaw Road (and fields to the north), and Gun Hill.	Following ongoing discussions with Essex and Suffolk Water, further understanding of how the network operates, and having considered the potential noise impacts for residents on Rectory Road, we have decided that the proposed water pipeline should be located around Coopers Shaw Road. The new pipeline route we are proposing results in a connection point along Gun Hill and avoids impacts on common land. As a result, the proposed pipelines along Dock Road and Rectory Road are no longer required. The land associated with these proposals along Dock Road, Hume Avenue, the A1089 to Fort Road access road, Rectory Road, Church Lane and part of Station Road have been removed from the Order Limits.	Changing the route of the pipeline in the way that we propose means that we no longer impact Walton Common and Parsonage common land. The route of the pipeline has also been moved away from residential properties along Rectory Road, reducing potential construction noise in that location. Moving the route of the pipeline impacts on a new area of land to the north of Coopers Shaw Road. However, this would be temporary and the land would be reinstated once the pipeline has been installed. continued...

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
11	Coopers Shaw Road (and fields to the north), and Gun Hill.		There would be a need to revise the traffic management proposals as a result of this change from those presented at the community impacts consultation: ■ there would now be a short-term closure of Gun Hill for two weeks, removing the need for the three-way traffic lights at the junction of Gun Hill, Fort Road and Coopers Shaw Road. ■ there would now be single lane traffic and traffic lights along a 50-metre stretch of Coopers Shaw Road for one month, reduced from single lane traffic along a 650-metre stretch. ■ three-way traffic lights would be removed at the junction of Gun Hill, Fort Road and Coopers Shaw Road. ■ Rectory Road/Church Road/ Station Road would now be reduced to a single lane for a 150-metre section of Station Road, south of the Tilbury Loop railway line for two months, reduced from the lane closures and traffic lights in 300-metre sections across a 1.5km section for nine months.

Figure 4-14: A13/A1089 junction



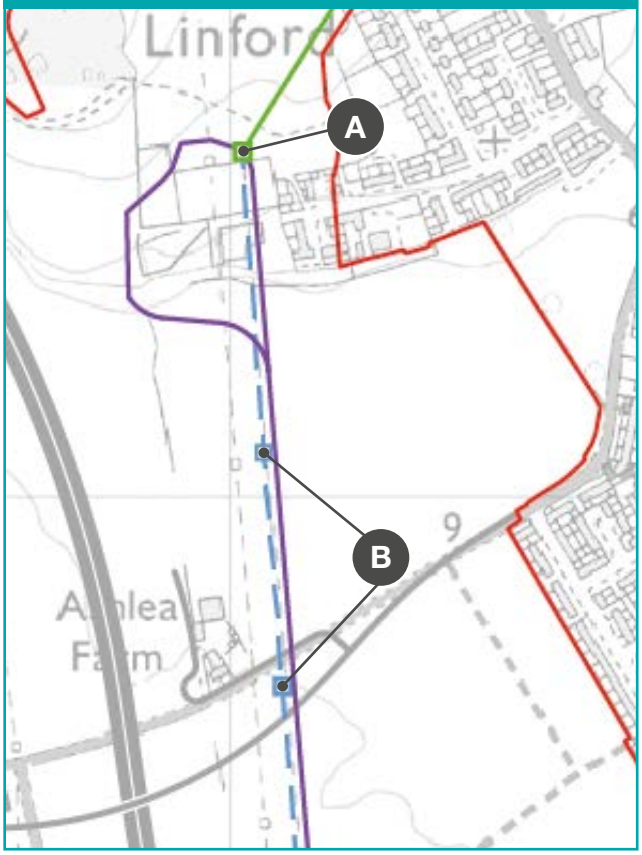
13 Muckingford Road electricity works.
14 Realignment of water pipeline.
15 A13/A1089 junction landscaping improvements.
16 New Orsett Cock/A1089 junction link road.
17 Refinements to route of a gas pipeline diversion around Orsett.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
13	North of Muckingford Road, west of Linford.	Following the 2021 community impacts consultation and ongoing engagement with UK Power Networks, we are now proposing a new way of delivering the diversion of electricity lines in this location. This is because more detailed investigations have shown that what we previously proposed would be incompatible with the existing infrastructure in this location. We plan to retain part of an existing overhead powerline that we previously proposed would be underground. This would be achieved by constructing a temporary pylon, east of the existing one, between Muckingford Road and the allotments. The overhead powerlines would be realigned via the temporary pylon while the existing one is removed and a new terminal pylon is built in its place. The temporary overhead powerlines would then be relocated on to the new pylon heading north and on reaching the new terminal pylon, would be installed underground, joining the previously proposed route heading south.	The residents of Linford would see a new type of pylon replacing an existing one and would continue to see approximately 300 metres of existing overhead powerlines that were previously proposed to be laid underground. There would not therefore be a significant change in visual effects, compared with the existing setting. Some vegetation would need to be removed to complete these works. continued...

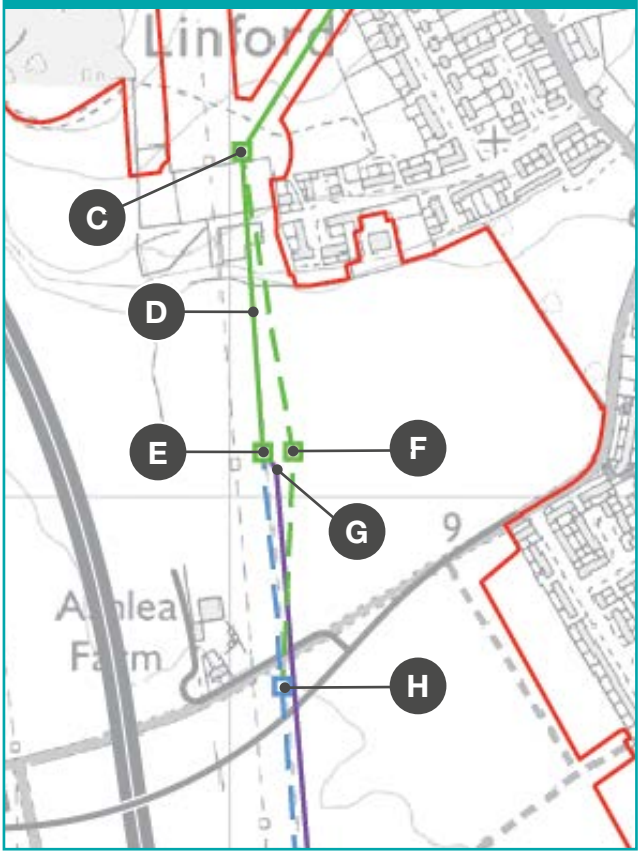
Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
13	North of Muckingford Road, west of Linford.	The temporary pylon and overhead powerlines would then be removed. To achieve this, the Order Limits need to be increased to the south-west of Linford. Some of the land previously proposed for temporary use only would now need to be changed to temporary use with the permanent acquisition of rights. Our revised proposal would ensure that the required changes to the electricity network in this location can be delivered, while being sensitive to the local environment and community.	

Figure 4-15: Muckingford Road electricity works proposals

Supplementary consultation proposal



Local Refinement consultation proposal



- **A** Existing pylon to be modified to a terminal pylon.
- **B** Existing pylon to be removed.
- **C** Existing pylon to be retained.
- **D** New overhead powerline on existing alignment.
- **E** Pylon to be re-constructed as a terminal pylon.
- **F** Temporary pylon.
- **G** Length of underground cable reduced.
- **H** Existing pylon to be removed.

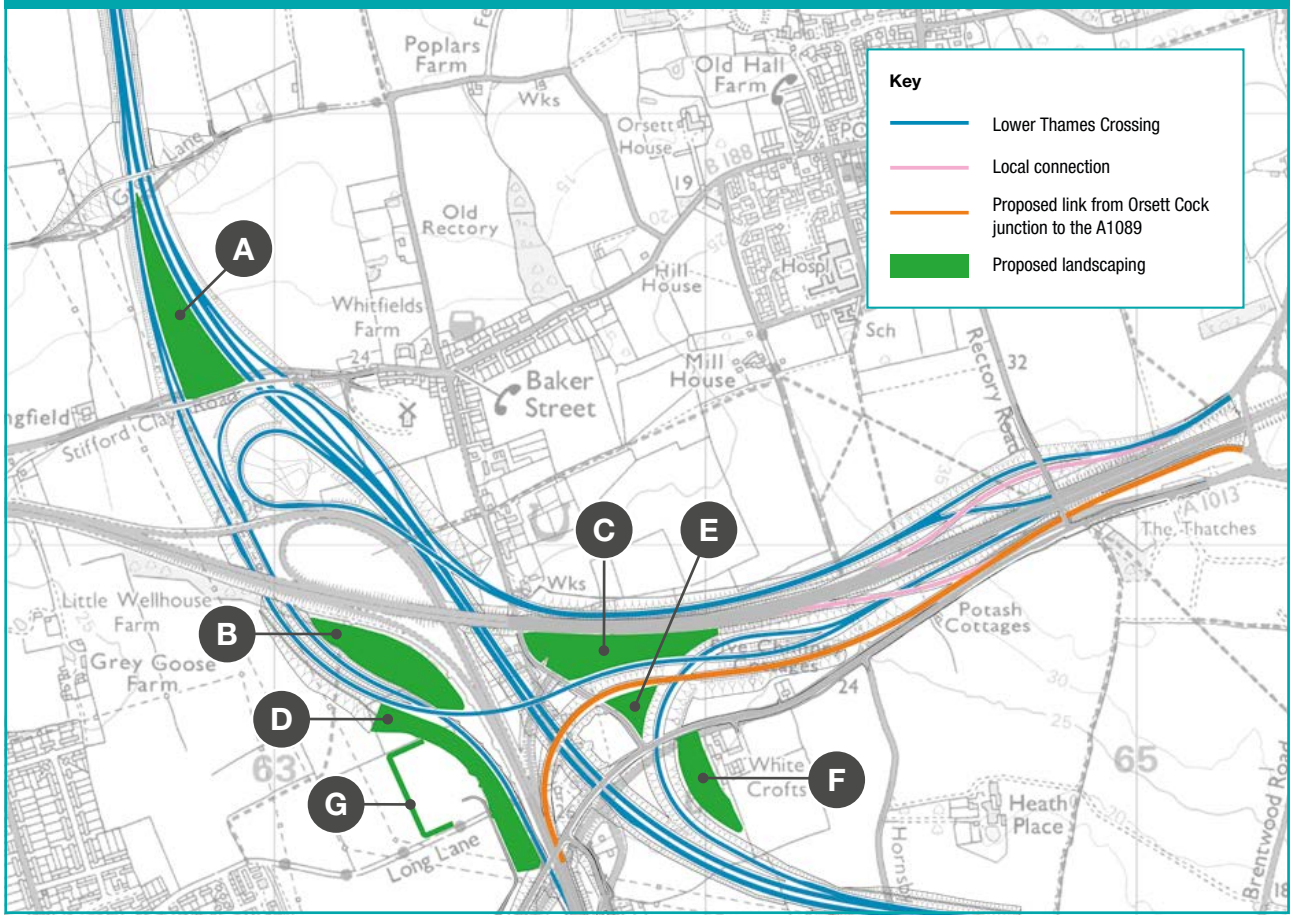
Key

- Electricity cables installed underground
- Existing overhead powerline
- Temporary overhead powerline
- Existing overhead powerline to be removed
- Proposed Order Limits

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
14	Brentwood Road, south of the Orsett Cock junction.	Following the 2021 community impacts consultation and ongoing engagement with Essex and Suffolk Water (ESW), we have developed our knowledge of how the water network would operate once diversions to the rest of the network have been carried out. We are proposing to divert a water pipeline along the A1013. The diverted asset severs a link with the existing water pipeline located further east and we have identified that this would have left residents without a water supply. The proposal that we are now presenting would reconnect residents by providing a new water pipe from the existing supply. To accommodate this proposal, there will need to be an extension of the Order Limits to enable ESW to construct the additional connection. There would also be a need to acquire permanent rights for ESW to operate and maintain this connection.	This change ensures that we can maintain a water supply to residents' properties. Installation of an additional section of water pipe would require excavations closer to residents east of Brentwood Road. This would result in a temporary increase in construction activity, including noise, for these residents. However, the works would only take place for a very short period of time. All of these works would be completed during the day and access to properties would be maintained. It is proposed that the works would be delivered using the traffic management measures that were published during the community impacts consultation. Traffic lights and lane closures are proposed in 300-metre sections to enable the works to take place. The proposed pipeline connection is expected to take a few weeks to complete.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
15	Various locations around the A13/ A1089 junction.	We are proposing six landscaping features where the project would join the A13, as shown in Figure 4-16. This shows the extents and describes the levels of the proposed features. The additional landscaping would be located within the Order Limits, which we presented in the 2021 community impacts consultation, and relates to land previously identified for woodland and other planting alongside the new road. No further land would therefore be required to accommodate these changes. The details of the planting mix to be used within these new landscaped areas will be set out in the Outline Landscape and Ecology Management Plan as part of our DCO submission. Material for the construction of the landscape features would be re-used from elsewhere within the project, reducing the need to use local waste management facilities.	The placing of clean excavated material from construction activities in these areas would provide noise, landscape and visual benefits for some nearby residents and maximise these benefits. This is particularly apparent at Area F. In this location, the landscaping would provide partial screening to the A13 junction. This means that the landscaping feature would make the road less visible to residents of The Whitecroft care home.

Figure 4-16: Proposed landscaping A13/A1089 junction



A Landscaping 2m above Stifford Clays Road and 15m above Lower Thames Crossing.

B Landscaping 10m above existing ground.

C Proposed landscaping 9m above the A13 and 17m above Baker Street.

D Landscaping 11m above existing ground.

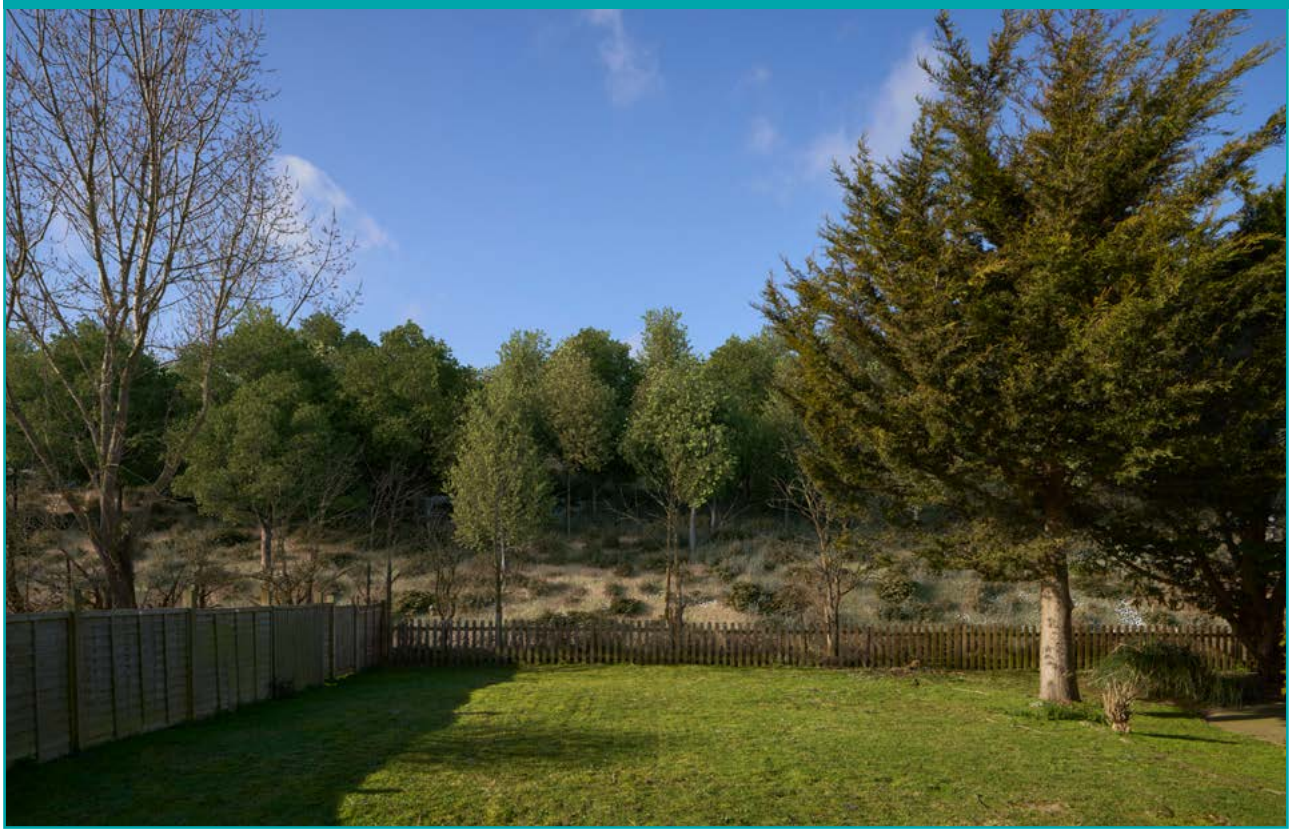
E Proposed landscaping 11m above Baker Street.

F Proposed landscaping 9m above existing ground west of The Whitecroft care home.

G Additional landscape screening around the relocated Gammonfields Way traveller site.

Figure 4-17: Existing view of A13 landscape looking west from The Whitecroft care home

Figure 4-18: Proposed view of A13 landscaping looking west from The Whitecroft care home



Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
16	A link road south of the A13, between the Orsett Cock junction and the A1089.	Following feedback from stakeholders and further comments from consultees on the traffic modelling presented at the community impacts consultation, which raised concerns about the re-routing of traffic on to local roads, we have revised the link road. This addresses these concerns, reducing the traffic on Brentwood Road and the A1013 Stanford Road in comparison to our traffic forecasts with the project that were presented in summer 2021. The A1089 southbound is currently accessed from a link road off the A13 westbound, which is to the west of the Orsett Cock junction. As part of our design, we proposed moving it so that traffic using the link road would leave the A13 earlier, and before westbound traffic from the Orsett Cock junction would join the A13.	The modified link road from the Orsett Cock junction would improve connectivity between the LTC and the Port of Tilbury (including the planned Thames Freeport), and central Grays as shown in Figures 4-19 and 4-20. This would reduce the impact of the LTC on traffic on a number of local roads in the area. Some roads, however, would see an increase in traffic. The scale and extent of the predicted changes in traffic flows differs in each peak period as shown in Figures 4-21 to 4-26 and as described in Table 1. As a result of the introduction of the new link road, there is expected to be a reduction in traffic flows on Brentwood Road, the A1013 Stanford Road, and west of the proposed A13/A1089 LTC junction on the M25 and A13. In addition, there is predicted to be an increase in traffic flows on Rectory Road/Conways Road, between the Orsett Cock junction and the A1089, Marshfoot Road, on the A1089 southbound, and southbound traffic on the new road between the M25 and the A13. continued...

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
16		We now propose a change to the connection from the A13 westbound to the A1089 southbound that would be accessed directly from the Orsett Cock junction. Traffic would be able to access the A1089 southbound from the A13 and Orsett Cock junction without the need to use local roads. Westbound traffic on the A13 to the east of the Orsett Cock junction would need to leave the A13 at the Orsett Cock junction to access the new link road to the A1089 southbound.	Figures 4-27 to 4-32 present the predicted change in traffic as a result of the project, providing an update from the information given in the community impacts consultation. Air quality and noise are impacted by traffic flows. Therefore, the changes in traffic flows around the A13/A1089 junction as a result of this additional link means there would be localised changes (including increases and decreases) in air quality and traffic noise levels along roads, compared with those presented at the community impacts consultation. These changes are described in Table 2. The air quality and noise impact of the new link road from the Orsett Cock junction will be fully assessed and presented in the Environmental Statement as part of our DCO submission.

Changes to connections at the A13/A1089 junction

Figures 4-19 and 4-20 show the connections at the A13/A1089 junction between the new road and the A1089 and the A13 westbound and the A1089. Figure 4-19 shows these connections in line with the design presented at the community impacts consultation, while Figure 4-20 shows the connections as a result of the new link road.

Predicted changes in traffic since the community impacts consultation as a result of the new link road

Figures 4-21 to 4-26 show the predicted change in traffic as a result of the new link road, (compared with the 2021 community impacts consultation).

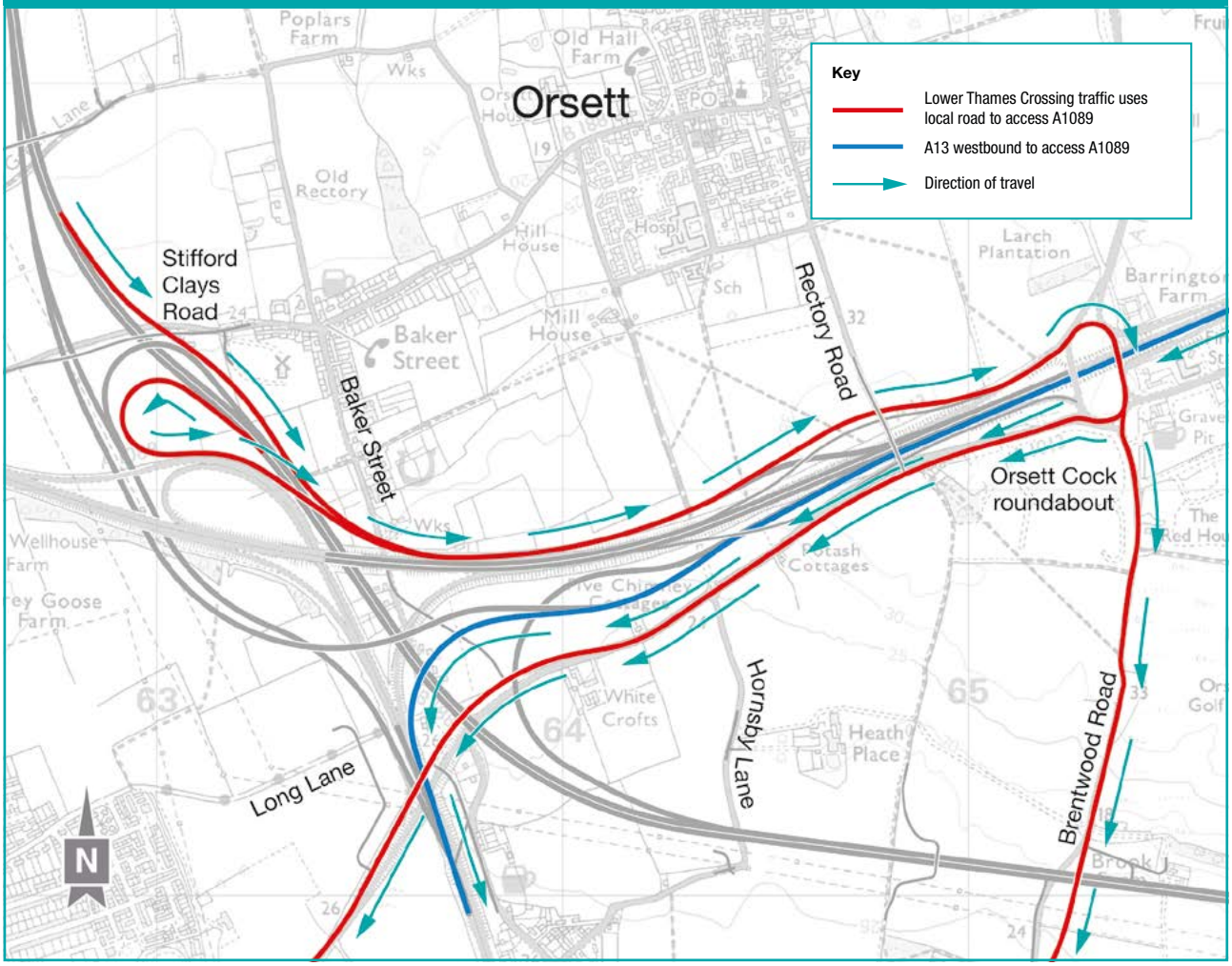
Figures 4-21 to 4-23 show the predicted changes in traffic flow and Figures 4-24 to 4-26 show predicted changes in traffic as a percentage.

Table 1 provides a summary of the predicted changes in traffic as a result of the proposed new link road from the Orsett Cock junction to the A1089.

The 'bands' in which the traffic flow changes are shown in Figures 4-21 to 4-24 differ to those presented at the community impacts consultation and those in Figures 4-27 to 4-29, to clearly show the change resulting from the new link road.

The changes are modelled in the morning peak (7am to 8am), inter peak (an average hour between 9am and 3pm), and the evening peak (5pm to 6pm) and are measured in Passenger Car Units (PCUs) per hour, where one PCU is equal to a car and 2.5 PCUs is equivalent to an HGV.

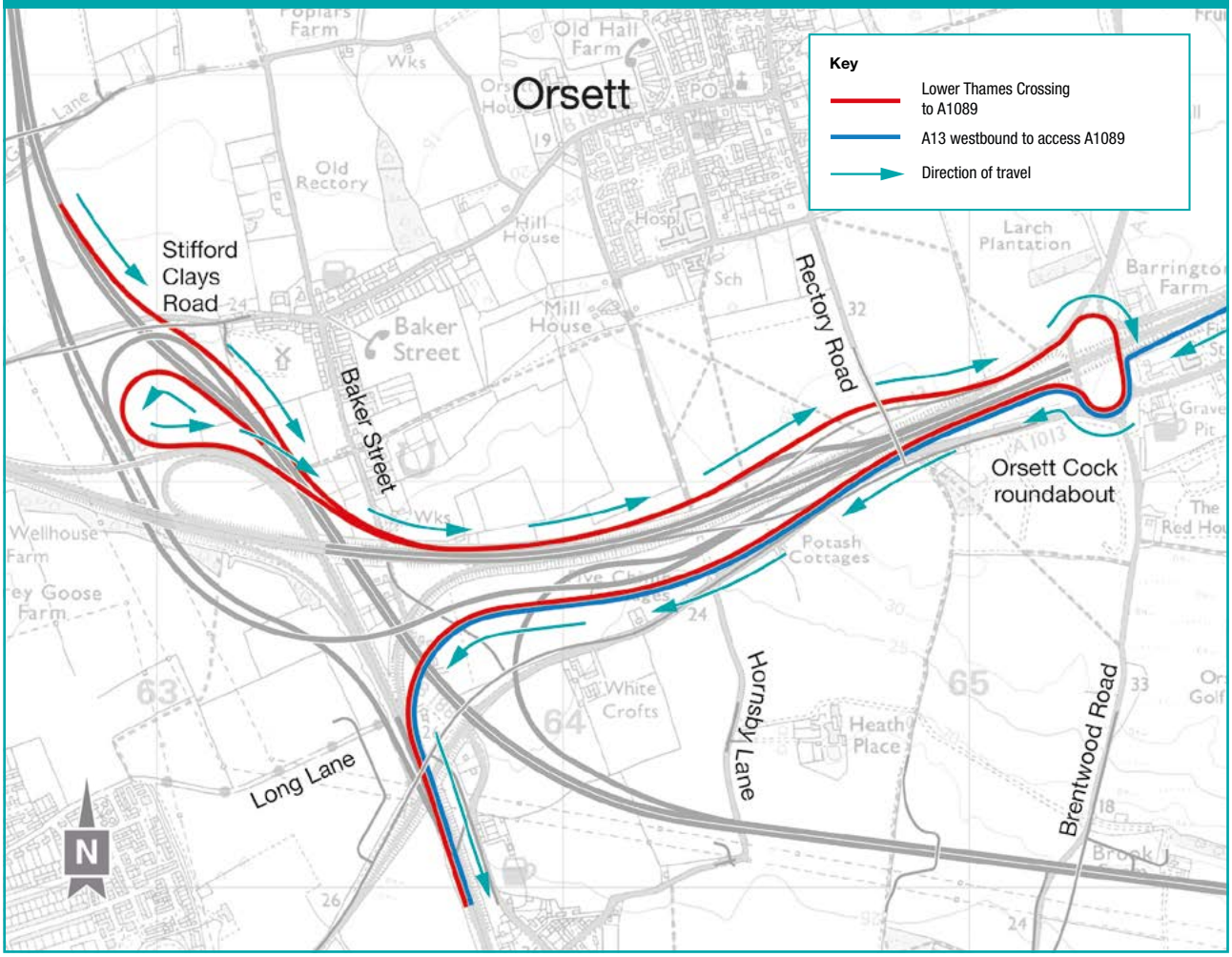
Figure 4-19: A13/A1089 junction connections at community impacts consultation



Traffic on the Lower Thames Crossing heading to the A1089. Leave the Lower Thames Crossing northbound and follow the road, looping back to cross over the Lower Thames Crossing, or leave the Lower Thames Crossing southbound and follow the road, travelling under Stifford Clays Road. These connections merge and head to the Orsett Cock junction. From there, take either the A128 Brentwood Road or A1013 Stanford Road and use the local road network to reach the A1089.

Traffic on the A13 westbound heading to the A1089. Leave the A13 westbound and follow the road, travelling over the connection between the A13 westbound and Lower Thames Crossing southbound. Continue on the road, passing over the realigned Baker Street and the Lower Thames Crossing, and join the A1089 southbound.

Figure 4-20: A13/A1089 junction connections at local refinement consultation



Traffic on the Lower Thames Crossing heading to the A1089. Leave the Lower Thames Crossing northbound and follow the road, looping back to cross over the Lower Thames Crossing, or leave the Lower Thames Crossing southbound and follow the road, travelling under Stifford Clays Road. These connections merge and head to the Orsett Cock junction. At the junction take the sixth exit and follow the road, travelling under Rectory Road and over the connection between the A13 westbound and Lower Thames Crossing southbound. Continue on the road, passing over the realigned Baker Street and the Lower Thames Crossing, and join the A1089 southbound.

Traffic on the A13 westbound heading to the A1089. Leave the A13 westbound at the Orsett Cock junction, and take the fourth exit and follow the road, travelling under Rectory Road and over the connection between the A13 westbound and Lower Thames Crossing southbound. Continue on the road, passing over the realigned Baker Street and the Lower Thames Crossing, and join the A1089 southbound.

Figure 4-21: Predicted change in the morning peak as a result of the new link road from the Orsett Cock junction, 2029

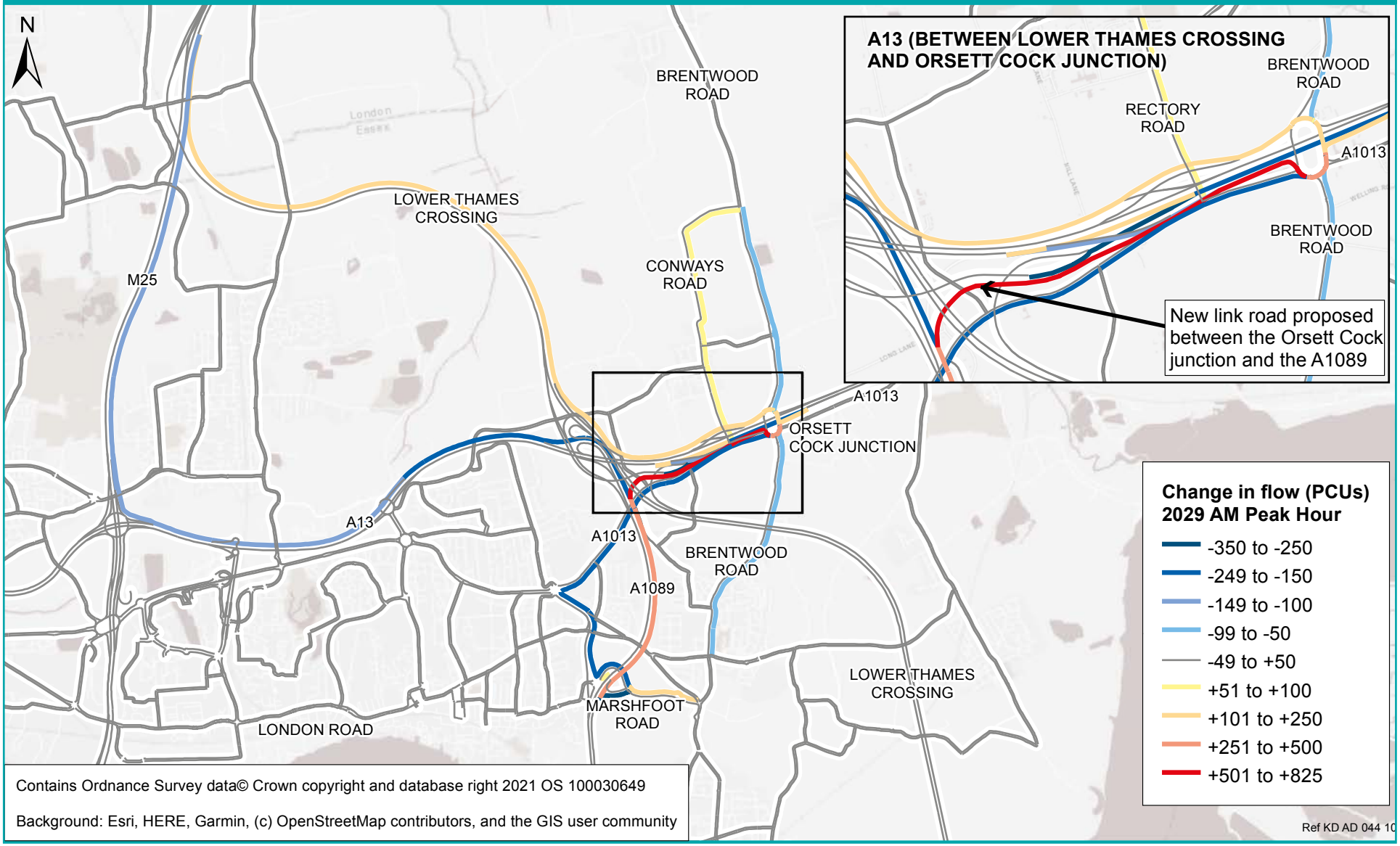


Figure 4-22: Predicted change in the inter peak as a result of the new link road from the Orsett Cock junction, 2029

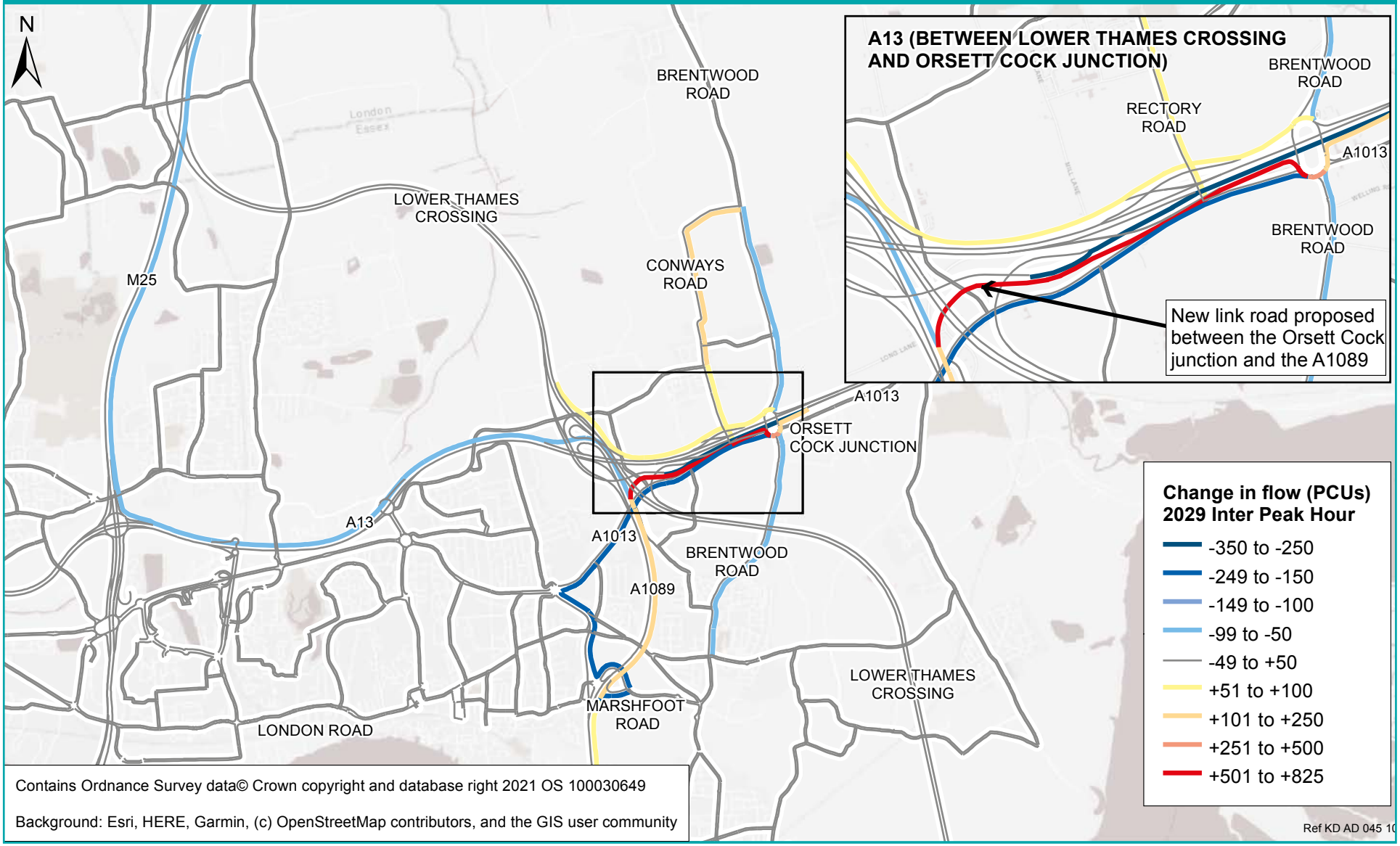


Figure 4-23: Predicted change in the evening peak as a result of the new link road from the Orsett Cock junction, 2029

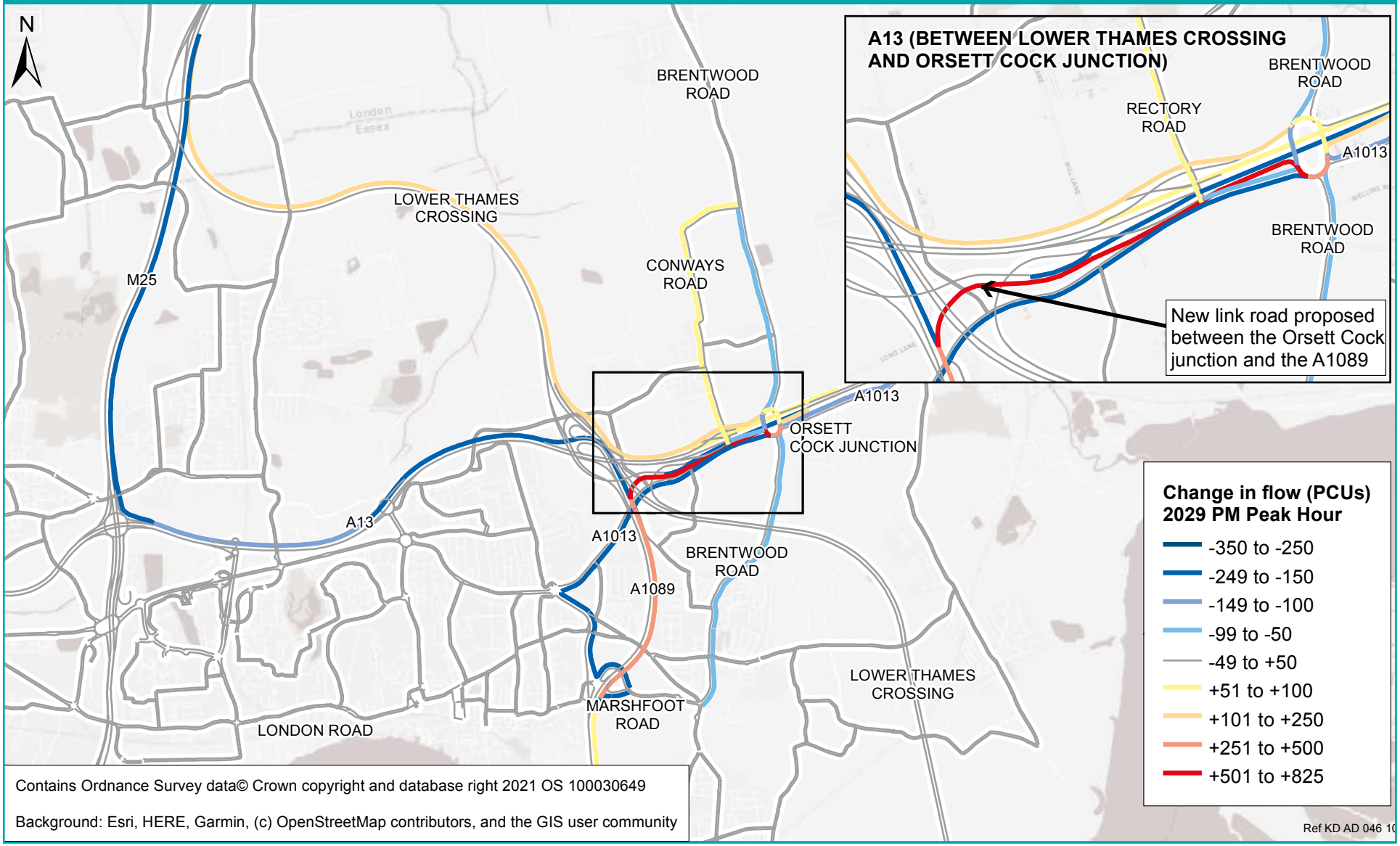


Figure 4-24: Predicted percentage change in the morning peak as a result of the new link road from the Orsett Cock junction, 2029

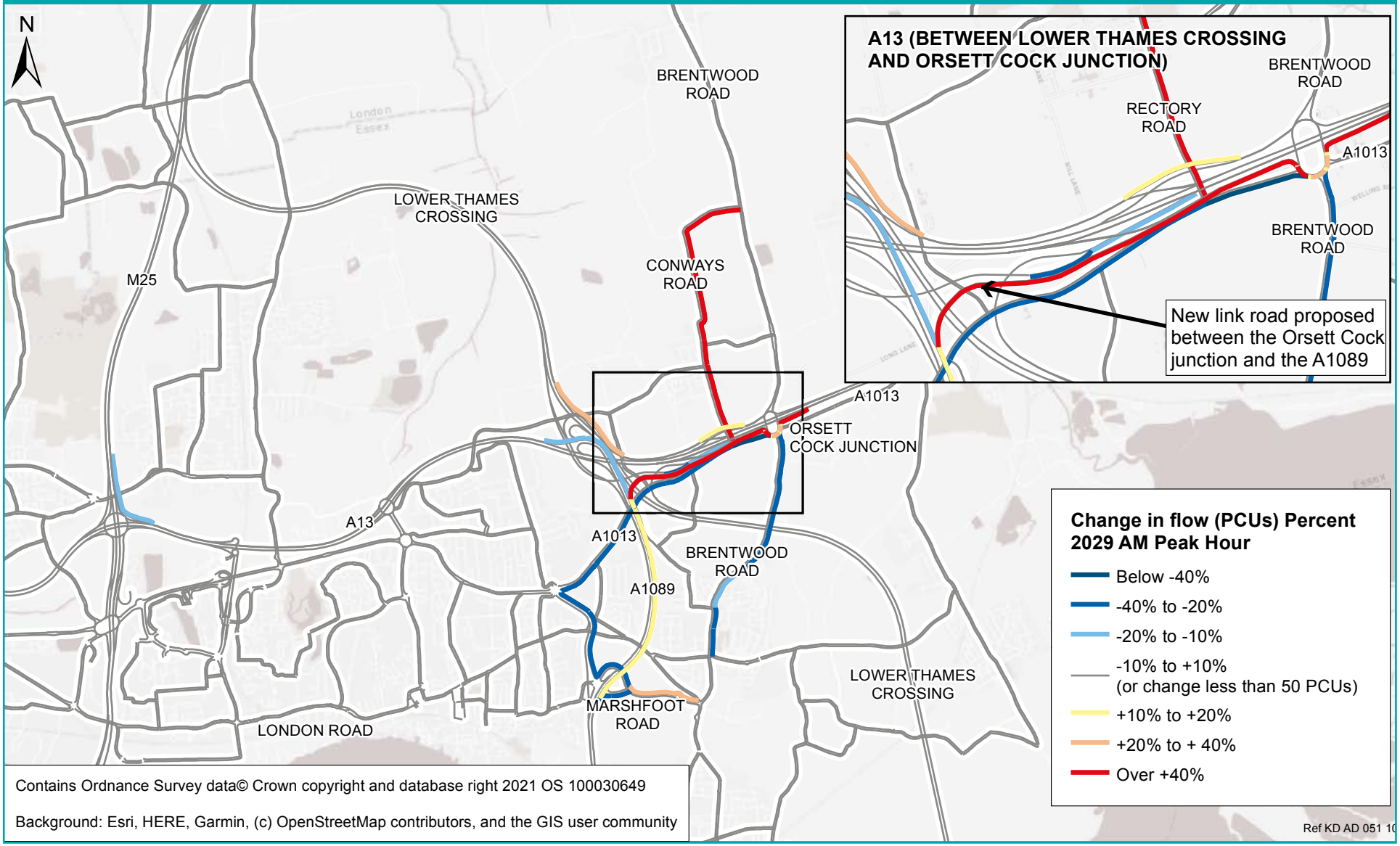


Figure 4-25: Predicted percentage change in the inter peak as a result of the new link road from the Orsett Cock junction, 2029

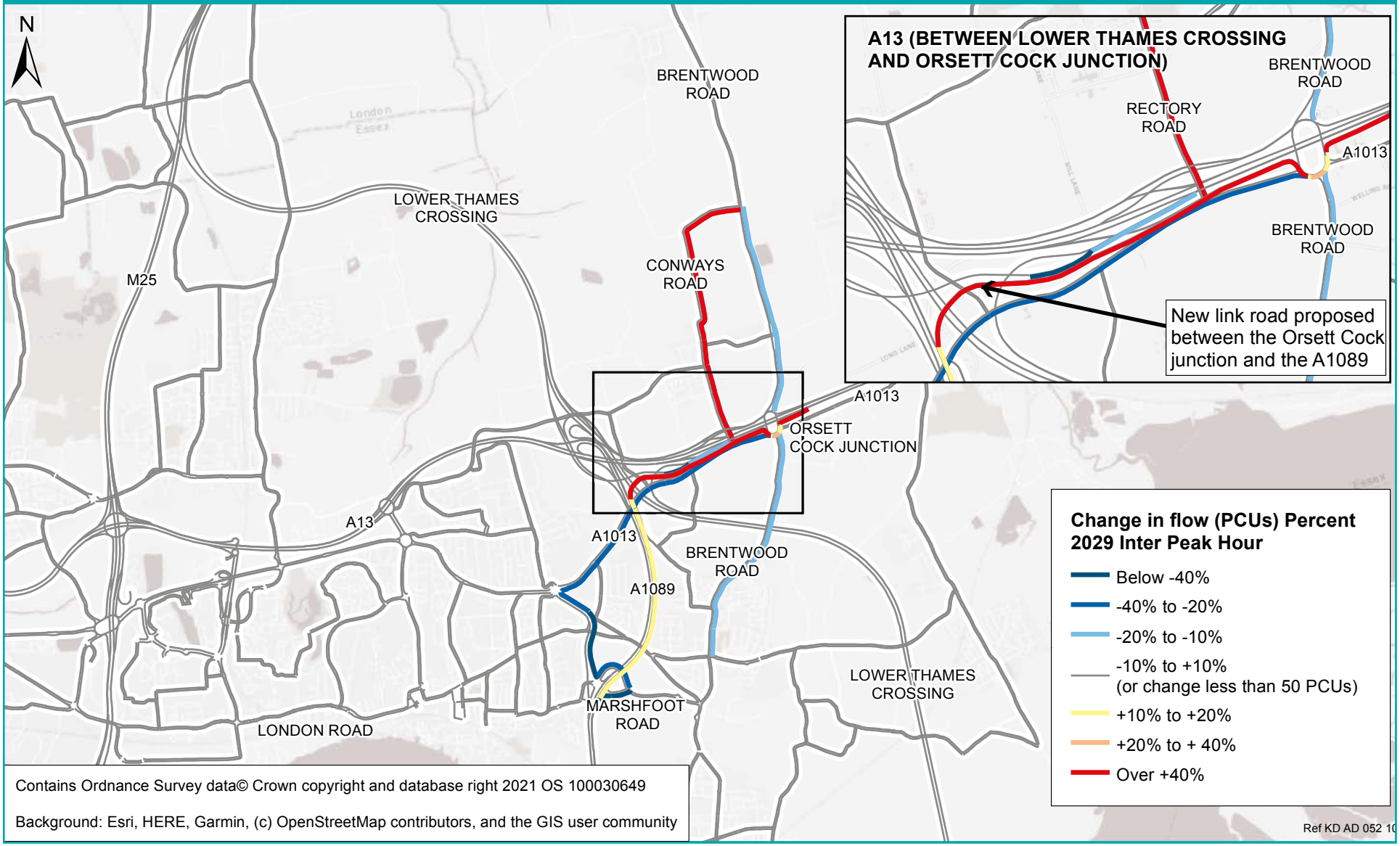


Figure 4-26: Predicted percentage change in the evening peak as a result of the new link road from the Orsett Cock junction, 2029

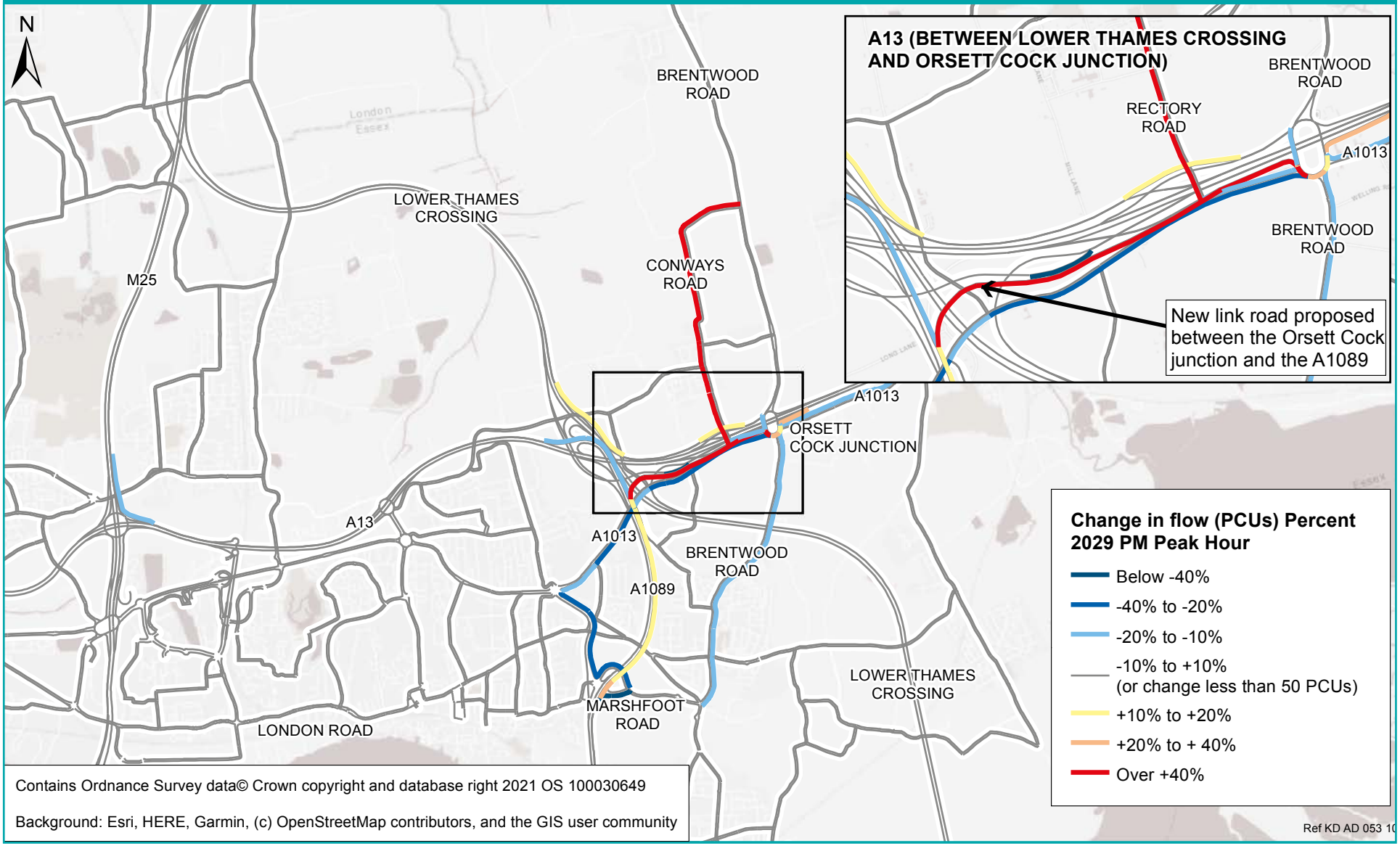


Table 1: Description of the predicted changes in traffic from those we consulted on in 2021, as a result of the new Orsett Cock junction to A1089 link road

Road	Predicted changes in traffic as a result of the new link road
Lower Thames Crossing	Southbound traffic on the LTC between the M25 and the A13 is predicted to increase by between 101 and 250 PCUs in the morning and evening peaks, and by up to 50 PCUs in the inter peak. This would be an increase of up to 10% in all modelled time periods.
New link road	The newly proposed link road between the Orsett Cock junction and the A1089 is predicted to carry between 501 and 825 PCUs in all modelled time periods.
A13	West of the proposed A13 junction with the LTC, eastbound traffic levels on the A13 are predicted to decrease by up to 249 PCUs in the morning and evening peaks, and between 50 and 99 PCUs in the inter peak. This would be a decrease of up to 10% in all modelled time periods.
A1013 Stanford Road	South of the A13, westbound traffic levels are predicted to fall on the A1013 Stanford Road west of the Orsett Cock junction by between 150 and 249 PCUs in all modelled time periods. In the morning peak, this would be a decrease of between 20% and 40% between Rectory Road and the Daneholes roundabout, and more than 40% between Rectory Road and the Orsett Cock junction. In the inter and evening peaks this would be a decrease of between 20% and 40%.
Marshfoot Road	In the morning peak, eastbound traffic on Marshfoot Road east of the A1089 is predicted to increase by between 101 and 250 PCUs. This would be a rise of between 20% and 40%.
A1089	On the A1089, southbound traffic between the A13 and the junction with Marshfoot Road is predicted to rise by between 251 and 500 PCUs in the morning peak, 101 and 250 PCUs in the inter peak and 251 and 500 PCUs in the evening peak. This would be an increase of between 10% and 20% in all modelled time periods. Southbound traffic on the A1089 between the junction with Marshfoot Road and the Asda roundabout is also predicted to increase by between 51 and 100 PCUs in the inter and evening peaks. This would be a rise of up to 10%.

Road	Predicted changes in traffic as a result of the new link road
Brentwood Road	Brentwood Road runs north-south through the Orsett Cock junction. It is predicted to see a decrease in traffic southbound of between 50 and 99 PCUs in the morning and inter peak periods between its junctions with Conways Road and Linford Road. North of the A13, this would be a drop of up to 10% in the morning peak and between 10% and 20% in the inter peak. South of the A13, this would be a decrease of between 20% and 40%. In the evening peak, it is predicted that north of the A13, there would be a decrease of between 50 and 99 PCUs as far as the junction with Conways Road. South of the A13, there would be a predicted drop southbound of between 50 and 99 PCUs as far as the junction with Marshfoot Road. North of the A13, there would be a decrease of up to 10%, while south of the A13, there would be a drop of between 10% and 20%.
Conways Road and Rectory Road	North of the A13, traffic on Conways Road/Rectory Road is predicted to increase by between 51 and 100 PCUs westbound/southbound in the morning peak and northbound/eastbound in the evening peak. During the inter peak, westbound/southbound traffic on Conways Road/Rectory Road is predicted to increase by between 101 and 250 PCUs to the junction with the B188 High Road. A rise of between 51 and 100 PCUs is predicted on Rectory Road between the junction with the B188 High Road and the A1013. This would mean an increase of more than 40% in all modelled time periods.

Predicted changes in traffic as a result of the Lower Thames Crossing

While Figures 4-21 to 4-26 present the predicted change in traffic as a result of the new link road between the Orsett Cock junction and the A1089 only, Figures 4-27 to 4-32 show the forecast change in traffic as a result of the project overall.

These figures provide an updated picture of the predicted impact of the project on the road network from that shown in the Operations update at the community impacts consultation.

Figures 4-27 to 4-29 show the predicted change in traffic volumes, and Figures 4-30 to 4-32 show the predicted change in traffic as a percentage.

The area shown is where our predictions have changed since the community impacts consultation. Elsewhere, our predicted impacts on the road network remain the same.

The changes are modelled in the morning peak (7am to 8am), inter peak (an average hour between 9am and 3pm), and the evening peak (5pm to 6pm) and are measured in Passenger Car Units (PCUs) per hour, where one PCU is equal to a car and 2.5 PCUs is equivalent to an HGV.

Figure 4-27: Predicted change in the morning peak as a result of the project, 2029

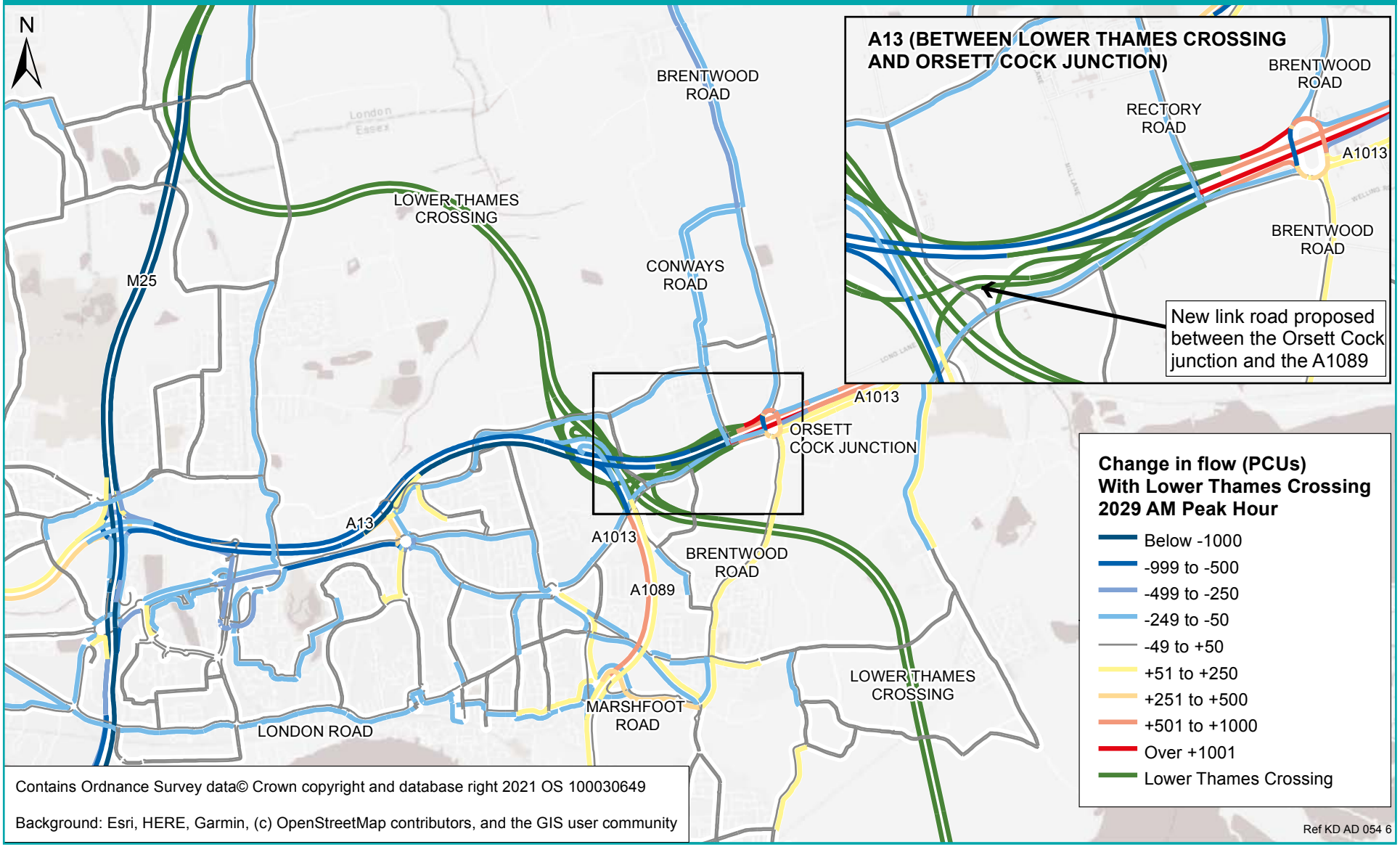


Figure 4-28: Predicted change in the inter peak as a result of the project, 2029

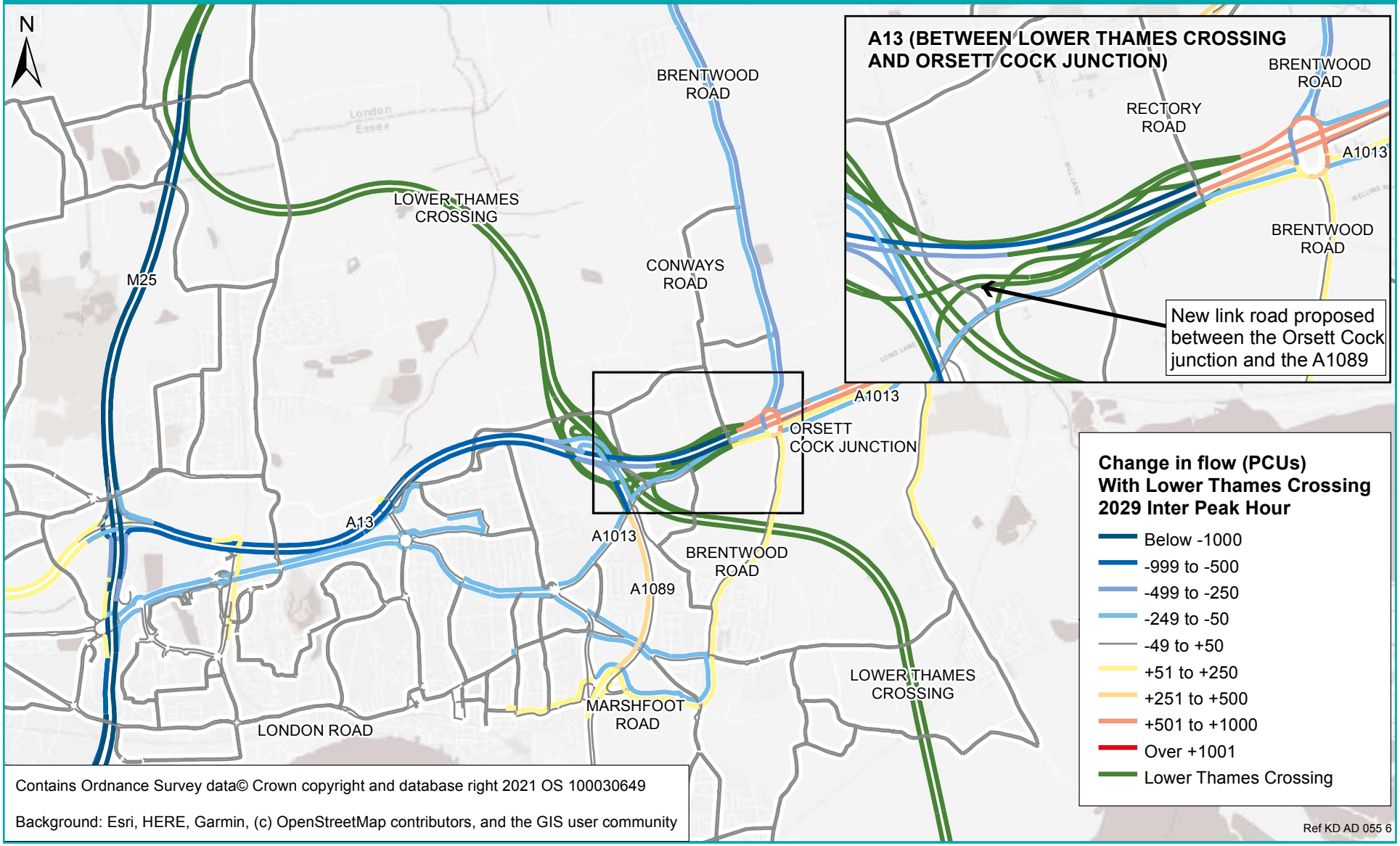


Figure 4-29: Predicted change in the evening peak as a result of the project, 2029

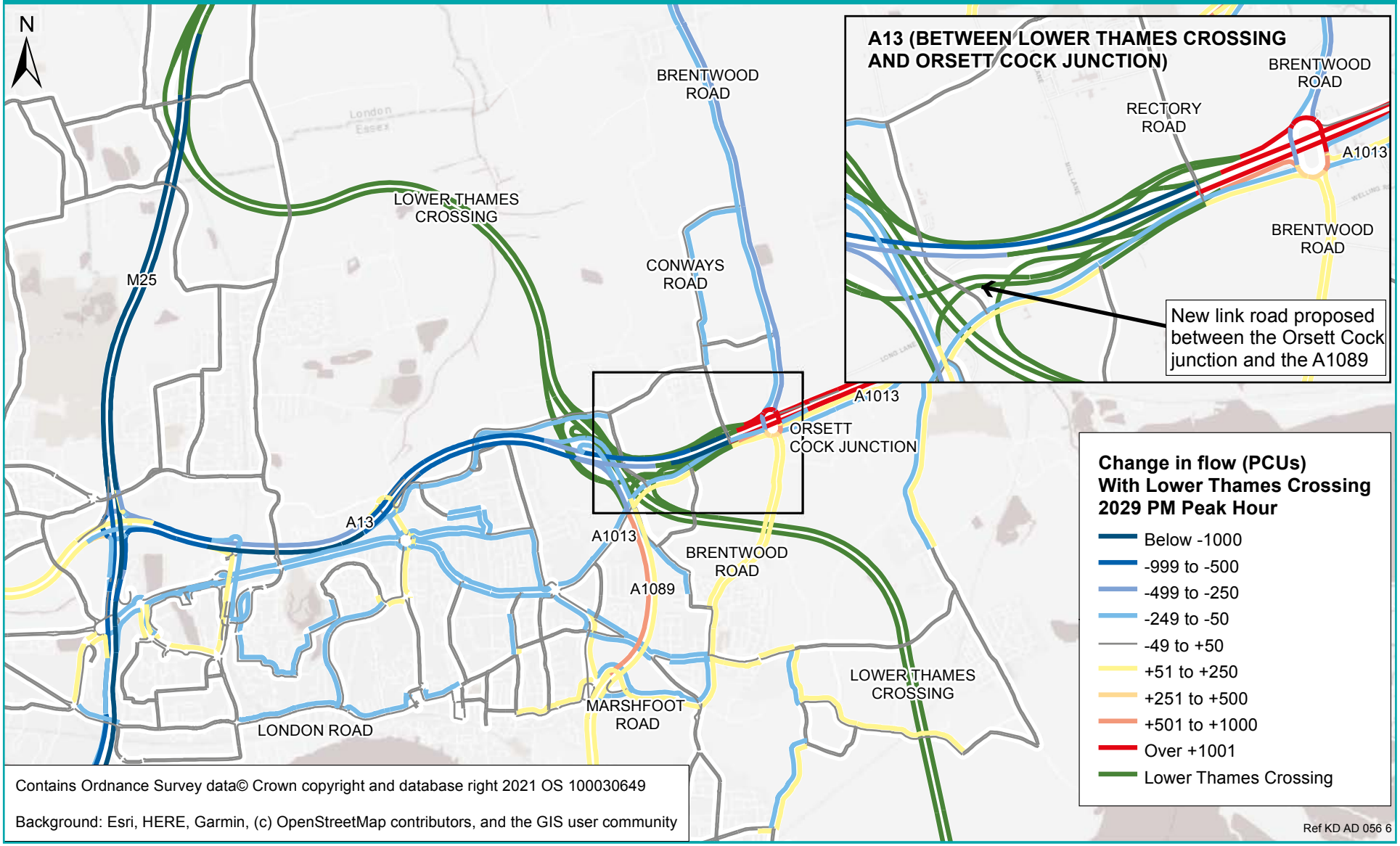


Figure 4-30: Predicted percentage change in the morning peak as a result of the project, 2029

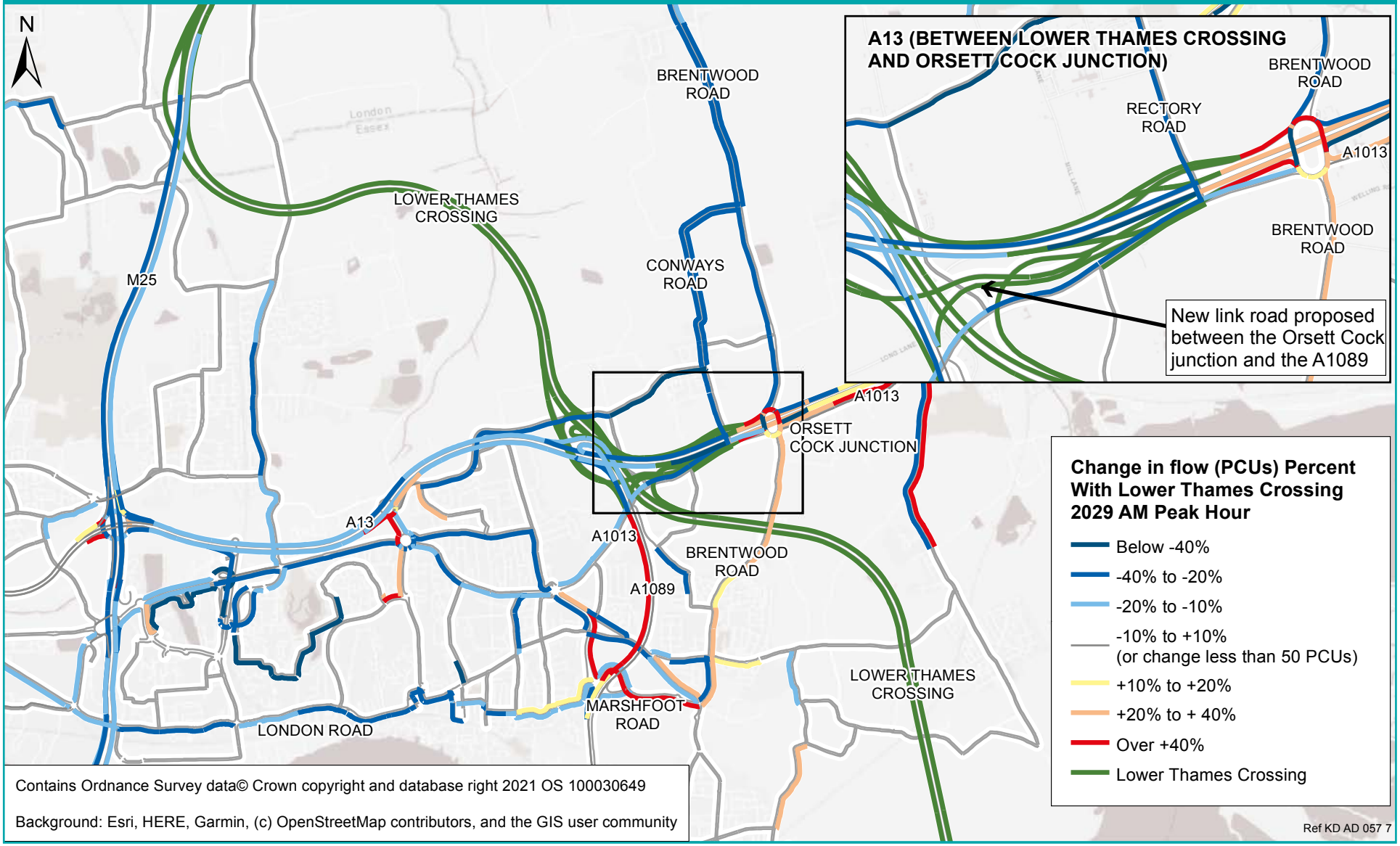


Figure 4-31: Predicted percentage change in the inter peak as a result of the project, 2029

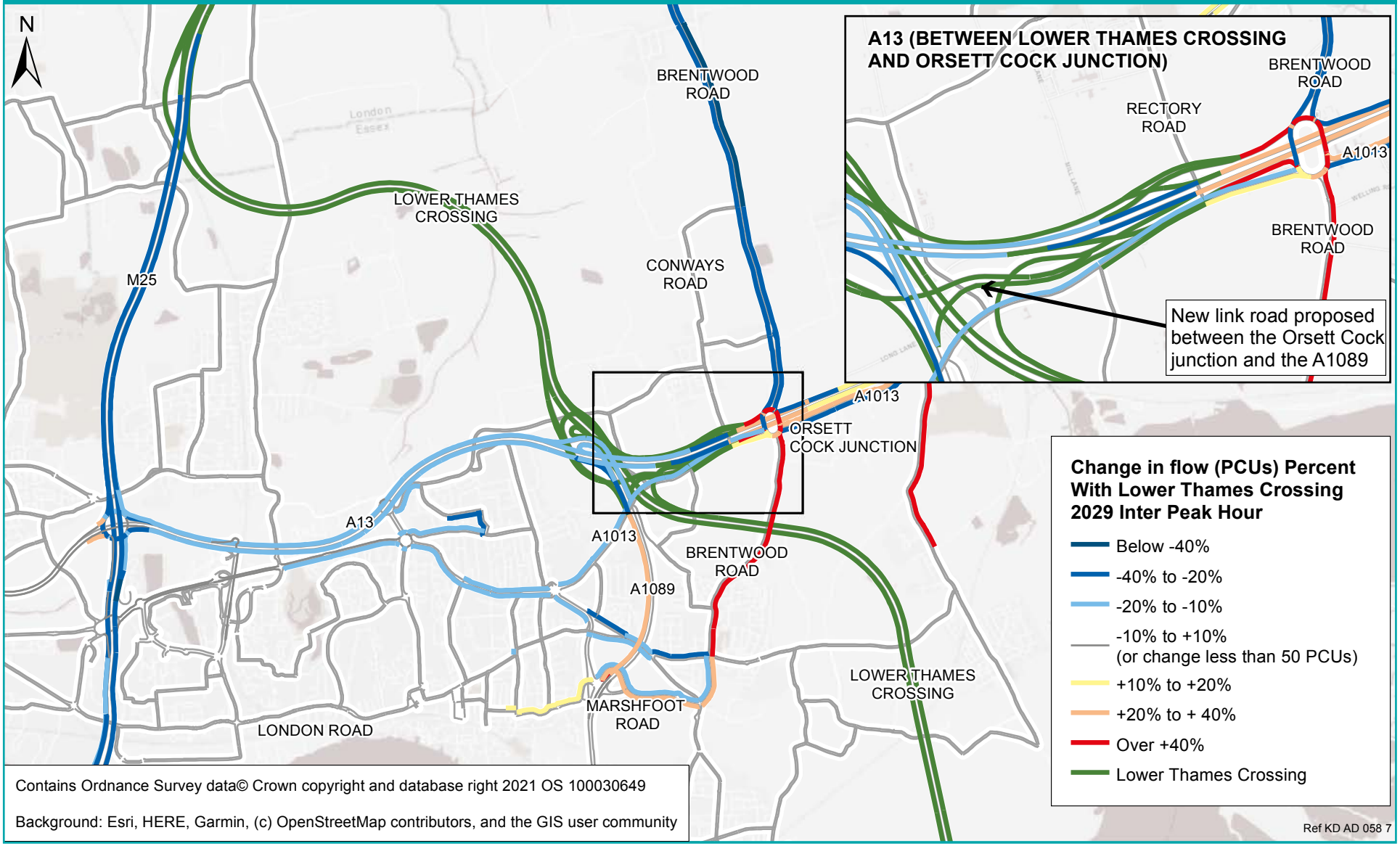
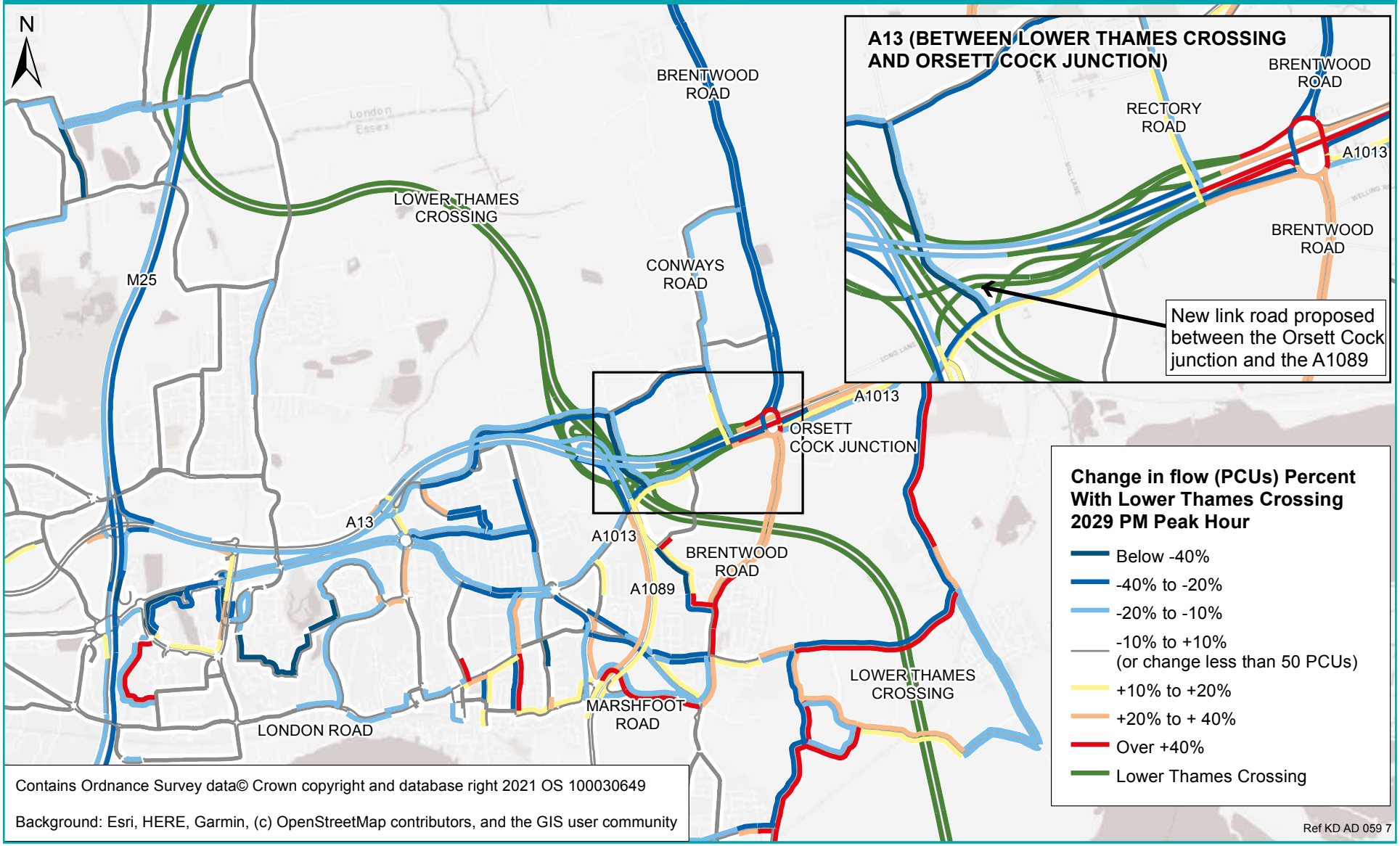


Figure 4-32: Predicted percentage change in the evening peak as a result of the project, 2029



Air quality and noise impacts predicted as a result of the newly proposed A13/A1089 link road

Air quality and noise are directly affected by the predicted changes in traffic flows that result from the newly proposed A13/A1089 link road.

At the community impacts consultation, we presented noise and air quality impacts for wards directly affected by the scheme. These impacts were based on the predicted traffic flows from the community impacts consultation version of the project's transport model.

To understand if there would be changes to air quality or noise impacts as a result of the newly proposed A13/A1089 link presented at this consultation, we compared the predicted traffic flows presented at the community impacts consultation with our latest traffic modelling (which includes the newly proposed link road). The table on the next page presents our findings.

Where increases in predicted traffic flows have been identified, this may lead to greater changes in air quality and road traffic noise than those presented at the community impacts consultation. Where reductions in predicted traffic flows have been identified, this may lead to an improvement in air quality and road traffic noise compared with those presented at the community impacts consultation. However, when looking at the overall impact of the project, it is expected that the impacts will be in line with those presented previously.

Table 2: Predicted changes in air quality and noise impacts from those presented at the community impacts consultation, as a result of the new Orsett Cock junction to A1089 link road

Road	Predicted changes in noise and air quality as a result of the new link road
Rectory Road, Conways Road and High Road (eastern end)	As a result of the new proposal, it is expected that Rectory Road, Conways Road and High Road (the eastern end) may see an increase in predicted traffic flows. However, the predicted changes to road traffic noise along Rectory Road, Conways Road and High Road are similar to those presented at the community impacts consultation, with negligible (less than 1dB(A)) to minor (1 to 2.9dB(A)) reductions in noise compared with if the LTC was not built (as shown in Figure 16.20 of the Ward impact summaries – North of the river part 1). The change in predicted traffic flows along Rectory Road, Conways Road and High Road is also predicted to result in similar air quality impacts to those presented at the community impacts consultation. Changes in air quality in this area presented at the community impacts consultation were predicted to be negligible, compared with if the LTC was not built (as shown in Figure 16.21 of the Ward impact summaries – North of the river part 1).

Road	Predicted changes in noise and air quality as a result of the new link road
Brentwood Road	As a result of the new proposal, a reduction in traffic flows is predicted along Brentwood Road north and south of the Orsett Cock junction. However, the change in predicted traffic flows along Brentwood Road north and south of the Orsett Cock junction is not predicted to result in a change to noise impacts which we presented at the community impacts consultation. Changes in road traffic noise along Brentwood Road north of the Orsett Cock junction are expected to remain similar to those presented at the community impacts consultation, with minor (1 to 2.9dB(A)) reductions predicted, compared with if the LTC was not built (as shown in Figure 16.20 of the Ward impact summaries – North of the river part 1). With regard to Brentwood Road south of the Orsett Cock junction, noise impacts are again expected to remain similar to those presented at the community impacts consultation, with negligible impacts (less than 1dB(A)) increasing to major (greater than 5dB(A)) increases in noise where Brentwood Road approaches and crosses the new road (as shown in Figure 15.19 of the Ward impact summaries – North of the river part 1). The change in predicted traffic flows along Brentwood Road north and south of the Orsett Cock junction are predicted to result in similar air quality impacts to those presented at the community impacts consultation. Changes in air quality presented at the community impacts consultation were predicted to range from minor improvements along Brentwood Road north of the Orsett Cock junction to a minor worsening along Brentwood Road south of the Orsett Cock junction, compared with if the LTC was not built (as shown in Figures 15.20 and 16.21 of the Ward impact summaries – North of the river part 1).

Road	Predicted changes in noise and air quality as a result of the new link road
Roads west and east of the A13/ A1089 junction	As a result of the new proposal, traffic flows on the A13 to the west of the A13/ A1089 junction and eastbound traffic flows east of the Orsett Cock junction are predicted to see a reduction, although these changes are unlikely to be significant. Predicted increases in forecast traffic flows may occur at the LTC southbound off-slip to the east of the A13/A1089 junction, along the new link road between the Orsett Cock junction and the A1089, and at the westbound A13 off-slip on to the Orsett Cock junction. However, the change in predicted traffic flows along the westbound A13 off-slip is predicted to result in similar noise impacts to those presented at the community impacts consultation, which predicted a major (greater than 5dB(A)) reduction in road traffic noise compared with if the LTC was not built (as shown in Figure 16.20 of the Ward impact summaries – North of the river part 1). The change in predicted traffic flows along the westbound A13 off-slip and eastbound traffic flows east of the Orsett Cock junction are predicted to result in similar air quality impacts to those reported at the community impacts consultation. Changes in air quality in this area presented at the community impacts consultation were predicted to range from negligible to a minor worsening in air quality, compared with if the LTC was not built (as shown in Figure 16.21 of the Ward impact summaries – North of the river part 1). The new proposal is predicted to see an increase in traffic flows, which is likely to increase noise impacts close to the southbound off-slip of the Lower Thames, to the east of the A13/A1089 junction. At the community impacts consultation, we presented the noise impacts of the proposed southbound off-slip for the LTC, to the east of the A13/A1089 junction. This showed moderate (3 to 4.9dB(A)) to major (greater than 5dB(A)) reductions in noise levels, as a result of the LTC's proposed low-noise road surfacing and junction earthworks (as shown in Figure 16.20 of the Ward impact summaries – North of the river part 1). The link road proposed at this consultation is likely to increase road traffic noise as a result of predicted increased traffic flows.

Road	Predicted changes in noise and air quality as a result of the new link road
A1013 Stanford Road	As a result of the new proposal, a reduction in traffic flows is predicted close to the A1013 Stanford Road. However, the change in predicted traffic flows along the A1013 Stanford Road is predicted to result in similar noise impacts with those presented at the community impacts consultation. Changes in road traffic noise along this section of A1013 Stanford Road are expected to remain similar to those presented at the community impacts consultation, with minor (1 to 2.9dB(A)) reductions predicted, compared with if the LTC was not built (as shown in Figure 16.20 of the Ward impact summaries – North of the river part 1). The change in predicted traffic flows along the A1013 Stanford Road is predicted to result in similar air quality impacts to those presented at the community impacts consultation. Changes in air quality in this area presented at the community impacts consultation were predicted to result in a minor worsening in air quality, compared with if the LTC was not built (as shown in Figure 16.21 of the Ward impact summaries – North of the river part 1).
A1089 southbound	As a result of the new proposal, the A1089 southbound between the A1013 and the Marshfoot Road junction is predicted to see an increase in traffic flows. The change in predicted traffic flows along the A1089 southbound is predicted to result in noise impacts similar to those presented at the community impacts consultation. Changes in road traffic noise along this section of the A1089 southbound are expected to remain similar to those presented at the community impacts consultation with minor (1 to 2.9dB(A)) reductions predicted, compared with if the LTC was not built (as shown in Figures 15.19 and 17.18 of the Ward impact summaries – North of the river part 1). The change in predicted traffic flows along the A1089 southbound is predicted to result in air quality impacts similar to those presented at the community impacts consultation. Changes in air quality in this area presented at the community impacts consultation were predicted to be negligible, compared with if the LTC was not built (as shown in Figures 15.20 and 17.19 of the Ward impact summaries – North of the river part 1).

Road	Predicted changes in noise and air quality as a result of the new link road
Marshfoot Road	As a result of the new proposal, reductions in traffic flows are predicted close to Marshfoot Road. The change in predicted traffic flows along Marshfoot Road is predicted to result in similar noise impacts to those presented at the community impacts consultation. Changes in road traffic noise along this section of Marshfoot Road are expected to remain similar to the community impacts consultation with negligible (less than 1dB(A)) changes predicted, compared with if the LTC was not built (as shown in Figures 14.15, 15.19 and 17.18 of the Ward impact summaries – North of the river part 1). The change in predicted traffic flows along Marshfoot Road is predicted to result in similar air quality impacts to those presented at the community impacts consultation. Changes in air quality in this area presented at community impacts consultation were predicted to be negligible, compared with if the LTC was not built (as shown Figures 14.16, 15.20 and 17.19 of the Ward impact summaries – North of the river part 1).

The air quality and noise impacts of the new link road between the Orsett Cock junction and the A1089 will be fully assessed and presented in the Environmental Statement included as part of our DCO submission.

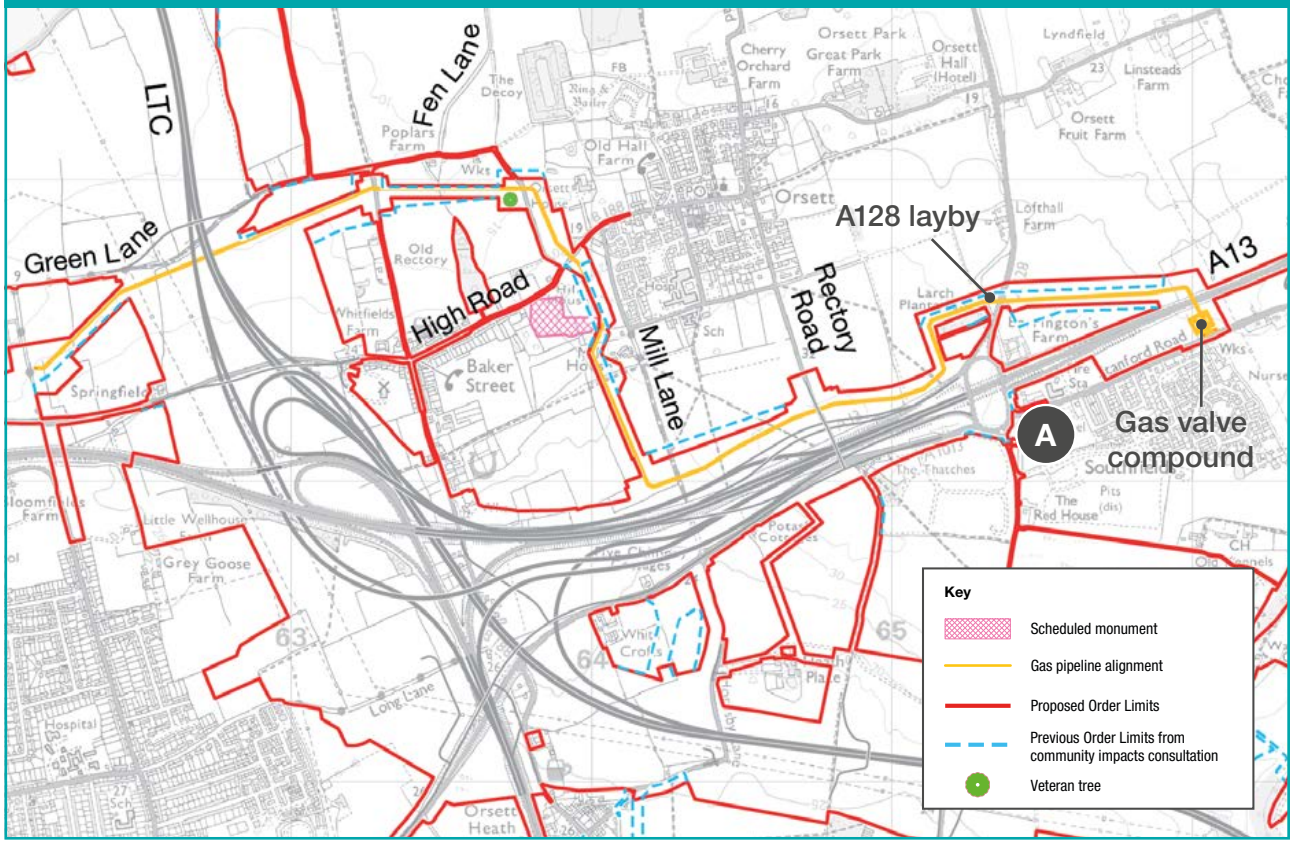
Figure 4-33: Existing view of A13-A1089 looking south

Figure 4-34: Community impacts consultation view of A13/A1089 looking south

Figure 4-35: Proposed view of A13/A1089 looking south

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
17	North of the A13, from Baker Street to near the A128 Brentwood Road and east of the Orsett Cock junction, south of the A13.	We propose to refine the route of a gas pipeline diversion in this location, to avoid a scheduled monument west of Orsett. The Order Limits have been modified as a result of this change and the pipeline can now pass through a gap in the existing vegetation, removing a risk to a veteran tree. There would be a minor extension of the Order Limits to allow for modifications to be completed to the existing network east of Orsett Cock junction. The new gas pipeline alignment is shown in Figure 4-36. We are carrying out assessments to understand whether the change we are proposing to the route of this pipeline affects the NSIP status of the diversion. Our DCO application will set out all of the utilities NSIPs for which consent is being sought.	Realigning this gas pipeline diversion and amending the working area means we can avoid a significant impact on a scheduled monument. We can also retain a veteran tree that was previously at risk of removal from the gas pipeline diversion. To the west of Mill Lane the working area would move east by 30 metres, bringing it within 50 metres of the nearest residential property. The gas pipeline would move east by seven metres. Construction noise levels here are not predicted to exceed the existing background noise levels. The existing vegetation would screen the visual impact of moving the works closer to these residential properties. There would be a closure of the A128 southern access to a layby for up to two months. Access to the layby from the north would not be affected.

Figure 4-36: Refinements to a gas pipeline diversion around Orsett

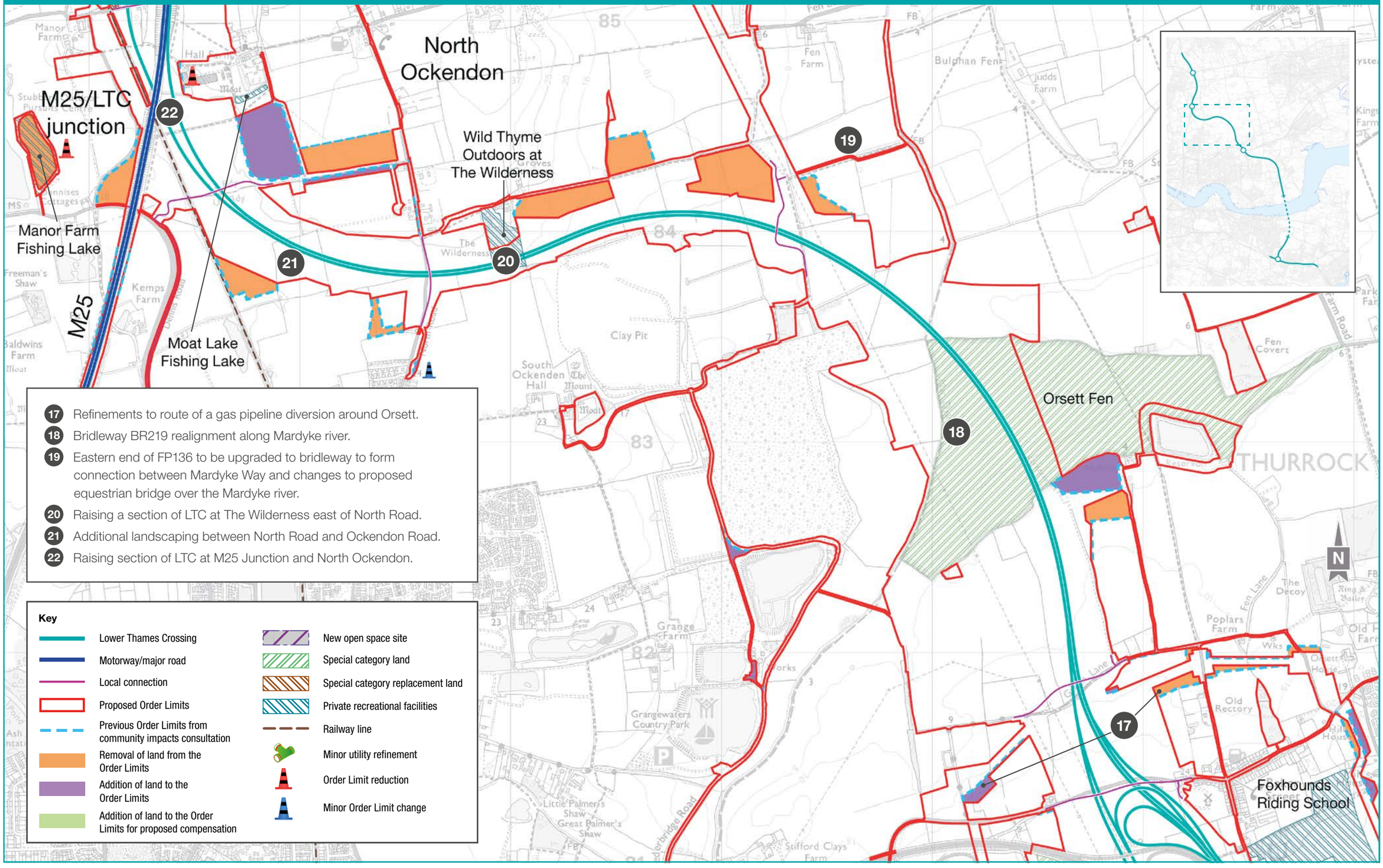


A Additional land added to complete works on existing gas pipeline.

Figure 4-37: Existing view of landscaping around the A13

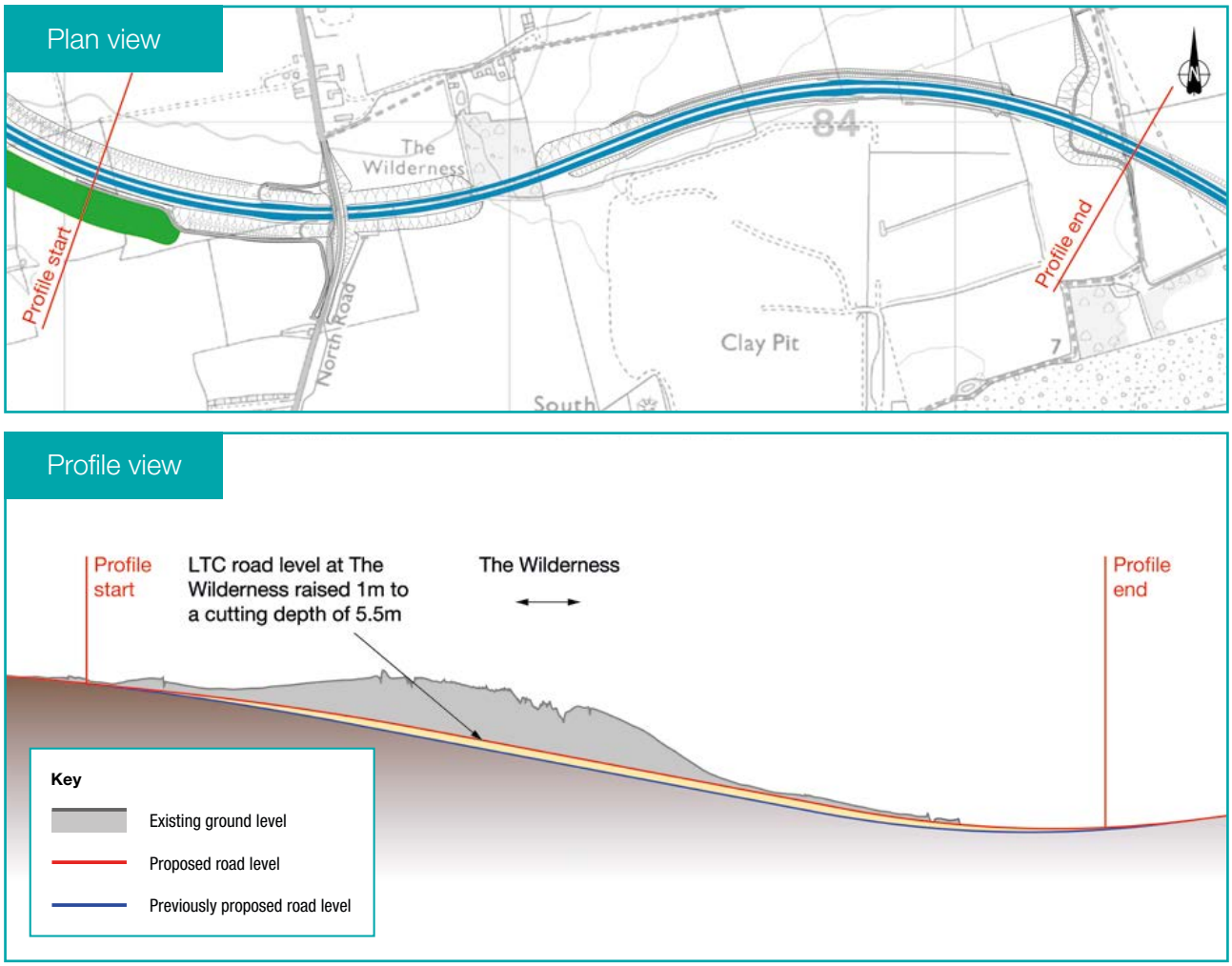
Figure 4-38: Proposed view of new landscaping around the A13

Figure 4-39: Mardyke Valley/North Road



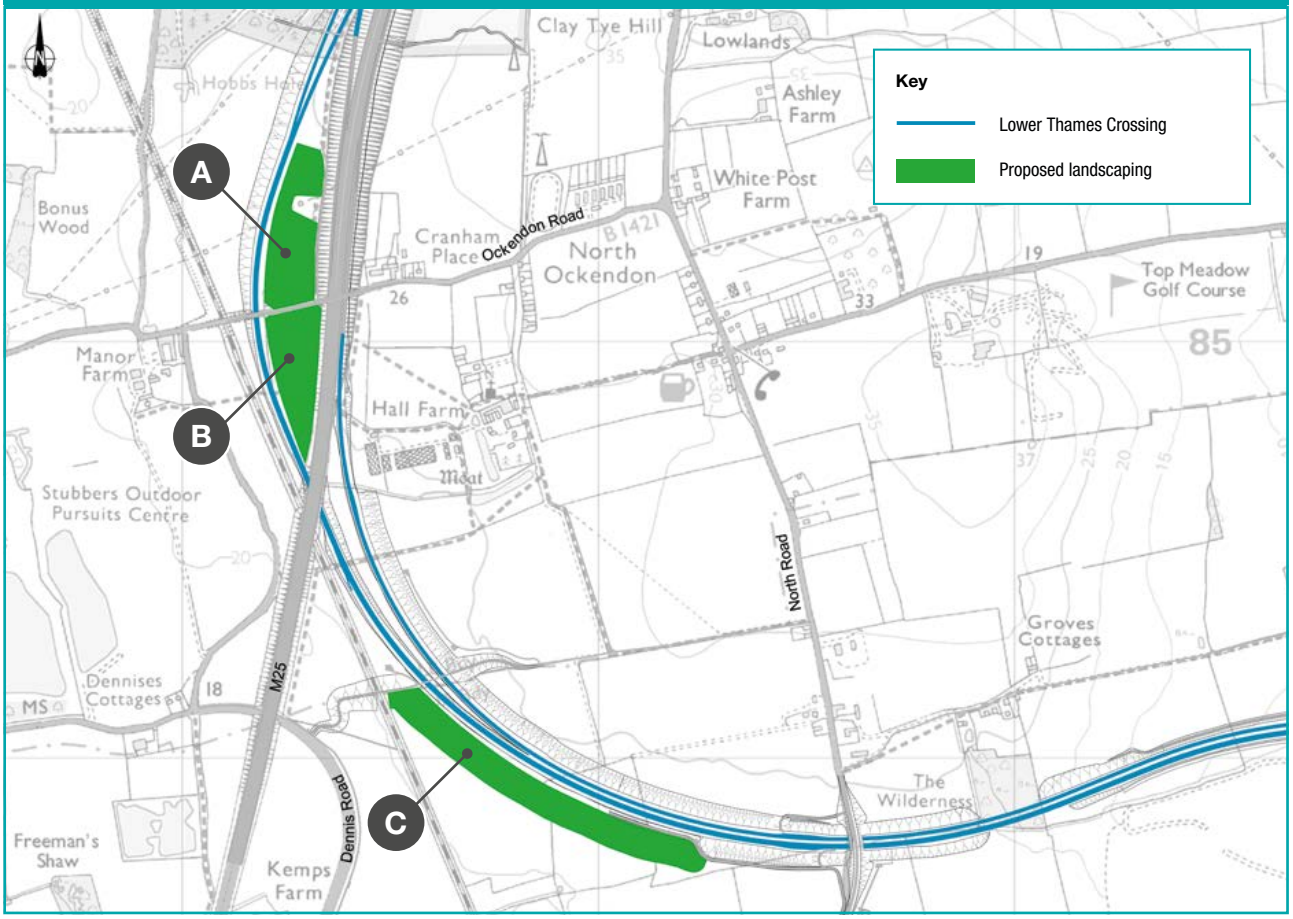
Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
20	Section of the route that passes under North Road crossing (near The Wilderness).	At our previous consultation the 2.2km section of road at this location was proposed to be in a cutting up to 6.5 metres below ground level. As a result of further design refinement, we are proposing to raise the road alignment while maintaining the required headroom clearance beneath existing structures. The depth of the cutting would be reduced by one metre to 5.5 metres below ground level for around 2.4km.	By raising the road in this location the amount of excavated material being removed by road would be considerably reduced. The change in road level would be marginal. There would be no significant change in noise and visual impacts during construction and operation for nearby communities.

Figure 4-40: Raised vertical alignment of Lower Thames Crossing across a section of 'The Wilderness'



Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
21	M25/LTC junction (North Ockendon).	We are proposing additional landscaping up to six metres from the existing ground level with planting around the M25/ LTC junction. We are also proposing two other landscaping features (areas A and B) around the junction between the LTC and the M25. Figure 4-41 shows the extent and describes the levels of the three features proposed. The additional landscaping would be within the Order Limits presented in the 2021 community impacts consultation and would relate to land identified for woodland and other planting along the new road. No further land would be required to accommodate this change. The detailed planting mix to be used within these new landscaped areas will be included in the Outline Landscaping and Ecological Management Plan as part of our DCO submission. Material for the construction of the landscape features would be re-used from elsewhere within the project, reducing the need to use local waste management facilities.	The placing of clean excavated material from construction activities in this area would provide noise, landscape and visual benefits for some nearby residents and maximise these benefits. This is particularly apparent at Area C, where the most significant landscaping changes are proposed. In this location, the LTC would be constructed below ground level, so the road would be less visible to local residents. It would also reduce the level of noise for surrounding communities.

Figure 4-41: Landscaping around Lower Thames Crossing and M25



A Additional landscaping between the M25 and Lower Thames Crossing, sloping down 13.5m from Ockendon Road to Lower Thames Crossing.

B Landscaping 15m above Lower Thames Crossing and 10m above the existing M25 at its highest point.

C Landscaping 6m above existing ground and 5m above Lower Thames Crossing.

Figure 4-42: Existing view of area proposed to contain landscaping around the M25

Figure 4-43: Proposed view of new landscaping around the M25

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
22	LTC/M25 junction (North Ockendon).	At our previous consultation, the 1.5km section of road at this location was proposed to be in a cutting up to 11.3 metres below ground level. As a result of further design refinement, we are proposing to raise the height of the road alignment while maintaining the required headroom clearance beneath existing structures. The depth of the cutting at the LTC/M25 junction would be reduced by 1.5 metres to 9.8 metres below ground level for around 1.5km.	By raising the road alignment in this location the amount of excavated material removed by road would be considerably reduced. The change in height would be marginal and there would be no significant change in noise and visual impacts here during construction and operation.

Figure 4-44: Raised vertical alignment of the Lower Thames Crossing across a section of M25 at North Road

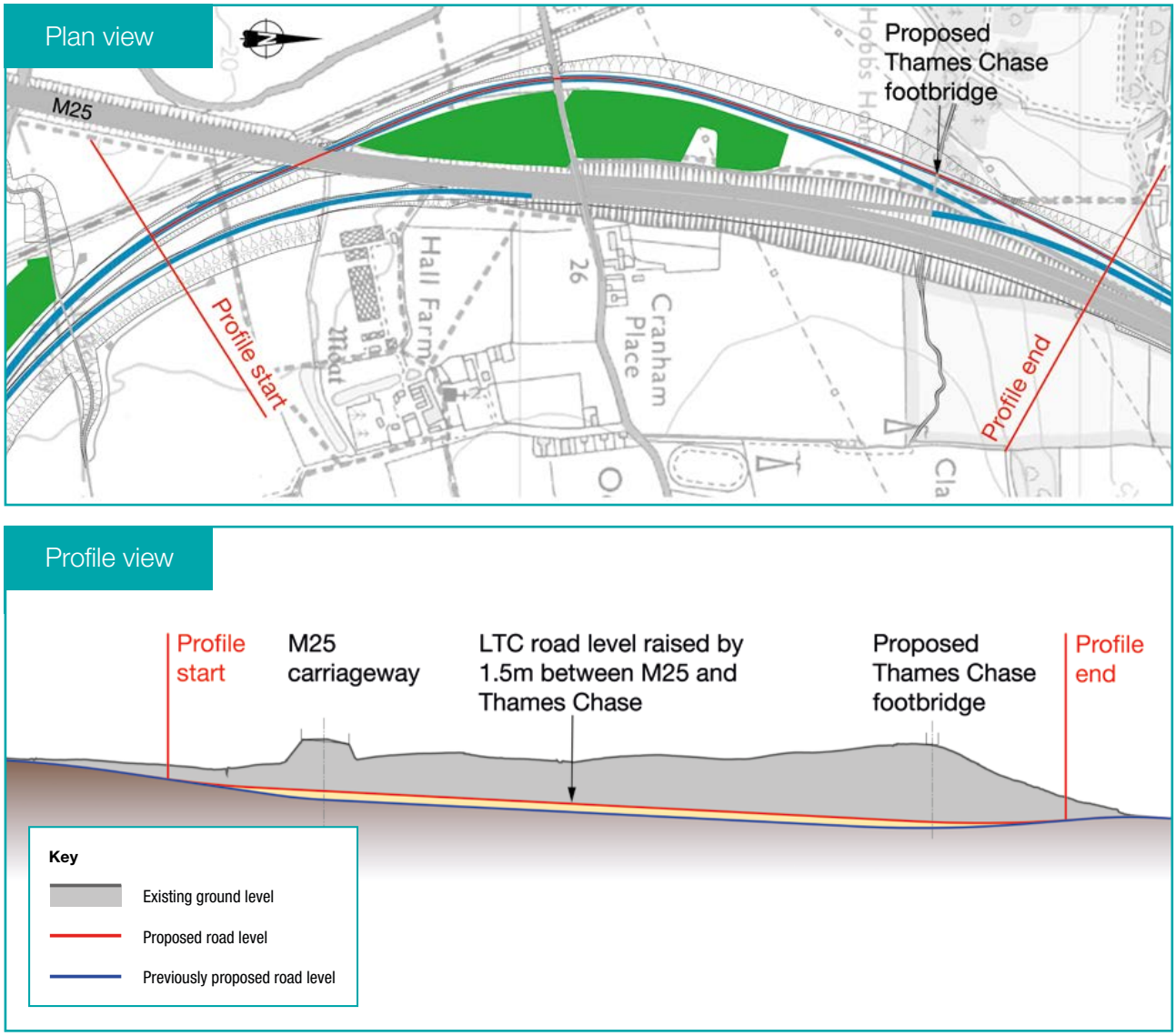
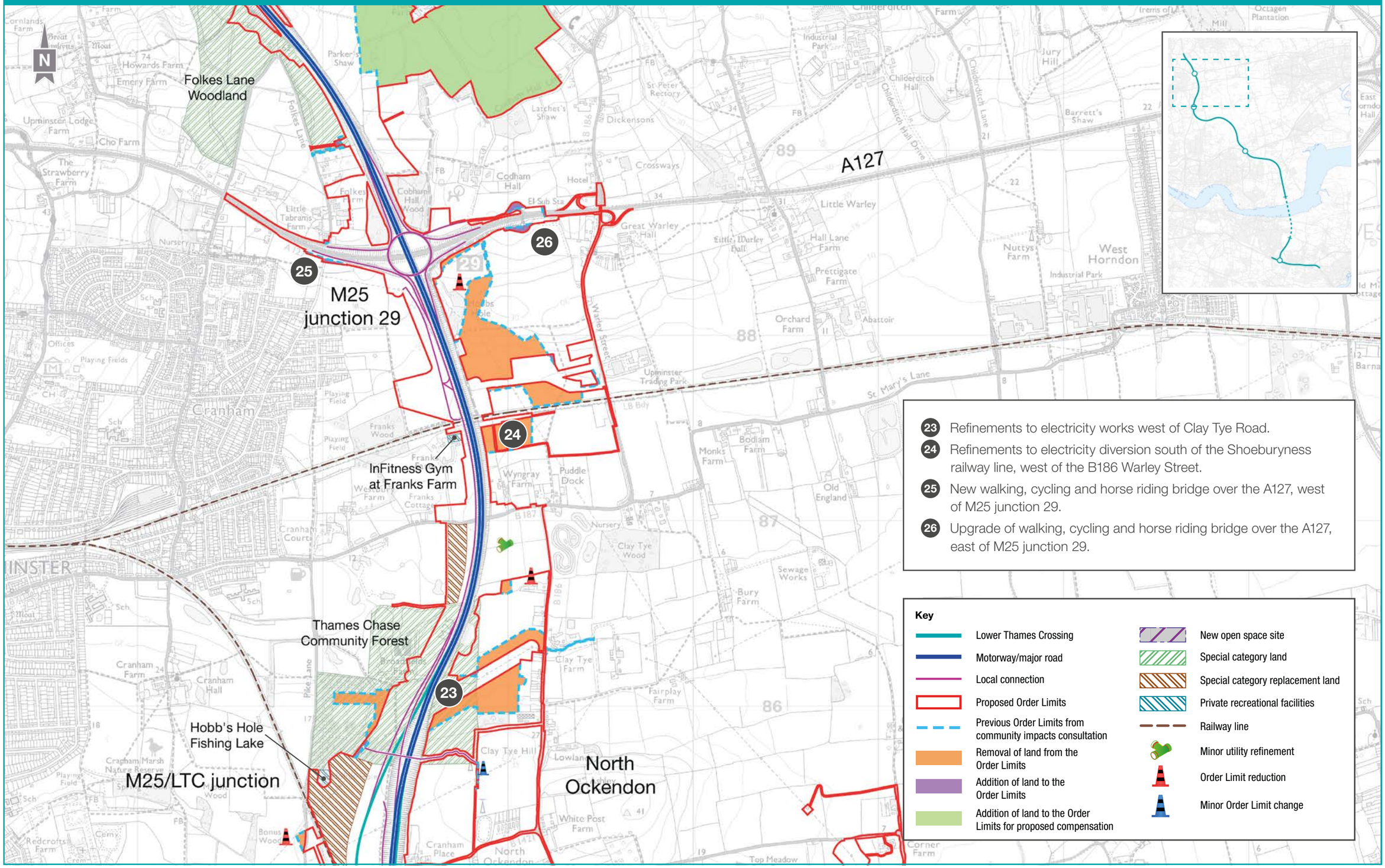


Figure 4-45: M25 junction 29



23 Refinements to electricity works west of Clay Tye Road.

24 Refinements to electricity diversion south of the Shoeburyness railway line, west of the B186 Warley Street.

25 New walking, cycling and horse riding bridge over the A127, west of M25 junction 29.

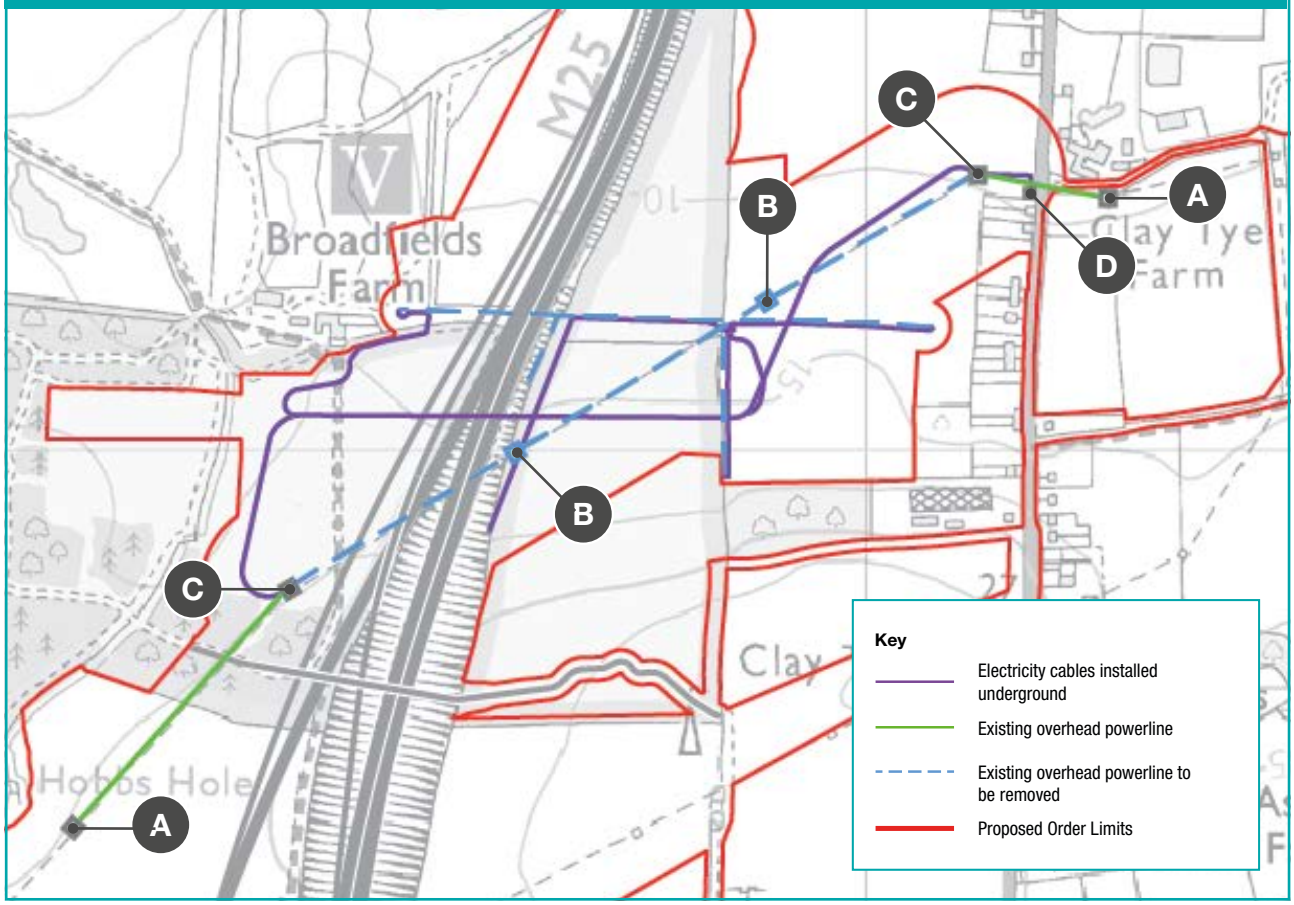
26 Upgrade of walking, cycling and horse riding bridge over the A127, east of M25 junction 29.

Key

- Lower Thames Crossing
- Motorway/major road
- Local connection
- Proposed Order Limits
- Previous Order Limits from community impacts consultation
- Removal of land from the Order Limits
- Addition of land to the Order Limits
- Addition of land to the Order Limits for proposed compensation
- New open space site
- Special category land
- Special category replacement land
- Private recreational facilities
- Railway line
- Minor utility refinement
- Order Limit reduction
- Minor Order Limit change

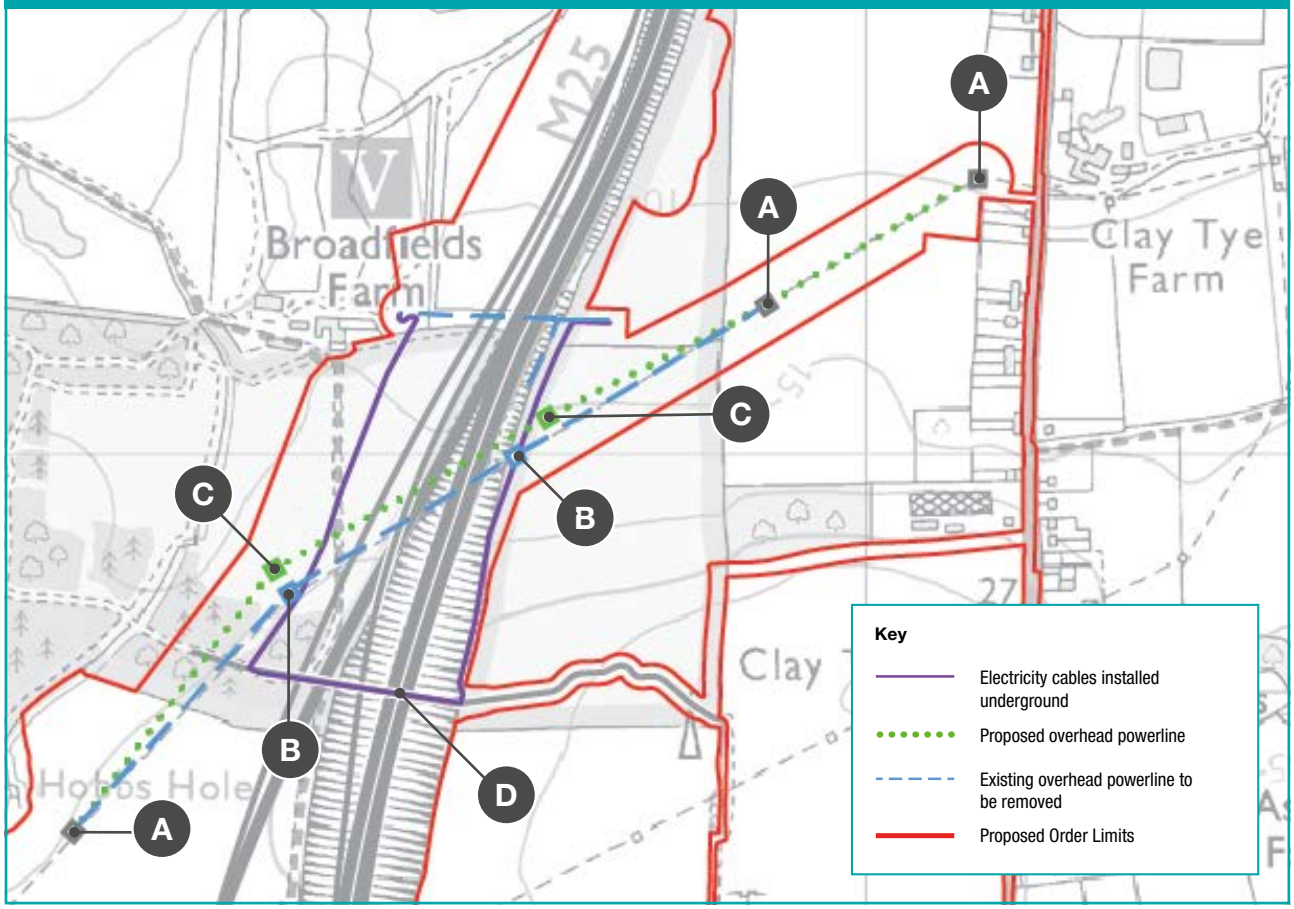
Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
23	To the west of Clay Tye Road and within Thames Chase Community Forest, Upminster.	Following site investigations by the utility company (UK Power Networks) and feedback from landowners, we have refined our proposal to divert electricity cables in this location, as proposed at the supplementary consultation (see Figure 4-46). Overhead powerlines would now be diverted along two new taller pylons north of their current position either side of the M25. We would also divert another electricity cable through the proposed Thames Chase footbridge, removing the need for trenchless installation of the cables under the M25, as previously proposed at the supplementary consultation (see Figure 4-46). This change would use more of the existing electricity infrastructure to deliver the proposal and removes the requirement for a substation to be built along Clay Tye Road. It also reduces the extent of works previously proposed to the east and west of the M25, resulting in some changes to the Order Limits in this location.	The new proposal reduces the amount of land and time required for construction of the utility diversion in the Thames Chase Community Forest and neighbouring farmland as cables would no longer need to be installed under the M25. While there would be an increased visual impact associated with the overhead powerlines from the plans presented at the community impacts consultation, our new proposal only results in a minor change to the existing overhead powerlines in this location. Our revised proposal would require the removal of some vegetation in Thames Chase Community Woodland, which would be replanted.

Figure 4-46: Overhead line changes and Clay Tye Road utility substation proposed at supplementary consultation



- **A** Existing pylon to be retained.
- **B** Existing pylon to be removed.
- **C** Existing pylon to be modified to a terminal pylon.
- **D** Proposed substation location.

Figure 4-47: Overhead line changes and removal of Clay Tye Road utility substation proposed at local refinement consultation



- **A** Existing pylon to be retained.
- **B** Existing pylon to be removed.
- **C** New pylon to be constructed.
- **D** Modified alignment of underground electric cable diversion within the footbridge..

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
24	South of the Shoeburyness railway line (between Upminster and Laindon), west of the B186 Warley Street.	As first proposed at supplementary consultation in March 2020, we would need to divert an existing electricity cable in this location. The diversion would still be required but we are proposing a refinement that would reduce its impact. The change we are now proposing, which has been discussed with UK Power Networks, involves moving the construction area 30 metres to the east. This proposal would result in a reduction in the Order Limits to the north of Tyes Stud Farm as the land is no longer needed. Permanent rights of access would be required from Warley Street for the operation and maintenance of the network by UK Power Networks. There would also be a minor increase in the Order Limits to the east of the cable diversion to accommodate the construction of these works.	This proposal means the works to divert this electricity cable can be moved further away from residential properties, reducing construction impacts for residents. Access for construction, operation and maintenance of the cable is now proposed to be from the east through neighbouring agricultural fields and past some residential properties. It is anticipated that any future access requirements would be infrequent. Traffic lights or similar are now proposed on the B186 (Warley Street) for two weeks to build the access.

4.2 Improvements for walkers, cyclists and horse riders

The Lower Thames Crossing would create almost 3km of new or improved pathways for every 1km of new road. This would encourage active travel and promote health and wellbeing across the region. New bridges and paths would connect to upgraded and extended routes to give the local community and visitors easier and safer ways of travelling between the area's parks and woodlands, heritage sites and employment centres. For more information please visit **https://nationalhighways.co.uk/our-work/lower-thames-crossing/walkers-cyclists-and-horse-riders/**

In this consultation, we are proposing some changes to our plans for walking, cycling and horse riding routes.

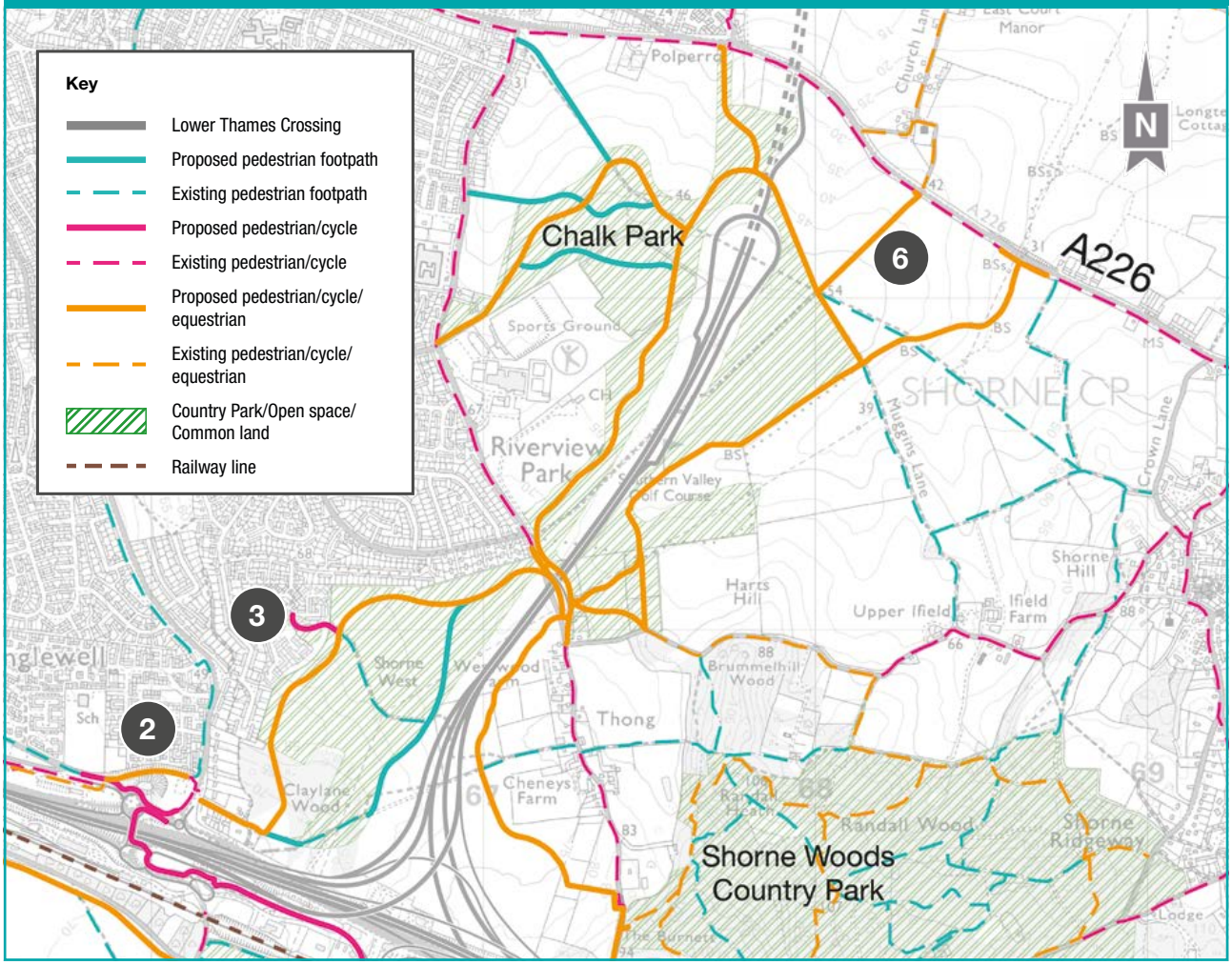
To the south of the river our proposals include:

- redesignation of Hever Court pedestrian-cycle track north of the A2/Lower Thames Crossing junction to a bridleway
- redesignation of footpath NS169 as a pedestrian-cycle route at Michael Gardens
- redesignation of footpath NG8, south of the A226 Gravesend Road

To the north of the river our proposals include:

- new footpaths to link the heritage assets of Coalhouse Fort and Bowaters Battery to East Tilbury
- the realignment of BR219 along the Mardyke river
- upgrading the walking, cycling and horse riding bridge over the A127, east of M25 junction 29
- a new walking, cycling and horse riding bridge over the A127 west of junction 29
- the eastern end of FP136 to be upgraded to a bridleway link to Mardyke Way. The proposed equestrian bridge over the Mardyke River would be a footbridge and the existing footbridge to the north would be replaced with an equestrian bridge.

Figure 4-48: Proposed, new, realigned and improved walking, cycling and horse riding routes between southern tunnel entrance and A2/M2 corridor



2 Redesignation of Hever Court pedestrian-cycle track north of A2/LTC junction to a bridleway.

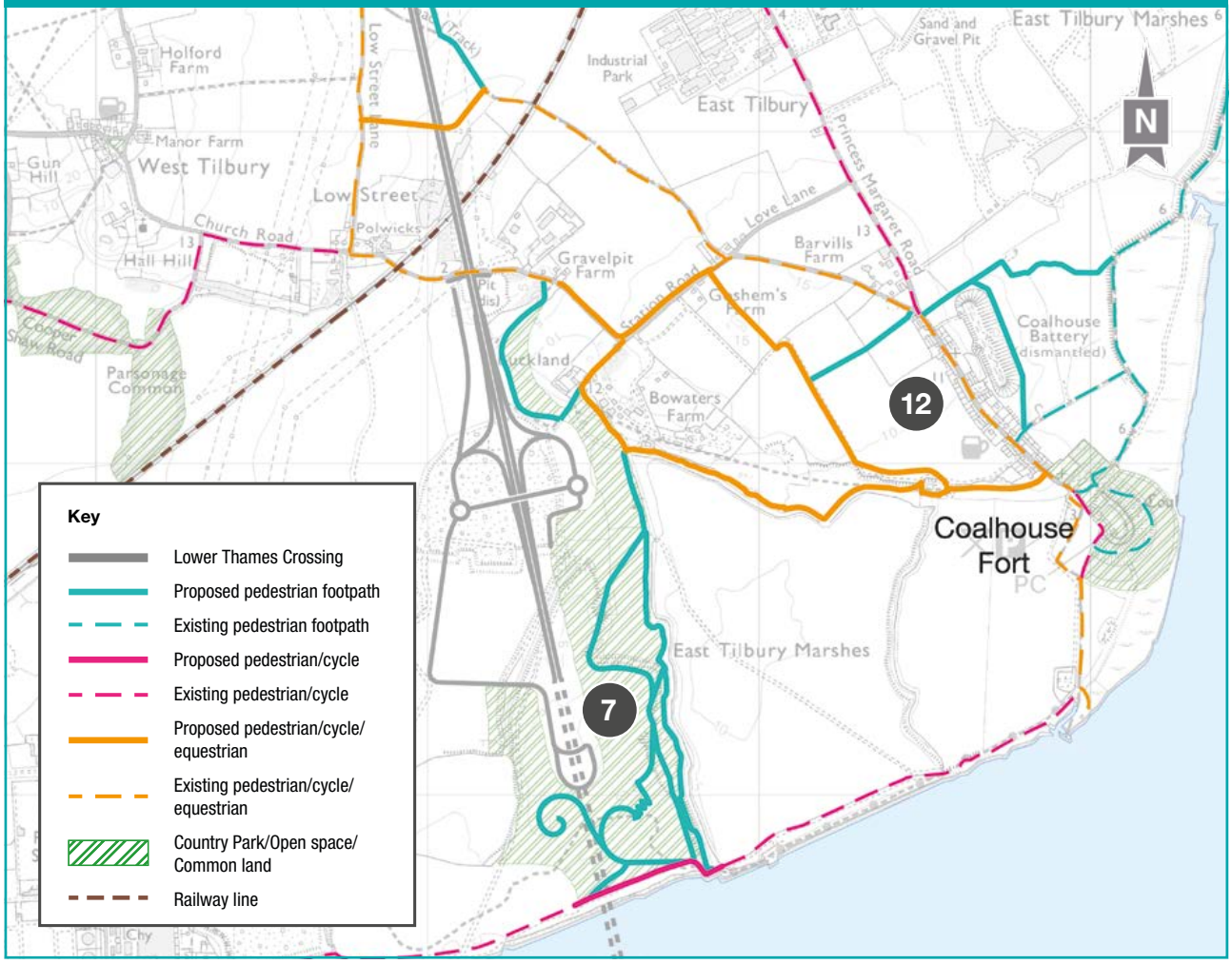
3 Redesignation of footpath NS169 as pedestrian-cycle track at Michael Gardens.

6 Redesignation of footpath NG8 as bridleway, between A226 Gravesend Road and footpath NG9.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
2	Hever Court Road, Gravesend.	Following discussions with the British Horse Society, we propose a redesignation of the Hever Court pedestrian-cycle track north of the A2/LTC junction to a bridleway. This would improve connections from the existing bridleway that runs alongside cycle route NCR177 to footpath NG17, which would be upgraded from a footpath to a bridleway. This improved connectivity would link existing bridleway provision and newly created routes to Chalk Park via the new green bridge at Thong Lane over the A2/M2.	Improved local connections for horse riders.
3	Michael Gardens (off Astra Drive), Gravesend.	Following discussions with the British Horse Society, footpath NS169 would be redesignated as a pedestrian-cycle track rather than the bridleway proposed at the community impacts consultation. This redesignation is as a result of public concerns about horses near the children's play area in Michael Gardens and the lack of stables in this location.	Reduced local connectivity for horse riders than in previous proposals for footpath NS169.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
6	A226 Gravesend Road, Gravesend.	Following discussions with the British Horse Society and its request for an equestrian route parallel to the A226 Gravesend Road, the footpath and verge along that road was considered unsuitable for horse riders due to the narrow verges. In response, we now propose that the northern section of footpath NG8 would be redesignated for walkers, cyclists and horse riders. This links up to Lower Higham Road via Church Lane and would cross the A226 Gravesend Road. This north-south link to Church Lane would improve access to the existing east-west route along Lower Higham Road.	There would be improved local connectivity for walkers, cyclists and horse riders towards Lower Higham Road and across the A226 Gravesend Road.

Figure 4-49: Proposed, new, realigned and improved walking, cycling and horse riding routes between northern tunnel entrance and Tilbury area

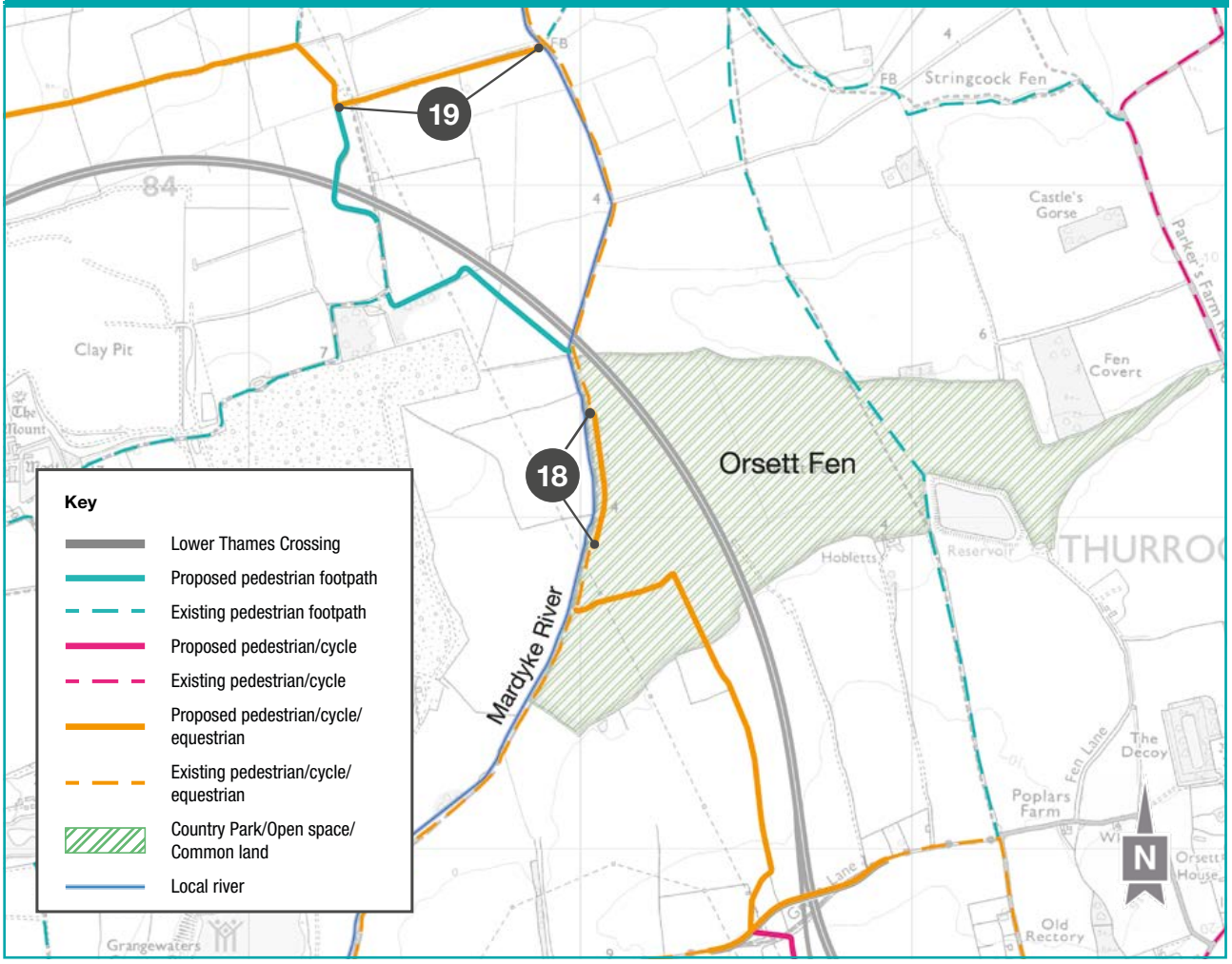


7 Redesign of Tilbury Fields to provide link from BR58 (Coal Road) to FP200 through this area.

12 New footpaths to link the heritage assets of Coalhouse Fort, Coalhouse Battery and Bowaters Battery to East Tilbury.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
12	Land north of, and next to, Coalhouse Fort, East Tilbury and Bowaters Battery.	Following the feedback received at the community impacts consultation, we are proposing to include new Public Rights of Way and permissive path links to the heritage sites of Coalhouse Fort and Bowaters Battery, and to East Tilbury. These new connections would create a variety of alternative routes that walkers, cyclists and horse riders on the coastal path could use to access Bowaters Battery and Coalhouse Fort. This would provide recreational and heritage benefits for the area. As part of the Tilbury Fields redesign proposals in this area (detailed on page 45), we have also identified an opportunity to provide a link from BR58 (Coal Road) to FP200 through this area. This would be designated as a bridleway. New footpaths within Tilbury Fields would ensure the park can be accessed via the Two Forts Way in the south and in the north by FP200. Alongside other footpath improvements in the Tilbury area, there would be enhanced recreational walks and loops connecting Tilbury Fields to the wider landscape with better access to the riverfront.	This change would provide improved connections for recreational and heritage visitors in this area.

Figure 4-50: Proposed new realigned and improved walking, cycling and horse riding routes between Mardyke Valley and Orsett Fen



18 Bridleway BR219 realignment along Mardyke river.

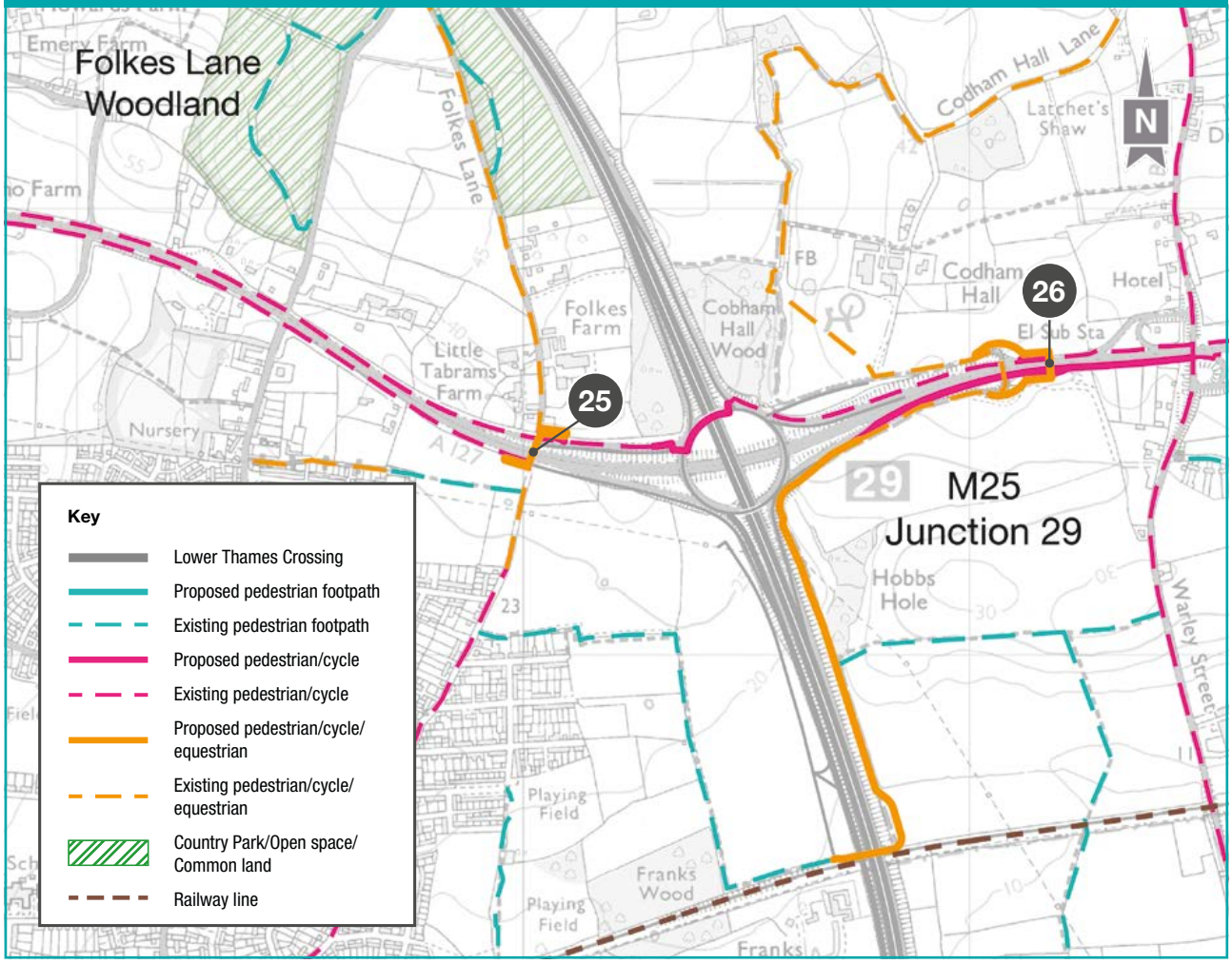
19 Eastern end of FP136 to be upgraded to bridleway to form connection between Mardyke Way and FP135, replacement of pedestrian bridge over Mardyke with equestrian bridge.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
18	Mardyke River, western edge of Orsett Fen.	At the community impacts consultation, we set out our mitigation proposals for an area of water vole habitat in the Mardyke Valley. Since then, we have been discussing the layout of the habitat with Natural England and we have put in place a minor refinement to its design. The bridleway is proposed to move three metres east of its current route and would cross a new area of water vole habitat via bridges to the east of the Mardyke River.	This refinement has resulted in a need to change the alignment of a short section of the existing bridleway BR219, running along the eastern bank of the Mardyke River.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
19	To the west of the Mardyke River.	At the community impacts consultation, we set out our proposals to partially upgrade footpath FP136 to a bridleway which was to cross the new road via a new bridge and connect to bridleway BR219 just south of the new road viaduct on the eastern side of the Mardyke River. Following feedback from interested parties, we have amended the proposal in this area to provide a realigned bridleway link to the existing Mardyke Way bridleway BR219. Footpath FP136 would be upgraded to a bridleway to the west of the Mardyke between the river and the northern end of the bridge over the LTC. Features such as a gate and/or a stile would be installed to reduce and mitigate the likelihood of unauthorised vehicles accessing the route.	By upgrading the existing footpath FP136 to a bridleway north of LTC, this would improve the user experience as the route of the bridleway would be located further away from the new road and follow a more scenic route. continued...

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
19	To the west of the Mardyke River.	The proposed link between FP136 and BR219 south of the LTC would remain as a footpath instead of the previously proposed bridleway. There would also be utilities and maintenance access along the length of the new route with restricted maintenance access for utilities and the viaduct. Consequently, the previously proposed equestrian bridge that would cross the Mardyke River to the south of the new road would be amended to a footbridge, while the existing footbridge to the north would be replaced with an equestrian bridge.	

Figure 4-51: Proposed new realigned and improved walking, cycling and horse riding routes between A13 and around M25 junction 29



25 New walking, cycling and horse riding bridge over the A127, west of M25 junction 29.

26 Upgrade of walking, cycling and horse riding bridge over the A127, east of M25 junction 29.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
25	A127 crossing, west of the M25, junction 29.	At our community impacts consultation, we proposed a walking-cycling bridge to the west of M25 junction 29. Following feedback from the London Borough of Havering and local cyclists' groups, we are now proposing a new bridge for walkers, cyclists and horse riders linking Moor Lane in the south to Folkes Lane in the north. At present, pedestrians walking on the footways alongside the A127 and passing underneath the M25 can use crossing points over the slip roads connecting the A127 to the M25. The changes to the road network associated with the LTC would take away these crossing points, removing the connection across the M25 along the southern side of the A127, rerouting pedestrians across the northern side of the M25 junction 29 roundabout. The newly proposed bridge improves the connectivity, by providing a crossing of the A127 to the west of the M25, allowing rerouted pedestrians to return to the southern side of the A127 more safely.	A new bridge would allow walkers, cyclists and horse riders to cross between north and south footways to both sides of the M25, ensuring east-west connectivity. This would address some of the historical severance caused by the A127. Construction of the bridge across the A127 to the west of junction 29 would have a minor impact on an area of Franks Wood and Cranham Brickfields Site of Nature Conservation, south of the A127. This area of woodland is protected by a Tree Preservation Order and some of the trees covered by this would need to be removed to allow the footbridge to be installed. Replacement planting would be provided for any trees or vegetation lost as part of construction of the footbridge and this would be secured through the updated Environmental Masterplan and Outline Landscape and Ecology Management Plan. There would also be utility diversions associated with bridge construction.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
25	A127 crossing, west of the M25, junction 29.	This additional bridge would also provide quicker and safer access from Cranham in the south to Hole Farm, an area of compensatory woodland planting that would form a new community woodland being developed in partnership with Forestry England. A local extension to the Order Limits would be required to enable the construction of ramps leading up to the new bridge and to complete localised utility diversions.	During construction of the new bridge, there would be a temporary closure of the footway that runs along the north side of the A127 eastbound off-slip. Pedestrian access would be maintained via a temporary local diversion along an area of land immediately next to the existing path, which would be in place for approximately three months. The section of footway that connects Moor Lane to the south side of the A127 westbound on-slip would also be temporarily closed for approximately three months so the new bridge could be built. Potential diversions in this area would be discussed with relevant stakeholders.

Map reference	Location of the change	Lower Thames Crossing proposals	Impact of the change
26	Proposed A127 walking cycling and horse riding crossing east of M25 junction 29, Great Warley.	In response to stakeholder feedback from the British Horse Society and Essex County Council, the proposed pedestrian-cycle bridge over the A127 east of M25 junction 29 (added to the proposals following the design refinement consultation), has been updated since the community impacts consultation. It would now also accommodate horse riders and includes a link to bridleway BR183. This means horse riders would no longer be dependent on the existing bridge across the A127 that is currently shared with vehicles (including HGVs). The new bridge would link into the existing BR183 bridleway via a series of ramps, and would still be accessible for pedestrians and cyclists. A modification is now proposed to make the new bridge accessible to horse riders through the addition of equestrian parapets (barriers at a correct height for horse riders to ensure the safety of riders, horses and drivers on the road below).	As a result of this change, there would be improved local connections and a safer crossing of the A127 for horse riders. This proposal would mean that horse riders would no longer need to share the existing bridge across the A127 with vehicles. This would therefore be safer for horse riders crossing the A127.

Figure 4-52: Existing view over the A127 to the west of J29

Figure 4-53: Proposed view of new bridge over the A127 to the west of J29

4.3 Special category land

At the community impacts consultation, we presented information on special category land that would be directly affected by the Lower Thames Crossing and its construction.

Where we refer to special category land, we are using the definition from the Acquisition of Land Act 1981.

- 'Common' includes any land subject to be enclosed under the Inclosure Acts 1845 to 1882, and any town or village green.
- 'Fuel or field garden allotment' means any allotment set out as fuel allotment, or a field garden allotment, under an Inclosure Act.
- 'Open space' means any land laid out as a public garden, or used for the purposes of public recreation, or a disused burial ground.

Replacement land is defined for the purposes of Section 131 as 'Land which is not less in area than the Order land and which is no less advantageous to the persons, if any, entitled to rights of common or other rights, and to the public.'

Since our last consultation, we have updated our proposals at Tilbury Green, Walton and Parsonage Common and Thames Chase Community Forest.

The route section map figures throughout chapter 4 show special category land, but in addition, only the replacement special category land that has changed since the previous consultation is shown.

In the table below we describe the special category land and changes to the impact that the new road would have. We also outline proposals for how and where we would replace areas of special category land that the project would impact. The land would be subject to compulsory purchase, either permanent acquisition or the acquisition of rights over the land, or would be subject to temporary possession to construct the new road.

Map showing section of the route	Location of the change	Lower Thames Crossing proposals	Impact of the change
Tilbury area	Tilbury Green. This area of land is registered common land and allows for public access. It includes FP200 and links into other footpaths within the surrounding area.	Our proposals close to Tilbury Green have changed to accommodate emerging plans for Thames Freeport, located immediately west of the project on the north bank of the River Thames. The area of Tilbury Green within the Order Limits has not changed but the area that is proposed to be acquired permanently has increased from approximately 7,400 square metres to approximately 12,500 square metres. Areas of the diverted footpath would be designated as common land so they benefit from the same rights as the affected parts of FP200. The replacement land comprises approximately 12,800 square metres compared with approximately 12,500 square metres that is proposed to be acquired. The replacement land would be no less advantageous for the public.	We propose to permanently acquire sections of FP200 for the new road and landscaping. We also need to take temporary possession of a small area of FP200 for environmental mitigation. Permanent rights would be acquired over this area to support and manage the reinstated habitats. We are proposing an alternative route for FP200 that links the new open space at Tilbury Fields to the network of footpaths in the area, providing improved access to the riverfront. The footpath would be upgraded to a bridleway so it can be used by horse riders as well as pedestrians. For more information about the change, refer to the Tilbury area section of this chapter.

Map showing section of the route	Location of the change	Lower Thames Crossing proposals	Impact of the change
Tilbury area	Walton Common and Parsonage Common. The land is registered as common land and provides scrub and grassland, which is valuable for wildlife and drainage.	Construction of the Thurrock Flexible Generation Plant (TFGP) NSIP, separate to the LTC , would result in the permanent loss of approximately 10.1ha of Walton Common. A Section 16 (Commons Act 2006) application has been submitted in connection with TFGP to de-register the area of Walton Common affected by the TFGP proposal. If successful, the existing site would no longer be common land and an area of approximately 11.6ha immediately to the north would instead be designated as common land. We propose to reduce the Order Limits around Fort Road and the Port of Tilbury entrance to avoid impacts on Walton Common. For more information, refer to the 'Coopers Shaw Road water connection refinement' change within the Tilbury area section of this chapter. The area of Walton Common and Parsonage Common within the Order Limits has been reduced from approximately 25,750 square metres to approximately 10,100 square metres. No replacement land is proposed because any impacts on Walton Common would be temporary. Land would be reinstated to its original use following completion of the works. Its existing use would therefore not be affected.	We need to take temporary possession of a small section of Walton Common for utility works for the northern tunnel entrance. Permanent rights would be acquired over this area for maintenance. We would also need to take temporary possession of an area of Walton Common to support construction of the project. A Section 38 (Commons Act 2006) application would be submitted to allow construction works on the common land where only temporary possession is sought. Should TFGP's Section 16 (Commons Act 2006) application be approved, this area of Walton Common would be de-registered before our works begin, and therefore no longer comprise common land.

Map showing section of the route	Location of the change	Lower Thames Crossing proposals	Impact of the change
M25/J29	Thames Chase Community Forest. This site consists of open fields, walking tracks and a mix of vegetation including memorial trees. It is designated as open space.	We have further developed our utility diversion proposals to refine the land needed at this location. We would use more of the existing utilities infrastructure to deliver our proposals. The revised proposal now diverts overhead powerlines along two new taller pylons north of their current position either side of the M25. It would divert another electricity cable through the proposed Thames Chase footbridge, removing the trenchless installation of the cables under the M25 as previously proposed. For more information, refer to the 'Refinements to electricity works west of Clay Tye Road' change within the M25 junction 29 section of this chapter. The replacement land covers approximately 156,100 square metres. This is no less in area than the land proposed to be permanently acquired and the land that may be less advantageous once the necessary rights are acquired. The proposals for the replacement land are unchanged from our previous proposals. The replacement land would provide new woodland and biodiversity mitigation, and would include a mixture of grassland, scrub and trees. It would provide equal accessibility and would be no less advantageous for the public.	We propose to permanently acquire part of the site for the new road and earthworks. Permanent rights would also be required for the diversion of utilities.

Case study: Hole Farm

National Highways own agricultural land north of the M25 junction 29 known as Hole Farm. We are proposing to create the largest community woodland in the East of England and convert the farm into a woodland-dominated mosaic of wildlife-rich habitats. This would be done through a combination of natural regeneration and planting.

The site will be managed by Forestry England on behalf of National Highways. Forestry England is supporting the Government's target of planting 30,000ha of new woodland every year by 2025 to help deliver ambitious plans to become net-carbon zero by 2050.

As part of the Lower Thames Crossing, approximately 2.92ha of Hole Farm has already been proposed as replacement land for part of the existing Folkes Lane Woodland replacement land and this plan remains unchanged.

Since the community impacts consultation, the Lower Thames Crossing Order Limits have been extended to include most of Hole Farm, excluding the buildings. Up to 75ha of the site have been identified to provide compensation for the potential impacts of nitrogen deposition on designated ecological sites as a result of vehicles using the Lower Thames Crossing (refer to chapter 5 for more information).

The site is considered appropriate for nitrogen deposition compensation because it would link with existing woodlands that form part of the habitat network in this area.

The compensatory planting would form part of, and integrate with, the masterplan for the entire site that is being developed in partnership with Forestry England and the wider Thames Chase Community Forest partners. The masterplan would also include proposals for the facilities associated with a community woodland, such as a tree nursery and a visitors' centre.

Community engagement to inform the development of the masterplan for the site is ongoing and a public consultation on the proposals will be carried out ahead of an application being submitted to Brentwood Borough Council to change the use of the site and create the visitor facilities. It is proposed that the facilities, which do not form part of the proposed compensatory planting, would be consented separately from the Lower Thames Crossing DCO application. The final amount of land within Hole Farm allocated to nitrogen deposition compensatory planting would align with the overall aspirations, and masterplan, for the whole site.

4.4 Private recreational facilities

In addition to impacting special category land, the new road would also affect a number of private recreational facilities, such as sports clubs and fishing lakes.

We propose to either acquire all or part of these sites (or rights over these sites), or use the areas temporarily to build the new road, or the sites may be affected by the project's construction activities and are located outside of the Order Limits.

We have reported how our proposals affect private recreational facilities at previous consultations. At the community impacts consultation, we provided an update on our plans at three sites where our design had changed. Since then, only our proposals at Linford Allotments have been refined for this consultation.

Our updated plan for this site is described in the table below.

Section of the route	Land description	Description of the impact on the land
A13/A1089 junction	**Linford Allotments** This is located off Lower Crescent in Linford.	Linford Allotments is located within the Order Limits, and we propose to take temporary possession of the site for the construction of utility works. Since the community impacts consultation, our utilities design has changed slightly in this location. We are proposing to divert both existing overhead electricity powerlines onto a temporary alignment over the allotments, and then back to the existing alignment permanently after the works are complete. Please see the Muckingford Road electricity works change in chapter 4 for further information. This would result in a temporary impact on the use of the allotments during construction, including restriction on the use of the site during the works. These works would be similar in nature to those undertaken for the routine operation and maintenance of the existing utilities assets in this location. This would not prevent the existing use of the allotments following the completion of works.

Since the community impacts consultation, we have continued to engage with landowners near the project. Although there are no new material impacts on these sites, the facilities below have been highlighted through ongoing engagement and project development, so we are taking the opportunity to provide information in relation to them.

Section of the route	Land description	Description of the impact on the land
Tilbury area	**Condovers Scout Activity Centre** This is located between East and West Tilbury. It provides holiday facilities, as well as space for camping.	A small section (approximately 150 square metres) of the site in the south-west corner is needed temporarily during construction for water utility connection works. The working area for the utility works is largely located outside of the site and would not affect its existing operation. The works will not impact the use of the activity centre.
A13/A1089 junction	**East Tilbury and Linford (ETL) Gun Club** This is a private clay pigeon shooting club located in Linford. The site is also used by an air rifle club, East Tilbury and Linford Field Target Club.	Part of the site is needed to install a new overhead electricity power line. This would involve vegetation clearance in the north-east of the site, and restrictions during construction. Permanent rights would be required in this area for the operation and maintenance of the power line. We are engaging with the occupants to support their continued operation during the construction and operation of the LTC .
A13/A1089 junction	**Foxhound Riding School** This is located to the north of the A13, east of Baker Street. It provides equestrian facilities including an indoor school and jumping field.	We propose to acquire a small part of the site currently used by Foxhound Riding School alongside the A13. The site is accessed from Baker Street, which we propose to use to access the main and utilities working areas during construction. The site may experience temporary impacts during construction, such as noise disturbance, because of its proximity to the project. We are working with Foxhound Riding School to support their continued operation during this period.

Section of the route	Land description	Description of the impact on the land
Mardyke Valley/North Road	**Moat Lake (end of Church Lane) Fishing Lake** This is a privately owned fishing lake let out to fishing clubs.	This lake is not within our Order Limits, however the project is proposing to improve the access used for this lake. While there will not be any direct impact on the operation of the lake, we are also proposing to move the M25 compound to the south of the fishing lake. We are currently in ongoing discussions with the landowner.
Mardyke Valley / North Road	**Wild Thyme Outdoors, Wilderness** This is a privately owned woodland that is used to provide outdoor foraging and education services, with activities primarily for children.	The project would impact on the operation of the existing recreational facilities at The Wilderness, as the new road would be constructed in a section of the site preventing operations. We are currently in ongoing discussions with the landowner and the operator to explore solutions for addressing this impact.
M25/J29	**InFitness Gym, Franks Farm** This is a privately owned gym that operates within Franks Farm.	This site is located outside of the Order Limits, however the access from the south is inside the Order Limits for the purposes of utilities diversion works. Access to the gym would be maintained at all times. It is not expected that the operation of the gym would be affected, although the outdoor area to the north may have access restricted during the construction period. We are currently in ongoing discussions with the landowner and operator. Please see the refinement to electricity diversion north of St Mary's Lane change in chapter 4 of this guide for further information.

Section of the route	Land description	Description of the impact on the land
M25/J29	**Manor Farm Reservoir Fishing Lake** This is a privately owned fishing lake let out to fishing clubs.	We propose to permanently install bat boxes on the existing lakeside trees around the lake. This would require permanent rights for the monitoring and maintenance of this mitigation. We do not expect these works to affect the use of the fishing lake or cause disruption to its users. We are currently in ongoing discussions with the landowner.
M25/J29	**Hobb's Hole Fishing Lake** This is a privately owned fishing lake let out to fishing clubs.	Excluding the access this site is located outside of the Order Limits. However, it would be surrounded by the proposed replacement land for the Thames Chase Community Forest. The site could continue to be used for the purposes of fishing although the access arrangements may change. We are currently in ongoing discussions with the landowner to explore solutions for addressing this impact.

Have your say

You can provide your feedback about this chapter by answering questions 1, 2 and 4 in the response form for this local refinement consultation.

5

Assessment of the impacts of nitrogen deposition and proposals for mitigation and compensation

Introduction

This chapter explains the impacts on the environment of nitrogen emissions from traffic flows that would change as a result of building and operating the Lower Thames Crossing. As well as explaining our assessments, we set out our proposals for mitigating and compensating for the predicted impacts. In this instance, mitigation means measures that would reduce the amount of nitrogen emitted, while compensation refers to proposals to offset the emissions by planting new habitats and enhancing existing ones.

As well as addressing congestion at the Dartford Crossing and its approach roads, the Lower Thames Crossing's objectives include minimising adverse impacts on health and the environment. The new route has been designed to be the greenest road ever built in the UK. It features the country's longest road tunnel, which would protect the River Thames and nearby wetlands, and seven green bridges to maintain habitat connectivity.

Once open, the new road would form an essential part of the UK's transport network. Ambitions laid out in the Government's Transport Decarbonisation Plan will see the sale of new petrol and diesel cars phased out by 2030, with the same expected for heavy goods vehicles from 2035 or 2040, dependent on vehicle class. The future of road travel is a zero carbon one, powered by zero carbon energy sources, hydrogen and biofuels. As more and more petrol and diesel vehicles are replaced by electric ones, we expect to see the environmental impacts of vehicle emissions go down over time.

Have your say

You can provide your feedback about this chapter by answering question 3 in the response form for this local refinement consultation.

Why are we consulting on additional proposals?

Throughout the design and development of the Lower Thames Crossing, we have carried out assessments to understand its impact on the environment. These have included looking at the predicted changes in traffic flows when the new road opens, which has helped us understand the potential impacts of vehicle emissions on the environment.

It is important to assess nitrogen emitted from vehicle exhausts because after it enters the atmosphere, it falls on habitats (a process known as 'nitrogen deposition') and can affect the way plants grow. For example, the nitrogen can act as a fertiliser, which can be either good or bad for the plants depending on the extent of deposition. As such, it is important to understand the impact of nitrogen deposition and take steps to reduce the impacts where they are likely to be significant.

Our assessments of vehicle emissions have always been in line with the existing guidance for major road projects. Since our last consultation, we have revised our assessment methodology in light of the latest scientific opinion and after discussions with Natural England. Our assessment of the impact of vehicle emissions now includes consideration of the impact of ammonia emitted from exhausts, as well as considering the nitrogen oxides (NOx). Many petrol and diesel vehicles now use catalytic converters to reduce the emissions of some pollutants, such as NOx, but these catalytic converters emit ammonia as a by-product which, along with NOx, can also contribute to nitrogen deposition. Our revised methodology accounts for this and provides a robust assessment of nitrogen deposition and its potential impacts on designated habitats.

Government data shows that nitrogen levels from road transport and other sources have fallen by 79% since 1990. While it is not part of our assessments, as our assessments are precautionary, it is predicted that this downward trend will continue and accelerate as a result of the Government's ongoing decarbonisation policies. This will result in many plants and habitats near roads improving over time as they are impacted less by nitrogen deposition from vehicles.

However, our latest assessments, which include ammonia emissions, show that changes to vehicle emissions when the Lower Thames Crossing is open may slow down the rate at which nitrogen levels reduce in some locations near the new road. The assessed locations are designated sites (habitats of ecological importance) within 200 metres of the affected roads. As a result of the new road opening, the nitrogen deposition reduction at those sites would not go down as quickly as it would if the Lower Thames Crossing were not built, potentially resulting in the quality of those habitats not recovering as quickly as they would otherwise.

We have already carried out surveys of many of the designated sites to understand how vulnerable the habitats may be to changes in nitrogen deposition. As it is necessary to carry out some surveys at a particular time of year, these are ongoing.

We have undertaken preliminary nitrogen deposition assessments for these areas based on the available traffic modelling. As the seasonal surveys continue, we will refine our assessments and finalise our proposals for mitigation and compensation, and these will be included in our DCO application. By taking this approach, we can ensure our mitigation and compensation proposals are sufficient to address any nitrogen deposition effects from the implementation of the Lower Thames Crossing.

Which designated sites are likely to be significantly affected?

Our assessment identifies which designated sites are likely to be significantly affected by nitrogen deposition on the basis of the precautionary approach we have taken to the future of vehicle decarbonisation. The assessment of significance includes considering the amount of nitrogen deposited, the importance of the site, the current condition of the site, the sensitivity of the site's plants to nitrogen, the duration of the predicted nitrogen impacts, and the proportion of the site affected. More information about our assessments can be found in the appendix.

The construction of the Lower Thames Crossing would have no significant impact on nitrogen deposition.

When the new road is open, our precautionary assessments have found that there would be a risk of significant nitrogen deposition effects at approximately 60 of the 136 designated sites being assessed. None of the 60 are internationally important designated sites, such as the Thames Estuary and Marshes Ramsar and Special Protection Area.

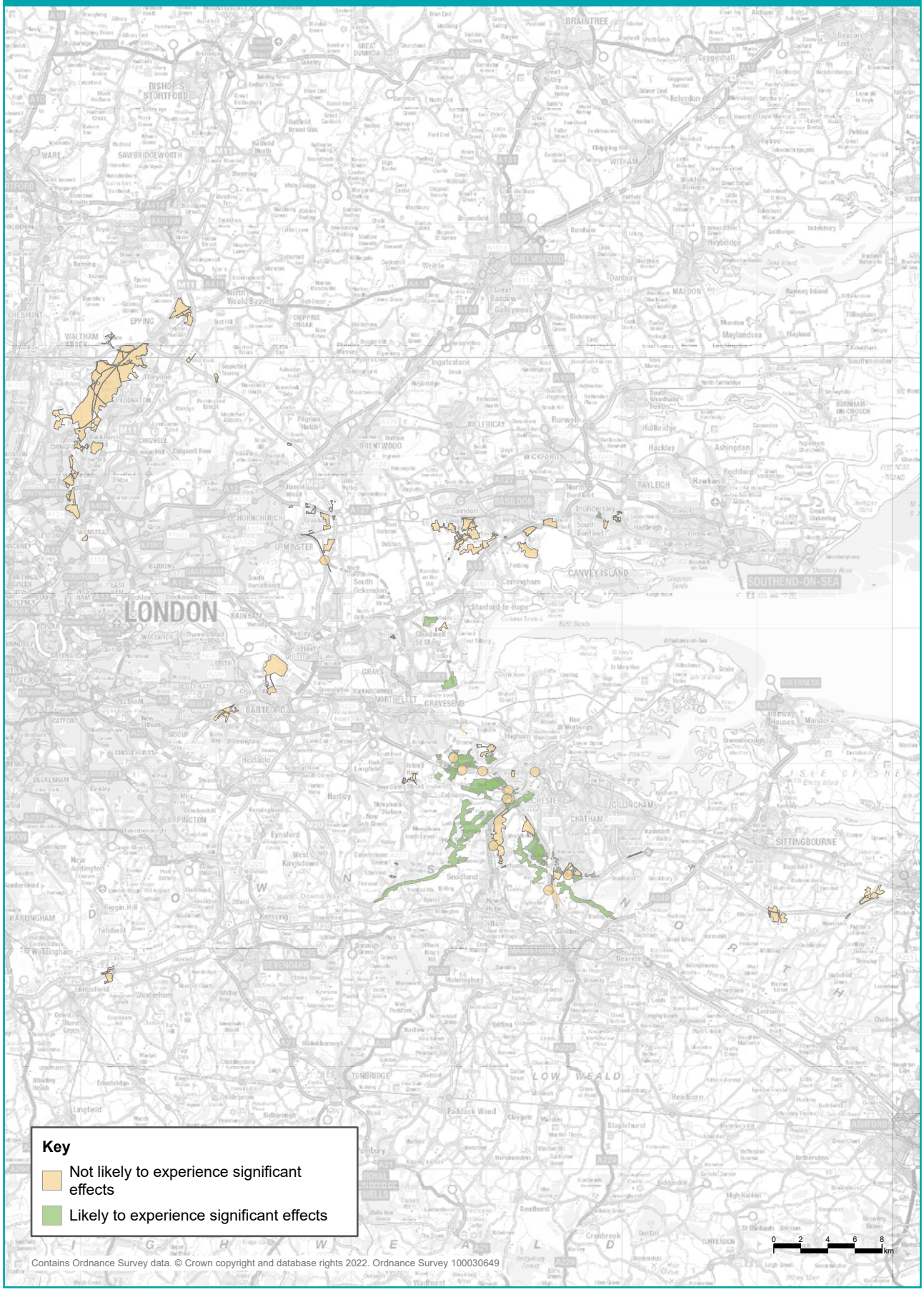
The combined area of the significantly affected designated sites is approximately 250ha. However, there is a possibility that the size of this area may change once additional surveys and further detailed assessments have been carried out.

Figure 5.1 shows the designated sites likely to be affected, based on our current assessments, with most of them south of the River Thames clustered in two locations:

- Along the A2 and M2 between the proposed A2/M2 junction with the Lower Thames Crossing and M2 junction 2
- Around M2 junction 3 and the A229 at Blue Bell Hill

The designated sites north of the River Thames that are most likely to experience significant effects, are more scattered but we have identified two clusters where most of the significant effects are likely to occur. These are mainly adjacent to the proposed route of the Lower Thames Crossing and consist of a Site of Special Scientific Interest, five ancient woodlands, five local wildlife sites, and a veteran tree. (Veteran trees are those that have a high ecological value, such as providing habitats for insects and fungus.)

Figure 5-1: Locations of designated sites likely and unlikely to experience significant effects



What mitigation and compensation measures are proposed?

The mitigation and compensation measures explained below are designed to reduce or compensate for any significant effects of nitrogen deposition once the new road is open.

Where the risk of significant impacts from nitrogen deposition has been identified, we have investigated mitigation measures that would reduce these effects. Where we have not identified any appropriate mitigation measures to reduce the impacts on nearby habitats, we are proposing compensation measures by creating new habitats and enhancing existing ones.

National Highways' standards states that the following mitigation measures should be considered where there are predicted to be significant effects on designated sites:

1. Reducing vehicle speeds to mitigate air quality effects. This can involve enforcement of an existing 70mph speed limit or reduction of an existing 70mph limit to 60mph.
2. Installation of vertical barriers at least 9 metres high.

Our investigations have concluded that there are no sections of motorway where reducing the speed limit is the best solution to managing nitrogen deposition as a result of the new road opening. Furthermore, installing nine-metre-high barriers between the road and the affected designated sites would have too many negative impacts for this to be appropriate mitigation. The appendix includes more information about why these measures are deemed unsuitable.

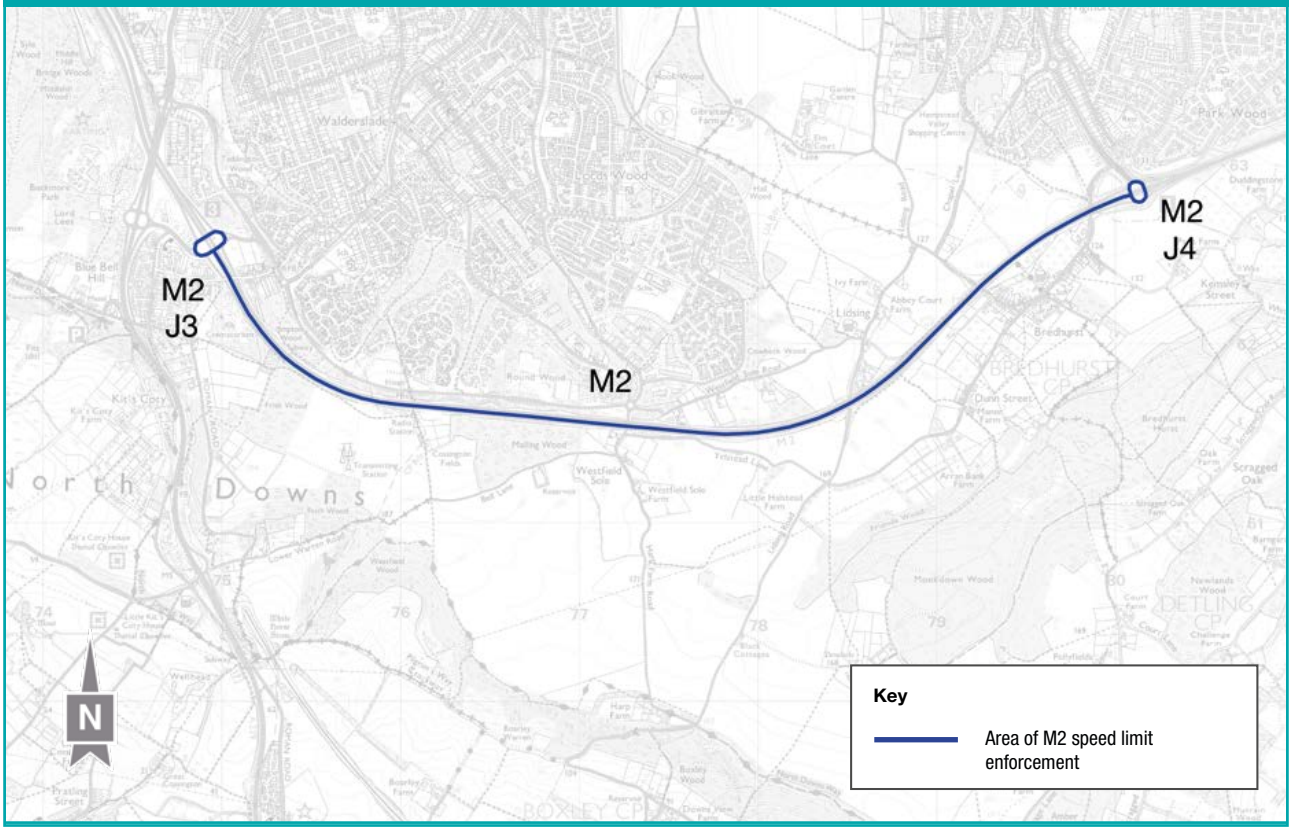
Speed enforcement

Traffic data shows that the speed limit is exceeded by some motorists on some sections of the road network. Driving at faster speeds increases nitrogen emissions, so by enforcing the speed limit on certain sections of road, average vehicle speeds can be brought down, reducing nitrogen deposition on nearby designated sites.

Following our assessment of nitrogen deposition, we have been considering whether installing speed cameras on the M2 between junctions 3 and 4 (see Figure 5.2) once the Lower Thames Crossing is open would be effective in encouraging road users to drive at the legal speed limit, on top of existing enforcement measures. This would provide additional encouragement for motorists to obey speed limits, on top of existing speed enforcement measures. This location has been chosen because our traffic modelling shows that some motorists are likely to exceed the speed limit here when the Lower Thames Crossing is open. There would be no change to the speed limit, which would help maintain traffic flows and journey times.

We are reviewing whether additional speed enforcement measures at this location would be feasible, taking into account all relevant considerations (e.g. cost, technical feasibility).

Figure 5-2: Location of proposed additional speed enforcement measures on the M2 between junctions 3 and 4



Epping Forest Special Area of Conservation

Our assessment has concluded that there would be no significant effects on Epping Forest Special Area of Conservation because nitrogen deposition at this designated site would be very small. However, we understand that Natural England or other parties may disagree and consider mitigation to be necessary. For this reason, we have investigated mitigation measures that would reduce nitrogen deposition effects on Epping Forest. We have investigated reducing the speed limit from 70mph to 60mph on the M25 westbound between junctions 27 and 26 for four years from the Lower Thames Crossing opening. Our assessment shows that this would have the effect of reducing nitrogen deposition, but we do not consider this measure necessary and are not proposing it.

Proposed compensation land

Where there are no appropriate mitigation measures, then we have identified how best to offset the impacts of nitrogen deposition by creating new compensatory habitats. Creating new habitats would offset the potential significant effects on the designated sites affected by nitrogen deposition. While the primary purpose of the land would be as compensation for nitrogen deposition, the land could also provide additional benefits such as:

- Increasing public access to the countryside. If appropriate we would consider making these sites publicly accessible in a way that complements their primary function as compensatory habitats.
- Improving the appearance of the local landscape by planting new trees and other plants.
- Enhancing biodiversity by increasing the number of linked habitats.
- Planting new habitats that would absorb carbon dioxide from the atmosphere, reducing the carbon impacts of the project.

Our current proposal is that our DCO application should contain the powers to create approximately 250ha of new wildlife-rich habitats. Where possible, these would be linked to existing habitats, improving biodiversity along new ‘green corridors’.

We consider this to be a comprehensive response to the risk of adverse effects on habitats from nitrogen deposition.

Once our full assessments are complete, as a potential additional compensation measure we are looking at whether it would be appropriate to establish a fund to provide financial and technical support for measures that would address any specific effects that are not adequately compensated through new planting. If, following additional assessment and engagement, this is considered appropriate, we would work with stakeholders and landowners to develop these plans. More information about the potential fund can be found in the appendix.

Compensation sites

We have worked with Natural England and the relevant local planning authorities to identify sites that would be suitable for our habitat creation proposals. Following this exercise, we have identified 279ha of land that are considered suitable for habitat creation. Following the conclusions of our on-going assessments and this consultation, we intend to refine our proposals to provide approximately 250ha of compensatory habitat. The land is located in four areas:

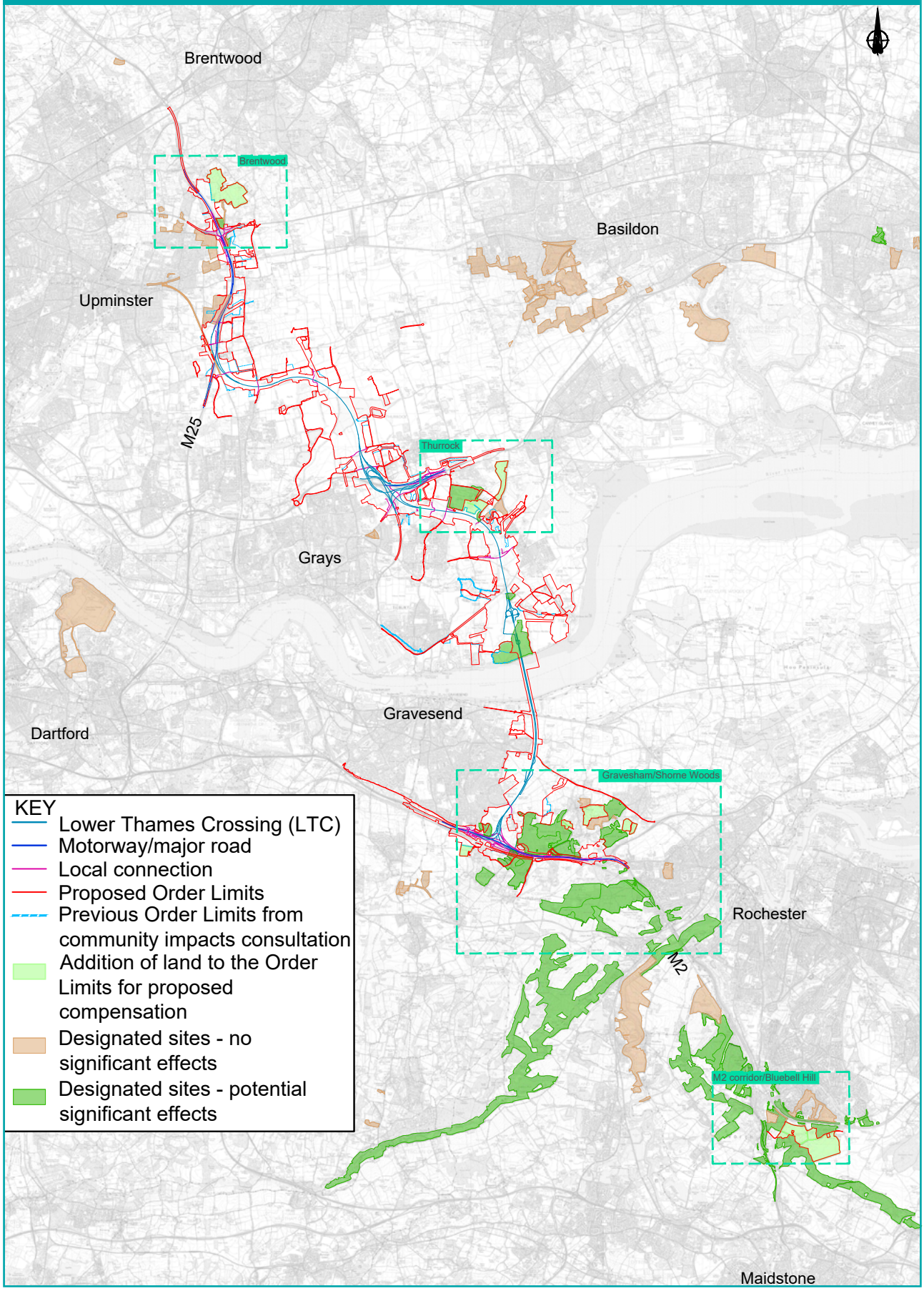
- M2 corridor and Blue Bell Hill
- Gravesham and Shorne Woods
- Southfields, Thurrock
- Hole Farm, Brentwood

The sites were identified using a detailed selection methodology, which is explained in the appendix. In these locations, significant new areas of wildlife-rich habitats would be created, along with smaller areas that connect habitats that have previously been fragmented. The conclusions of our ongoing work will allow us to refine our proposals further and the final proposals will be included in our DCO application.

Before starting the habitat creation works, we would erect security fencing around the perimeter of the compensation areas. The landscape planting would involve initial ground preparation works, including removal of vegetation where required and preparation of soils using tractors and excavators to get the appropriate soil conditions for the required planting. Planting would be carried out at the first available planting season. The season of planting would depend on the species selected and when we gain access to the land. In some cases, areas may be allowed to naturally regenerate so that local plants have the chance to establish from seed. An effort would be made to retain vegetation but where it is beneficial to remove it, clearance would be carried out during winter where possible, to avoid impacts on breeding birds. Where this is not practicable, clearance would be supervised by an Ecological Clerk of Works to ensure no nests are disturbed or destroyed.

The planting of the compensation sites would be developed to have beneficial environmental impacts against other environmental factors, such as landscape. Where it is possible that environmental impacts may occur as a result of the proposed change in land use, these would be minimised through sympathetic design and the application of the control measures set out in the Code of Construction Practice (CoCP) and the Outline Landscape and Ecology Management Plan. We do not expect there to be any impacts from the habitat creation works on noise levels or air quality. Draft versions of these documents were shared during the community impacts consultation, and these will be updated to reflect the new compensation sites and included in our DCO application. Our assessments of the impact of planting of the compensation sites will be included in the Environmental Statement, which will also form part of our DCO application.

Figure 5-3: Proposed areas for compensatory habitat creation



Compensation area M2 corridor/Blue Bell Hill

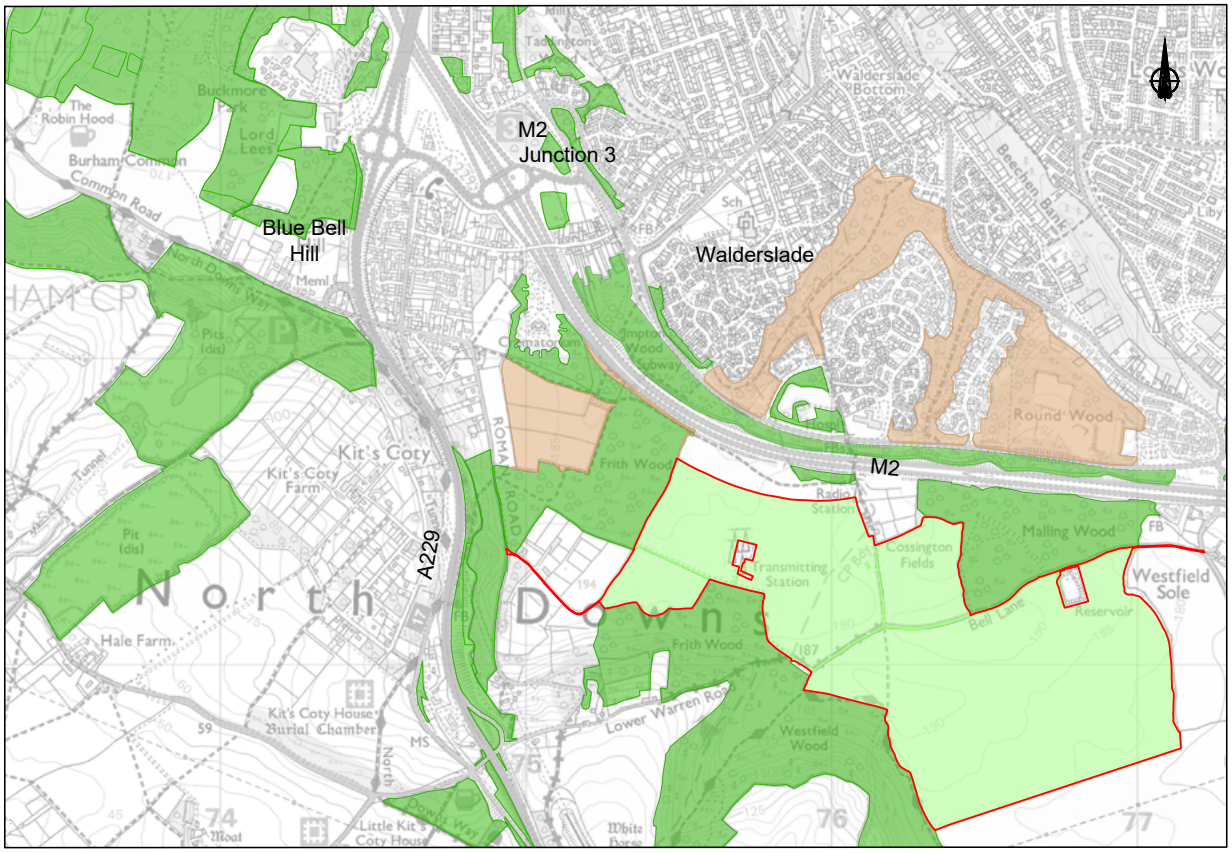
This is made up of four parcels of privately owned farmland totalling approximately 104ha and would form one large area for habitat creation. They have been identified due to their size and proximity to several affected designated habitats, as well as other designated sites that are not impacted by the Lower Thames Crossing. The number of these sites bordering this area, such as Frith and Westfield Woods, provides an opportunity to enhance ecological links, including to the North Downs Woodlands Special Area of Conservation. We would create mosaic habitats dominated by woodland but designed to enhance existing habitats.

The compensation area is located within Kent Downs Area of Outstanding Natural Beauty (AONB). This provides an opportunity to compensate for the effects of nitrogen deposition and provide wider ecological and biodiversity benefits for habitats and landscape along the M2/A2 corridor. It would also provide visual screening of an existing overhead powerline in the AONB.

Additionally, historic maps show that this currently farmed compensation area was wooded in the nineteenth century. This recent past means that, it would be more appropriate for woodland creation for both ecological and landscape reasons than other areas that have been cleared of woodland for longer.

Further work will also be carried out to identify potential opportunities for the compensation area to connect to the North Downs Way.

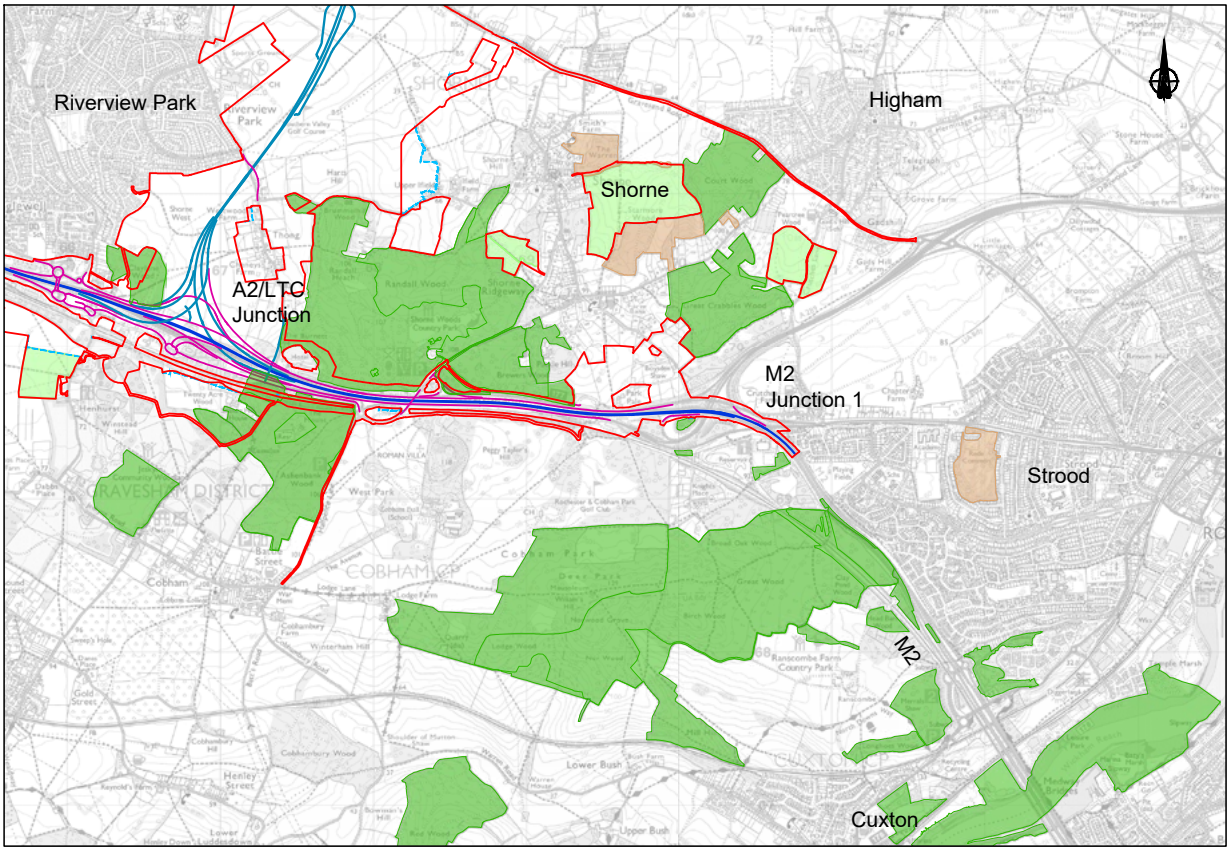
Figure 5-4: Proposed compensation land in the M2 corridor and Blue Bell Hill area



KEY

- Lower Thames Crossing (LTC)
- Motorway/major road
- Local connection
- Proposed Order Limits
- Previous Order Limits from community impacts consultation
- Addition of land to the Order Limits for proposed compensation
- Designated sites - no significant effects
- Designated sites - potential significant effects

Figure 5-5: Proposed compensation land located in Gravesham/Shorne Woods



Compensation area Gravesham/Shorne Woods

This compensatory area is made up of four parcels of privately owned land, as show in Figure 5-5. Together, they total approximately 55ha. They have been identified due to their location in relation to affected habitats and their suitability to improve connectivity between existing habitats.

Creating new habitats here would reconnect existing woodland across the Shorne Woods area that has been subject to severance and isolation in the past. The parcels are also next to, or form part of, a wider approach to mitigation and compensation, with other areas to be planted as mitigation, for instance, for loss of ancient woodland. The combination of these parcels of land and other mitigation would comprehensively enhance habitats in this area through natural regeneration and targeted planting.

The northern proposals, located to the north of the A2, include three parcels of agricultural land totalling approximately 46ha. These are next to Shorne and Ashenbank Woods SSSI, Great Crabbles Wood SSSI and ancient woodlands. The parcels of land would not create a single large area of new habitat but would link existing woodlands and habitats. They would be carefully designed, planted and managed to support and enhance the specific habitats within the adjacent woodlands.

The western site, which is currently farmed and located south of the A2, is close to Ashenbank Woods and totals approximately 9ha. This area has been identified due to its proximity to an impacted site and it is also next to woodland planting mitigation for the loss of ancient woodland. It would therefore provide ecological benefits, including improved links for existing habitats and the creation of a larger ecological area through mitigation and compensation. Its selection and planting would establish a mosaic of woodland in other habitats that enhances existing habitats and integrates with the landscape.

Compensation area Thurrock

Two parcels of land totalling approximately 45ha have been identified in Thurrock (see Figure 5-6) for compensatory planting. The eastern area of land shown on the map is publicly owned, whereas the area to the west is private farmland. Both are located to the south of the A13 in Southfields and are close to designated sites and existing woodland that are impacted by nitrogen deposition. Creating new wildlife-rich habitats would increase connectivity between existing habitats, which would be beneficial both ecologically and from a landscape perspective.

The privately owned site was identified as it is a farmed field next to an impacted habitat. We would use a combination of natural regeneration (where woodlands develop naturally from seeds that have fallen on the ground) and planting to create wooded areas next to existing ones that merge into more open habitats. To be sensitive to the valley landscape, these could include parkland featuring scattered trees in grasslands.

The eastern area is a brownfield site, formerly used for landfill, owned by Thurrock Council. It mostly consists of grassland with some sections of scrub. It was identified because:

- It would reduce the need to use further areas of farmland
- It would reduce the impact on other landowners and productive land
- It is in a good position for connecting habitats.

We would encourage the development of wildlife-rich habitats on this site by promoting natural regeneration, with targeted planting where necessary. Our proposals would need to carefully take into consideration any constraints from the site's former use as a landfill. Prior to any soil disturbance or vegetation removal, to prevent the potential disturbance of residual contamination appropriate risk assessments would be carried out. The Contractor undertaking the works would provide method statements for acceptance by National Highways and, if required, consultation with the Environment Agency before starting works.

Figure 5-6: Proposed compensation land located in Thurrock

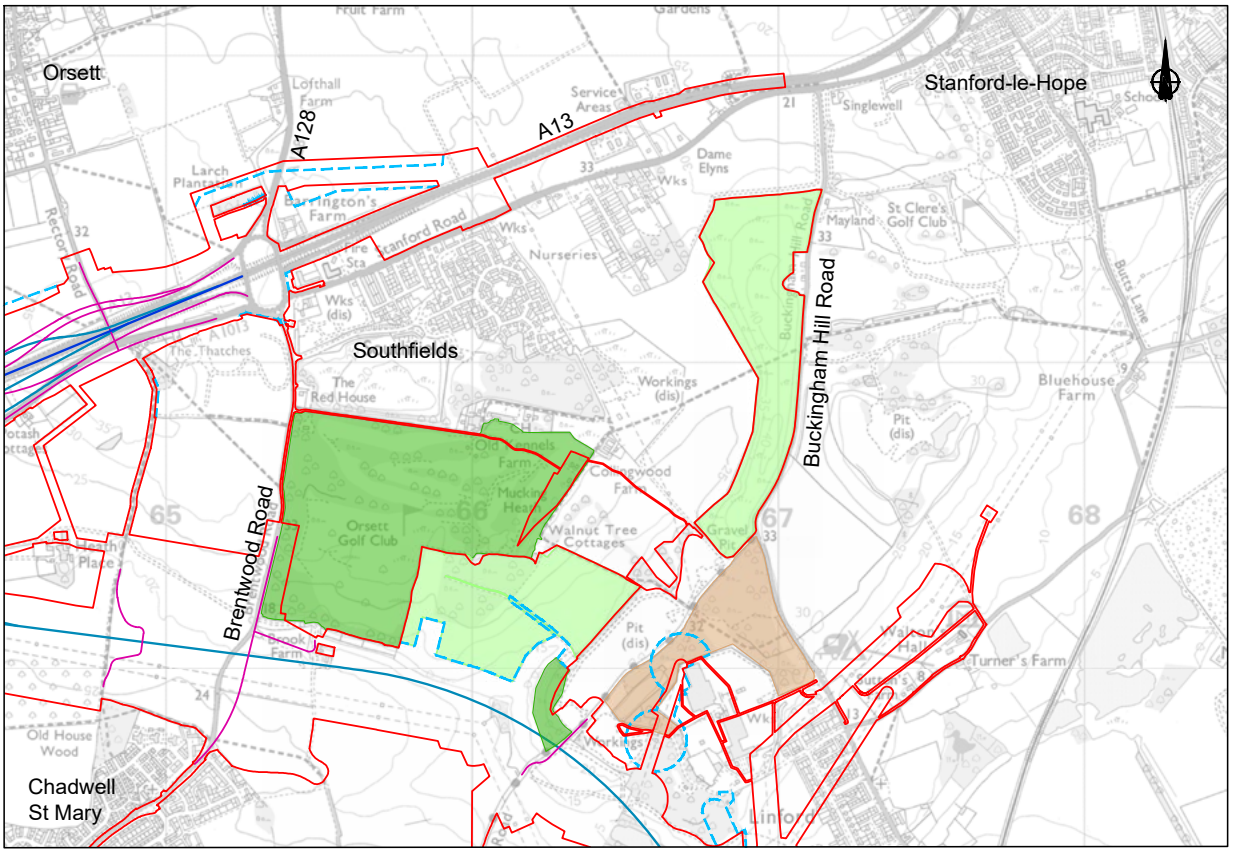
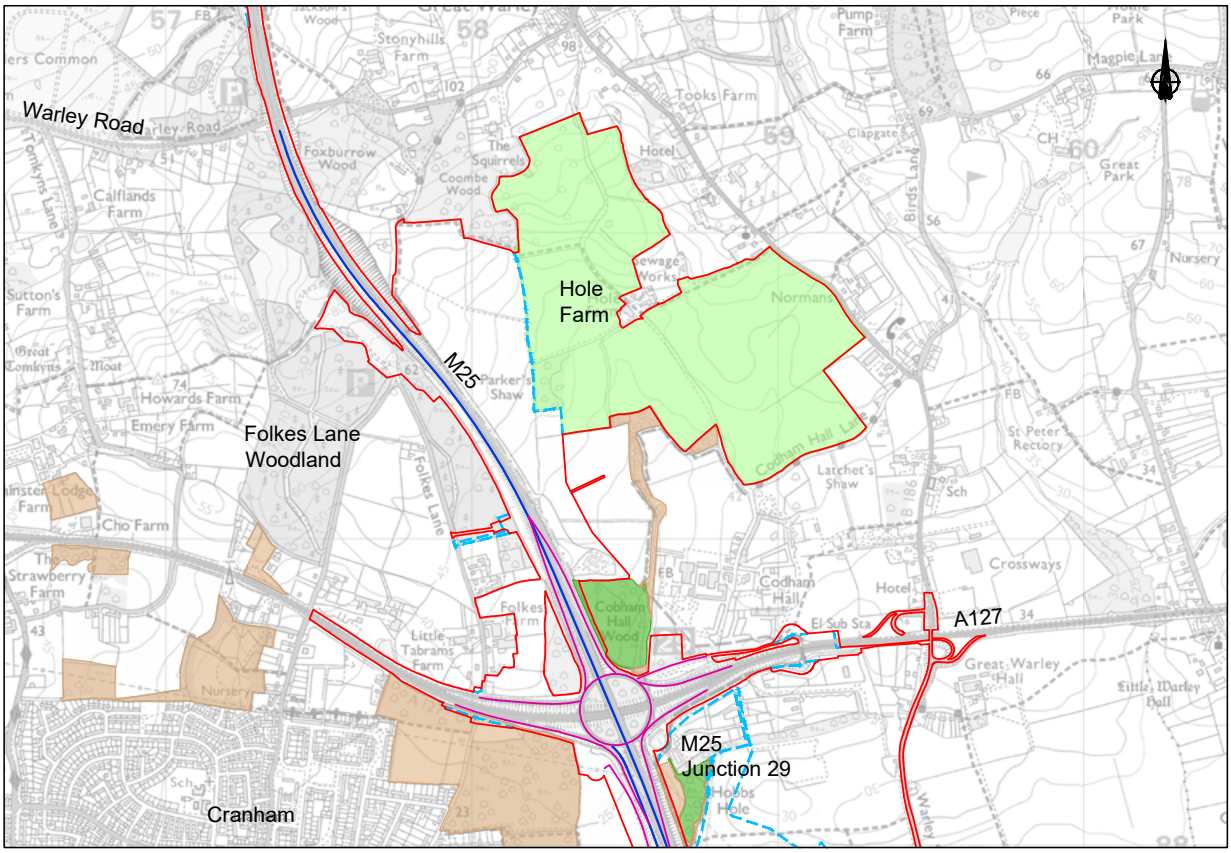


Figure 5-7: Proposed compensation land at Hole Farm, located in Brentwood



KEY

- Lower Thames Crossing (LTC)
- Motorway/major road
- Local connection
- Proposed Order Limits
- Previous Order Limits from community impacts consultation
- Addition of land to the Order Limits for proposed compensation
- Designated sites - no significant effects
- Designated sites - potential significant effects

Compensation area
Hole Farm, Brentwood

Most of the Hole Farm site was purchased by National Highways in 2021 to deliver benefits for communities and the environment. Working in partnership with Forestry England and the wider Thames Chase Community Forest partners, the site was identified as providing an opportunity to create a new community woodland that would become part of the Thames Chase Community Forest network. This would build on the small proportion of the site adjacent to the M25 that was already needed by the Lower Thames Crossing to provide public open space replacement for works at Folkes Lane Woodland.

Following our assessments, we identified Hole Farm, which is currently used for agricultural purposes, as a location for compensatory habitat creation because it is close to Codham Hall Woods and other designated sites. It would also link with the existing woodlands that form part of the habitat network in this area. There is an existing farmhouse and paddock within Hole Farm which will be retained and these are not included in our proposals for Hole Farm.

We are considering using up to 75ha of the Hole Farm site as compensatory planting to offset against the risk from impacts of nitrogen deposition caused as a result of traffic using the Lower Thames Crossing. Within this 75ha, we would convert the existing farmland to a woodland-dominated mosaic of wildlife-rich habitats through a combination of natural regeneration of habitats and planting.

This compensatory planting would form part of, and integrate with, the masterplan for the entire site that is being developed in partnership with Forestry England and the wider Thames Chase Community Forest partners. The masterplan will also include proposals for the facilities associated with a community woodland such as a tree nursery and a visitor centre. A period of community engagement to inform the development of the masterplan for the site is on-going and a public consultation on the proposals will be undertaken ahead of an application being submitted to Brentwood Borough Council to change the use of the site and create the required visitor facilities. It is proposed that these elements would be consented separately from the Lower Thames Crossing DCO application. The final amount of land within Hole Farm allocated to nitrogen deposition compensatory planting will align with the aspirations, and masterplan, for the overall site.

Next steps

Ongoing work

This document has recorded the work we are doing to address the potential risks to nearby habitats from nitrogen deposition from traffic using the Lower Thames Crossing. It explains our work in progress and our current thinking about the right approach to mitigation and compensation. We have more assessments to carry out but the feedback from this consultation will inform the approach that we submit and secure as part of our DCO application.

Our work includes:

- Refinement of assessments based on finalised traffic and air quality modelling.
- A decision on whether to implement additional speed enforcement on the M2 between junctions 3 and 4, followed by further development of these proposals, which would be informed by the responses to this consultation and site surveys.
- Further development and refinement of the proposals for compensation measures, informed by the responses to this consultation, including:
  - desk-based assessments and site visits to collect further information on constraints affecting potential compensation sites (such as utilities not previously identified) and opportunities (including connections to existing woodland or habitats of ecological value)
  - refining the proposed compensation areas
  - defining and agreeing overarching objectives and environmental design principles for each compensation area
  - outline design of the compensation areas, covering species mix, layout, maintenance and management requirements
- Ongoing engagement with stakeholders, including landowners, throughout the development of our mitigation and compensation proposals.
- Development of the habitat management fund if it is considered necessary to complement the new habitat creation. This includes further measures to address specific impacts that may not be fully compensated through the new habitat creation.

Design and assessment

Our assessments of the impact of nitrogen deposition on ecological habitats and our proposals for mitigating and compensating for it will be included in the Environmental Statement and the Habitats Regulations Assessment that will form part of our DCO application.

The Order Limits presented in this consultation include the potential locations for compensation planting outlined above.

The location of the compensation areas will be shown in our DCO application and would, with the exception of Hole Farm, be the subject of compulsory acquisition powers, as a fallback measure should we be unable to reach an agreement with landowners. The location of the compensation areas will be presented in the Environmental Masterplan, which will form part of the ES and the DCO application. The outline management and maintenance requirements will be presented within the Outline Landscape and Ecological Management Plan (OLEMP), which will detail the proposed management of the landscape and ecological elements of the Lower Thames Crossing. A draft copy of the OLEMP was consulted on during our community impacts consultation. It will be further developed with additional detail for our DCO application. Furthermore, all the new compensation areas would be subject to the requirements and controls set out in the DCO and associated documents.

The compensation proposals that are currently being assessed and refined will be included within the EIA and reported within the Environmental Statement. This will cover environmental assessments of any potential effects on cultural heritage, landscape and visual, terrestrial biodiversity, soils and other relevant topics if required following desk-based assessments and site visits. If the ongoing work confirms that the mitigation measures are to be progressed, these will also be included within the Environmental Statement.

6

How to have your say

Please let us know your views on the changes presented in this local refinement consultation. All the consultation information, including the response form, is available at **https://ltcconsultation2022.nationalhighways.co.uk/**

You can have your say using any of the methods listed below.

If you would like to comment on aspects of our proposals from earlier consultations, please use the 'Other comments' section on the response form.

Online

Fill in the survey at
https://ltcconsultation2022.nationalhighways.co.uk/

Post

Send your response form, or comments, to
FREEPOST LTC CONSULTATION
The Freepost address is the only text needed on the envelope, and you don't need a stamp.

Telephone

You can book a call back from a member of the project team to provide comments on the changes. From 12 May 2022, call us on 0300 123 5000 to book an appointment weekdays between 9am and 5pm.

Email

Send your comments to **LTC.CONSULTATION@TRAVERSE.LTD**

Please note, we cannot guarantee that responses sent to any other address will be considered. Responses will be accepted until 23:59 on 20 June 2022.

Scan me

Use your phone to scan this QR code to go straight to the consultation.

Data privacy notice

We are committed to protecting your personal information. Whenever you provide this information, we are legally obliged to use it in line with all applicable laws concerning the protection of personal data, including the General Data Protection Regulation (GDPR).

How will National Highways use the information we collect about you?

We will use your personal data collected via this consultation to:

- analyse your feedback to the consultation
- produce a summary report, based on our analysis of responses (individuals will not be identified in our Consultation Report)
- write to you with updates about the results of the consultation and other developments
- keep up-to-date records of our communications with individuals and organisations

Any personal information you include in this form will be available to, or used by:

- National Highways
- Traverse (an independent company we are using to analyse feedback to the consultation)
- the Planning Inspectorate (the Government agency that will consider our application for permission to build the Lower Thames Crossing)
- the Secretary of State for Transport (who will decide on our application)
- our legal advisers
- consultants working on the Lower Thames Crossing project

It is also possible that trusted third-party providers, for example construction companies, may later use your contact details to communicate with you about this project.

Find out more

Under the terms of the GDPR, you have certain rights over how your personal data is retained and used by National Highways.

For more information, see our full data privacy statement at **https://nationalhighways.co.uk/our-work/lower-thames-crossing/privacy-notice/**

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Find out more

All our consultation materials are available online at **https://ltcconsultation2022.nationalhighways.co.uk/**

They include:

- Guide to local refinement consultation
- Map Book 1 – General Arrangements
- Map Book 2 – Land Use Plans
- Map Book 3 – Engineering Plans
- Local refinement consultation leaflet
- Response form and Freepost envelope
- Easy Read version of the Guide to local refinement consultation

Website

Visit our website at **https://ltcconsultation2022.nationalhighways.co.uk/** to:

- watch videos explaining the proposals
- explore an interactive map
- view the consultation documents, including the response form and maps

Events

For the most up-to-date list of events, please refer to our website at **https://ltcconsultation2022.nationalhighways.co.uk/** or phone us.

Locations to review and collect consultation materials

The consultation materials will be available to collect and map books will be available to review, at deposit locations from 12 May 2022:

Kent and Gravesham

- Cuxton Library, Bush Road, Cuxton, Rochester ME2 1EY
- Gravesend Library, Windmill Street, Gravesend DA12 1BE
- Maidstone Library, Kent History & Library Centre, James Whatman Way, Maidstone ME14 1LQ
- Snodland Library, 15-17 High Street, Snodland ME6 5DA

Thurrock, Essex and Havering

- Brentwood Library, New Road, Brentwood CM14 4BP
- Chadwell Library, Brentwood Road, Chadwell St Mary, Grays RM16 4JP
- Grays Library, Thameside Complex, Orsett Road, Grays RM17 5DX
- Romford Central Library, St Edwards Way, Romford RM1 3AR

For the most up-to-date list of venues, please refer to our website at **https://ltcconsultation2022.nationalhighways.co.uk/** or phone us.

Locations to take away consultation materials

The guide, response form and Freepost return envelope will be available to collect from 12 May 2022 at the following locations:

Kent and Gravesham

- Coldharbour Library, Coldharbour Road, Northfleet, Gravesend DA11 8AE
- Dartford Library, Central Park, Market Street Dartford DA1 1EU
- Higham Library, Villa Road, Higham, Rochester ME3 7BS
- Larkfield Library, Martin Square, Aylesford ME20 6QW
- Meopham Library, Wrotham Road, Meopham, Gravesend DA13 0AH
- Riverview Park Library, The Alma, Leander Drive, Gravesend DA12 4NG
- Shorne Woods Visitor Centre, Gravesend DA12 3HX
- Strood Library, 133 High St, Strood, Rochester ME2 4TJ

Thurrock, Essex and Havering

- Belhus Library, South Ockendon Centre, Derry Avenue, South Ockendon RM15 5DX
- Corringham Library, St Johns Way, Corringham Stanford-le-Hope SS17 7LJ
- East Tilbury Library, Princess Avenue, East Tilbury RM18 8ST
- Harold Hill Library, 19a Farnham Road, Romford RM3 8ED
- Stanford-le-Hope Library, High Street, Stanford-le-Hope SS17 0HG
- Tilbury Library, Tilbury Hub, Civic Square, Tilbury RM18 8AD
- Upminster Library, 26 Corbets Tey Road, Upminster RM14 2BB

More venues could become available during the consultation period, so please check our website for updates at **https://ltcconsultation2022.nationalhighways.co.uk/**

You can also stay in touch via Twitter and Facebook: @lowerthames

Information videos

Videos explaining our proposals are available on our website. They include captioning and a British Sign Language interpreter. For more information, visit **https://ltcconsultation2022.nationalhighways.co.uk/.**

Telephone surgery

You can book a call back from a member of the project team to discuss any questions. Call us on **0300 123 5000** to book an appointment.

Home delivery

If you do not have access to the internet, you can order printed copies of this guide, a feedback form and Freepost return envelope.

Please call us on 0300 123 5000 to request a consultation pack. This pack, including delivery is free of charge – there is a limit of one pack per household.

Previous Lower Thames Crossing consultations

Documents from our previous consultations are available online at **www.lowerthamescrossing.co.uk/archive**

If you need help accessing this or any other National Highways information, please call **0300 123 5000** and we will help you.

AP1

Appendix (AP) - Nitrogen deposition impact assessment, mitigation and compensation for the Lower Thames Crossing

Introduction

In chapter 5 of the guide, we provide an overview of the work being carried out to understand the impact of nitrogen emissions as a result of traffic using the Lower Thames Crossing and the wider affected road network. Chapter 5 also includes a summary of our mitigation and compensation proposals. This appendix provides more information about how our assessments are carried out and the proposals to mitigate against, and compensate for, the potential impacts from nitrogen caused by the forecast changes in traffic as a result of the Lower Thames Crossing.

As part of our assessment of the impacts of the Lower Thames Crossing on the environment, we have considered the impacts of vehicle emissions on human health and ecological habitats. These assessments have included consideration of the nitrogen that is emitted into the atmosphere from vehicle emissions, which, when it falls on habitats, is a process known as 'nitrogen deposition'. This can affect how plants and habitats grow: for example, it can act as a fertiliser, which can be either good or bad for the plants depending on the extent of deposition. As such, it is important to understand the impact of nitrogen deposition and take steps to reduce the impacts where they are likely to be significant.

Our assessments of vehicle emissions have always been in line with the existing guidance for major road projects. Since our last consultation, we have revised our assessment methodology in light of the latest scientific opinion and after discussions with Natural England. Our assessment of the impact of vehicle emissions now includes consideration of the impact of ammonia emitted from exhausts, as well as considering the nitrogen oxides (NOx).

Many petrol and diesel vehicles now use catalytic converters to reduce the emissions of some pollutants, such as NOx, but these catalytic converters emit ammonia as a by-product which, along with NOx, can also contribute to nitrogen deposition. Our revised methodology accounts for this and provides a robust assessment of nitrogen deposition and its potential impacts on designated habitats. The impacts of vehicle emissions on human health presented in our community impacts consultation have not changed. While there are some differences in predicted traffic flows near the revised A13/A1089 junction compared with the information presented during that consultation, the overall air quality impact on human health is unlikely to change as a result of the changes in traffic flows and, as such, the new road's impacts on health are not considered to be significant.

Nitrogen is an important component of organic life forms and is vital for plant life. It can be found in the atmosphere as pure nitrogen and in compounds, including nitrogen dioxide (NO2), nitric oxide (NO) and ammonia (a compound formed of nitrogen and hydrogen, NH3). Here, we use the term nitrogen to refer to all these compounds.

Although naturally occurring, nitrogen can be released into the atmosphere through activities such as heating properties, agricultural practices (including the use of fertilisers) and from petrol and diesel vehicles on the roads. A change in nitrogen levels can have wide-ranging effects on the way ecosystems function, both negative and positive including the speed of growth of plants and decomposition. Too much nitrogen can also become toxic to plants.

Across the UK, levels of nitrogen (both NOx and nitrogen deposition) at designated sites, an area of land that has been designated for nature conservation and/or the study of wildlife, typically exceed statutory air quality thresholds and recommended levels for habitats. However, Government data shows that nitrogen levels from road transport and other sources have fallen by 79% since 1990. While it is not part of our assessments, as our assessments are precautionary, it is predicted that this downward trend will continue and accelerate due to the policy commitments outlined in the Government's plan, Decarbonising Transport: A Better, Greener Britain (July 2021)[1]. The decrease in petrol and diesel vehicles and the increased use of electric vehicles and other measures will also contribute to this reduction.

Our assessments

Traffic and air quality modelling

The Lower Thames Crossing is a major new road and, once the road is open, traffic is forecast to reduce on some roads (cutting congestion and improving journey times), but traffic is also forecast to increase on some other roads. Where traffic increases, there would be an increase in nitrogen deposition on habitats in close proximity.

The 'affected road network' is an area within which traffic forecasts could influence our air quality assessment. This has been identified using National Highways assessment criteria contained within the Design Manual for Roads and Bridges (DMRB). Figure AP 1-1 shows the extent of the affected road network, the extent of which may be refined upon completion of our traffic modelling.

1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf

Figure AP 1-1: The affected road network

We have assessed the potential impact of traffic on air quality, with these assessments being carried out in line with DMRB guidance LA105[2], which is the document that sets out the requirements for assessing and reporting the effects of highway projects on air quality in the UK.

To predict how traffic would change with and without the Lower Thames Crossing, we used the project's transport model, which has been built in line with the Department for Transport's (DfT) Transport Analysis Guidance. These predicted changes in traffic flow have been used to carry out our air quality modelling, which predicts the impacts of changing vehicle emissions on the affected road network.

The air quality model is used to forecast the amount of nitrogen deposition on habitats along the affected road network. We then use information from the UK's Air Pollution Information System database[3] to understand how emissions would affect habitats.

Following our community impacts consultation, we have continued to work with Natural England to better understand how the nitrogen released through vehicle emissions should be assessed. As mentioned above, our assessment of the impact of vehicle emissions now includes consideration of the impact of ammonia emitted from exhausts, as well as considering NOx. This revised methodology aligns with emerging science and methodologies for assessing nitrogen deposition. This is in addition to our assessments of NOx, which we had considered in our previous assessment and presented in our Preliminary Environmental Information Report at statutory consultation and in our Ward impact summaries during the community impacts consultation.

2 DMRB LA105: www.standardsforhighways.co.uk/dmrb/search/10191621-07df-44a3-892e-c1d5c7a28d90

3 Air Pollution Information System: www.apis.ac.uk

Assessing air quality impacts on designated sites

In line with the methodology set out in DMRB LA105, our assessment involves considering the impact of nitrogen deposition on designated ecological sites within 200 metres of the affected road network. 'Designated sites' are areas of land that have special status as protected areas because of their ecological and cultural importance.

There are many designated sites along the affected road network. These are mainly woodland and include Ramsar sites, Special Protection Areas, Special Areas of Conservation, Sites of Special Scientific Interest (SSSI), Local Nature Reserves, Local Wildlife Sites, Nature Improvement Areas, ancient woodland, and veteran trees.

We are carrying out an Environmental Impact Assessment (EIA) to consider the potential and residual impacts of the Lower Thames Crossing on local communities and the environment during construction and once the new road is open. The EIA also identifies measures that could be taken to reduce (mitigate) the negative impacts. The assessments that make up the EIA will be reported in the project's Environmental Statement, which will form part of our application for a DCO later in 2022.

A Habitats Regulations Assessment (HRA) is also being carried out to consider whether the Lower Thames Crossing would negatively impact the conservation objectives of any internationally important designated sites. These must be considered in our HRA and include Special Areas for Conservation, Special Protection Areas and Ramsar sites. They are also referred to as the 'National network of internationally important designated sites'.

The HRA has two stages:

- 'Screening', where any likely significant effects are identified (stage 1)
- 'Appropriate assessment' (stage 2), where any likely significant effects are assessed to determine whether they would adversely affect the integrity of the designated site, taking into account any mitigation proposed. (Assessment of 'site integrity' is a consideration of the effects on the structure and function of the habitats within the site.)

Like the EIA, the HRA assesses potential impacts, identifies mitigation, and sets out any residual impacts. However, the HRA requires a higher degree of evidence to demonstrate that there would be no significant effects on the integrity of the assessed sites. The assessments that make up the HRA will be reported in the HRA Statement to Inform an Appropriate Assessment, which will also form part of our DCO application.

As part of the EIA and HRA assessments, we are in the process of surveying the potentially affected designated sites, allowing us to collect extra information about their features and their condition to better understand how they might be affected by the predicted changes in nitrogen deposition when compared with if the Lower Thames Crossing were not implemented.

We have already carried out surveys of many of the designated sites to understand how vulnerable the habitats may be to changes in nitrogen deposition. As it is necessary to carry out some surveys at a particular time of year, these are ongoing.

We have undertaken preliminary nitrogen deposition assessments for these areas based on the available traffic modelling, using a precautionary approach to assumptions about the speed with which transport will decarbonise. As the seasonal surveys continue, we will refine our assessments and finalise our proposals for mitigation and compensation, and these will be included in our DCO application. By taking this approach, we can ensure our mitigation and compensation proposals are sufficient to address any nitrogen deposition effects from the implementation of the Lower Thames Crossing.

Both the EIA and the HRA consider the concentration of deposited nitrogen, the size of the area being impacted, and the duration of the predicted impact. Along some roads, there would be a decrease in nitrogen deposition due to a forecast reduction in traffic. However, along roads where there is a predicted increase in traffic, then our assessments show a rise in nitrogen deposition compared with the situation if the Lower Thames Crossing was not built. When an increase in nitrogen deposition is predicted, our assessments (in accordance with DMRB LA105) use two thresholds to identify where we need to investigate in more detail:

- For designated sites assessed under the EIA, in line with DMRB LA105, we carried out further investigations where we identified a potential increase in nitrogen deposition of more than 0.4kg of nitrogen per hectare per year, which is the level above which there could be an impact on those habitats.
- For internationally designated sites assessed under the HRA, we investigated further where we identified a potential increase in nitrogen deposition of at least 1% of a level known as the Lower Critical Load. This is the estimated level of nitrogen exposure that may lead to degradation of the designated sites.

If nitrogen levels are predicted to exceed the relevant threshold for a designated site that does not mean that adverse impacts would be significant, but it highlights that further investigation is needed.

For sites where thresholds would be exceeded, we have carried out a qualitative assessment of whether the effects from nitrogen deposition would be significant on each impacted habitat. A professional judgement has been made by competent specialists as to whether the effects would be significant based upon the following criteria:

- the importance of the designated site, such as whether it is of international, national or county-level significance
- whether the features of the designated site (for example, plant species) would be sensitive to the effects of nitrogen deposition. If not, it is unlikely that the effects would be significant
- the current condition of the designated site, such as whether it is already in a poor condition and whether nitrogen deposition would worsen the situation
- the duration of the impacts on the site predicted as a result of the Lower Thames Crossing. The longer the site would be affected, the more likely the effects would be considered significant
- the proportion of the site that would be affected. The greater the proportion, the more likely an effect would be considered significant.

Avoidance, mitigation and compensation

The ability to avoid all adverse effects has been considered as part of the assessment and review of where thresholds are exceeded. The Lower Thames Crossing route and design has been selected after extensive development, engagement, and consultation. Moving the route to avoid nitrogen deposition on designated sites within 200 metres of the new road and affected road network would be likely to have negative impacts on the environment elsewhere and would potentially make it unviable.

The potential for mitigation measures has been assessed in line with the DMRB LA105, which states that they should be viable and provide a quantifiable change to the effects. For each affected ecological site or habitat, the need for mitigation, and its potential feasibility, was assessed. Further information can be found under Mitigation measures.

Where we cannot avoid or directly mitigate the risk of the impacts of nitrogen deposition, creating wildlife-rich habitats will add to the stock of high-quality woodland in the area and how well it is connected to other habitats in the landscape. These measures will be put in place on a precautionary basis to ensure that the overall coherence of the network of protected sites and habitats is maintained by enhancing the resilience of the network of habitats that supports each affected site. Further information can be found in the Compensation measures section.

Results of the assessments

For the opening year of the Lower Thames Crossing and during its operation in the 2030s, the revised methodology for assessing nitrogen deposition has so far led to more extensive potential effects being identified than previously identified. No significant effects are reported during construction.

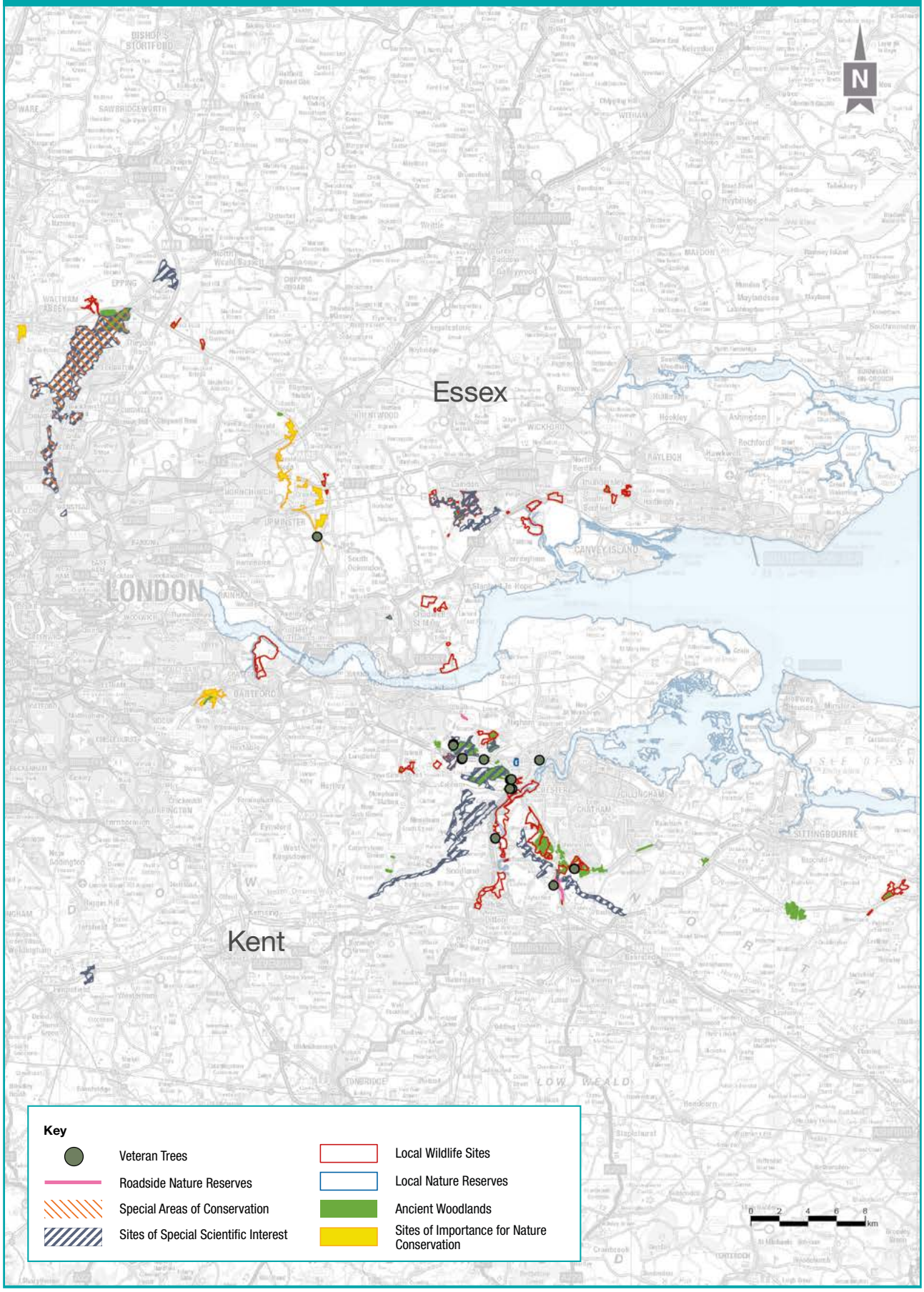
The results presented here are the conclusions of the assessment work completed to date. Our assessment work will continue, and our final conclusions will be presented in our DCO application.

For the EIA, 136 designated sites were identified for assessment. These are shown in Figure AP 1-2 below comprising:

- 9 sites of SSSI
- 1 local nature reserve
- 37 local wildlife sites
- 14 sites of importance for nature conservation
- 7 roadside nature reserves
- 1 nature improvement area
- 40 areas of ancient woodland
- 26 veteran trees
- 1 country park (also categorised as a local wildlife site)

In some cases, there is an overlap of the designations, such as where part of an SSSI is also designated as a local nature reserve, a local wildlife site, or includes ancient woodland. Epping Forest, one of the SSSIs considered in the EIA, is also a Special Area for Conservation, which is considered in the HRA.

Figure AP 1-2 Location of ecological receptors where further assessment is required



The significantly impacted sites

As described above, in the stage 2 HRA, our assessments to date have concluded that there would be no adverse effects on the integrity of any internationally important designated sites.

Our preliminary EIA assessment to date (including surveys of sites where the DMRB LA105 threshold is exceeded) has identified on a precautionary basis the potential for significant effects at approximately 60 of the 136 sites being assessed. The combined area of the potentially significantly affected designated sites is approximately 250 ha. However, there is a likelihood that this area may change (increase or be reduced) once additional surveys and further detailed assessment have been carried out, including the results of our traffic and air quality modelling, which will be presented in our DCO application.

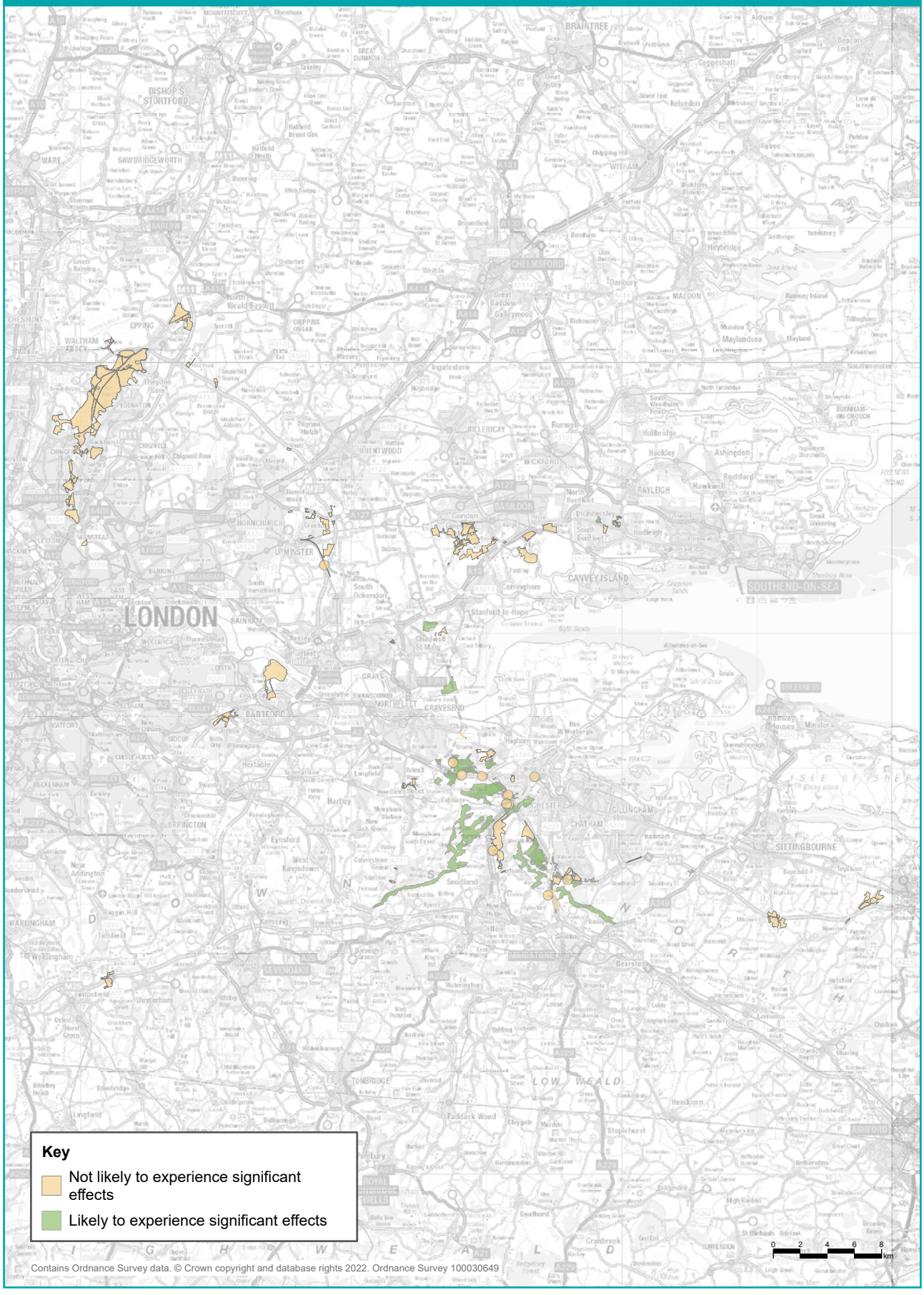
Figure AP 1-3 shows the designated sites likely to be reported as experiencing significant effects based on our preliminary assessments, under the EIA. Most of those that are predicted to experience significant effects are south of the River Thames and are clustered in two locations:

- Along the A2 and M2 between the proposed A2/M2 junction with the Lower Thames Crossing and M2 junction 2
- Around M2 junction 3 and the A229 at Blue Bell Hill

The designated sites north of the River Thames that are most likely to experience significant effects, are more scattered but we have identified two clusters where most of the significant effects are likely to occur. These are mainly adjacent to the proposed route of the Lower Thames Crossing and consist of a SSSI, five ancient woodlands, five local wildlife sites and a veteran tree.

For the EIA, the nitrogen deposition site survey assessments are currently ongoing, and the information presented here represents our initial conclusions (see the section on ongoing work below). We will continue to refine our assessments as more information is made available and report on them in our DCO application.

Figure AP 1-3: Locations of designated sites likely and unlikely to experience significant effects



Mitigation measures

Where the potential for significant adverse effects has been identified, we have been investigating options to avoid, mitigate or compensate for them. As stated above, our assessment has concluded that to realise the benefits that the Lower Thames Crossing would provide, these effects cannot be avoided, so it is necessary to consider mitigation and compensation.

National Highways' guidance for carrying out air quality assessments (DMRB LA105) states that mitigation measures must be viable and provide a quantifiable change. It also states that the following mitigation measures should be assessed for suitability, alongside any other proposed viable mitigation.

LA105 mitigation options assessed

The mitigation measures that are set out in LA105, which we have assessed are:

1. Reducing vehicle speeds to mitigate air quality effects. This can involve enforcement of an existing 70mph limit or reduction of an existing 70mph speed limit to 60mph
2. Installation of vertical barriers at least 9 metres high.

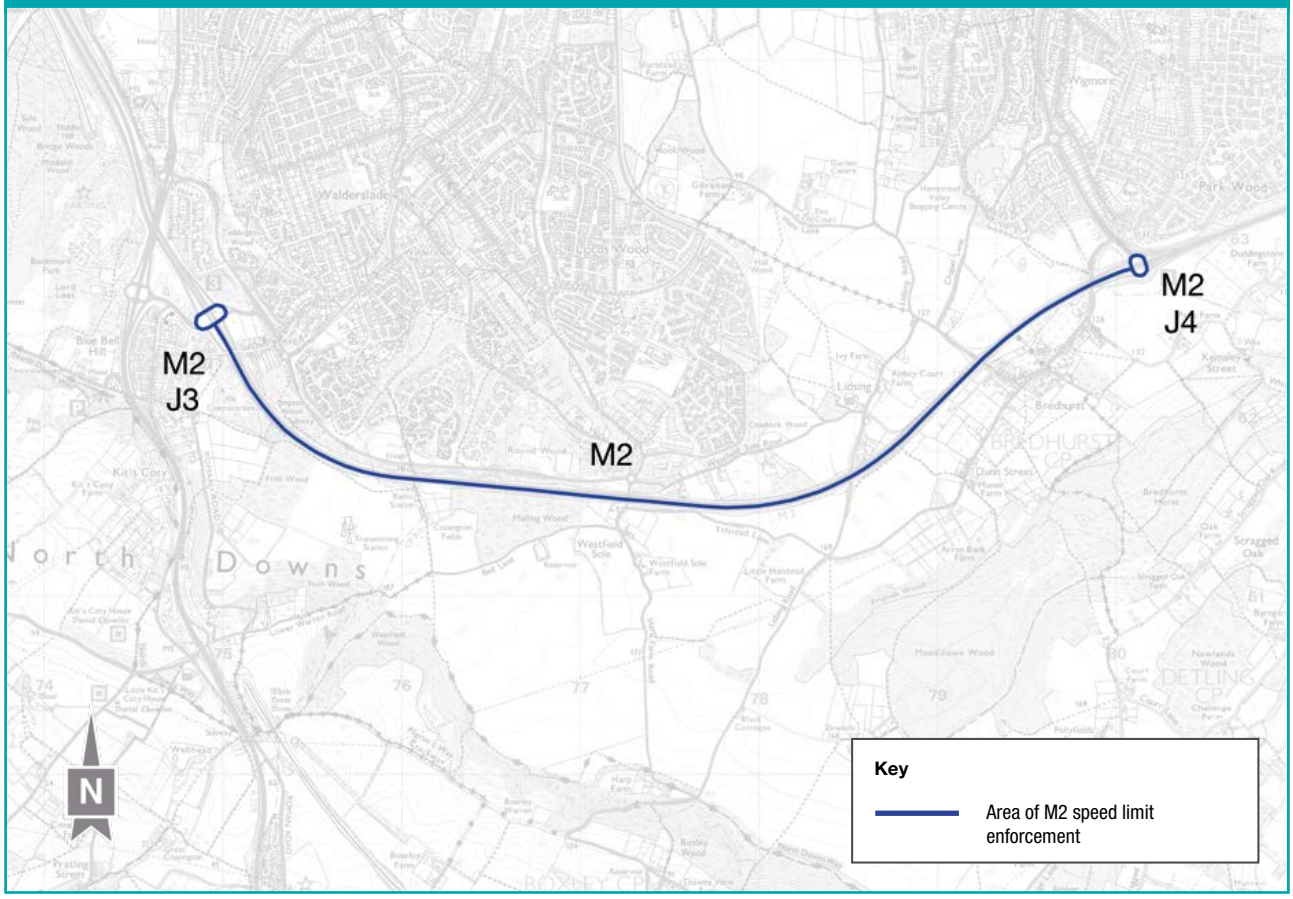
1. Speed limits

1.1 Enforcement

Traffic data shows that the speed limit is exceeded by some motorists on some sections of the road network. Driving at faster speeds increases nitrogen emissions, so by enforcing the speed limit on certain sections of road, average vehicle speeds can be brought down, reducing nitrogen deposition on nearby designated sites. We have been considering whether installing speed enforcement cameras on certain sections of road would be effective in encouraging road users to drive at the legal speed limit, on top of existing speed enforcement measures. There would be no change to the speed limit, which is preferable as it would maintain traffic flows and journey times.

Our work to date has found that this measure would only be effective along sections of the road network where traffic typically exceeds the speed limit of 70mph. Traffic modelling suggests that traffic typically exceeds the speed limit primarily on the M2 between junctions 3 and 4 (as shown in Figure AP 1-4). As a result, additional speed enforcement at this location could be effective due to its proximity to some affected designated ecological sites.

Figure AP 1-4: Section of the M2 between junction 3 and junction 4 where speed limit enforcement is proposed



As part of our ongoing assessments, we are reviewing whether additional speed enforcement measures would be feasible in this location, taking into account all relevant considerations (e.g. cost, technical feasibility). Should this be the case, then the area of significantly affected habitats would be reduced, as the mitigation would mean that there would no longer be significant effects on some of the sites near to this section of the M2.

1.2 Speed limit reductions

Speed limit reductions involve implementing 60mph speed limits (in accordance with DMRB LA105) along sections of the road network currently designated as 70mph to reduce the average speed of traffic on that section of road. Lowering the speed limit works in a similar way to speed enforcement cameras, reducing the average speed of traffic on that section of road and so reducing nitrogen deposition. Roads where the average speed is lower than 60mph have been discounted because the reduction would not adequately reduce the nitrogen deposition.

For the HRA, our assessment has concluded there would be no adverse effects on the integrity of internationally designated sites because nitrogen deposition would be insignificant, so we consider mitigation unnecessary. However, we understand that at Epping Forest Special Area of Conservation, Natural England or other parties may disagree with some of our assessment and consider mitigation to be necessary. If this is the case, that would be a matter for consideration during the examination of the DCO application.

To understand the implications, we investigated mitigation measures to avoid or reduce effects on Epping Forest Special Area of Conservation. We have investigated reducing the speed limit from 70mph to 60mph on the M25 westbound between junctions 27 and 26 for four years from the Lower Thames Crossing opening. Our assessment shows that this measure would have the effect of reducing nitrogen deposition, but we do not consider this measure necessary as our assessment concludes there would be no adverse effects on the Epping Forest Special Area of Conservation, and we are not proposing it.

For the EIA, we have identified that speed limit reductions along two sections of the M2 - between junctions 1 and 4, and between junctions 3 and 4 – would help reduce nitrogen deposition at nearby designated sites. However, further assessments, including traffic modelling, found that speed limit reductions on these sections of motorway would result in other negative impacts. These include increased traffic and emissions on local roads as motorists sought alternative routes as a result of increased journey times on the strategic road network. As such, we are not proposing a speed limit reduction in these locations as mitigation for effects in the EIA.

2. Vertical barriers at least nine metres high

DMRB LA105 guidance states that vertical barriers at least nine metres high should be considered as a mitigation option. This type of barrier encourages nitrogen emissions to rise to a height where it can disperse and dilute, reducing its impact on nearby habitats on the other side of the barrier.

We have carried out a review of the affected road network to identify locations where vertical barriers could be installed. Our initial assessment has found that there are no sections of the affected road network where it would be feasible to install them. The initial step in our review was to filter out potential environmental effects and where the installation was not technically feasible for engineering reasons. This is primarily where:

- Their installation could have adverse effects on heritage features. These barriers should not be sited within 200 metres of any location with a heritage designation, which includes listed buildings, scheduled monuments, and registered parks and gardens.
- Negative landscape and visual effects could be introduced. These barriers are not suitable near (within 10 metres) to residential properties.
- They could impact protected trees. These barriers are not appropriate within one metre of any veteran trees, trees subject to Tree Preservation Orders, or within 15 metres of ancient woodland.
- Their installation could have adverse effects on heritage features. These barriers should not be sited within 25 metres of any Conservation Areas or within 200 metres of any location with a heritage designation, which includes listed buildings, scheduled monuments, and registered parks and gardens.
- There is insufficient space on the carriageway to allow installation.

In addition, 80 percent of the Lower Thames Crossing is proposed to be below ground in either a tunnel, cutting or false cutting. At these locations, installing a barrier would not be feasible and no benefits could be accrued.

Four of the 60 sites identified did not fall within roads that met the criteria outlined above and therefore warranted further exploration. The affected road network adjacent to the remaining four sites was reviewed to see whether the barriers could be installed in these locations. Our assessment has concluded that at these remaining locations barriers would not be feasible.

- Low Street Pit Local Wildlife Site (West Tilbury): to mitigate the effects on this receptor a barrier would be required on the Lower Thames Crossing Tilbury Viaduct; this would result in additional visual impacts as the viaduct is elevated. There would also be potential impacts on overhead lines if installed in this location.
- Goshems Farms Local Wildlife Site (Tilbury): Installing barriers at this location would not be technically feasible as it lies in the footprint of the proposed road and supporting structures, mainly the Lower Thames Crossing northern tunnel entrance and excavated material landscaping. In addition no nitrogen deposition benefits could be accrued as a barrier in this location would be in a cutting which would prevent the nitrogen from dispersing at a sufficient height.
- Cuxton Pit No. 3 Local Wildlife Site (Medway): The is located east of the M2 Junction 2, adjacent to A228 Sundridge Hill. A continuous barrier could not be provided in this location as access would be required to the M2 roundabout /slip road. Barriers are not appropriate where breaks in the barrier would be required to allow access to slip roads.
- River Medway Between Cuxton and Temple Marsh Local Wildlife Site: The site is located under the existing M2 Medway Bridge. The barriers would not be suitable on the existing road bridge as structural and wind loading issues could arise.

While barriers of this type would offer air quality benefits to the designated ecological areas behind them, their scale and appearance would have adverse effects as set out above.

For these reasons, we do not consider the installation of barriers of this type to be appropriate to mitigate nitrogen deposition effects from the Lower Thames Crossing, and therefore they have been discounted.

Additional mitigation options assessed (outside LA105)

In addition to the mitigation measures set out in DMRB LA105, we also investigated other measures for preventing nitrogen from reaching designated sites. These included installing air quality purifying or filtering technologies to reduce nitrogen going to the adjacent habitat. However, these measures have been shown to be ineffective at the scale required for a road project, so these were also discounted.

Compensation measures

For the HRA, no compensation for Epping Forest Special Area for Conservation is required. This is because as mentioned above under 'Mitigation measures' our assessment concludes that there would be no adverse effects on site integrity.

For the EIA, our assessments have concluded that avoidance and mitigation of the impacts of nitrogen deposition are not feasible, apart from potential speed enforcement on a section of the M2 (junctions 3 to 4), which we are continuing to investigate. This is why we are proposing compensation measures to offset the risk of significant effects from nitrogen deposition from changes in traffic flows as a result of the Lower Thames Crossing.

The nitrogen deposition from changes in traffic caused by the Lower Thames Crossing may impact on the growth of plants in habitats, particularly woodland. Where we cannot avoid or directly mitigate the risk of those impacts, creating wildlife-rich habitats will add to the stock of high-quality woodland in the area and how well it is connected to other habitats in the landscape. These measures would be put in place on a precautionary basis to ensure that the overall coherence of the network of protected sites and habitats is maintained by enhancing the resilience of the network of habitats that supports each affected site.

After engagement with Natural England two options for compensation have been considered:

1. habitat creation
2. a fund to manage existing habitats

1. Habitat creation

We have used an appropriate methodology and followed the latest guidance and advice from Natural England, to assess the potential impacts of the Lower Thames Crossing and understand the benefits of our compensation proposals.

For this consultation, we have identified several sites that are considered suitable for compensatory habitat. These sites are split across four areas totalling 279ha. Subject to further engagement (including with Natural England, local authorities and landowners), additional assessments and the outcomes of this consultation, we intend to refine our proposals to create wildlife-rich habitats and expect this to amount to around 250ha. Our proposals will then be submitted as part of our DCO application. We consider this to be a precautionary but proportionate response to the theoretical risk of potential degradation of designated sites.

We have considered:

- Creating multiple, small, new habitat sites
- Using a landscape scale compensation approach

The landscape scale approach is one that seeks to accrue multiple benefits from habitat creation. For example, providing social benefits such as public access with additional environmental benefits such as climate change resilience and increased biodiversity. By creating new habitats on a large scale (rather than in a series of scattered sites), these benefits can be enhanced.

After consideration, and following guidance provided by the Department for Environment, Food and Rural Affairs and Natural England, the landscape scale compensation approach was progressed. This offers long-term enhancements and improvements in quality to the wider ecological network of habitats, building resilience to climate change, and providing strong green corridors for the movement of species across the landscape. Multiple new smaller habitat sites would be less resilient to external pressures such as extreme weather and would not offer landscape scale corridors where protected species could move.

The habitat creation proposals would include habitat types that are similar or complementary to ones that are likely to be significantly affected, which are mostly woodlands. It would therefore include a variety of habitats linked to woodland ones, such as grassland and scrub.

Additional benefits of our compensation proposals

As well as offsetting the impacts of nitrogen deposition, our compensation land proposals would bring significant additional benefits including:

- Increased public access to the countryside. If appropriate, we would consider making these sites publicly accessible in a way which complements their primary function as compensatory habitats.
- Improving the appearance of the local landscape by planting new trees and other plants.
- Enhancing biodiversity by increasing the number of linked habitats.
- Planting new habitats that would absorb carbon dioxide from the atmosphere, reducing the carbon impacts of the project.

Habitat site selection methodology

We have selected a package of sites and these are identified in the Compensatory Areas section below. In selecting the sites to include in the application, we were guided by our selection criteria and our on-going engagement.

To identify potential areas for compensation, we engaged with Natural England and the relevant Local Planning Authorities, using the following methodology and engagement:

1. Ranking the ecological suitability of areas based on the proximity to designated receptors, in particular SSSIs and ancient woodlands.
2. Identifying potentially suitable areas of land by analysing how any new habitats could connect with existing ones.
3. Excluding areas that are not suitable for tree planting such as areas allocated for development, roads, water features, and those already planted or within 200 metres of the affected road network.
4. Excluding areas where it was considered that existing land uses should not be changed, for example good quality agricultural land, registered common land or land used for recreational purposes.
5. Excluding sites that contain known environmental constraints including existing wildlife-rich habitats (such as designated sites), heritage designations (e.g. areas within 200 metres of scheduled monuments or Grade I or II* listed buildings), and flood risk areas.
6. Further filtering of suitable areas by specialist teams, including heritage, landscape, utilities, land referencing and planning.
7. Developing a shortlist of possible sites with the best ecological opportunities and no, or manageable, constraints.

2. A fund to manage existing habitats

We are considering establishing a habitat management fund to provide additional compensation for nitrogen deposition. If after carrying out additional assessment and engagement such a fund is deemed necessary and appropriate to address specific impacts which would not be properly compensated by the creation of new woodland, then details of the fund would be developed in conjunction with stakeholders, including engagement with specific landowners and managers. Once established, the fund would be open to applications that meet the following objectives:

- Support the management of the most biodiverse significantly affected existing sites and habitats to improve site conditions and build long-term resilience for these sites. This management must be above the existing or planned management of the location.
- Support measures on land linked to significantly affected designated sites and habitats through adverse impact pathways (for example, to fund landowners to reduce the use of fertilisers), which would reduce existing adverse effects on those designated sites and habitats and therefore improve their resilience.

Identified compensation sites

We have identified potential sites for habitat creation in the following four areas, which are also shown in Figure AP 1-5:

- M2 corridor and Blue Bell Hill
- Gravesham and Shorne Woods
- Southfields, Thurrock
- Hole Farm, Brentwood

Within these areas, we used our selection methodology to identify parcels of land that could be used for habitat creation. In these locations, significant new areas of wildlife-rich habitats will be created, along with smaller areas that connect existing habitats that have been fragmented in the past.

We are having on-going discussions with the owners of the parcels of land that we have identified for compensatory planting. Our proposal is that the land on which the compensatory planting would be carried out will be included in our DCO application and where necessary we would seek powers to compulsorily acquire it. As with all land required for the project, we would also progress discussions with landowners to acquire sites by agreement.

We will continue to work closely with relevant stakeholders (including landowners), Natural England and local authorities to make sure our proposals achieve a sufficient quality of compensation.

Before starting the habitat creation works, we would erect security fencing around the perimeter of the compensation areas. The landscape planting would involve initial ground preparation works, including removal of vegetation where required and preparation of soils using tractors and excavators to get the appropriate soil conditions for the required planting. Planting would be carried out at the first available planting season. The season of planting would depend on the species selected and when we gain access to the land. In some cases, areas may be allowed to naturally regenerate so that local plants have the chance to establish from seed. An effort would be made to retain vegetation but where it is beneficial to remove it, clearance would be carried out during winter where possible, to avoid impacts on breeding birds. Where this is not practicable, clearance would be supervised by an Ecological Clerk of Works to ensure no nests are disturbed or destroyed.

The planting of the compensation sites would be developed to have beneficial environmental impacts against other environmental factors, such as landscape. Where it is possible that environmental impacts may occur as a result of the proposed change in land use, these would be minimised through sympathetic design and the application of the control measures set out in the Code of Construction Practice (CoCP) and the Outline Landscape and Ecology Management Plan. We do not expect there to be any impacts from the habitat creation works on noise levels or air quality. Draft versions of these documents were shared during the community impacts consultation and these will be updated to reflect the new compensation sites and included in our DCO application. Our assessments of the impact of planting of the compensation sites will be included in the Environmental Statement, which will also form part of our DCO application.

Further information on the habitat creation areas as detailed in chapter 5 is provided below.

Figure AP 1-5: Areas identified for compensation habitat creation

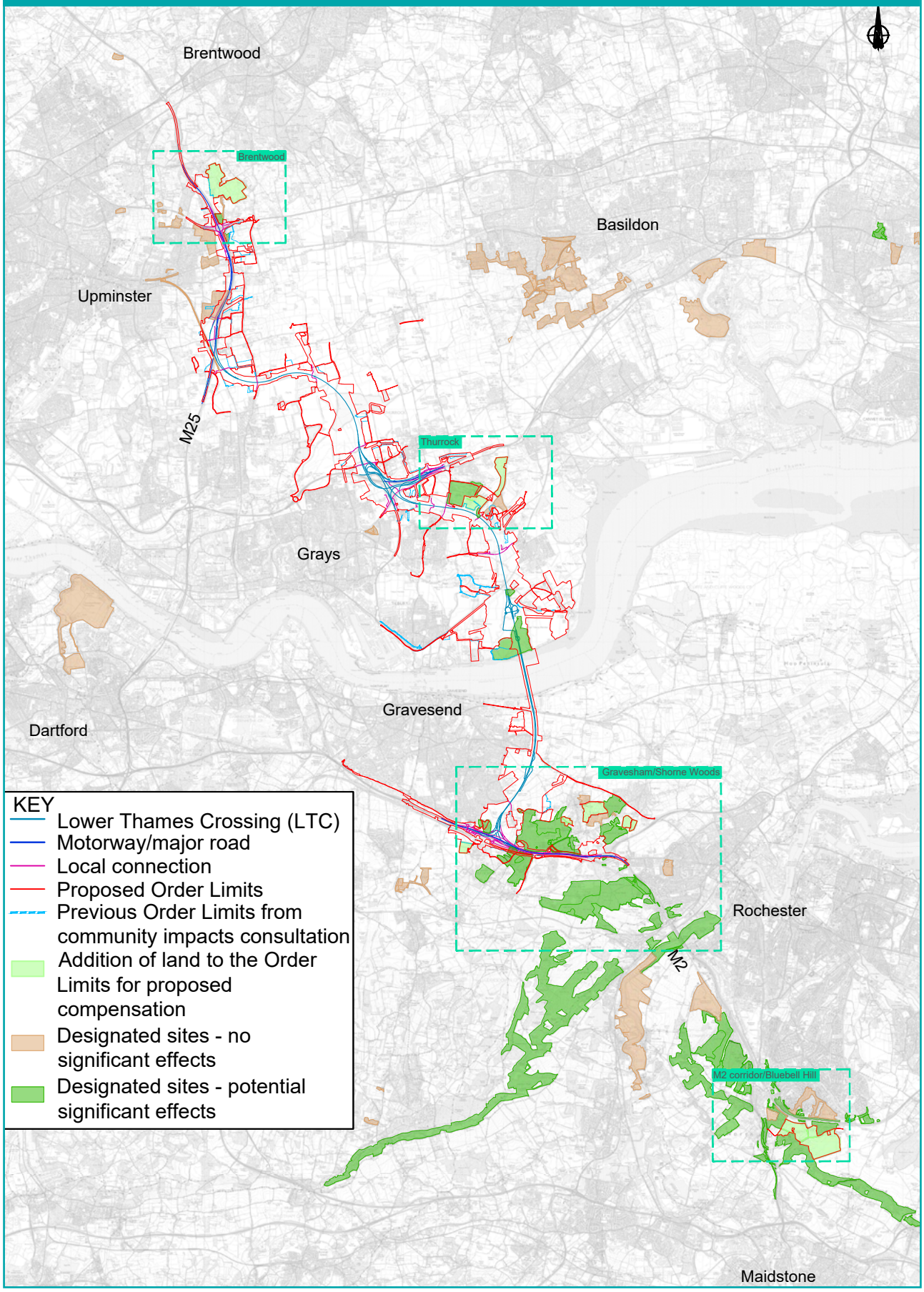
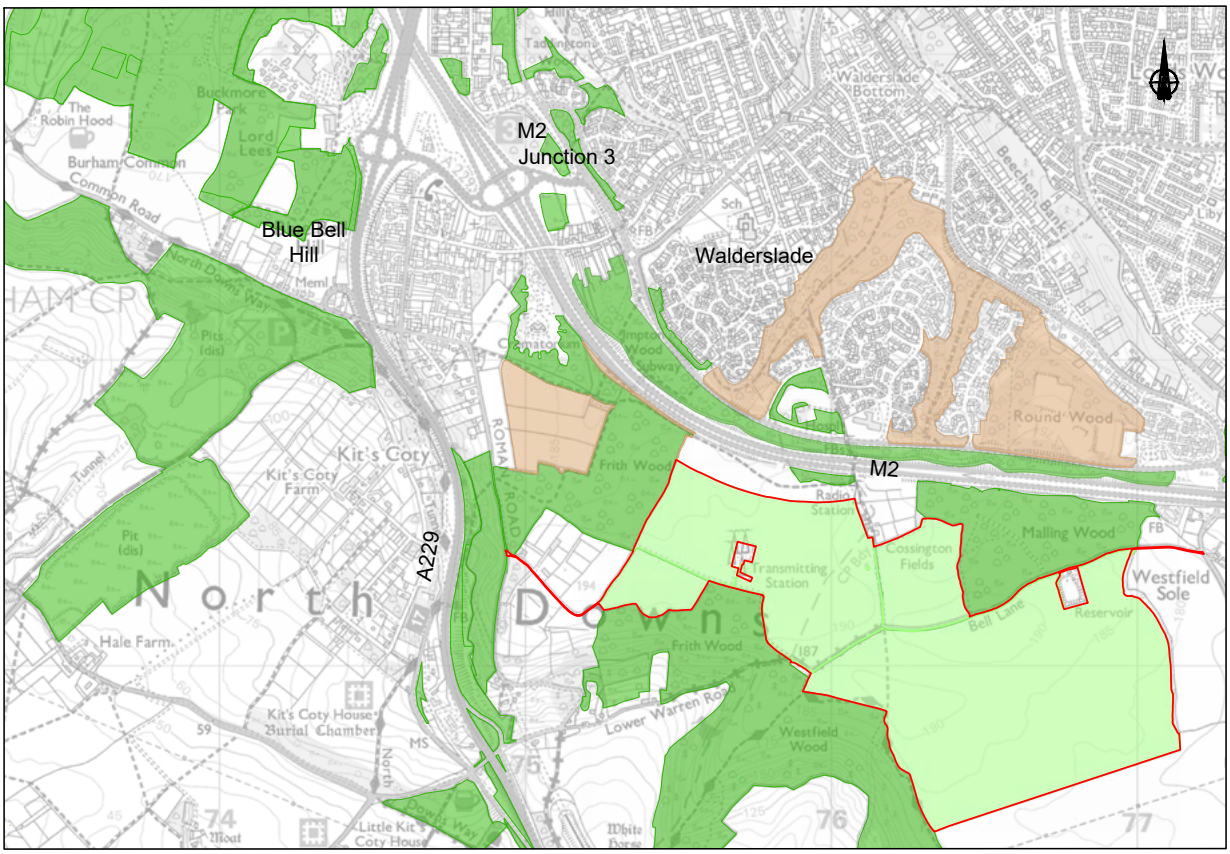


Figure AP 1-6: Proposed compensation land in the M2 corridor and Blue Bell Hill area



KEY

- Lower Thames Crossing (LTC)
- Motorway/major road
- Local connection
- Proposed Order Limits
- Previous Order Limits from community impacts consultation
- Addition of land to the Order Limits for proposed compensation
- Designated sites - no significant effects
- Designated sites - potential significant effects

Compensation area M2 corridor/Blue Bell Hill

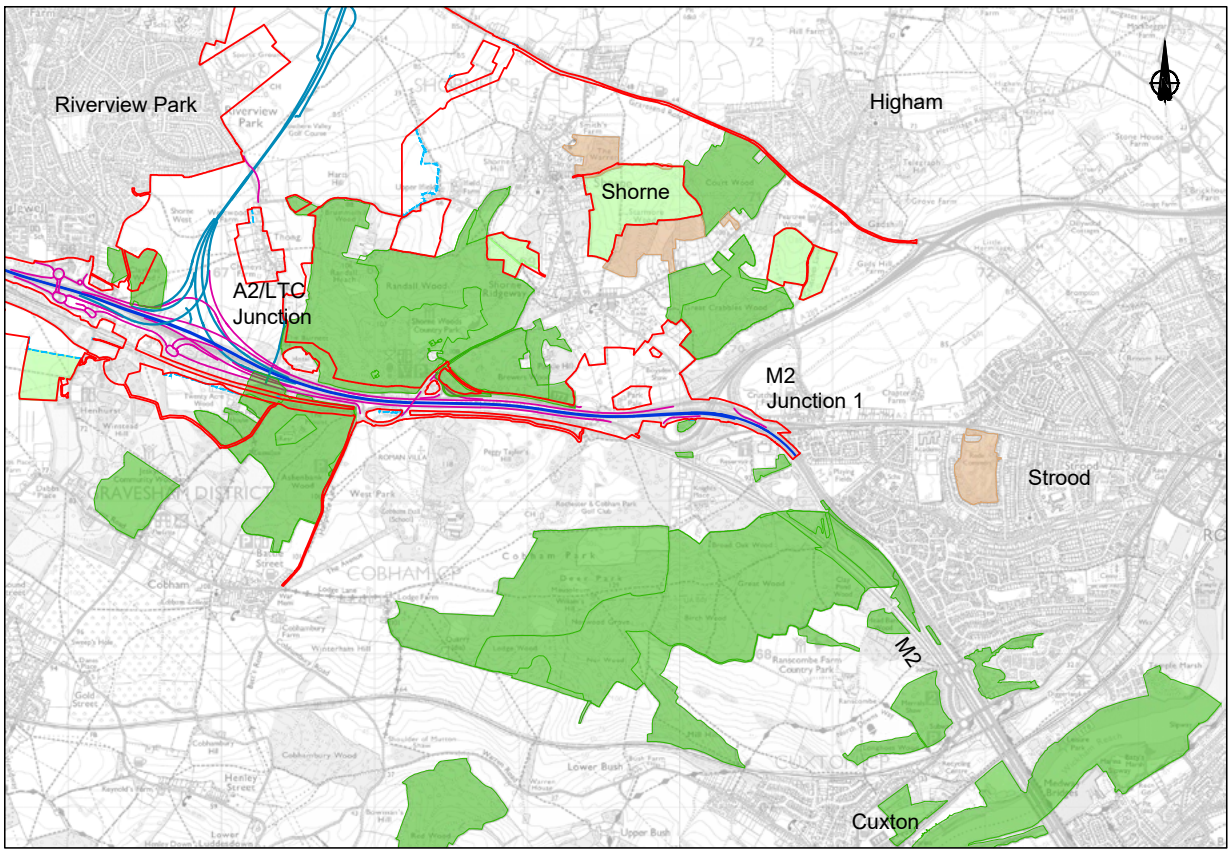
This is made up of four parcels of privately owned farmland totalling approximately 104ha and would form one large area for habitat creation. They have been identified due to their size and proximity to several affected designated habitats, as well as other designated sites that are not impacted by the Lower Thames Crossing. The number of these sites bordering this area, such as Frith and Westfield Woods, provides an opportunity to enhance ecological links, including to the North Downs Woodlands Special Area of Conservation. We would create mosaic habitats dominated by woodland but designed to enhance existing habitats.

The compensation area is located within Kent Downs AONB. This provides an opportunity to compensate for the effects of nitrogen deposition and provide wider ecological and biodiversity benefits for habitats and landscape along the M2/A2 corridor. It would also provide visual screening of an existing overhead powerline in the AONB.

Additionally, historic maps show that this currently farmed compensation area was wooded in the nineteenth century. This recent past means that, it would be more appropriate for woodland creation for both ecological and landscape reasons than other areas that have been cleared of woodland for longer.

Further work will also be carried out to identify potential opportunities for the compensation area to connect to the North Downs Way.

Figure AP 1-7: Proposed compensation land located in Gravesham/Shorne Woods



Compensation area Gravesham/Shorne Woods

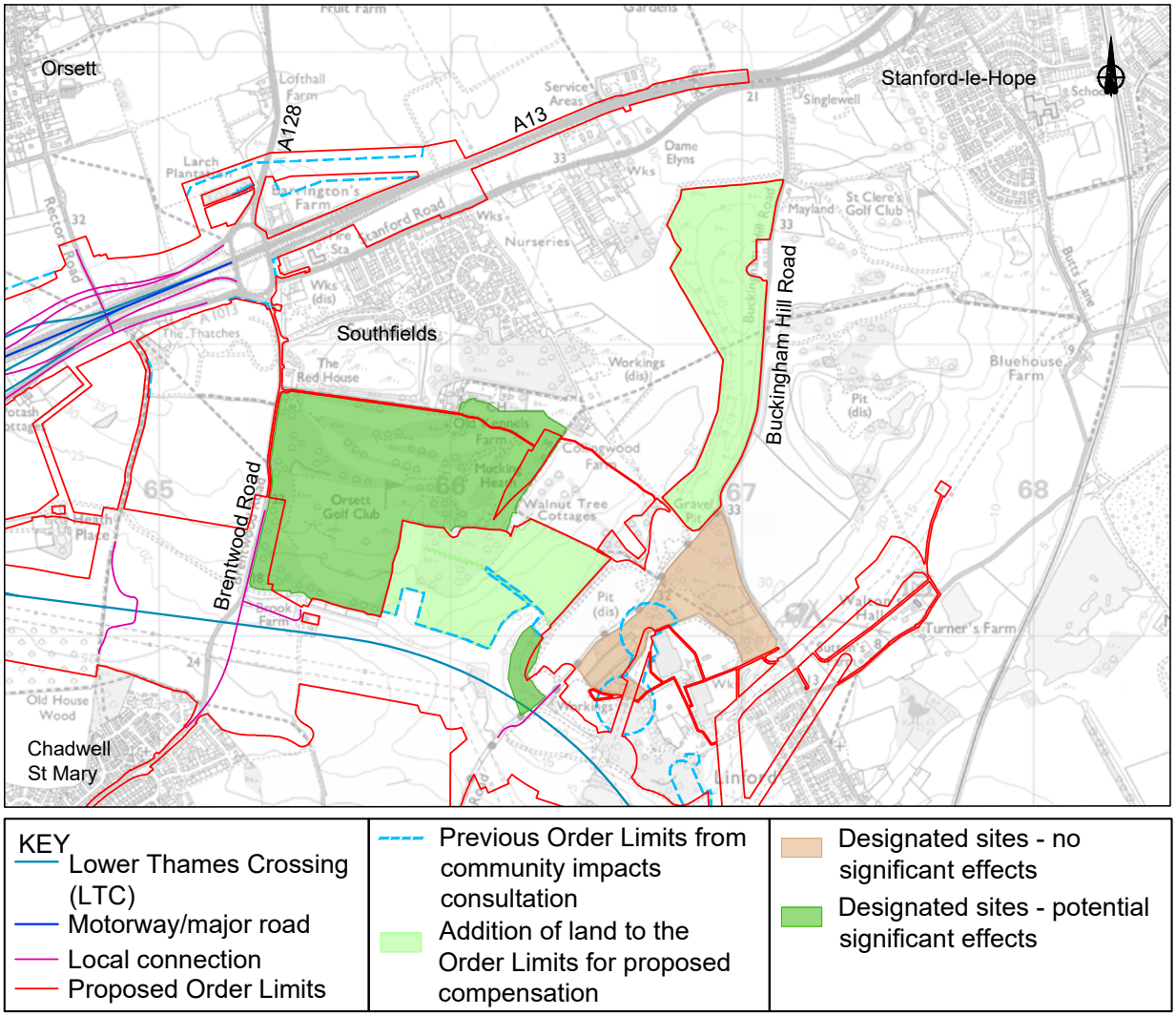
This compensatory area is made up of four parcels of privately owned land, as show in Figure AP 1-7. Together, they total approximately 55 ha. They have been identified due to their location in relation to affected habitats and their suitability to improve connectivity between existing habitats.

Creating new habitats here would reconnect existing woodland across the Shorne Woods area that has been subject to severance and isolation in the past. The parcels are also next to, or form part of, a wider approach to mitigation and compensation, with other areas to be planted as mitigation, for instance, for loss of ancient woodland. The combination of these parcels of land and other mitigation would comprehensively enhance habitats in this area through natural regeneration and targeted planting.

The northern proposals, located to the north of the A2, include three parcels of agricultural land totalling approximately 46 ha. These are next to Shorne and Ashenbank Woods SSSI, Great Crabbles Wood SSSI and ancient woodlands. The parcels of land would not create a single large area of new habitat but would link existing woodlands and habitats. They would be carefully designed, planted and managed to support and enhance the specific habitats within the adjacent woodlands.

The western site, which is currently farmed and located south of the A2, is close to Ashenbank Woods and totals approximately nine ha. This area has been identified due to its proximity to an impacted site and it is also next to woodland planting mitigation for the loss of ancient woodland. It would therefore provide ecological benefits, including improved links for existing habitats and the creation of a larger ecological area through mitigation and compensation. Its selection and planting would establish a mosaic of woodland in other habitats that enhances existing habitats and integrates with the landscape.

Figure AP 1-8: Proposed compensation land located in Thurrock



Compensation area Thurrock

Two parcels of land totalling approximately 45ha have been identified in Thurrock (see Figure AP 1-8) for compensatory planting. The eastern area of land shown on the map is publicly owned, whereas the area to the west is private farmland. Both are located to the south of the A13 in Southfields and are close to designated sites and existing woodland that are impacted by nitrogen deposition. Creating new wildlife-rich habitats would increase connectivity between existing habitats, which would be beneficial both ecologically and from a landscape perspective.

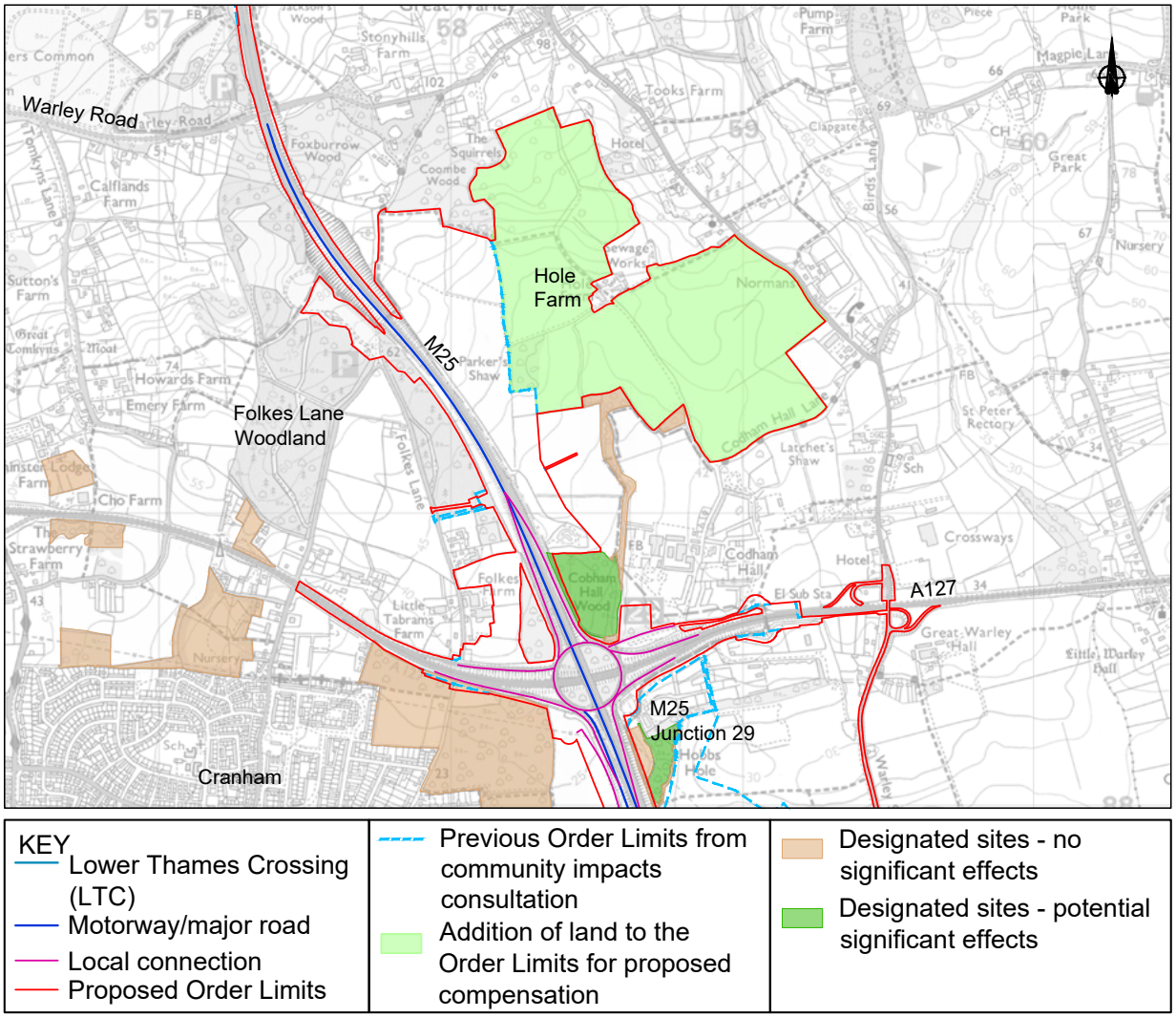
The privately owned site was identified as it is a farmed field next to an impacted habitat. We would use a combination of natural regeneration (where woodlands develop naturally from seeds that have fallen on the ground) and planting to create wooded areas next to existing ones that merge into more open habitats. To be sensitive to the valley landscape, these could include parkland featuring scattered trees in grasslands.

The eastern area is a brownfield site, formerly used for landfill, owned by Thurrock Council. It mostly consists of grassland with some sections of scrub. It was identified because:

- It would reduce the need to use further areas of farmland
- It would reduce the impact on other landowners and productive land
- It is in a good position for connecting habitats.

We would encourage the development of wildlife-rich habitats on this site by promoting natural regeneration, with targeted planting where necessary. Our proposals would need to carefully take into consideration any constraints from the site's former use as a landfill. Prior to any soil disturbance or vegetation removal, to prevent the potential disturbance of residual contamination appropriate risk assessments would be carried out. The Contractor undertaking the works would provide method statements for acceptance by National Highways and, if required, consultation with the Environment Agency before starting works.

Figure AP 1-9: Proposed compensation land at Hole Farm, located in Brentwood



KEY

- Lower Thames Crossing (LTC)
- Motorway/major road
- Local connection
- Proposed Order Limits
- Previous Order Limits from community impacts consultation
- Addition of land to the Order Limits for proposed compensation
- Designated sites - no significant effects
- Designated sites - potential significant effects

Compensation area
Hole Farm, Brentwood

Most of the Hole Farm site was purchased by National Highways in 2021 to deliver benefits for communities and the environment. Working in partnership with Forestry England and the wider Thames Chase Community Forest partners, the site was identified as providing an opportunity to create a new community woodland that would become part of the Thames Chase Community Forest network. This would build on the small proportion of the site adjacent to the M25 that was already needed by the Lower Thames Crossing to provide public open space replacement for works at Folkes Lane Woodland.

Following our assessments, we identified Hole Farm, which is currently used for agricultural purposes, as a location for compensatory habitat creation because it is close to Codham Hall Woods and other designated sites. It would also link with the existing woodlands that form part of the habitat network in this area. There is an existing farmhouse and paddock within Hole Farm which will be retained, and these are not included in our proposals for Hole Farm.

We are considering using up to 75ha of the Hole Farm site as compensatory planting to offset against the risk from impacts of nitrogen deposition caused as a result of traffic using the Lower Thames Crossing. Within these 75ha, we would convert the existing farmland to a woodland-dominated mosaic of wildlife-rich habitats through a combination of natural regeneration of habitats and planting.

This compensatory planting would form part of, and integrate with, the masterplan for the entire site that is being developed in partnership with Forestry England and the wider Thames Chase Community Forest partners. The masterplan will also include proposals for the facilities associated with a community woodland such as a tree nursery and a visitor centre. A period of community engagement to inform the development of the masterplan for the site is on-going and a public consultation on the proposals will be undertaken ahead of an application being submitted to Brentwood Borough Council to change the use of the site and create the required visitor facilities. It is proposed that these elements would be consented separately from the Lower Thames Crossing DCO application. The final amount of land within Hole Farm allocated to nitrogen deposition compensatory planting will align with the aspirations, and masterplan, for the overall site.

Ongoing work

This document has recorded the work we are doing to address the potential risks to nearby habitats from nitrogen deposition from traffic using the Lower Thames Crossing. It explains our work in progress and our current thinking about the right approach to mitigation and compensation. We have more assessments to carry out but the feedback from this consultation will inform the approach that we submit and secure as part of our DCO application.

Our work includes:

- Refinement of assessments based on finalised traffic and air quality modelling
- A decision on whether to implement additional speed enforcement on the M2 between junctions 3 and 4, followed by further development of these proposals, which would be informed by the responses to this consultation and site surveys
- Further development and refinement of the proposals for compensation measures, informed by the responses to this consultation, including:
  - desk-based assessments and site visits to collect further information on constraints affecting potential compensation sites (such as utilities not previously identified) and opportunities (including connections to existing woodland or habitats of ecological value)
  - refining the proposed compensation areas
  - defining and agreeing overarching objectives and environmental design principles for each compensation area
  - outline design of the compensation areas, covering species mix, layout, maintenance and management requirements
- Ongoing engagement with stakeholders, including landowners, throughout the development of our mitigation and compensation proposals
- Development of the habitat management fund if it is considered necessary to complement the new habitat creation. This includes further measures to address specific impacts that may not be fully compensated through the new habitat creation.

Design and assessment

Our assessments of the impact of nitrogen deposition on ecological habitats and our proposals for mitigating and compensating for it will be included in the Environmental Statement and the Habitats Regulation Assessment that will form part of our DCO application.

The Order Limits presented in this consultation include the potential locations for compensation planting outlined above.

The location of the compensation areas will be shown in our DCO application and would, with the exception of Hole Farm, be the subject of compulsory acquisition powers, as a fallback measure should we be unable to reach an agreement with landowners. The location of the compensation areas will be presented in the Environmental Masterplan, which forms part of the Environmental Statement and the DCO application. The outline management and maintenance requirements will be presented within the Outline Landscape and Ecological Management Plan, which details the proposed management of the landscape and ecological elements of the Lower Thames Crossing. A draft copy of the Outline Landscape and Ecology Management Plan was consulted on during our community impacts consultation. It will be further developed with additional detail for our DCO application. Furthermore, all the new compensation areas would be subject to the requirements and controls set out in the DCO and associated documents.

The compensation proposals that are currently being assessed and refined will be included within the EIA and reported within the Environmental Statement. This will cover environmental assessments of any potential effects on cultural heritage, landscape and visual, terrestrial biodiversity, soils and other relevant topics if required following desk-based assessments and site visits. If the ongoing work confirms that the mitigation measures are to be progressed, these will also be included within the Environmental Statement.

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Please submit your response by

23:59 on 20 June 2022

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